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WHAT'S AHEAD IN SERVICE RESEARCH?

New perspectives for business and society

Tiziana Russo-Spena and **Cristina Mele**

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WHAT'S AHEAD IN SERVICE RESEARCH

NEW PERSPECTIVES FOR BUSINESS AND SOCIETY

NOTES FROM CHAIRS

From September 7-10, 2016 the Department of Economics, Management and Institutions hosted the **XXVI RESER conference** with about 150 participants from different continents.

Service research has been a focus of Department of Economics, Management and Institutions, since its inception. We are proud that the Department has established the 2016 Conference aimed at fostering more systemic and integrative research approaches on service science.

RESER (The European Association for REsearch on SERvices) is a network of research groups and individuals active in service research and policy formulation, mainly located in European countries. The Association was established in 1988, at a time when knowledge of service employment and industries was scarce and there was a limited understanding of the role of services in economic, business and social restructuring. The specific strength of RESER conferences has been their multidisciplinary nature.

The **RESER 2016 Conference** aims to capture frontier thinking in service research and to set a new research agenda to make sense of the full picture of economies and society as complex networks and systems of services. The challenge for service scholars in the 21st Century is to contribute to the understanding of the economics and society. The new millennium brings a new complexity of systems, interactions, networks, technology and social issues to the core of developed and developing economies and societies and the need of rethinking the relationships between businesses, organizations and public actors.

On September 7th, a doctoral workshop took place with the guidance of Prof. **Eric Arnould** (Aalto University) and Prof. **Anu Helkkula** (Hanken, University). Doctoral students gave presentations of their dissertation projects and received feedback as well as insights from senior scholars. Prof. Helkkula and Prof. Arnould also gave a speech on how to structure a research proposal and thesis.

On September 8th, the conference started in the morning and participants received their conference package from the famous Italian company (and conference sponsorship) Carpisa. The conference has the patronage of Italian Association of Management (SIMA), Italian Marketing Association (SIM), Italian Academy of Business Economics (Aidea), Sinergie (Italian Journal of Management) and other institutions at national and regional levels. Sponsors of the conference also include other primary firms and organizations from different industries: Carano Costruzioni, Consorzio DataBenc, Gelatosità, Harmont&Blaine, RossoPomodoro, RelationatWork and SMSengineering.



On behalf of the conference committee **Patrick Storm**, RESER President welcomed all participants and acknowledged the opportunity to have the conference in the South of Europe and in Italy, with the hope to widen the RESER community

The co-chairs **Tiziana Russo-Spena** and **Cristina Mele** welcomed participants and prompted the need to promote a constructive dialogue as well as cooperation among service scholars from different countries and disciplines for the development of service science.

After the welcome session on Saturday morning, Eric Arnould, Professor of Marketing at the Aalto University Business School, gave a keynote speech on 'Two Neglected Cultural Constructs for Service Research', arguing from an anthropological perspective, that service research still adopts a rather mechanistic conception of culture that limits its contributions. Adding enriched cultural constructs to service research creates opportunities to contribute to other conversations. Drawing from two different empirical studies, his intervention addresses two aspects of culture. One is to do with mutuality or what some might call consociality. These are labels for the binding ties of mutual qualification that affect the service encounter. The other is the cultural templates for action and interpretation. Of necessity, these templates, or heuristics and routines, organize the practices that service researchers gloss as resource integration.

The RESER 2016 Conference was organized around seven main themes concerning:

- 1) service ecosystems;
- 2) smart technologies and service innovation;
- 3) well-being and value (co)creation;
- 4) service innovation in emerging markets;
- 5) internationalization and geographies of services;
- 6) market creation in service research;
- 7) methodological challenges in service studies.

In the parallel sessions participants heard how important for the current service research is for contributing to broadening scientific conversations about social, business and technology issues. Participants listened to about service ecosystems and well-being as two important social scientific constructs at the basis of the service research in the next future. Speakers told participants about the challenges of new internationalization trends, with a special focus on emerging and developing countries. They also focused on the role of service innovation in emerging markets and how social innovation constructs include new social-business models as well as new practices.

On September 9th, special invited speakers from key leader service firms have animated the debate of the Executive Roundtable focusing on the new emerging technologies of Internet of things (IOT) and Internet of Everything (IOE) and how they are transforming industries, markets and society.

Concerning the social events, the conference welcome and dinner took place at two beautiful locations. On September 8th, the Welcome Dinner was held at Pizzeria Rosso Pomodoro, that offered, Neapolitan pizza in a waterfront setting of the Naples Bay.

On September 9th, The Gala Dinner at lovely seafront Royal Hotel Continental Royal – Sala Posillipo delighted the attendees with an amazing view on Castell dell'Ovo and the tasting of many Neapolitan specialties.

During the Gala dinner the award ceremony took place. The RESER lifetime awards were given to Prof. **Jean Philippe** from University of Paul Cézanne Aix Marseille and to Prof. **Pierre Yves Leo** from Aix-Marseille-Université, France, for their achievement in Service Research.

One grant “RESER founders award” for supporting PhD students (500€) was awarded to Michel Becker who won the competition for the best PhD paper presented at the 2016 RESER Conference.

On 10th September, the closing social event at the National Archaeological Museum of Naples provided participants with a breath taking journey into the ancient past of human history

Being the host of RESER has been a great experience. It was great to hear that participants enjoyed the service level and gave us wonderful comments as the following one.

“My experience of RESER 2016 in Napoli is excellent!

It is not only due the quality of the program, related discussions and social events but also due to the “ease” and high level of event management. Everything well went on so smoothly! I am aware how much effort, collaboration, patience and coordination was put into such undertaking and its outcome. My congratulations first of all to Tiziana and Christina, but also to the administrative staff and group of students that were always around to help with a smile on their face!”

Table of Contents

CALL' CENTRES TO 'CONTACT' CENTRES: SHIFTING PARADIGMS OF CUSTOMER SERVICE SYSTEMS AND RESEARCH.....	1
<i>Vishal Parikh</i>	
A COHERENT SET OF CUSTOMER EXPERIENCE FACTORS FOR THE DEVELOPERS OF INDUSTRIAL PRODUCT SERVICES.....	20
<i>Carsten Droll, Saed Imran, Miriam Sämann, Christian van Husen, Dieter Haeberle, Abdul Rahman Abdel Razek</i>	
A COMPARATIVE CASE STUDY OF CULTURE-BASED REGENERATION PLANS OF CITIES. STRATEGIC EVIDENCES AND BEST PRACTICES.....	29
<i>Cirillo Nicola</i>	
A DIVERSIFIED STRATEGY TO MODERNIZE A PUBLIC SERVICE BY ASSOCIATING USERS: THE CASE OF THE CAF (FAMILY ALLOWANCES ORGANIZATION) YVELINES (ILE-DE-FRANCE).	45
<i>Christian Bourret, Elodie Clair, Murielle Dassonville, Laura Suzzoni</i>	
A NOTE ON SERVICES IN THE EUROPEAN UNION REGULATIONS: IS DIGITAL CONTENT A SERVICE?	55
<i>Damien Broussolle</i>	
BUILDING LEGITIMACY FOR ENTREPRENEURIAL INNOVATIONS IN HEALTH SERVICE ECOSYSTEM: AN INSTITUTIONAL APPROACH.....	76
<i>Arto Wallin</i>	
CHALLENGES AND BENEFITS OF DEVELOPING A SERVICE-ORIENTED BUSINESS MODEL IN SMALL FIRMS – A CASE STUDY FROM FINLAND.....	84
<i>Helen Reijonen, Raija Komppula, Henna Kokkonen, Harri Ryyänen</i>	
CHANGES IN THE INTELLECTUAL STRUCTURE OF SERVICE INNOVATION AND SERVICE SYSTEM IN THE DIGITAL AGE: AN INTERDISCIPLINARY ANALYSIS FROM 1986 TO 2015.....	103
<i>Silva-Morales Milena J.</i>	
CO-CREATING AN EVENT THROUGH SOCIAL NETWORKS. A DIFFERENT EVENT PLANNING STRATEGY.....	138
<i>Maddalena Tammaro</i>	
CO-CREATING WELL-BEING SERVICES IN ECOSYSTEMS: TWO CASE STUDIES.....	149
<i>Pöyry-Lassila, Päivi, Kantola, Tarja, Noso, Marika, Pohjonen, Soile, Meristö, Tarja, Lankinen-Lifländer, Merja</i>	
CONCEPTUALIZING RESOURCE INTEGRATION IN VALUE CO-CREATION USING THEORIES OF MOTIVATION.....	165
<i>Rolf Findsrud, Bård Tronvoll, Bo Edvardsson</i>	
CONNECTING SMART TECHNOLOGIES AND ECOSYSTEMS THROUGH	

THE INTERNET OF THINGS.....	183
<i>Amitrano CC., Tregua M. , Bifulco F.</i>	
COUPLING MECHANISM AND INFLUENCE PATH OF PRODUCER SERVICES AGGLOMERATION ON MANUFACTURING UPGRADE: PLS-SEM ANALYSIS OF CHINA’S ABOVE PREFECTURE LEVEL CITIES.....	201
<i>Liu Yi</i>	
CREATING SERVICE EXPERIENCE IN DIGITAL BUSINESS.....	226
<i>Tero Rantala, Juhani Ukko, Minna Saunila, Hanna Puolakoski, Hannu Rantanen</i>	
DEVELOPING A SCALE TO MEASURE EMOTIONAL RESPONSES TO BUYING COMPLEX SERVICES: A CASE OF OCCUPATIONAL DISABILITY INSURANCE.....	242
<i>Lisa Muetzel, Thomas Kilian, Gianfranco Walsh</i>	
DIGITAL MARKETING INNOVATIONS AND THEIR ROLE IN SERVICE ECOSYSTEMS, THE EXCHANGE OF VALUE AND SOCIAL IMPACT.....	259
<i>Signori P., Flint D.J.</i>	
DIGITAL SERVICE INNOVATION AND SMART TECHNOLOGIES: DEVELOPING DIGITAL STRATEGIES BASED ON INDUSTRY 4.0 AND PRODUCT SERVICE SYSTEMS FOR THE RENEWAL ENERGY SECTOR	274
<i>Peter Weiß, Bernhard Kölmel, Rebecca Bulander</i>	
DIGITALIZATION AND BIG DATA SUPPORTING RESPONSIBLE SERVICE BUSINESS CO-EVOLUTION	292
<i>Mikko Mäntyneva, Vesa Salminen, Heikki Ruohomaa</i>	
DO YOU SEE WHAT I SEE? WEB APPLICATION AS A METHOD FOR CREATING A SHARED CONTEXT IN EMPLOYEE-DRIVEN INNOVATION.....	303
<i>Katriina Lahtinen, Marika Järvinen</i>	
ECONOMIC IMPACT OF HEALTHCARE SYSTEMS: AN INTER-COUNTRY INPUT-OUTPUT APPROACH.....	317
<i>José Luis Navarro Espigares</i>	
EDUCATING THE FUTURE GENERATION OF SERVICE INNOVATORS IN EMERGING MARKETS: A TALE FROM THE LAND OF 10000 LAKES.....	338
<i>Marco Ferruzca, Päivi J. Tossavainen, Virpi Kaartti</i>	
ENABLING A RESOURCE INTEGRATION PRACTICE THROUGH THE CROWD.....	351
<i>Maria Colurcio, Monia Melia, Angela Caridà, Stella Carè</i>	
EVALUATING LEARNING DISABILITY CASE MANAGEMENT FROM A SERVICE DELIVERY NETWORK PERSPECTIVE.....	367
<i>Mark Spurrell, Luis Araujo, Nathan Proudlove</i>	
ENVISIONING POTENTIAL VALUE CREATION THROUGH MANAGING RESOURCE BECOMING.....	387
<i>Mikael Gidhagen</i>	
FIFTEEN ADVANCES AND FIFTEEN CHALLENGES FOR SERVICE INNOVATION STUDIES.....	390

Faridah Djellal and Faïz Gallouj

FORMES, TRAJECTOIRES D'INNOVATION DES NOUVEAU MODELES DE CROISSANCE ET ROLE DES SERVICES: LE CAS DE L'ECOLOGIE INDUSTRIELLE ET DE L'ECONOMIE DE FONCTIONNALITE.....425

Merlin-Brogniart Céline

FROM CHANNEL MANAGEMENT IN SALES AND DISTRIBUTION TO CO-EVOLVING SERVICE ECOSYSTEMS.....439

Katariina Palomäki, Katri Valkokari, Taru Hakanen

FROM CUSTOMER VALUE TO CUSTOMER WISDOM – MANAGING AND MEASURING CUSTOMER VALUE CO-CREATION IN DIGITAL SERVICE SYSTEMS.....454

Juhani Ukko, Minna Saunila, Tero Rantala

HOLISTIC SERVICE DEVELOPMENT IN THE PUBLIC SECTOR– CASE STUDY FROM FINLAND.....471

Maria Laukkanen, Raija Komppula

HOW DOES INNOVATOR'S DNA WORK IN SERVICE SYSTEMS FOR NEW ENTREPRENEURSHIP ACCELERATION?482

Luigi Cantone, Pierpaolo Testa, Giacinto Dario Di Sarno

HOW HUMAN RISK COULD LEAD TO VALUE DESTRUCTION IN SERVICES: AN EXPLORATORY STUDY ABOUT OCCUPATIONAL STRESS IN THE SWISS WEALTH MANAGEMENT SECTOR.....492

Magali Dubosson, Emmanuel Fragnière, Marilyne Pasquier, Cyrille Reynard

ICT AND NEW SERVICE EXPERIENCE IN ITALIAN INSURANCE INDUSTRY512

Antonio Coviello, Giovanni Di Trapani

INFINITY SOURCE OF INNOVATIVE SERVICE519

Leisa Cristina Sena Moreno

INFLUENCE OF INSTITUTIONS IN RESOURCE INTEGRATION AND VALUE CREATION IN A MULTI-LEVEL CONTEXT OF SERVICE ECOSYSTEMS.....528

Luís Castro Ferreira, João Menezes

INTERNATIONALISATION THEORY PERSPECTIVE OF PRODUCT-SERVICE INNOVATION: THE GÖTHEBORG IV MODEL.....544

CherylMarie Cordeiro

IT PROFESSIONAL SERVICES: MANAGING CUSTOMIZATION SERVICES IN THE HYBRID SOFTWARE BUSINESS.....558

Matthias Bertram, Mario Schaarschmidt, Harald von Korflesch

LEAN HEALTHCARE MAY ENDANGER SUSTAINABLE PERFORMANCE IMPROVEMENT, IF SERVICE DOMINANT LOGIC APPROACH IS EXCLUDED.....577

Laura Castrén

LEVEL OF SMARTNESS IN URBAN CONTEXTS: OPEN ISSUES IN MEASUREMENT590

Amitrano C.C., Bifulco F.

MARKET DYNAMICS: A COMPLEX ADAPTIVE SYSTEM VIEW604

Roberto Bruni, Luca Carrubbo, Ylenia Cavacece, Maria Di Muro

MARKETS AS EVOLVING INSTITUTIONAL PROBLEM-SOLUTION CONFIGURATIONS.....618

Kaisa Koskela-Huotari Per Skålen

MINTZBERG'S STRATEGY CONTINUUM: A SERVICE SCIENCE PERSPECTIVE.....628

Author: Muhammad Mukarram

MULTIPLE CORRESPONDENCE AND CLUSTER ANALYSES FOR AN IN-DEPTH LITERATURE REVIEW ON SERVICIZATION.....640

Alessandro Augurio, Laura Castaldi

MUNICIPAL SERVICES IN THE FRAMEWORK OF LA21: A COMPARISON BETWEEN NORWAY AND SPAIN.....651

José Luis Navarro Espigares, Marcus Buck, Guillermo Maraver Tarifa, José Aureliano Martín Segura, Tor Midtbø, César Pérez López, Mari Ann Saethre

NARRATIVES ON VALUE EXPERIENCE THROUGH ACTIVITIES OF AN INDIVIDUAL'S WELL-BEING.....676

Minna Lappi, Saara Pekkarinen

NEW TRENDS FOR SERVICE ECO-SYSTEMS ANALYSIS, A 'SUSTAINABLE' APPROACH. IMPLICATIONS FOR DESTINATION MANAGEMENT.....691

Marco Tregua, Luca Carrubbo, Francesca Iandolo, Silvia Cosimato

PERSPECTIVES ON VALUE-IN-USE IN SERVICE RESEARCH.....713

Gustav Medberg, Johanna Gummerus, Marco Tregua

PROFILING CULTURAL TOURISTS. THE CASE OF HIGH TECHNOLOGY CULTURAL DISTRICT IN NAPLES.....726

Valentina Della Corte, Giovanna Del Gaudio

PUBLIC INNOVATION IN THE DIGITAL ERA: NEW OPPORTUNITIES FOR MULTIDISCIPLINARY COLLABORATION AND CITIZEN EMPOWERMENT.....739

Johanna Leväsluoto, Kirsi Hyytinen, Marja Toivonen

PUBLIC SERVICE INNOVATION: A PUBLIC SERVICE DOMINANT LOGIC VIEW.....756

Per Skålen¹, Marit Engen, Peter Magnusson, Linda Bergkvist, Jenny Karlsson

RESERVATION OF PEOPLE-PROCESSING SERVICES: WHAT DOES DIGITIZATION CHANGE?771

Mario Schaarschmidt, Bjoern Hoeber, Harald F.O. von Kortzfleisch

REVIVING DIY: THE IMPORTANCE OF DO IT YOURSELF TO THE PORTUGUESE ALTERNATIVE ROCK SCENE.....789

Ana Oliveira, Paula Guerra, Pedro Costa

SERVICE DOMINANT ARCHITECTURE BASED ON S-D LOGIC FOR MASTERING DIGITAL TRANSFORMATION: THE CASE OF AN INSURANCE COMPANY.....807

Markus Warg, Peter Weiß, Ronald Engel, Andreas Zolnowski

SERVICE ECOSYSTEMS AS FRAMEWORKS TO ELABORATE SUSTAINABLE FUTURES.....	827
<i>Päivi Pelli</i>	
SERVICE FIRM INNOVATION: DISAGGREGATED CLASSIFICATION ANALYSIS FOR MÉXICO.....	840
<i>Zagaceta, J.C.</i>	
SERVICE INNOVATION DRIVEN ENTERPRISES IN EMERGING MARKETS: A CONTEMPORARY NEW INSIGHT OF FIRMS IN DYNAMIC GLOBAL CONTEXT	861
<i>Amir Atarodian</i>	
SERVICE ORIENTATION AND TECHNOLOGY INNOVATION IN MUSEUM: MUSEO ARCHEOLOGICO NAZIONALE OF NAPLES CASE STUDY.....	879
<i>Izzo F., Mustilli M., Sasso P., Solima L.</i>	
SERVICES CO-CONSTRUCTION IN THE FRENCH HEALTHCARE SYSTEM WITHIN PATIENTS' DIGITAL USES - AN APPROACH THROUGH SOME INFORMATION PLATFORMS	889
<i>Thérèse Depeyrot-Ficatier, Christian Bourret, Claudie Meyer</i>	
SERVITIZATION IN ITALY: EVIDENCES FROM THE LAZIO REGION.....	909
<i>Luna Leoni</i>	
SHARING THE PIE – AN EMPIRICAL EXAMINATION OF REFERRAL REWARD SHARING ON PEER-TO-PEER PLATFORMS.....	925
<i>David Dose, Gianfranco Walsh</i>	
SMART TOOLS AND SERVICE OPPORTUNITIES FOR CHILD PROTECTION ECOSYSTEM IN THE FUTURE: CASE FAMILY VIEW.....	939
<i>Tarja Meristö, Tarja Kantola, Merja Lankinen-Lifländer</i>	
SOCIAL INNOVATION AND THE ENVIRONMENT: HOW DO SOCIAL INNOVATIONS ADD TO CHANGE TOWARDS SUSTAINABILITY?	954
<i>Doris Schartinger</i>	
STRATEGIC MATTERS OF THE CUSTOMER CO-CREATION IN SERVICE INNOVATION.....	972
<i>Liudmila Bagdoniene, Gintare Valkauskiene</i>	
SUSTAINABILITY REPORTS BY SERVICE SECTOR COMPANIES IN THE DECADE OF CLIMATE CHANGE.....	987
<i>José Aureliano Martín Segura, César Pérez López, José Luis Navarro Espigares</i>	
SUSTAINABLE TOURISM AND THE MATERIALITY OF ACCOMMODATION SERVICES.....	1007
<i>Yuli Volpi; Sônia Paulino</i>	
SYSTEMATIC INNOVATION AND SERVICE OFFERING DEVELOPMENT IN A KNOWLEDGE-INTENSIVE PROJECT ORGANIZATION	1021
<i>Seppo Kuula, Erkkka Niemi</i>	
TECHNOLOGY AS A SERVICE ENABLER IN RETAIL ENVIRONMENTS.....	1038
<i>Stefan Wolpert, Angela Roth</i>	

THE CINDERELLA STORY – A SKILLED WORKER’S NEW CHANCE IN THE DIGITALIZATION OF SERVICES.....	1059
<i>Eveliina Saari, Sari Käpykangas, Mervi Hasu</i>	
THE CORE TASK APPROACH TO MODELLING THE DYNAMICS OF VALUE CO-CREATION AND INNOVATION ACTIVITY.....	1072
<i>Inka Lappalainen, Maaria Nuutinen</i>	
THE CUSTOMER EXPERIENCE... IS THERE AN APP FOR THAT? A CONCEPTUAL UNDERSTANDING OF THE CUSTOMER EXPERIENCE WITH M-COMMERCE MOBILE APPLICATIONS.....	1088
<i>Graeme McLean , Khalid Al-Nabhani, Alan Wilson</i>	
THE EFFECTS OF VALUE CO-CREATION ON CONSUMER TRUST IN THE CONTEXT OF SERVICE FAILURES.....	1100
<i>Josieli Lazzarotto, Angela Caridà, Kenny Basso</i>	
THE MEDIATED EFFECT OF PSYCHOLOGICAL OWNERSHIP ON LOYALTY IN ACCESS-BASED CONSUMPTION: THE CASE OF CARSHARING	1112
<i>Natalia Sowik, Sven Henkel, Kira Hüsken,</i>	
THE MORE, THE MERRIER:CO-WORKING AS PRACTICAL EXPRESSION OF VALUE CO-CREATION IN SHARING ECONOMY.....	1130
<i>Orlando Troisi, Luca Carrubbo, Gennaro Maione, Carlo Torre</i>	
THE ORGANIZATION OF COMPANIES INVOLVED IN DRONE ACTIVITIES	1145
<i>Filomena Egizio, Claudia Russo</i>	
THE ROLE OF LEADERSHIP AND EMPLOYEE WELL-BEING IN ORGANIZATIONAL DIGITALIZATION.....	1159
<i>Riitta-Liisa Larjovuori, Laura Bordi, Jaana-Piia Mäkineniemi, and Kirsi Heikkilä-Tammi</i>	
THE ROLE OF META-ORGANIZATION IN THE PRIVATE REAL ESTATE MANAGEMENT. INTER-ORGANIZATIONAL DYNAMICS IN THE HISTORIC CENTRE OF NAPLES.....	1173
<i>Mariavittoria Cicellin, Stefano Consiglio, Riccardo Staffa</i>	
THE SERVICE EXPERIENCE MODELLING METHOD: AN INNOVATIVE THREE-LEVEL APPROACH FOR EFFECTIVE SERVICE MODELLING.....	1192
<i>Erik Kolek</i>	
THE SHARING ECONOMY: WHAT MAKES IT ATTRACTIVE FOR CONSUMERS? A PRELIMINARY STUDY IN THE CONTEXT OF HOSPITALITY SERVICES IN FRANCE.....	1213
<i>Daisy Bertrand, Fabienne Chameroy, Pierre-Yves Léo, Jean Philippe</i>	
THE STUDY ON NATIONALITY STRUCTURE OF SERVICES IMPORTS IN CHINA:BASED ON THE VALUE-ADDED TRADE ESTIMATION.....	1237
<i>Wenxiu Li, Yan Liu</i>	
THE VALUE (CO)CREATION AS PEAK OF SOCIAL PYRAMID.....	1250
<i>Polese Francesco, Caputo Francesco, Carrubbo Luca, and Sarno Debora</i>	
TOWARDS METHOD FRAGMENTS FOR SERVICE ENGINEERING.....	1267
<i>Michael Becker, Stephan Klingner</i>	

USER AS A NEW COMPONENT OF PRODUCTION: TYPOLOGY OF SERVICES FROM THE PERSPECTIVE OF THE LABOUR PROCESS.....	1286
<i>Leonel Corona-Treviño</i>	
USING DIGITAL CO-CREATION FOR INNOVATION DEVELOPMENT.....	1297
<i>Ruusa Ligthart, Jaakko Porokuokka, Krista Keränen</i>	
VALUE CO-DESTRUCTION IN THE SERVICE ECOSYSTEM: THE VOLKSWAGEN CASE.....	1307
<i>Cristina Mele, Mariarosaria Coppola, Tiziana Russo-Spena, Marco Tregua</i>	
WHAT'S NEXT IN BRAND MANAGEMENT? THE EFFECT OF BRAND AUTHENTICITY ON BRAND LOVE	1327
<i>Kira Hüsken, Sven Henkel</i>	

CALL' CENTRES TO 'CONTACT' CENTRES: SHIFTING PARADIGMS OF CUSTOMER SERVICE SYSTEMS AND RESEARCH

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This paper explores and compares the existing paradigm of 'call centres' as simplistic service functions underpinned by Taylorism with, the emergence of 'contact centres' as complex customer service systems. Such emergence has been briefly highlighted in the literature however, with little attention to the additional complexity and challenges on service design and delivery as a result of this shift. Through examination of literature and in-depth conversations with practitioners, the research has found that there is a further scope of exploration of contact centres beyond service delivery channels. Organisations have to re-consider service design and its implications on service management through fresh perspectives.

1. Background

Indeed, as the call for papers to 23rd Annual RESER Conference 2016 indicates, the shift from product-based business models to networked and service-based business model has led to the emergence of Service Ecosystems. Central to this emergence is the view of services as distinctive economic activity today, than just derivative of manufacturing (Burgess and Connell, 2005). Since the late 1990s, there has been a progressive structural transformation of modern economies. The contribution of services to the UK economy has increased from 46% in 1948 to 77% in 2015, whereas manufacturing has decreased from 42% to 10% in 2015 (ONS, 2016).

Consequently, there has been an emerging emphasis on service research. The last 15 years have been quite successful for service field to have benefited from combined efforts of both industry and academia leveraging exploratory opportunities for service scholars. The inter-disciplinary initiative called Service Science, Management and Engineering (SSME) by IBM Almaden Research Centre in 2004, is one of the prime exemplars of such efforts, followed by the increased visibility of service related communities of practice and specific conferences relating to service research. Such initiatives have not only established a platform for emerging service scholars like myself, but have also challenged the manufacturing led research agenda, from service scholars in the past.

Despite the velocity of growth in service activities and research, there is a view that research on services is still pre-mature and anecdotal. For example, Moussa and Touzani (2010:198) highlight in their review of service research of 18 years (from

1993 to 2010) that service research is still based on speculations than real facts. Also, they state that whilst the aforementioned inter-disciplinary efforts are appealing, they have also imposed further challenges in attaining consensus on terminologies and concepts within the service field. These are strong claims. I am of the belief that the very rationale of inter-disciplinary, multi-disciplinary or cross-disciplinary exploration of services has allowed better contextualization of services without which, it would always be a challenge to understand any service, given its fuzzy nature. Nevertheless, I am in partial agreement with their view about the anecdotal nature of service research, only because of the 'strategic drift' that exists between the industry practice and theory. In other words, academia has often not been able to keep pace with service innovations, market maturity and, practice, either due to the pace of the change itself or due to the inaccessibility of academia to the industry.

The purpose of this paper is to exemplify such 'strategic drift' in specific service environments, Call Centres through the preliminary findings of ongoing doctoral research. In particular, the paper discusses two key areas: one being the existing paradigm of Call Centres that are consistently reported and undermined as Taylorist organisations (Shankar and Kasturi, 2006; Hudson, 2011) and; Second, the emergence of contact centres as complex service systems of *customer service ecosystem* (please refer to the definition of contact centres later in this paper).

The paper is structured firstly, to narrate the existing paradigm of call centres and secondly, to narrate the emerging views in reference to contact centres. In particular, it highlights the similarities and contradictions between the two paradigms at high level, by discussing the findings in conjunction with inter/multi/cross disciplinary literature, and establish grounds for further analyses.

2. Call Centres

Taylor and Bain (1999) defined call centre as "a dedicated operation in which computer-utilizing employees receives inbound, or make outbound telephone calls, with those calls processed and controlled either by an automatic call distribution (ACD) or predictive dialling system".

Fundamentally, call centres are virtual set ups of what were traditionally the after sales service functions of manufacturing organisations, engaged in offering support post sales of products (Patelli et al. 2004). It encompassed activities such as customer care (e.g. administration and billing), technical support and other product-specific services (Goffin and New, 2001). After-sales services shared traditional characteristics of services, especially the heterogeneity and labour intensive nature. As a result of this, although necessary to business, they were often perceived as cost overheads due to high labour costs and hence, high cost to serve (Lele, 1997).

2.1. Types of Call Centres

Today, Call centres span across a range of industries including travel, telecommunications, banking, energy utilities, and government administration (Bishop et al. 2003). Similar to Goffin and New (2001), Robinson, Kalakota and Sharma (2005) categorise five main activities of call centres namely, Account Administration, Marketing, Sales,

Technical Support and Customer Analytics. Further, these activities might be performed in isolation, as different call centre functions, or blended with one or more activities (multi-skilled call centres) (Gans et al. 2003).

Call centres are also classified on the basis of customer segment being served, that is, whether call centre is serving another business(es) (business-to-business) or retail or individual consumers (business-to-consumers) (Miciak and Desmarais, 2001). Call Centres are also distinguished according to their distance from the supply chain of parent organisation, such as in-house or outsourced or according to the geographical distance from the parent organisation, such as captives (in-house offshored) or off-shore-outsourced call centres, respectively (Metters, 2008).

Given the wide scope of Call Centres, their classification according to the industry, sector, activities, customer segments, or in terms of their geographical/organizational dispersion from the value chain of the firms, has been a continual challenge (Houlihan, 2001). As always been the case with services, "though classification schemes help in differentiating various categories of service, it is the nature of service operations that is still fuzzy" (Kasturi, 2004:21) and Call centres are no different. Nevertheless, the above discussion is summarized in Table 1 to propose comprehensive and inclusive classification of call centres using 7 key dimensions.

Table 1: Summary of Classification of Call Centres (Consolidated by the Author)

Dimension of Classification	Author(s)
The type of service delivery (e.g. inbound call handling, outbound call handling)	Taylor and Bain (1999) Brown and Maxwell (2002)
Type of customers being served (Business-to-Business or Business-to-Consumer)	Miciak and Desmarais (2001)
Industry of operation (e.g. consumer products, financial services, tourism/transport, remote shopping, telecoms, entertainment)	Brown and Maxwell (2002) Bishop et al. 2003
The type of activity performed or service provided (e.g. telemarketing, tele-banking, product sales, information service, account administration, billing and payments, after-sales technical support services)	Brown and Maxwell (2002) Robinson and Kalakota (2005) Goffin and New (2001)
Production models (Mass production, professional services, mass customization)	Batt and Moynihan (2002)
Single Skilled or Multi-skilled	Gans et al. (2003)
On the basis of outsourcing and offshoring	(Metters, 2008)

2.2. Current Narratives of Call Centres

In the last two decades, the literature on call centres research has been emerging and overwhelming. Whilst the discussion of *all* the narratives is out of scope for this paper, this section summarises two specific strands relevant to this study. Of these, call centres as modern exemplars of taylorism, is central to the themes discussed in the literature thus far.

Similar to after-sales, call centres have often been labelled as 'necessary evil' environments characterised by low-skilled, routinized work practices, designed using the principles of scientific management (Breathnach, 2000). Pioneered by Frederick

Winslow Taylor in the early 19th century, scientific management aimed at organisation of the tasks and workforce in the manufacturing environments by:

- Designing the work practice using scientific laws, that is most efficient and profitable to the employer;
- Train the workforce to learn the designed work practice;
- Monitor the workforce to ensure that the designed work practice is being adhered to and,
- Ensure equal division of work and labour to perform the designed work practice (Taylor, 1911).

In call centres, scientific management or *Taylorism* is evident in two forms: serving high volume of customers through standardised service delivery and, achieving managerial control over employees through de-skilling and monitoring (Peaucelle, 2000). The literature available on call centres extensively exemplifies the prevalence of Taylorism in call centres. Examples include standardisation of service processes through prescribed workflows and scripted conversations (Miciak and Desmarais, 2001), electronic surveillance of front line employees (Robinson and Morley, 2006), extensive activity based and skills based division of labour (Gray and Durcikova, 2005), real-time scheduling and forecasting of calls (Aksin et al. 2007) and, real-time measurement, monitoring and management of performance indicators (Dossani and Panagariya, 2005).

In addition, some authors have also intertwined Braverman's labour process theory and Foucault's conceptualisation of panopticon with Taylorism to emphasise the exemplification of intensive work organisation, de-skilling of workforce, and electronic surveillance in call centres (For example, see Fernie and Metcalf, 1998). As a result, call centres have been often labelled as *electronic sweatshops*, *battery farming*, *assembly line in the head*, or even *factories of the 21st century* (For example, see Shankar and Kasturi (2006) and, Hudson (2011)). Some have even gone as far as generalising this view, stating that all call centres are *the same*, sharing similar traits and characteristics, regardless of activity type, organisation, or sector (For example, see Breathnach, 2000).

A closely discussed theme with above, is the managerial implications associated with call centres as a result of above practices. Some of the prominent strands include quantity-quality conflict in call centres (Dean and Rainnie, 2009), human resource challenges such as coping with stress, burnout, emotional exhaustion and hence, high turnover of employees (Deery et al. 2010), managing resistance and counter-productive behaviours of employees as a result of taylorist practices (Mullholland, 2004), trade-union dynamics with call centres (Bain et al. 2002), and most importantly, managing service quality amidst above challenges (Jack et al. 2006).

The attributes of scientific management and its related advocates mentioned earlier are also seen as enablers of outsourcing and offshoring of call centres (Brown et al. 2011). Technological advancements and the power of computing have allowed organisations to reduce complexities imposed by heterogeneous service characteristics on service management, which restrained the measurability and tradability of services in the past (Bryson, 2007). Taylorism is vital instrument of standardization of performance based sourcing, which compounds cost benefits in addition to labour

arbitrage, cheaper infrastructure, and cheaper technology (Burgess and Connell, 2004). Thus, call centre services that are complex and non-standard could benefit from economies of scale and could be internationalized.

Outsourcing and offshoring implications have been of keen interest (especially the latter). To date, offshoring of call centres has been widely discussed exemplifying India (D'Cruz and Noronha, 2007), Ireland, Philippines, South Africa (Kinnie et al. 2008; Benner et al., 2007), and countries in Western and Eastern Europe (Connell and Burgess, 2006). Common themes include drivers and risks related to outsourcing and offshoring (Kakabadse and Kakabadse, 2002) decision making typologies of call centres outsourcing and offshoring (Lacity and Hirschheim, 1993), issues relating to different outsourcing contracts (Aksin, De Vericourt, and Karaesmen, 2006), and other region-specific issues in call centres (D'Cruz and Noronha, 2007). The managerial and human resource related issues discussed earlier, are also extended in context of outsourced and especially, offshored call centres too. Service quality issues as a result of language and cultural inefficiencies (Lewin and Peeters, 2006), customer resistance to offshoring (Sharma et al. 2009), in addition to the health and well being, and attrition (D'Cruz and Noronha, 2008) seems to be popular so far.

2.3. Anti-narratives of Call Centres

More than few exceptions to above have been reported in literature, questioning the homogeneous narrative of call centres. Firstly, there is a growing literature indicating that after-sales service are emerging to be more than just support functions and could be strategic differentiator, revenue generator and/or an brand fostering functions of organisation (Gaiardelli et al., 2008). Secondly and in specific reference to call centres, call centre services are emerging to be more than just 'necessary evil', and are emerging to be major point of contact for customers and source of revenue for businesses (Evensen et al. 1999).

Until recently, some authors have further challenged the current narratives by exemplifying certain activity types, such as technical support that require certain level of technical skills to manage transactions (D'Cruz and Noronha, 2007). Similarly, Russell (2004) challenged the homogeneity of call centres by exemplifying evidence of variations in certain industry specific call centres. More specifically, Koskina (2006) and Weinkopf (2006) indicated flexible and autonomous human resource management and operational management strategies in international call centres, respectively.

An array of activities is performed by call centres in various industries, which could be designed using different production models (Batt and Moynihan, 2002). Customer Service tasks can be knowledge intensive and hence, cannot always be deemed as low-skilled sweatshops (Shah and Bandi, 2003). There is also a shift, from scrutinising call centres using the philosophies of Taylor, Braverman and/or Foucault, to evaluating call centres using post-Taylorist philosophies (Piercy and Rich, 2009). However, these accounts are still in premature stages, and the evidence is limited. In addition, there is a growing evidence of firms' strategic view on outsourcing and/offshoring of call centres. For example, there are evidences of strategic considerations towards sourcing models, along with emphasis on relationship management, partner selection strategy and sourcing decision making, bearing in mind the process

specific complexities and managerial challenges associated with call centres (See Jeong et al.'s (2012) review on call centre offshoring research).

Amidst such exceptions is the proliferation of evidence of technological advancements and innovation in call centres. Smith (2009) suggested that majority of call centre literature discusses technological innovations and their impact on improving service processes and leveraging customer satisfaction in sweeping manner. However, until recently, there is an emergence of the literature discussing the technological changes in service provision and management through call centres. Of these, one of the key advancements that is of keen interest to this study is 'Contact Centres'. Therefore, it is imperative that contact centres are introduced before any other technological advancement are discussed in detail¹.

3. Contact Centres

In contrast to Call Centres, Contact centres are service functions or service organizations, where in service personnel interact with customers via telephony, and other web based technologies including e-mails, chat, fax (and now, social media) to provide information, support products, solicit new business, and myriad of other activities (Holland and Lambert, 2013). In specific reference to service systems,

"A contact center is a coordinated system of people, processes, technologies and strategies that provides access to information, resources, and expertise, through appropriate channels of communication, enabling interactions that create value for the customer and organization" (Cleveland, 2012:16)

As the reviewers of this paper accurately highlighted, the evolution from call centres to contact centres as complex service systems, has been (briefly) highlighted in the literature. However, most of the literature reviewed for the purpose of this research has highlighted the differences between call centre and contact centre at high level. In particular, the discussion is confined to the increase in number of channels through which services are being delivered by contact centre. While some authors have appraised contact centres as successors of call centres (For example see Calvert, 2001), the term 'contact centre' is still used synonymously to 'call centre' (Moberg et al. 2004; Chambel and Alcover, 2011). Even those authors that have highlighted the differences noticeably interchange the terminology in their work (For example, see Larner (2002)), thereby blurring the differences between the two.

Shah et al. (2007) have highlighted some of the key differences between the first generation call centres and, second and third generation contact centres, as illustrated in Figure 1. Whilst their attempt to this differentiation is quite fruitful, even their work has confusing and/or synonymous use of terminology.

¹ In doing so, the author has not dismissed the technological advancements and innovations that have been discussed under 'call centres'. However, the purpose of the paper is to provide a departure from the term 'call centres' to 'contact centres' for future research.

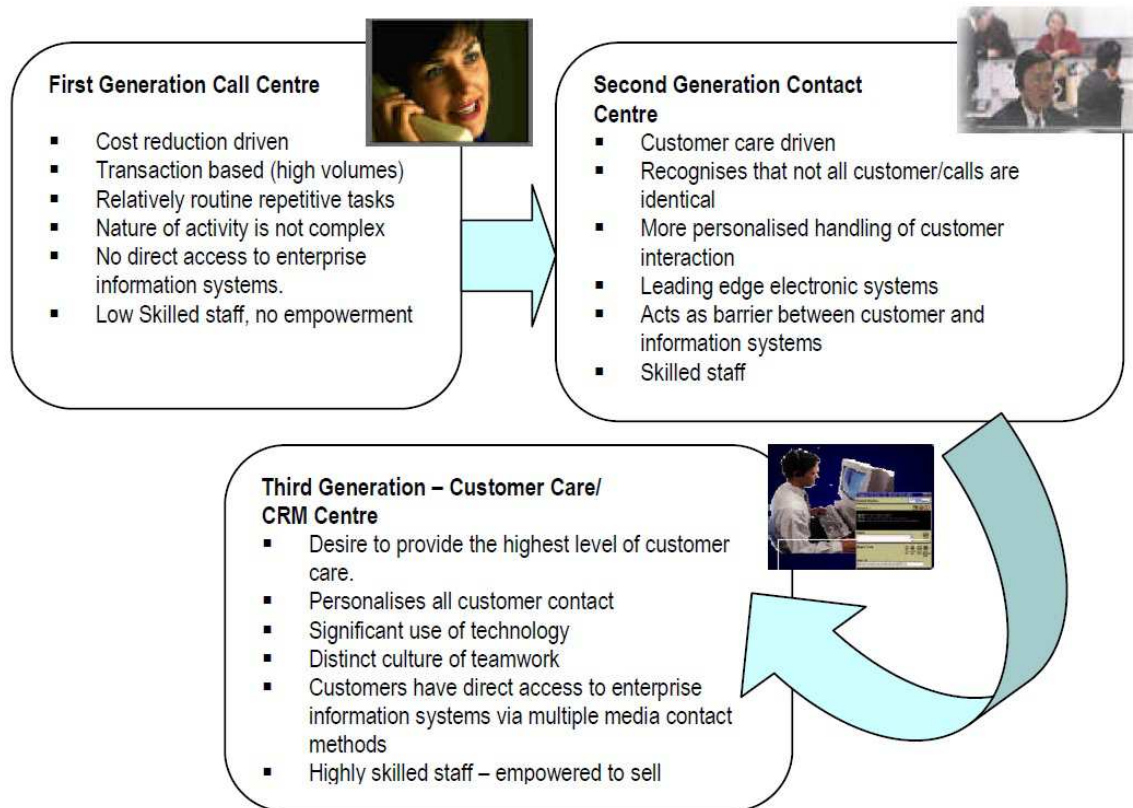


Fig. 1: Shift from Call Centres to Contact Centres (Shah et al. 2007)

The above illustration indicates the strategic shift in the role of call centres from being a cost-centric function aiming to turnover high volume of transactions, to a sophisticated customer centric centre, aiming to create and manage personalized relationship with the customers. Beyond the strategic shift, Shah et al. (2006) has also emphasised on heterogeneity and complexity in the transactions, and that unlike call centres, contact centres require skilled staff to manage these transactions.

Whilst Shah and his colleagues have summarised the last 20 years of call centres' journey to contact centres succinctly, they have only discussed these differences at high level with little elaboration and/or exemplification of such service environments or the features of each generation as illustrated above.

Call centres and contact centres both, are technologically driven (Smith, 2009). Technologies such as call routing technologies, Customer Relationship Management (CRM) systems, Knowledge Management systems and Interactive Voice Response (IVR) systems have existed in call centres for quite some time now, and are commonly found in contact centres too. Besides the move from singular channel service provision to multi-channel, the literature on technology and innovation is slowly progressing towards the current innovations in industry, which are still associated to call centre than contact centre. Some of the very recent examples include the adoption and implementation of Customer Relationship Management (CRM) systems in call centres (Abdulateef et al. 2011), use of data analytics and big data in improvement of business processes (Vera-Baquero et al. 2014), and implementation of social media, mobile, analytics and cloud services (SMAC) in call centres (Jayaraman and Mahajan, 2015). The evidence of these developments is sparse, although promising in the literature.

Of particular interest to this research is the consideration of service management implications of contact centres. Unlike call centres' literature, where in service management challenges have been reported in context of scientific management, very little is evidenced about challenges relating to third or even second generation contact centres², except, for example, challenges relating to multi-channel service provision (Wilson and Daniel, 2007), and lean driven service management mentioned earlier. Rather, some authors have replicated the prevalence of issues relating to scientific management in call centres, to contact centres (For example, see Curry and Lyon (2008)). Whilst it is not completely inaccurate to do so, as their findings do highlight the commonality between call centre and contact centre, such narratives have only narrowed the scope of further exploration of the latter.

In summary, this research appreciates the work done so far in 1) exploring and exploiting the call centre environments of the last two decades and the issues surrounding the service management of these call centres, and 2) accounting 'contact centres' as successors of call centres to a certain extent, highlighting the growth in number of service provision channels. The purpose of this paper therefore, is to explore contact centres beyond the distinction of service provision through multiple channels, exploring service management challenges associated with contact centres. For the purpose of contextualisation and clarity, I will use the term 'Contact Centre' as opposed to 'Call Centre' here onwards.

4. Methodological Considerations

Constructionism, in its general form, is about the knowledge and reality that is constructed through the interaction between human beings and their world, and is developed through their practice within a particular social context (Crotty, 1998:42). In particular reference to service, Katzan (2008:12) suggests that "service systems are socially constructed forms of interaction where in entities (person, group, or organisation) exchange beneficial forms of action through the combination of people and technologies that adapt to the changing level of information in the system."

Accordingly, this research was about exploring the construction of this reality or service system, that is, contact centres in this case. Particularly, the purpose was to identify what elements are considered by the practitioners and service providers to construct the service system and the considerations of factors under each of the identified elements of that service system. Further, it was expected that this would lead the researcher to develop the understanding of new implications of service management in accordance with the service design elements.

The findings presented in this paper are a result of preliminary analysis of data collected for ongoing doctoral research between 2014 and 2015 that has resulted in the framework which was used for examination of the service management practice

² I do not advocate the use of terms 'second' and 'third' generation contact centres, as the industry refers to second generation contact centre as multi-channel contact centres, and third generation contact centre as omni-channel contact centres.

of the organisation. Given the exploratory nature of research, qualitative methods were deemed suitable to address the research questions.

The data was collected in two phases. Phase one consisted of developing the preliminary understanding of key elements of contact centre service design and decision making factors within those key elements. In this phase, data was collected through in-depth conversations with independent contact centre consultants and technology service providers that are not associated to any specific organisation. The rationale for selecting consultants was to ensure that the initial understanding of the contact centres is captured without specific industry and/or organisation's influence.

These findings were extended to phase two, where in the service design elements were further explored and discussed, along with their linkage to the service management challenges. For this purpose, one of the major telecommunications firm in UK, referred to as X for the purpose of this study, was accessed.

The data collection comprised of in-depth conversations with independent consultants from the industry, and service management team of X that are responsible for managing X's service provision through contact centres. In particular, the individuals were selected on the basis of their remit towards the service design elements captured in phase one. In addition, the researcher had opportunities to have informal conversations over e-mail with individuals from X's outsourced contact centres (referred to as Firm Y and Firm Z), who were responsible for managing service on behalf of X³. In total, the researcher had 16 in-depth conversations ranging from 45 minutes to 120 minutes (including follow-up conversations), 3 e-mail conversations, and 2 telephonic conversations with the participants during both the phases.

In order to ensure integrity and research ethics, care was taken to assure the protection of both, participants and brand's identity. Prior to access and before having conversations, participant information sheet was provided and consent for recording and note-taking was taken, explaining the rights of participants. Also, wherever deemed necessary by the participants, non-disclosure agreements were signed by the participant to develop trust between the researcher and the participants.

All the conversations, wherever applicable, were recorded and transcribed. Thereafter, data familiarisation was done by constant re-reading of transcripts before analysing the data. The analysis of data entails: (a) in-depth exploration of the key elements of contact centre's service system design, using the narrative of the participants and, (b) obtain holistic understanding of service management of X's contact centre under scrutiny. Rich descriptions of data were created in accordance with these two objectives. Thereafter, these descriptions were further read to tease out specific characteristics of X's service management practice, and to be able to compare and contrast those characteristics with the prevailing narratives that exist in the literature.

³ Despite having a non-disclosure agreement with the researcher and Telecom X, Firm Y and Z were resistant to have telephonic or face-to-face conversations. Therefore, alternative means of data collection were sought.

5. Findings and Discussion

As mentioned earlier, the purpose of this research was a) to identify and explore the service design elements of contact centres so that b) service management implications could be explored and discussed in accordance with the service design elements identified.

Several elements were identified that contribute to the thinking of service design and development. For example, Fitzsimmons and Fitzsimmons' (2011) work on service design elements identified 4 structural design considerations namely, delivery system, facility design, location and, capacity planning, and 4 managerial design considerations including Information, Quality, Service Encounter and Managing Capacity and Demand. In addition, Service Blueprinting was identified as key element to encompass detailed consideration of service processes, their complexity, failure points, process fulfilment time, and costs incurred in delivering the service processes. All of these elements were further characterised with additional considerations such as strategic positioning of service and information systems consideration to accommodate factors that influence the overall service provision.

Specific to contact centres, Rijo et al. (2012) identified twelve key factors that contribute to the development of information systems design of contact centres namely, flow, channels, technology, service type, integration, geography, dimensioning, ways to obtain the service, user and agent focus, legislation, business domain, and relevant actors. Further, they have characterised these factors into 9 sequential yet iterative steps to design a contact centre. Their objective was dilemmatic throughout the paper. Firstly, they highlighted these factors in light of designing the contact centre information systems (CCIS) design, and then replicated these factors to the design of the contact centre however, referring to contact centre design as CCIS design. This required further examination.

This research has identified 9 key elements of contact centres service design, as illustrated in the figure 2 below. In addition, some key considerations were identified within each element of the service design, through conversations and literature reviewed.

The preliminary findings of this study has revealed interesting insights about the telecommunications market in the UK, and its influence on the strategic decision making of X towards its customer service provision through contact centres.

The telecommunications market in the UK within which Telecom X operates, is highly competitive. Pressures are increasing as existing operators and other service providers seek to strengthen their market position by offering products at competitive prices. Whilst the firms are continually investing in improving their network infrastructure and product innovation to counter the market pressures, the overall profitability in telecommunications business is low compared to other industries, such as finance and airline. Given this, firms such as X are focusing on building their competence by leveraging their service provision.

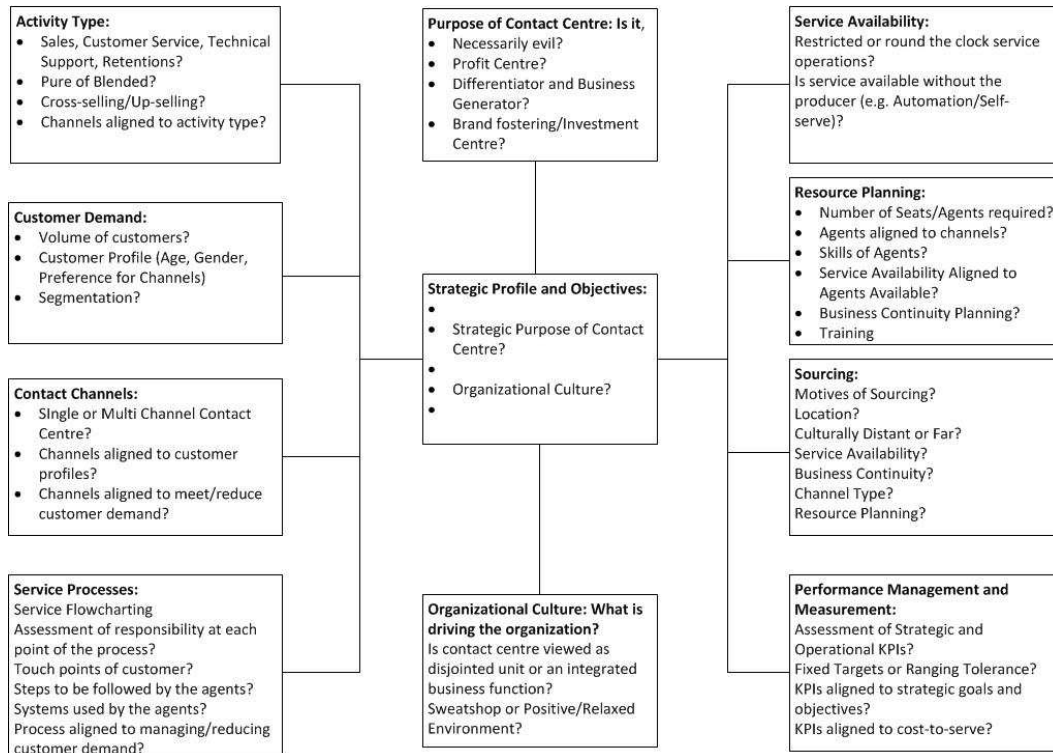


Fig. 2: Key Elements of Service Design and Associated Decision Making Factors (Fitzsimmons and Fitzsimmons, 2011; Rijo et al. 2012; and Author)

As mentioned earlier, call centres were often viewed as cost-overheads or 'necessary evils' of organisation engaged in providing after-sales support of the products, administration, and information based services. Whilst the purpose of contact centres remain the same, a thorough examination of cross-disciplinary literature and conversations have revealed that contact centres are emerging to be integral to competitive advantage (Chew, 2010). X's Contact centres were found to be increasingly involved in providing the above mentioned services as well as being the source of differentiation for organisation. Further, they are slowly emerging to be a source of revenue generation and brand fostering too, where in addition to core activities discussed earlier, cross-sell/up-sell of products are being incorporated. To date, these profiles were only explored in the context of after-sales service broadly, with little reference to contact centres (Gaiardelli et al., 2008).

Also, traditionally, call centres were perceived to be a 'black box' of the organisation where in service improvements were managed in silo, that is, disjointed from the rest of the supply chain of the organisation (Jaaron and Backhouse, 2011). As a result of this, call centres were perceived as after-thought rather than integral component of the service culture. Whilst this was no different for Telecom X, over the years, X's senior management team has adopted organisation-wide service culture approach, as opposed to functional or 'silo' approach, by integrating customer service with areas of the business.

X was faced with number of challenges in transforming the organisation's service strategy and culture. Firstly, like call centres, contact centres were labour intensive in nature, and hence, the overall cost-to-serve is still high in comparison to the profit margin. Secondly, the type of products being used by customers, for example, smartphones and tablets, are significantly, different to the products used by customers 15 years ago. Accordingly, the subscription plans, offered to the customers are

different to, with inclusion of internet package, in addition to traditional voice and text bundles. This has led to increase in the overall complexity of service that demands additional technical skills from service personnel. Thirdly, the customers' expectations from service and demographics are ever evolving, which means that customers are of varied age groups, gender, and culture, and have personalised needs, which are not always suitable to deliver through certain channel provisions. Lastly, the pace of market maturity is too fast to be able to sustain profitability in the business for longer time.

Like Call Centres, X's Contact centres were found to be in a similar tension of managing high cost to serve whilst being able to provide best service to their customers. However, other challenges were also found that were linked to the specific elements of service design, and were found different to call centre challenges discussed to date.

For example, traditionally, the purpose of demand management in call centres was to manage the volume of demand in accordance with the service operation hours, by predicting demand, fulfil that demand, and/or by shifting the demand to other service channels to handle additional demand (Jack et al. 2006). However, in addition to these, the concern of contact centre managers today is to be able to identify the cause of the demand at the first place, analyse and if appropriate, channel the demand strategically to various channels. For example, a lot of transactional stuff like paying the bills, knowing the balance of minutes, text and data, or changing address details can be now done through automated and self-service portals. As a result of this, demand can be managed cost effectively, so that labour intensive channels such as phone, can be used to manage complex transactions. However, the increase in the number of channels has raised several complexities in managing the demand with optimum cost and consistent service quality.

The emergence of contact centres has been found positive for firms such as Telecom X. The literature suggested that service provision through multiple channels has a positive impact on customer satisfaction and strengthening loyalty thereby, leveraging the competitive advantage of the organisation (Dalla Pozza, 2014). It also helps firms such as X, to reduce the cost-to-serve, especially in the case of self-service channels. X's contact centres are currently offering services through phone, e-mail, chat, social media, and through self-service portal over the internet. However, in addition to issues with customer demographics and expectations discussed earlier, it was found that multi-channel service provision could also lead to detrimental effect on the overall service quality, if the channel strategy is not compatible with the complexities imposed by the service processes. Also, certain channels lack autonomy such as Twitter. In addition, if the channels and related service processes are not effectively aligned and managed, the 'silo' effect could lead to fragmented customer journey (Bamforth and Longbottom, 2010).

Service Process Management in contact centres is becoming increasingly complex are steering away from scientific approach of management. It not only comprises scientific blueprinting, flowcharting and documentation of service processes (Rijo et al. 2012). Rather, it entails understanding of the interaction between people (including service personnel and customer), technology, and service processes in order to fulfil the transactions, and their linkages with the objectives of the service, and customer centric goals of the organization. Complexity of products and hence, service delivery are given careful consideration in the design stage of service

processes. Processes are scoped and designed bearing in mind the complexities of products, information systems and channels used to deliver those processes.

X exhibited little evidence of taylorism in management of their service processes. For example, as opposed to 'scripting' and its use in contact centre, X's service personnel use an interactive information system, referred to as *guided help* that *suggests* service personnel which steps *could* be followed to fulfil the transaction. Their philosophy suggests that whilst scientific management enabled predictability of process flows and time taken to fulfil the service process, it's still a challenge for X's service management team to manage the variation that is induced in the service process by both, service personnel and customer. Also, as opposed to cost-reduction approach through intensive standardisation, X's service process management approach was driven by continual service improvements through identification and elimination of failure points in service processes, so as to be able to reduce the overall failure demand and hence, associated cost-to-serve. However, certain level of standardisation which is inevitable in any organisation, for example, the scripting of terms and conditions, reading out regulations to customers, and performance measurement (discussed later).

Given the multi-channel model of contact centres, certain channels, such as self-service has enabled seamless service availability of service for the customer. However, as opposed to Shah et al.'s (2007) view, a contact centre still needs to consider whether the service will be provided for limited number of hours in a day, or it will be a round the clock service operations. This again, depends upon the criticality of the product being offered (e.g. emergency services) and the impact of the failure to provide service on customers' experience of the product. For example, phone channels of X's contact centre are restricted, bearing in mind the lack of customer demand in late evenings. However, self-service channels and automated voice interactive channels are still available, which has not only allowed X to effectively manage their capacity but also offset cost-to-serve to a certain extent.

Like any call centre, Resource planning in X's contact centre was found to be primarily about the number of seats/heads available to serve customers in accordance with the service levels set for the contact centre. Furthermore, *staffing and scheduling* is done to ensure that necessary number of agents is available to manage the customer demand. This entails consideration of the shifts design (e.g. breaks, training, on-call durations), number of agents available in those shifts, holidays and unplanned absences, and recruitment that might need to be done to fulfil the customer demand.

Resource planning further allows the contact centre to align customer demand with the number of hours the contact centre will operate, and sourcing strategy in terms of service availability. It was found that X's contact centres were able to flexibly manage their capacity through heavy reliance on their outsourced partners both, domestic and international. Like any other call centre, X benefited from labour arbitrage, flexibility to manage capacity and demand, and business continuity through their sourcing arrangement. However, over the past few years, they have re-considered their sourcing strategy in accordance with the four key challenges mentioned earlier. In addition, X realised that whilst sourcing was fruitful in managing cost-to-serve, they were increasingly facing service quality issues due to cultural and language inefficiencies of their offshore-outsourced counterparts, inconsistent capacity management of their outsourced counterparts, and other performance related issues.

Firms, therefore, are making conscious decisions to source the contact centres on the basis of service channels, by keeping complex activities in-house or at least on shore, whereas outsourcing and offshoring channels such as social media, and chat.

A critical element ignored by Rijo et al. (2012) is the performance measurement and management that is crucial to both, call centre and contact centre and hence, links to every element of service design, including strategic profile. However, they do mention benchmarking of contact centres' performance against the industry. X's senior management team suggests that benchmarking of indicators is important in terms of designing the contact centre. However, as one of the participants suggested, *"If you say that I am going to completely benchmark my contact centre in accordance with the industry, then you must be really dumb"*. This is in sharp contrast to the existing perception of call centres' performance management.

With the shift in the strategic focus of contact centres, there has also been a shift of focus from certain metrics that distinguishes contact centres from call centres. It was found that X's contact centre performance is measured using 45 different types of metrics, of which four key metrics are directly linked to the strategic objectives of X's contact centres. The first two are effectiveness metrics namely, net promoter score, first contact resolution, as opposed to customer satisfaction and other quantitative targets found in call centres (see Jack et al. 2006). Also, like call centres, efficiency metrics such as average contact time and adherence are still measured highlighting moderate level of Taylorism. However, these are not strict targets or fixed numbers, but guidelines or observed as ranging performance, as opposed to traditional call centres. The contact centres, whether in-house or outsourced and/or offshored follow the same levels of guidelines under each metrics. There are bonuses and rewards for service personnel who are within the ranging performance levels set by the contact centres. In order to incorporate an integrated service culture as mentioned earlier, the performance of the contact centre is also extended to other functions/departments of the organization in the form of performance pay to employees of X.

The role of technology in performance measurement, monitoring management in contact centres was found to be more about improvement of processes as opposed to electronic surveillance and control exertion on service personnel. Contact centre information systems are emerging to be sophisticated in terms of capturing and producing analysis regarding the call data, drivers and resolution. This data/information is used to understand customer contact drivers as mentioned earlier, where the service personnel could have improved the experience of customers, and how the processes could be improved or simplified in order to enhance the customer satisfaction.

6. Concluding Remarks

From the initial conversations with independent consultants and the practitioners of the industry, factors that are critical to service design of contact centres were revealed. In addition, examination of cross-disciplinary literature and collected data enabled further characterisation of these factors, and to tease out preliminary themes that will be used to scrutinise the data collected, further.

The data collected so far, also suggests that contact centres exhibit complexities in different areas of service design, which is basic abstraction of service (eco) systems. Accordingly, contact centres could be referred to as critical component of customer service ecosystems of organisations. Further cross examination of data collected with literature review has revealed challenges in following areas of service design, in addition to strategic profiling of contact centres: demand management, channel management, service process management, capacity management, service availability management, sourcing strategy, and performance management, which are further imposing challenges on management of these service ecosystems.

Contact centres are emerging to be exemplars of post-taylorist forms of service systems, where the objectives are beyond the pursuits of productivity and managing volumes, as was the case in call centres. While cost-to-serve is still major concern for both call centres and contact centres, its consideration is not confined to where savings can be achieved and how efficiently contact centres are designed and managed, and services are delivered. Instead, the challenge faced by contact centre managers is how to use contact centres as source of differentiation, revenue generation, or possibly as a fosterer of brand reputation in the market. Accordingly, service management is about optimising costs whilst implement service improvements as corporate strategy as opposed to 'silo' functional strategy.

The role of technology in contact centres is no longer confined to electronic surveillance, and monitoring of activities, but as an enabler of cost optimization through multi-channel service provision, and intensive analyses of data gathered through these channels for continual service improvements. Also, technology is used to improvise service delivery, by empowering both, service personnel and customer to co-create value. However, technology is also perceived as a challenge, in the form of products that are to be supported and the complexity it imposes on service processes. Further, multi-channel service provision could deter service quality if not aligned and managed to the service complexities. Thus, contact centres, unlike call centres, are complex in terms of technology being used. Last but not the least, given the increasing customer expectations, contact centres are challenged by how quicker can they adapt to the changing environment and respond?

The findings of this research are found to be consistent with slowly emerging literature in other strands of service research, such as supply chain management, operations management, generic service industries, and service marketing literature. Some of these findings were also reported in reference to finance, banking and insurance firms. In reporting the findings of this research, the purpose of the author was not to dismiss the developments reported by other authors in the past. In fact, the author has critically appraised their contribution through findings of this study thereby, co-creating value for service scholars. However, one of the key challenges for the author so far has been the lack of specific reference or corroboration of above strands to contact centres. As a matter of fact, the literature itself was found in 'silo' from the mainstream call/contact centres or even service management research, which was difficult to mine for the purpose of this study. As a result, one of the key contributions of this study is to converge the aforementioned strands for a) better understanding of contact centres, b) contextualise the strand of contact centres for future service science researchers and c), to indicate paradigm shifts appropriately.

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A COHERENT SET OF CUSTOMER EXPERIENCE FACTORS FOR THE DEVELOPERS OF INDUSTRIAL PRODUCT SERVICES

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It is widely regarded and accepted among the developers of industrial product services that offering a compelling product service environment, which provides value for their customers in the form of experiences, has far-reaching positive consequences on long term profitability and competitiveness. The customer experience factors play an increasingly significant role in determining the success of a company's offering. Yet, little is explored concerning the factors that can distinguish this compelling service experience for service development. Consequently, our aim in this paper is to show how to possibly distinguish coherent customer experience factors in service design by selecting a set of established service experience dimensions. This procedure can serve to determine qualified dimensions through an empirical study that tends to comply with the expectations of customer-specific industry services.

1. Introduction

Service-intensive products such as machine-tool, medical devices or passenger lifts are heavily reliant on the quality of customers' service experience. However, despite the wide range of contemporary service-development strategies that are applied during service development, it remains true that the level of the competitive success of any industrial product service provider depends on the degree of customer satisfaction, which in turn, is ultimately determined by the customer experiences. By the term industrial product service(s) used in this paper, we mean where products and services needs to be integrated (Schweitzer and Aurich, 2010, 158-164). In recent years, the product-service industry has become increasingly aware of the need to create value for customers in the form of experiences (Berry, et al., 2002, 85). Some of the reasons behind this may be that the positive customer experience offers the possibility of long-term competitive advantage to the firms and can also result in satisfied and loyal customers with positive word-of-mouth communication, improved retention and reduced complaints (Garg and Rahman, 2014, 87-117). Millions of euros are spend each year on various enhancement programs to improve the service sectors effectiveness in service development, in an attempt to remain competitive.

Customer experience can be defined as the imminent response of a customer to its encounter with a company, that is, user's interpretation of their total interaction with

the organisation. According to (Yahya, 2010), customer experience is a notion that accounts for customer needs, perceptions, intentions, behaviours and is developed through the service lifecycle.

Considering that today customers have a greater number of choices than ever before, and more channels through which to pursue them. With such a disparity, the prospect of improvements remains in urgent demand. As a result, we observe companies striving to offer superior service encounters that could lead to outstanding customer experience (Gilmore and Pine, 2002, 4-11). This may involve offering of brand messaging, value-enhanced products, excess of features, coupons, rewards or baited rebates (Meyer, 2007, 1-11).

While companies have been trying to quantify customer experience across phases of a customer's journey and have acquired plenty of data in this quest, the problem is that measuring customer experience does not tell how to achieve it. This challenge remains, despite the fact that immense efforts and progress that have been made to systematically engineer the customer experience. This paper attempts to respond to this challenge. In our investigation, we focus on recognising those characteristics that can guide the product service provider to gauge the effectiveness of their services.

To spell out what constitutes a comprehensive customer experience, all of its contributing elements needs to be embraced, that is, by analysing absolute customer experience into factors or component experiences. Thus, service experience factors can be defined as those contributing elements or aspects that together constitutes the right environment for engineering customer experience.

The rest of the paper is structured as follows: firstly, we briefly provide the concept of customer experience dimensions and briefly explain all of the proposed dimensions in Section 2. Secondly, we present the study to validate and to further investigate on each service experience dimension in Section 3. In Section 3.2, the findings of this study are presented. Finally in Section 4, we discuss the strength and limitations of our proposal and conclude the paper.

2. Customer Experience Dimensions

Researches have attempted to establish factors which could be used to evaluate customer experiences (Nasution and Mavondo, 2008, 204-213). The crux of their efforts has focused on exploring ways to assess or improve customer value and customer quality, thereby to deliver quality service to customers. However, studies in devising the right stimuli to engineer an excellent customer experience are still scarce (Gentile, et al., 2007, 395-410; Verhoef, et al., 2009, 31-41). In this regard, this investigation sheds light on establishing a clear set of proposed service experience categories or dimensions that could assist service providers in setting a coherent set of contributing service experience factors. The notation of dimensions with respect to setting customer experience factors can be defined, as the distinct aspect of any product service offered. In this study, the proposed set of service experience dimension aims to pave a path through which a service provider can select and order the most appropriate service factors to their business service environment. Falling under each dimension, the possible set of contributing service factors may positively influence to engineer a higher level of customer experience.

This study is initially based on quality dimensions of Servqual (Parasuraman, et al., 1988, 12-40), and later thorough literature research and with a combination of detailed discussions with research groups from service industry and the domain experts from industrial partners of the Association for Service Management International (AFSMI), we identified twelve distinct dimensions. A brief detail on each of these service experience dimension are outlined as follows:

1. **Reliability** - This dimension refers to the extent that service providers have the ability to offer the promised service, dependably and accurately. This is to confirm that the service provider offers what he has committed to. In accordance with this dimension, for example, some of the relevant proposed service experience factors are: i) punctuality; ii) adherence to deadlines; and iii) ability to take customers problems seriously. Therefore, based on these three customer experience factors, the customer rates, whether the service provided at the agreed time, the agreed date is met and that any problem is taken seriously.
2. **Know-How** - This dimension refers to the satisfaction with the knowledge and the transfer of this knowledge from the service provider, such as in the form of training, consulting and coaching support with expert advice. For this dimension, for example, some of the proposed relevant service experience factors that falls under this category are: i) skills; ii) advice; and iii) training.
3. **Competence** - This dimension refers to the extent that the service providers has competence in meeting the industrial challenges to stay up to date and be capable of advancing, which will allow them to handle upcoming problems and challenges in an expert manner. In accordance with this dimension, some of the relevant proposed service experience factors are: i) innovation; ii) ability to improve; iii) handling with upcoming problems.
4. **Appreciation** - This dimension represents a psychological aspect and describes the perception of how much a customer is appreciated and valued, such as due courtesy of service personal towards them and also in comparison to the other customers of this service. In addition, the service provider's loyalty to customers by sending them best offers and deals on time. In agreement with this dimension, some of the relevant proposed service experience factors are: i) appreciation as a customer; ii) friendliness of service personnel; iii) service provider loyalty towards customer.
5. **Empathy** – This is the ability of the service provider to put themselves in the customer's shoes. That is, how a company is able to respond to their individual customer's needs, to make the customer comfortable, for example, customer friendly opening timing, individual customer care, or to have a unique understanding of customer's specific needs. For this dimension, some of the relevant proposed customer experience factors are: i) emotional component; ii) Understanding of service needs; iii) Target compliance with the client's interests.
6. **Communication** - This dimension takes into account the overall exchange of information on the offered service lifecycle between service provider and the customer. That is, how often the company communicates with the customer, whether the contents of the service are documented, or regular communication is held on the status of the offered service. The relevant proposed customer experience factors may include: i) claims or complaints; ii) frequency of communication; iii) documentation

7. **Security** - This dimension takes into consideration the security aspect in relation to the exchange and transmission of sensitive information and data. The relevant proposed service experience factors that could impact on the security aspect of the offered service and may include: i) data security; ii) information security; iii) safe atmosphere.
8. **Related Product** - This service experience dimension deals with the actual product with which the service is coupled with, that is, a poor quality, lower performance and maintenance-intensive product may result in negative customer experience factor. Therefore, the product quality and design itself plays a major decisive role regardless of the excellence of its service offered. The relevant proposed service experience factors are: i) quality of the primary product; ii) maintenance friendly primary product; iii) reliability of the primary product.
9. **Tangibles** - This dimension deals with furnishing of the technical equipment and other required materials, such as, the maintenance and appearance of physical facilities and personnel. The customer experience factors that may fall under this dimension are: i) availability of spare parts; ii) appearance of premises; ii) appearance of the personal.
10. **External Resources** - This dimension focuses on the indirect support of qualified resources or services that are external and are not directly conducted by the service provider, which may be required by the customer. The relevant proposed customer experience factors under this category may include: i) quality of cooperation partners; ii) quality of contractors.
11. **Profitability**- This dimension is concern with cost effectiveness of the service offered, that is, an adequate return on the customer's investment during the service lifecycle. The relevant proposed customer experience factors under this category may include: i) price-performance ratio; ii) profitability over service lifetime
12. **Responsiveness** - This dimension deals with the high responsiveness from the service provider in concern with urgency or emergency. That is, the ability of service provider to react fast, accurately and targeted to a customer's call. The relevant proposed customer experience factors that may fall under this category are: i) quickness; ii) availability of service; iii) emergency plan.

In an attempt to better respond to the interest of various stakeholders involved in product service industry, we have proceeded with our study by conducting a survey.

3. The Study

3.1. Objective and Overview

- To assess and improve upon the proposed service experience dimensions, a survey was carried out, where a total of 62 individuals belonging to product service industry participated. The survey consists of almost 21 questions in total, classified mainly into four different categories: The first category seeks background information on participants such as which participant belongs to which product service industry, average years spent working in this industry and their current work activities. In second category, the participants were asked to grade each of the

twelve customer experience factors, based on the Likert scale of five (1 denotes “not important”, and 5 “very important”). In the third category, we questioned participants on their views, and to identify if any dimension important to their customers was omitted. The fourth category targets the ranking the dimensions according to their significance, where the most important on the top and the least important on the bottom of the rank list.

3.2. Findings

The findings reflect three main aspects of this study. The first aspect provides background information on the participants. The next two aspects of this study aim to assess the significance of each distinct service experience dimension and the second assists to determine the importance ranking.

- We have learned from the background information of respondents to our survey, that they represent six distinct product service industries, as shown in Figure 1. What we established was that the highest number of participants to this survey represented mechanical engineering industry and thereafter electrical engineering industry. Another interesting fact we observed is that 60 percent of participants had over 20 years' experience in the product service industry (see Figure 2). These basic statistics illustrate that almost 74 percent of participants reflect the perspective of two main engineering industries and majority of respondents had prolonged industrial experience.

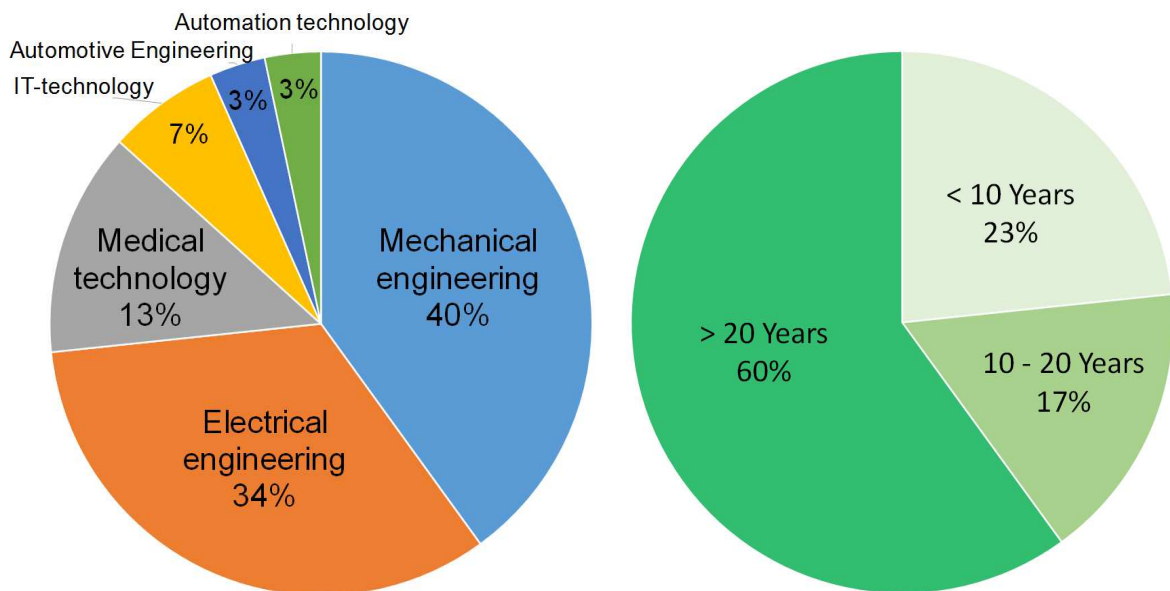


Figure 1: Survey participants representing range of Industries

Figure 2: Years of industry experience

- The second facet of our survey findings is where participants recorded their opinion on the significance of the proposed dimensions, by arranging them in descending order of importance. We learned that almost 21 percent of participants ranked the service experience dimension, *Competence*, highest in their list, and

almost 17 percent placed the dimensions *Know-how* and *Reliability* in second position in a descending list of the most important dimensions. The importance ranking on the rest of the dimensions are presented in Figure 3. Furthermore, in the third aspect of the survey, when participants were asked to score each dimension separately based on their importance, on the Likert-scale, we discovered that the dimension *Reliability* scored highest. The second highest score was awarded to the dimension *Competence* and the third highest to *Know-how*. In the same manner, we can infer that the least significant dimension is *External resources*. The feedback from this phase of the survey allows us to identify the most and the least significant service experience dimensions for industrial product services.

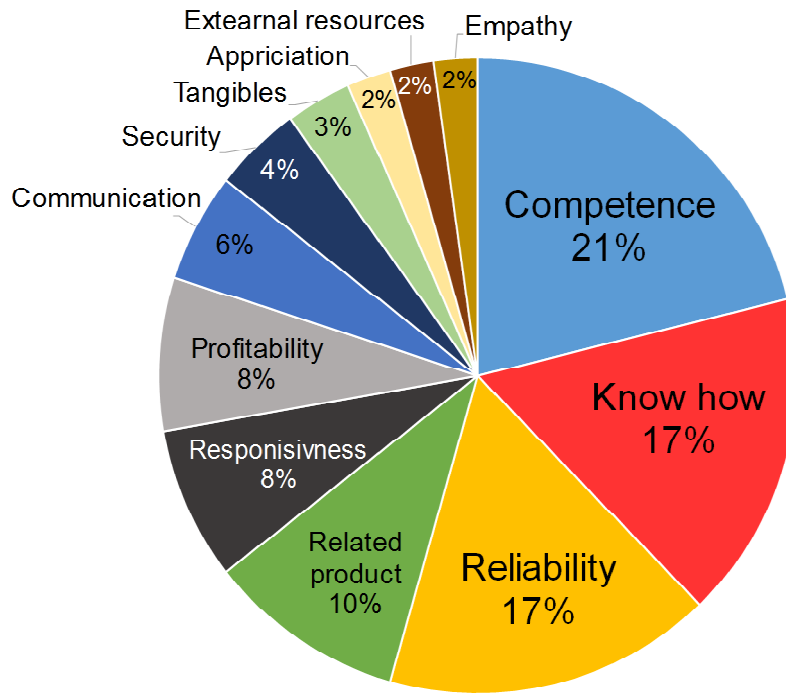


Figure 3: Ranking industrial product's service experience dimensions



Figure 4: Mechanical Industry



Figure 5: Electrical Industry

- An interesting fact that was revealed from this study when we examine the responses recorded, from the participants who only representing mechanical and electrical engineering industry. In both cases the maximum selection of appealing dimensions are not more than six, where four out of six service experience dimensions are commonly selected, which are *Know-how*, *Profitability*, *Competence* and *Communication*, as show in Figures 4 and 5 respectively. Another interesting fact is that dimension *Reliability*, which has been awarded as the one of the most important, is not selected as important at all, which allow us to apprehend how subjective the selection of these dimension can be for any product service industry. Furthermore, on the question of the missing dimensions, some of the suggestions we received as a feedback were: *brand*, *interfaces know-how*, *cross-process understanding*, *solution orientation*, *outcome troubleshooting* and *the benefits of use*.

4. Discussion and Conclusion

The results show that the successful product's service experience may leverages more than one dimension, the particular combination of the involved dimensions depends on the characteristics of the service itself. Furthermore, we can infer that, by leveraging more service experience dimensions, we may intensify the whole hedonic value of the offered service. The selected set of dimensions by any product service providers may need to stay up to date, as to what constitutes a customer' service experience which may change over time, depending on several variables, such as customer changing age, family structure, new customer or existing one. In addition, the response of this survey reflects Central European culture, which may differ by region. This study focuses on Business-to-Business service environment and targets primarily common product service providers with equally competitive business market and not those who enjoy monopoly power in the relevant market. Furthermore, in many situations, this proposed set of dimensions may not play such an influential role such as in case when the need is immediate such as in emergency and have no time to schedule it.

The proposed list of service experience dimensions is not exhaustive and does not cover all possible service areas but the most prominent ones to select when developing product services. Therefore, this study aims to set out a path, covering possible fronts, where industrial product services may be employed. In addition, the proposed set of dimensions intends to qualify for typical industrial product services on a broad scale and aims to assist the service developer to take into account all possible aspects of customer experience factors.

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A COMPARATIVE CASE STUDY OF CULTURE-BASED REGENERATION PLANS OF CITIES. STRATEGIC EVIDENCES AND BEST PRACTICES.

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Most cities and small towns have based their strategies for economic regeneration from experienced decline on cultural planning. Culture-based urban plan has grown from an interesting alternative into a core urban strategy. Cultural tourism is a new key sector of the urban strategies through new attractions and cultural events. Many cases proposed in literature have experienced different strategic approaches. A comparative analysis is needed to collect and better understand strategic alternatives and common elements that have influenced their experiences and successes. The paper reviews four cases in literature - Barcelona, Bilbao, Glasgow, Matera - and proposes a conceptual strategic roadmap to compare them and draw long term path. Furthermore, the analysis draws attention to the role of city policy makers' managerial competencies to exploit local cultural resources.

1. Introduction⁴

In recent years, city policy makers are implementing strategies in order to increase the social and economic prosperity. International studies suggest that the prosperity of a place is directly related to its competitiveness (Porter, 2008). Along this line, it is well known that territories may build their competitiveness leveraging their cultural heritage (Sasaki, 2004) and the tourism plays a key role in their development and competitiveness (Lazzereti; Petrillo, 2006). The idea of using culture as a engine of economic growth also reflects the transition from declining manufacturing cities to sites of more knowledge and service-based production.

Culture is increasingly utilised by policy makers as a means of social and economic development of cities. These include cultural tourism as the new key sector of the urban strategies through new attractions, cultural events and routes, heritage centres and historical identities. Policy makers reinforce and expand local cultural value proposition to

⁴ This study is part of a broader research project that will gather and communicate the contents of the scientific knowledge of artistic, archaeological, literary, historical and philosophical nature in the territory of Regione Campania, with an emphasis on historic centers, activating and experiencing new strategies for their representation, organization, dissemination and promotion based on paradigms of technological intelligence, that the European Union asks to raise.

target new visitors and to improve residents' quality of life which they offer. By investing in cultural resources and local traditions, cities seek to secure a niche position in the international competition to attract visitors, in this way they develop an industry that is sustainable and rich in synergies with other strategic sectors of the urban economy (Russo and Van der Borg, 2002).

Most city cultural planning cases have experienced different strategic approaches adapting their planning and implementation at context conditions too. Therefore, a comparative analysis is needed to collect and better understand opposite approaches, strategic alternatives and common elements that have influenced their experiences and successes. In this way it is possible to highlight culture-led strategies for urban regeneration. The urban regeneration is a complex strategy, it involves a lot of economic and social variables, however this study concerns the topics of culture and tourism.

This paper continues as follows. Next a theoretical overview for the study is provided. This is followed by a section on methodology, which describes our sample of cities. The following section proposes two comparative analysis to draw attention on the strategic alternatives for culture-based urban regeneration and the role of policy makers of the cities. Finally, the paper has a section for conclusions of the research.

2. Theoretical Background

Culture, as a source of identity, is also a powerful factor of economic and social innovation as well as of mobilization for development projects. Examples at local or municipal levels, as well as at national and international levels, show that culture, as a development "resource that cannot be relocated", has a high potential for attracting visitors and businesses, job creation, generating income and investment (UNESCO, 2009).

Most cities and small towns have based their strategies for economic renaissance on cultural planning (Scott, 2002; Cantone, 2005; Evans, 2005; Logan; Kockel, 2015). Culture-based urban valorisation has grown from an interesting alternative of urban development policy into a core strategy, generating enormous expectations in the interested territories.

Culture can break up path dependencies and lock-in effects so integral to old industrial operations (Grabher, 1993). Culture-led place re-imaging plays a critical role in the economic development of cities (Kotler and Gertner, 2002). Culture-led strategy (Evans, 2005) can change the image of cities, of declining industrial cities too, serving as a marketing tool. In the tourism international market, it can give a distinctive position in the competition, thus attracting more visitors. It may also have a psychological effect within the city, building self-confidence and civic pride among the population (Keating and de Frantz, 2004).

In the face of this reality, cities around the world search for strategies that take advantage of their unique assets to strengthen their competitive position in the global economy. Culture has emerged as an important ingredient of these strategies. The use of culture as an engine of economic growth reflects the transition from manufacturing to more flexible, knowledge and service-based activities, particularly in cities in the advanced economies.

However, not all cities possess a sufficient mass in terms of cultural assets to develop a viable cultural tourism industry. Furthermore, existing resources have to be promoted in conjunction with other forms of tourist attractions, spanning from events to gastronomy, developing high quality infrastructure and connecting a whole place network, without losing from sight the necessity to bring about a differentiated, authentic and attractive image (Russo and Van der Borg, 2002).

Empirical evidence reveals a wide variety of strategies and policies on this side and often includes a mix of actions that range from new infrastructures to cultural programs to education policies, from huge museums to events. In general terms, two main ways for the leveraging and the economic enhancement of cultural heritage emerge: either investing in huge cultural infrastructures, architectonic and urban requalification, and great events, as a means for attracting new resources or restyling touristic destinations. Tourism is central to this respect, since cultural assets can attract tourism to a specific destination, and tourism can bring new and fresh resources to the cultural sector and the entire area, and thus, nurturing competitiveness (Alberti; Giusti, 2012).

Cultural heritage may be conceived as a precious resource for the community, rather than a financial burden for the local economy. Cultural heritage should be considered no different than any other non-renewable resource requiring protection and integration into a global approach to the management of cities in effective competitive strategy (Pereira; Von Oers, 2011).

Cultural tourists are in fact highly selective in their consumption of heritage resources and the "traditional" heritage areas still have a considerable advantage over "new" heritage areas, because of the accumulated symbolic and aesthetic value accruing to the former. The creation of cultural facilities is an important weapon in the competitive struggle to attract inward investment and tourism to European cities (Bianchini and Parkinson, 1993), and in particular for emerging destinations.

However, cultural flagships cannot represent a prototype to be duplicated successfully in different locations and contexts. Dependent on the opportunities given for political participation and cultural self-expression, culture can serve both as a powerful catalyst for economic regeneration and as a source of political controversy over the future of the city (Keating; de Frantz, 2004).

The growing international prestige of hallmark cultural events has increased the expectations in cities, aspiring to host them, to improve their image and boost their tourist economy.

The most common objectives expressed by successful hosting cities are raising the capacity/ambition of the cultural offer in the host city (internally) and

raising the profile of the city and its cultural offer (externally). The dominance of these two objectives is a likely explanation for the two most common areas of positive impact, which tend to be articulated in a very similar way: raising the capacity and ambition of the cultural sector; and achieving image enhancement for the host city, often involving a repositioning as a leading cultural centre.

Another objective emphasised by hosting cities are conceptualised within the ambition for the hallmark cultural events to be a catalyst for change in other areas, such as: tourism development; increased inward investment; supporting the growth of new (post-

industrial) industries; physical regeneration and cultural facilities renewal; social engagement and enhanced pride in the city (Garcia; Cox, 2013).

The impact on the cities is critical for policy makers that adopt an effective culture-based regeneration plan, however not just local governments that seek to connect economic and cultural strategies. In effect, at an international level, the European Union established an annual event competition to select the European City of Culture (Papanikolaou, 2012) that similarly serves to promote economic development through cultural strategies in the hosting city.

Increased leisure time and leisure spending by tourists led to greater attention by city governments on cultural offer, paying specific attention to cultural resources and services. City policy makers consider the development of cultural policies as a valuable tool in diversifying the local economic base and achieving greater social cohesion. The need for economic restructuring also marks a change in policy emphasis from the social and political concerns to economic and urban regeneration priorities. The interest in urban culture planning therefore become driver of an attempt to cushion the negative effects of the painful transition from an industrial to a post-industrial economy (Richards, 1994; Bianchini; Parkinson, 1993; Logan; Kockel, 2015).

However, culture-led strategy has effects in the long term (Garcia and Cox, 2013). Culture contributions to city regeneration is a fragmented process that takes place over several years, perhaps a generation or more (Evans and Shaw, 2004). It includes quality of hospitality, communication with the public, the accessibility of the destination and its attractions and the atmosphere of the place; aspects that are often, arguably, neglected in cultural and tourism planning (Garrod and Fyall, 2000) and not in cities government direct management. Furthermore, the complexity of the process of cultural regeneration makes it hard to attribute an effect to a cause, particularly in the short term (Evans; Shaw, 2004).

Cultural tourism strategies have in common: a major growth of the area, they can be used to boost local culture, and they can aid the seasonal and geographic spread of tourism (Richards 1994).

Several cities have embraced a culture-based turn in their policies. Empirical evidence reveals a wide variety of strategic approaches.

3. Methodological Approach

This paper reviews literature and case studies in a comparative approach.

The research method employed in this study is to analyze and compare several case studies of cities, proposed in literature, highlighting relevant strategic elements featuring each of them. We discuss their different strategic approaches and implementations to outline best practices and relative efficacy, in order to overcome the limitations and specificities due at different context conditions of each city.

This comparative case study highlights strategic evidences resulting from international experiences of cities, that have based their development and revitalizing strategy on cultural tourism industry, and proposes an ideal strategic roadmap to face international

competition among tourist destinations. Furthermore, the analysis draws attention to the role of city policy makers' managerial competencies to exploit local cultural resources.

This study gather and compare the effective strategic elements in order to affect policy makers' decisions related to culture-based city strategic plans.

The selected cases are: Barcelona, Bilbao, Glasgow, Matera. They are featured by different strategic approaches, different histories and experiences in the city planning for economic renaissance based on cultural tourism, to enhance their image and cultural resources and to increase tourist attraction.

Table 1: The selected cases

City	Population	Sources
Barcelona (Spain)	1.602.386	Marshall, 2000; Balibrea, 2001; Monclus, 2003; Testa and Abbate, 2005; Evans, 2005
Bilbao (Spain)	353.187	Gomez and Gonzalez, 2001; Keating and de Frantz, 2004; Binns, 2005; Cirillo, 2005; Plaza, 2007; Plaza et al. 2015
Glasgow (Scotland)	599.650	Gomez, 1998; Boyle and Rogerson, 2001; Garcia, 2004; 2005; Gold and Gold, 2005; Garcia and Cox, 2013
Matera (Italy)	60.023	De Giacomo, 2013; Bianchini et al., 2013; APT Basilicata, 2016

4. Results

4.1 The case studies

Barcelona.

Barcelona's urban regeneration has become a prominent example to other cultural regeneration approaches in the ways that it 'took an urban design, cultural planning and creative quarter approach' and integrated cultural activity in the redevelopment of areas 'alongside other activities in the environmental, social and economic sphere' Barcelona's urban regeneration has become a prominent example to other cultural regeneration approaches in the ways that it 'took an urban design, cultural planning and creative quarter approach' and integrated cultural activity in the redevelopment of areas 'alongside other activities in the environmental, social and economic sphere' 'Barcelona Model' has become prominent example of cultural regeneration approach in the ways that it took an urban design, cultural planning and creative quarter approach, furthermore for its integrated cultural activity in the redevelopment of areas alongside other activities in the environmental, social and economic sphere (Marshall, 2000; Balibrea, 2001; Monclus, 2003, Evans, 2005; Testa and Abbate, 2005).

As Barcelona has reinvented itself, tourism has become one of its most prosperous and defining industries.

The city has a long experience in strategic planning since 1987, the triggering event was the organization of the Olympic Games of 1992, it brought the city to the world's spotlight. In 1997, city Mayor indicated that it was time for Barcelona to host another major event and demonstrate its continued leadership as a cultural centre. The city needed major events with a focus on culture, education and the long term viability of the experience, therefore it hosted Universal Forum for Cultures on 2004. These experiences have leaved a legacy of hallmark infrastructures, architectural renovation and new cultural centers as catalysts for urban renewal and engine of cultural renaissance.

The city turns into lucrative, interesting, fascinating place in which the semantics and hermeneutics of space have been constructed for foreign visitors, and this construction has necessitated a previous political and economic intervention (Barbiloa, 2001). The process of urban transformation is enriched of new cultural and aesthetic meanings by the projects of notable 'archistars', that have leaved in the city very attractive infrastructures for tourists and media attention. Their interventions exalt natural landscape or cultural heritage of the city, becoming travel motivations and new icons to diffuse international image of Catalonia capital. This is another crucial factor in explaining why the city is become an universal focus of attention and tourist destination.

Bilbao.

The absence of new industrial growth to counter the decline of traditional industries in Bilbao led authorities to turn to building facilities for cultural consumption. Investing in big hallmark iconic cultural infrastructure is one way to draw attention and visitors, this way is often referred to the 'Bilbao-Guggenheim effect' that is perceived as successful culture-led renewal (Binns, 2005; Cirillo, 2005). It is a highly visible evidence of the importance of 'cultural consumption' (Bianchini, 1993) to a city and can, thus, be used as a potent symbol in place marketing. Bilbao's former image was largely associated with violence from extremist Basque separatists, urban deterioration, pollution and a poor public transport system (Gomez and Gonzalez, 2001).

Thanks to new Guggenheim Museum, it has become an international art destination, with one million visitors per year approximately, and an average of 55% of foreign visitors a year, compared to less than 100,000 before museum opening (Plaza, 2007; Plaza et al. 2015). The city strategy matched the expansionary aim of the Guggenheim management that had sought since the 1980's to become the first global museum. However, investing in this stunning construction is a costly (166 Mio €, opened on October 1997), and therefore risky, business, which left uncertain local citizenry.

Along with several other public policies, the museum impacted the economy by creating a new tourist base (economic diversification) and re-imagining the city. This cultural re-imagining, through iconic art museum, aims to create symbolic capital for the city in the form of creative images, reputation and associations with innovation (Plaza et al., 2015).

Other cities without historic cultural centres now look to Bilbao as a model for what vision and imagination can achieve. But in a tourism view, such cultural hubs need a clear vision of what they can offer if visitors are to come more than once. Furthermore, despite the overall admiration, several critics raised doubts about the results of the cultural plan, highlighting the positive image development of this attraction bringing tourists to Bilbao,

especially from abroad, excluding, however, capacity of generating new jobs for most of the resident population and attracting expected corporations. In this way, culture can serve both as a powerful catalyst for economic regeneration and as a source of political controversy over the future of the city (Keating; de Frantz, 2004).

Glasgow.

The city experienced processes of deindustrialisation and subsequent huge loss of employment. In order to create a new service-based economy, a reconstruction of image and attractive tourist destination, it adopted a strategy to overcome its declining position (Gomez, 1998).

It was European Capital of Culture on 1990, a months-long festival established by European Union that includes performances and exhibitions in various locations. Local governments take this as an opportunity to lobby for European Regional Development funds, which they use to renovate and expand existing museums and concert halls and advertise their city around the world. Glasgow used the event as a catalyst to accelerate urban regeneration, which resulted in an ambitious programme of cultural activity with an unprecedented level of funding from local authorities and private sponsors. The city celebrated culture in a broad sense, comprising not only the arts, but other elements that reflected Glasgow's identity, with a view to reach and stimulate participation in less-privileged communities. The event operated as a platform to encourage additional cultural development and reposition urban environments (Garcia and Cox, 2013; Gold and Gold, 2005).

The event created the conditions to secure a relevant physical legacy through the generous investment in capital projects (£43 million), that resulted in new or renewed cultural infrastructures still operating today and the transformation of previously derelict spaces into innovative cultural spaces.

However, there was a lack of provisions to sustain cultural legacies in the long term and to invest in the context conditions, that would allow further activities to be produced and distributed in subsequent years.

Definitely, the event organisers failed to establish partnerships and workforce structures that could survive the year and be applied, on a smaller scale, outside a major event hosting process. Culture was used as an instrument for economic regeneration without being supported by a properly developed urban cultural policy, in a short-term opportunistic view (Boyle; Rogerson, 2001). Decision making were often on the basis of short-term potential business returns, media coverage and tourist appeal, rather than community development and self-expression (Garcia, 2004).

Matera.

Built on the rough faces of a ravine, Matera (in Southern of Italy) hides under the rock a tangle of grottoes, churches, crypts, tanks and houses, partially dug and partially built, which shape the very ancient "Sassi" quarters. Only, in the 1950s the Italian Government denounced the unhealthy conditions of the Sassi, in which men and animals lived together, many houses had no water and sewer system and the inhabitants were obliged to move to new neighbourhoods (De Giacomo, 2013). Therefore, a restoration and valorisation plan was adopted.

In 1993, the inscription in UNESCO's list enhanced the awareness of the architectonic and cultural heritage, allowed new fund collection, improved requalification process. After, the designation of Matera as European Capital of Culture for 2019 has fastened tourist growth, increasing the city reputation in the world too (Bianchini et al., 2013). Before of that the city experienced very poor visitors' flow, and until the inscription the tourism does not exist. From 1999 to 2015 the tourist arrivals are increased of 215%, with double-digit increase per year, and their presences of 102% (APT Basilicata, 2016). Thanks to new accomodation facilities and services for incoming tourists.

Matera has a cultural-historic heritage of great value, but the touristic flows are below its potential; indeed, the attraction of visitors depends on the quality of marketing mix the city offers, and it lack of policies able to favour the organisation of a system, putting together public and private actors (De Giacomo, 2013). The tourism has started in recent times, therefore resources, competencies and culture for that have to be developed and diffused yet.

4.2 The comparative analysis

The case studies and their comparison offer two strategic lessons for culture-led urban regeneration of cities, they are shown below.

The Strategic Roadmap

The case studies have highlighted the recourse to hosting major cultural events and developing cultural resources (e.g. museum, cultural facilities, cultural centres) as two means of culture-led strategy. These are two strategic trajectories adopted by the cities in order to develop and strengthen themselves in tourist destination competition: a resource-led strategy and an event-led strategy. Furthermore, the comparison of the cases brings out that there are effective results when the two trajectories interact over time.

Therefore, it is proposed a conceptual strategic roadmap based on the resource-led strategy and the event-led strategy adopted by the cities (Figure 1), it exalts the reinforcing effects of their interactions.

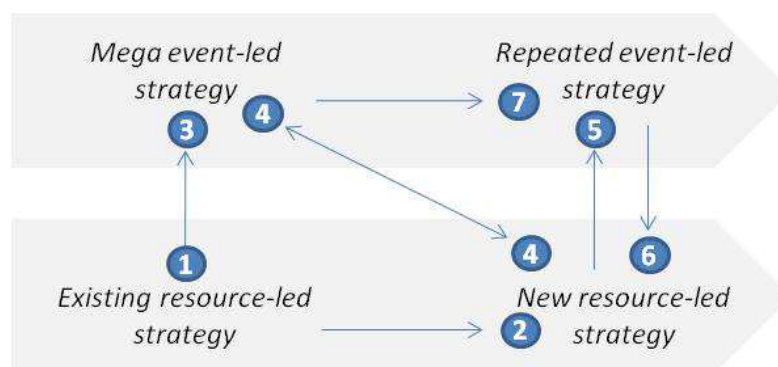


Figure 1: Strategic Roadmap⁵

⁵ The steps of the roadmap are indicated in brackets in the body of the text.

Starting with the first step (1) of the proposed model, we consider that each city has a cultural heritage, in terms of an existing bundle of cultural resources. In this condition it is possible to valorise the cultural heritage by a resource-led strategy based on: requalifying the structural state, improve the accessibility, integrating it with other local touristic resources and competencies, adding value with new knowledge, content and meaning. Let's consider this as the primary phase.

Matera case identifies this condition. Due to an increasing awareness on its cultural resources, Matera is able to start a strategy to give value to their local resources and traditions and to create an attractive image, becoming a new cultural destination. As a tourist destination, Matera is in its first stage of life-cycle: it is in an ideal condition to direct its development in a coherent and sustainable way, organizing a complete cultural offer able to enhance the value of all the expressions, material and immaterial, of the local culture. This cultural-led strategy strengthens existing sources of identity, rather than imposing new ones. The forthcoming event in 2019, the European Capital of Culture, will push the city towards the next step.

From the initial stage, a city could enrich its cultural heritage with new resources which are able to increase the tourist flow in order to attract new segments of visitors, becoming therefore a new long-lasting travel motivation. Furthermore, the cities can enrich their image within and outside local boundaries. This is the second step of the model (2): the new resource-led strategy. Bilbao is a typical case of this approach thanks to the 'Guggenheim effect'.

Another strategic option for cities coming from the first step is moving towards the third step (3), adopting a mega event-led strategy. This approach is based on the capacity to attract and manage a unique hallmark event, converting it into lever and a strategic instrument of urban renewal and regeneration. The changes to local image and identity are the most important long term legacy of such strategy. The Glasgow case represents its implementation. However, in a broader strategic vision, a three-fold objective is pursued: attracting tourists, renewal of the city image and use of the event as catalyst for pursuing specific operations of urban regeneration.

Effectively, a mega event is an occasional activator for new investments and city regeneration, allowing new resource creation and modernization. This new resource-led strategy (4, bottom-right) was adopted by Barcelona during its strategic pattern. Cultural resources are the legacies left on place. Surely, the cities with new cultural resources (e.g., Bilbao in the second step) can also exploit these ones, hosting and managing a major cultural event in their next step moving towards mega event-led strategy (4, top-left). This is the first interaction between the two strategic trajectories.

At this point an effective long-run strategy is able to activate a self-reinforcing virtuous cycle: the city may be able to manage another hallmark event, implementing a repeated event-led strategy (5), with the aim to attract, create, develop new resources (6). Barcelona is the best case of this approach. It experienced two consecutive major events and the success of this strategy. It enlarges its tourist base, attracts new investments, regenerates and enriches their cultural heritage and image.

On the other hand, when previous event-led strategy and its efficacy are proved (3), another major event can be planned on similar bases to the previous one. Therefore, another strategic alternative can be carried out: a narrowly repeated event-led strategy (7). In this case, with the same existing resources, a city could plan a new event to con-

solidate its image and give stability to tourist flow. The new event, with its attractions or contents, will be the new travel motivation and it could be the enabler for new resources.

The following table shows the strategic phases and the main objectives of the roadmap.

Table 2: Strategic actions and objectives of the roadmap

Strategic phase	Main objectives
Existing resource-led strategy	Valorising cultural heritage; Creating image/new image of the city; Attract the attention of tourists
Mega event-led strategy	Changing image of the city; Event is fund catalyst for urban resource regeneration; Attracting (new) tourists
New resource-led strategy	Enriching cultural heritage; Attracting new segments of visitors; Creating new long-lasting travel motivations
Repeated event-led strategy	Enlarging tourist base; Attracting, creating, developing new resources; Consolidating city's image

Policy makers' managerial competencies for culture-based regeneration strategy.

The rising centrality of culture as an economic-political factor for regeneration of cities needs that the city policy makers have managerial competencies in attracting funds, enhancing cultural resources, facing international event hosting competition, creating a cultural value proposition for tourism market.

Urban regeneration policies need strong leadership with a large degree of autonomy. This is often provided by a charismatic Mayor, but it may also be provided by development agencies, run by professionals or technical elites or linked to sections of the local business community too.

The city regeneration plans involve the building and development of policy makers' managerial competencies over time, in order to exploit existing cultural resources, generate and manage new ones. The cities lacking developed managerial competencies have poor capabilities to exploit their resources in a long term view.

Barcelona during its strategic planning experience, from 1987, has developed managerial competencies to better exploit its existing and new cultural resources, attract funds, host events in order to enhance its competitive position facing international tourism competition. In a dynamic view (Teece et al., 1997), the city has evolved their managerial capabilities and reinforced its cultural resources and their combination over time. Furthermore, in a long term view, the repeated events hosting and new cultural resources building are a competencies development platform for policy makers. It is a learning by doing approach.

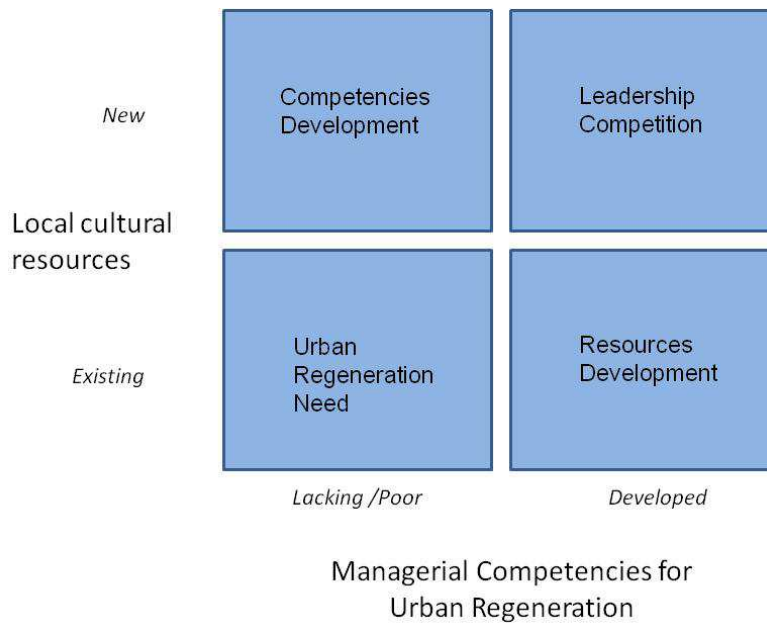


Figure 2: Impact of Policy makers' managerial competencies

Simultaneously considering the presence of cultural resources in the city to generate attraction of tourism and the quality of managerial competencies for urban regeneration to plan a suitable city strategy, leads to the matrix depicted in Figure 2. The conceptual matrix proposes four alternative city strategies in four different conditions to generate attraction of tourism and to enhance competitive position of the cities. In this way, we add reflections on policy makers capability to manage the culture-based regeneration plan of the city.

In bottom left side, the matrix portrays a city with lacking managerial competencies for urban regeneration and few cultural resources. The cities in this conditions have a weak competitive position to attract visitors and to create an appealing image; an urban regeneration strategy is needed. New cultural resources have to be created to attract cultural tourism target. Furthermore, it is necessary to activate and develop managerial competencies for urban strategy, attracting consultants or experts from outside, or mobilizing competencies inside the city from industrial or academic sector. In this case the city has to start its strategic roadmap.

Matera highlights this condition, it is a newcomer in tourism competition, therefore its policy makers have to develop managerial competencies and to cumulate planning experience. In order to compete for European Capital of Culture, Matera has mobilised heterogeneous competencies from local university, Chamber of Commerce and business community and expert from outside the region to contribute in planning activity. The next step is absorbing and consolidating this competencies in stable policy making process.

In the bottom right side, the matrix draws attention to resource development strategy. This is the case of a city featured by policy makers with developed managerial competencies. They have the opportunity to organise new combination of existing resources to better satisfy the reached target, but to enhance the competitive position of the city they have to create new cultural resources, in this way it is possible to enlarge

the tourist base and to offer new travel motivations. Barcelona with creation of new cultural resources, after its first event hosting experience, has developed competencies to host other events and to reinforce their bundle of cultural resources.

In the top left side, the matrix indicates a city with poor managerial competencies and new cultural resources, this is the case of managerial competencies development strategy for policy makers. The risk is a short term view, the occasional exploitation of existing and new cultural resources, or events, to achieve opportunistic tourism flow and media audience. Hosting hallmark cultural events without a long term view, the city does not build an effective urban cultural policy for sustain a long term repositioning strategy. The lack of managerial competencies does not allow to exploit the new resources, the legacy of an event and its image contribution over time.

Furthermore, the redevelopment strategies based only on new resources or events, without a long term view driven by policy makers, have their own problems. 'Cultural cities' reproduce the same or similar facilities in any number of places, echoing the globalization of industrial production, with its geographical dispersion of production and aggregation of consumption. The many competitions to host special events exhaust a city's resources in preparing endless bids. Winning cities take the major share of regional and national funds favouring products and performances attracting the largest possible audience, and suggesting a cultural globalization for global offers often seen as more competitive than domestic culture (Zukin, 2004), undermining the existing local culture in favour of a global taste, broadcasting similar images and activities (Riza, 2015).

In the top right side there is the best combination of the variables of the matrix. The cities in this condition have policy makers with strong managerial competencies for planning, have a long experience of hallmark events management and new cultural resources building, have a good knowledge of international tourism market. Furthermore, there is a differentiating cultural heritage, the past events have left legacy that is integrated in the local bundle of cultural resources; this allows new combination of these ones to attract and satisfy new tourism target for the cities over time. Policy makers strengthen their managerial competencies during their experience, this is a knowledge heritage for the city management.

5. Conclusions

The aim of the paper was to highlight long term strategic trajectory for culture-based urban regeneration. It uses the sample to gather secondary data for comparative analysis. Previous researchers have investigated single cases of cities have experienced culture-based regeneration strategy, but this study gathers more cases from literature in a comparative approach to arrange the results and to draw a unique long term strategic path.

This study examined four European cases of cities, collected from literature - Barcelona, Bilbao, Glasgow, Matera – that have adopted culture-led strategy to foster their economic regeneration, to enhance their cultural resources and image, relying on cultural tourism to response to decline.

The results of the comparative case study indicated that, in the cultural tourism competition among cities, the emerging competitors base their strategy on two critical trajectories:

- enhancing and increasing cultural resources (e.g. museum, cultural facilities),
- hosting major cultural events.

In order to face their industrial decline and international tourism competition, the cultural newcomer destinations cannot refer to their questionable historic heritage, therefore their cultural profile is dependent upon the success of new attractions, flagship resources and hallmark events.

Due to new tourist flow and media attraction generated by hallmark cultural events or new iconic cultural resources, the image of city acquires value through the breadth of the audience they reach.

Cultural event hosting facilitates the dissemination of a chosen image to potential tourists, investors and external policymakers.

An iconic museum can give to a city an advantage in competition for resources development, can make it recognizable to outsiders, can simplify and reduce risk in the decision-making process (Plaza et al., 2015) and can be an effective travel motivation. However, the existing world hallmark events require massive investments in infrastructures, that are often unsustainable and non-beneficial for the host communities. Although, it is the risky use of 'urban flagships' in a context of serious decline, as much as the subsequent political discourses built up around imitation of 'success stories', which are motivation of dispute between habitants and policy maker (Gomes and Gonzalez, 2001).

At the same time, the results of the research suggest that in order to nurture a long term strategy the two trajectories have to be fostered each other (e.g. Barcelona case) in a strategic roadmap, in this way: the cultural heritage increases, the image is continuously strengthened, the travel motivations are renewed. Therefore, the competitive position is more differentiated and inimitable. It increases the points of difference in culture value proposition of the cities and mitigates the similarities due to globalisation of cultural consumption. It is more simple to imitate an iconic flagship museum than a complex bundle of resources and a continuously reinforced image.

Otherwise, only short-run or occasional and opportunistic effects are obtained (e.g. Glasgow or Bilbao cases). Indeed, the effects from cultural regeneration are often reduced to direct consumption effects, rather than profiting of a more productive and long-run intensive local development. Long term strategy involves the construction of symbols and images as well as the redevelopment of the city value proposition.

The conceptual strategic roadmap proposed in this study draws attention on strategic alternatives and actions and can affect policy makers' decisions related to culture-led city strategic plans. Furthermore, in order to adopt a long term strategy the city policy makers have to develop managerial competencies to combining existing cultural resources effectively, to enhance cultural resources, to host hallmark events, to renew city image. The continuous actions are a learning platform for policy makers involved in the culture-based regeneration plan.

To conclude, this research was subject to several limitations, such as: only few cases are reviewed from literature, in a secondary data comparative analysis; more detailed study on actors involved in strategic plans are required, it will be in next step of the research. Of course, the question of what the cities would be without their culture-based strategy or what they could make better is still open.

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A DIVERSIFIED STRATEGY TO MODERNIZE A PUBLIC SERVICE BY ASSOCIATING USERS: THE CASE OF THE CAF (FAMILY ALLOWANCES ORGANIZATION) YVELINES (ILE-DE-FRANCE).

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The 101 CAF (Family Allowances Organizations – Caisses d’Allocations Familiales) correspond to one of the four parts (Family) of the French National Social Security (Sécurité Sociale) created in 1945. These CAF constitute a network managed by the CNAF (Caisse Nationale d’Allocations Familiales). The different CAF have some possibility of local experiments, particularly in their relations with their users. We first discuss the different words employed for people using their services: “users” (usagers), “recipients” (allocataires), “consumers” (clients). We prefer “citizens” (citoyens) or users-citizens in a co-production of services perspective of “daily innovation”. We will analyze the decisive choice of the Yvelines CAF (Ile-de-France Region) to maintain a “multichannel” approach for reception of users: physical (appointment in desks), telephone and internet via the platform “caf.fr” outlining the cooperations with local associations and proximity organizations to develop the involvement of “users-citizens”.

Key words: relations, public reception, modernization, services, ICT, innovation.

1. Introduction

The National Family Allowance Organization (*Caisse Nationale des Allocations Familiales - CNAF*) is one of the four different organizations constituting the French Social Security System (*Sécurité Sociale*) founded in 1945⁶. Its role for “social cohesion” is very important, especially in a period of economic crisis since 2008 and of crisis of the “social link” (Paugam).

⁶ The other organizations are the National Organization for Sick Insurance or in French *Caisse Nationale d’Assurance Maladie des Travailleurs Salariés* (CNAMTS) to finance and contribute to manage the Healthcare System, the National Organization for Pension Insurance or *Caisse Nationale d’Assurance Vieillesse* ou CNAV et l’ACOSS (URSSAF Network) to collect the contributions from organizations or companies and those from employees financing the whole French Social Security System. All these organizations pilot national networks of local organizations.

The ability of innovation of this key sector is globally misunderstood (Laville). After studying the main evolutions of the CNAF and its goals, we present the specificity of this work and particularly the position of the University's researcher of this paper. Then we will analyze recent developments in one of its local branches, Yvelines CAF in Ile-de-France Region (around Paris).

This work in progress corresponds to the first step of an evolution analysis of a local public service over time involving "citizens" in a co-production of services approach in the way proposed by P. Rosanvallon to try to "rethink the Welfare State", with all the specificity of services activities, particularly in the healthcare, welfare and social activities (Djellal - Gallouj).

2. Researcher's Position and Methodology: Complementary Views to Analyze a Services Proximity Organization in a Critical Period of Transition

This work corresponds to the cooperation of a University's Professor with members of the Management Team of Yvelines CAF, heavily involved in the organizational changes resulting in an important way from the implementation of the services platform caf.fr.

This complementarity of sights is essential for analyzing the trends developed in recent years in a public service modernization approach (Laville). We position in a dual perspective of "innovation in the territories" (Godet and al.) and of "daily organizational innovations" (Alter).

We have worked in a perspective of action research (Meyer). Within the French academic discipline of Information and Communication Sciences, we position in the approach proposed by F. Bernard, based on the convergence of four issues: link (relationship, interactions), meaning, knowledge, for action.

It corresponds to researcher's observations (with interviews of managers or users), analysis of documents (paper or digital) and Internet devices to help the CAF management team to better consider current trends and anticipate innovative ways in interaction with expectations (or needs) of citizens-users.

The position of the University Paris-East researcher has progressively changed in the recent years. At the beginning, we have rather an "observation" and analyzing position. Finally, in interaction with another works in the "Social and Solidary Economics" (*Economie Sociale et Solidaire*), particularly in training for unemployed young people to help them to develop their own economic activity, we progressively come to the research posture described by F. Bernard and al. as "engaging communication". They outline the dimensions of "engaging or committed position" and that of projects. This individual position also corresponds to a main objective of the CNAF: "improving the insertion pathway of people and families in precarious situation" (COG, p. 11).

3. CNAF, a part of the French National Social Security System

Social Security has been created in France by government order of October 4, 1945. It was "designed to insure workers and their families against risks of any kind of problem that may reduce or eliminate their earning capacity, to cover costs of maternity and family expenses they incur"⁷.

This last mission, expanded in 1978 to all families with dependent children, is fundamental to the future and to favor social cohesion. Family branch of the Social Security contributes decisively to this goal. On December 2015 31th, it covered nearly 31.1 million people (adults and children), enjoying at least a benefit paid by the welfare offices in metropolitan France and overseas departments (DOM: *Départements et Territoires d'Outremer*). A total of 47% of the French population (on 66 million), distributed in 11.8 million homes is covered by the benefits of CAF and received last year more than 70 billion euros direct benefits⁸. Family branch of the French Social Security has a networked management, the various local offices (101) being driven by the National Family Allowances Fund (CNAF).

In a contractual way, in a MAP (Public Action Modernization – *Modernisation de l'Action Publique* - approach, since twenty years, the State and the various Social Security funds conclude Objectives and Conventions Management or COG (*Conventions d'Objectifs de Gestion*). A COG was thus concluded for five years (2013 - 2017) between the CNAF and the State (under the double signature of the Ministry of Social Affairs and Health and the Ministry of Economy and Finance). The CNAF and the State have mutually committed around strong ambitions to services of family policy. "They intend to make the COG more than just a management tool, a real public policy tool that translates voluntarism and priorities of family policy shared by the government and the board of the CNAF⁹."

The COG has three major ambitions: "The proactive development of services to families, the implementation of a service policy to recipients adapted to the crisis and the changing needs of families, the requirement for improving the efficiency of the production process (producing better), associating administrators of the CAF, executive teams, agents and users. " Improving services dimension to users is clearly outlined, such as commitment to innovation by combining the two sides in a perspective of efficiency and performance in a context of economic crisis and budgetary constraints unavoidable. The major role of family policy, like all social security schemes for social cohesion and the maintenance of "social bond" (Paugam) is strongly reaffirmed. Also with the desire to involve "users" to change and decision-making process (pp. 1 - 3) in a service offering policy enshrined in the territories (p.

⁷ In French : « destinée à garantir les travailleurs et leurs familles contre les risques de toute nature susceptibles de réduire ou de supprimer leur capacité de gain, à couvrir les charges de maternité et les charges de famille qu'ils supportent ».

⁸ Newsletter « Annuaire Sécu » n° 704 du 3 juillet 2016.

⁹ Convention d'Objectifs et de Gestion (COG) entre l'Etat et la CNAF (2013 – 2017).

https://www.caf.fr/sites/default/files/cnaf/Documents/DCom/Presse/Communiqu%C3%A9s%202013/Cog2013_2017_integrale.pdf, p.1.

7).

These goals represent a broad and dynamic vision of family policy with ambitions as "Improving the insertion pathway of people and families in precarious position" or "foster family housing conditions and living environment quality" and " help families facing events or difficulties undermining family life "(COG, pp. 11-12).

The local CAF also pay the RSA (Solidarity Social Payment (*Revenu de Solidarité Active*), which replaced the Minimum Income Support (or RMI – *Revenu Minimum d'Insertion* created in 1988) and the single parent allowance (API – *Allocation de Parent Isolé*) since June 2009. The RSA is paid to the unemployed and workers who have few resources. It ensures a minimum income (RSA base) but also a complement to a small salary (RSA activity) to encourage the recovery or increase of a professional activity. Since February 2016, the RSA Activity has been replaced by the Activity Prime (*Prime d'Activité*). Family Allowances have so paid this Activity Prime to nearly 1.5 million recipients of RSA. Over 2.3 million homes, representing over 3.8 million people have already benefited, including 400 000 young people from 18 to 24 years, of this Activity Prime. Other social security funds as *Mutualité Sociale Agricole* (MSA) are also involved.

The CAF also conduct targeted actions on specific audiences. In this way, on June 2016 a specific campaign was opened for student housing, using social networks. The dissemination of a national video chat on the Youtube channel "Family Allowances" corresponded to its beginning.

"A communication policy to support the implementation of the goals of the COG " including the establishment of a master plan of communication to accompany the evolution of the industry and promoting its global services offer is clearly displayed as a key to success (COG, p. 27) with the use of social networks and digital technologies to better engage users.

The goals and the commitments of the national COG are then explained separately between the four National Social Security Funds and their various local offices, in our case, the Family Allowance Fund of Yvelines.

4. A Real Innovation Capacity, especially in Relations with Users

Yvelines CAF is one of the 101 local offices (with 620 employees for 217,594 users) of the National CNAF. The local CAF have some autonomy to implement social and organizational innovations. The Yvelines CAF work on a specific departement of Ile-de-France region created in 1967 (Yvelines), both urban and rural. Its population is very contrasted: Mantes-la-Jolie or Trappes for example are sensitive areas, Saint-Germain-en-Laye, Versailles or Rambouillet rather wealthy and residential towns. The headquarters of the Yvelines CAF are located in the new town of Saint-Quentin-en-Yvelines, regrouping new suburbs and more ancient towns.

This paper associates a University's professor and members of the management team of CAF Yvelines, particularly involved in the recent organizational changes resulting from the implementation of the platform *caf.fr* services. This complementarity of sights is important to analyze the main trends developed in

recent years in public service modernization perspective (Laville), and also as already mentioned above in a dual perspective of innovation in the territories (Godet et al.) and of every day organizational innovation or *innovation au quotidien* (Alter).

The ability of innovation of this key sector for the social cohesion as an essential part of Social and Solidary Economy is globally misunderstood (Laville) and so constitutes an interesting field of action research especially in a coproduction services with users-citizens perspective.

As points The Godet – Durance – Mousli report, "technology is important, but it is not essential." The authors point out that only 20% of innovations have technical origin and 80% social one (2010, p. 21). We place in this perspective, which also often meets the prospects of "daily innovation" according to N. Alter.

We also outline the importance of socio-technical new digital devices and especially platforms as new intermediation devices such as caf.fr both to give information to users but also to develop new services in interaction with them. For M. Doueihy, these platforms are essential, «not because they control access and storage, but because they have become through the activities of the users, places of convergence between information, communication, knowledge and sociability» (2011, p. 17)¹⁰.

This role of platforms is important in the policy of the CNAF to develop new relations with users in our perspective of services coproduction (caf.fr).

5. Users? Recipients? Customers? Citizens ? Towards gradual Construction of Autonomy?

The approaches of public relations and public service missions have evolved. In the lengthy document explaining the COG 2013 - 2017, CNAF often uses the traditional term of "user" (in French, *usager*), using also often that of "beneficiary" or "recipient" (in French, *bénéficiaire*).

Both terms have been gradually supplanted in other Social Security funds as CNAMTS (Sick Insurance – *Assurance Maladie*), by "customer" ("*client*") in relation to the development of quality approaches. The terms of users and beneficiaries seem a bit too passive, corresponding to only receiving benefits, "customer" term can induce a strictly financial and commercial side in relation to a market and competition between agencies, that is not the case in the French Social Security.

Furthermore, the "customer" term is overused and can generate some debate as it has been underlined by the sociologist G. Jeannot (2010) in the scientific journal sponsored by the CNAF (*Informations Sociales*).

G. Jeannot stresses that, with the opening up to competition of the major companies of the French public sector (EDF, SNCF, France Telecom, La Poste, etc.), the

¹⁰ In French : « non pas parce qu'elles gèrent l'accès et le stockage, mais parce qu'elles sont devenues grâce aux activités des usagers, des lieux de convergence entre information, communication, savoir et sociabilité » (2011, p. 17).

"users" ("usagers") have become "customers" ("clients"). But have they gained with the change? For him, "nothing is less sure ... Freedom of choice greatly awaited is only apparent ... guaranteed quality of service and customer care are neglected."¹¹

He highlights the evolution of the term "user" since the Middle Ages, where it corresponded to community practices, user being a quasi "usufructuary". This old word was used in the early twentieth century by considering the user as a quasi shareholder of the public service. After 1950, the term was gradually devalued, the "user" receiving only a standard service for better and for worse. It is before this devaluation of the term "user" that has developed the use of the term of "customer" or "client". G. Jeannot emphasizes that "the choice of being customer is not the choice of the customer." He stresses the risk of generalization of an economy of "low cost".

In the recent years, with the risks of privatization and change of employees status with increased casualization, some speak of the risk of "uberisation".

For making a strong impression, G. Jeannot parodies the title of a book of A. Ehrenberg (The fatigue of being oneself or *La fatigue d'être soi*, 1998) speaking of "the fatigue of being customer". The depressed feeling is never far from the requirement of widespread performance which has developed in our ultra-productive society.

In a perspective of responsibility in a coproduction of services perspective, we prefer to speak of "user-citizen" (*usagers-citoyens*).

6. The case of Yvelines CAF: a Multichannel and Partnership Strategy

The Yvelines CAF has done the decisive choice to maintain a multichannel strategy for reception of users: physical (appointment in desks), paper (possibility to write directly to the CAF), telephone (call center) and internet via the platform caf.fr¹². In the main changes experienced in recent years, Yvelines CAF favors some aspects: changes in the pattern of interactions with the public emergence of new intermediation ways, etc. This policy is explained in a lot of Yvelines CAF documents: specific leaflets or annual documents of activity, etc.

We insist on the originality of this strategy based on the development of partnerships for digital facilitation (associations, local authorities, local missions or *missions locales*, etc.).

At the physical host level (reception), the main effort since 2013 focused on a reception when people come (flow management or *gestion de flux*) to a welcome by appointments. The telephone service provides immediate responses or proposes

¹¹ In French, "avec l'ouverture à la concurrence des grandes entreprises du service public (EDF, SNCF, France Telecom, La Poste, etc.), les "usagers" sont devenus des "clients". Mais ont-ils gagné au change ? Pour lui, "rien n'est moins sûr ... La liberté de choix tant attendue n'est qu'apparente ... la garantie de la qualité du service et le soin du client sont délaissés".

¹² www.caf.fr

specific appointments. Appointments are divided into two different levels or even three regarding the different cases of people concerned. A first level of 10 min with answers to users and scanning the situation and updating the file of the user via file caf.fr. A second level of 20 mn allows more complex answers and appointments more specialized in particular to clarify the rights. A third type of appointment is possible with social workers for specific situations, especially of precariousness.

The objective is to make converging more services to caf.fr platform. So multimedia spaces have been set up with new and efficient equipments available for the users-citizens, with the possibility of being accompanied by agents specifically trained, which corresponds to a new job, this aspect of creation of new intermediation jobs with users becoming more involved actors may be particularly stressed.

This strategy has been developed in recent years in various local sites (10)¹³.

The effort particularly focuses on the development of the platform caf.fr services and therefore to exchanges and digital records and try to better link to it other types of physical reception and mails or paper interactions. Today caf.fr platform allows the users to monitor their files, get their statement of benefits, estimate, request a service, report changes of location or coordinates declaration of its resources, make appointments, pay back debt, get information on benefits or aids from the Yvelines CAF.

In a spirit of continuous process of improvement of services to users, a special effort is done to the support of partners and beneficiaries to the digital or dematerialized uses (via caf.fr platform) including the development of digital workshops digital, labeling CAF partners (associations, local authorities, local missions, etc.) in relay points and with information booklets for services tailored to the different needs of users. It should be mentioned their diversity, with more or less sensitive sites with more or less difficult publics: for example reception in Mantes-la-Jolie and types of received public are very different from those of Versailles, Rambouillet and Saint-Germain -in Laye.

At December 31 2015, 83,355 distinct recipients or users (about 217,594) have logged at least once on the caf.fr site, with a total of 326,019 connections (25,516 for benefit applications, 148,362 for resource statements 99 925 to changes in circumstances, 52,216 for other procedures online), an increase of 35.6% (the target set by the CNAF being 20% increase in 2015).

We are in this approach to enhance the role of "users-citizens" in a perspective of commitment for a co-production of local services especially around new uses of ICT. But it is above all to meet the best and with the existing means with very different expectations of very different publics depending on the site: youth connected with their smartphones are very different of immigrants populations in precarious situations who sometimes need a translator (problem for understanding the foreign languages) in a physical host. With the challenge of managing queues or time spent waiting a telephone response compared to a call center. Objectives of improving

¹³ Mantes-la-Jolie, Les Mureaux, Chanteloup-Les-Vignes, Conflans-Sainte-Honorine, Sartrouville, Saint-Germain-en-Laye, Versailles, Saint-Quentin-en-Yvelines, Trappes, Rambouillet.

services are essential in different COG and are quantified and checked in evaluation processes.

These changes in the manners to interact with the different publics favor the emergence of new intermediation jobs, which constitutes a new field for future action researches.

The clearly stated goal, particularly with the use of ICT is to develop autonomy and public accountability (with a major training effort based on partner organizations), we favor as mentioned above the term "citizen", valued by Strobel as soon as 1994, speaking of the "modernization by the user", essential in a co-production of services perspective.

Some users yearn for more autonomy in their actions, and to be less dependent on schedules and sites of reception.

The public training dimension is essential. CAF Yvelines seeks to expand this based on local associations. As in the health sector with the concept of "expert patient" (or *patient expert*), it is to develop and train "relay citizens" (or *citoyens relais*) who serve as intermediaries with other users-citizens.

7. Conclusion

The crisis has worsened since 2008. It is not only that of ultra competition and financial obsession of the economy, it is also that of the "social bond" or "*lien social*" (Paugam) and solidarity.

In this cooperation with the direction team of Yvelines CAF and above all in other cooperation for creating new economic activities for young people, the position of the Paris-East researcher has changed, becoming that of "committed researcher", taken for us all its meaning and corresponding to a new personal approach to the RSU or Social Responsibility of the Universities, revisited as "social responsibility of the researcher." Having gradually become convinced that the future can be built from micro actions on the territory and on daily innovative practices: improving services to users by involving them more with the development of new intermediation jobs.

This paper is a first step of the evolution analysis work of a local public service over time (the "Branch family" of French Social Security System) in a view of modernization, involving autonomous "citizens" from the perspective traced several years ago by P. Rosanvallon to "rethink the Welfare State" and rediscover solidarity in a context of "Social and Solidary Economy."

For the Social Security Organizations and, in particular, the CNAF, it also corresponds to new services organizations positioned changing between 'market and solidarity' (Laville, 2010). In this way, we share the G. Jeannot fears on changes to services "low cost" and widespread competition from French public companies (EDF, SNCF, La Poste, France Telecom ...). Where this logic of open competition will finish? In this sense, the Welfare organizations and wider social sectors will correspond to the "new frontier" of opening to competition? For G. Jeannot, the logic of opening these services to competition follows a progressive logic that now seems inexorable. If the European Union, the principle of competition in the Treaty of Rome originally was subject to exceptions for certain services. Will they continue in the future?

The French model of social protection was increasingly isolated in a European Union won by the Anglo-Saxon neo-liberalism. Will the British Brexit largely corresponding to the fears for the future and the reject of European bureaucracy permit awareness in Europe of the need for "social bond" and of the limits of the only model of the market?

We inscribe resolutely in a radically different perspective, which is that to give full meaning to solidarity and rebuild the Welfare state, of course with efficiency and performance requirements, in a difficult context of increasing budgetary constraints. This is to bet on the ambivalent potential of ICT: they both present the risk of more constraints and controls, but they can be also present tremendous potential for autonomy and interactions (citizen's empowerment).

Ultimately there is the goal to articulate the notion of "resilience" (capacity of reaction in a difficult situation) at individual and collective levels with that of "reliance" (link, relationship, interaction) to help to the "sustainable development" of territories or to "meet the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland report, 1987)¹⁴. For S. Bertezene, evoking this issue in the Health sector as a major sector of Welfare Social protection, "the long-term vision is essential ... in the one hand, we must be attentive to the impact of operations on the environment, particularly on resources present and future; and, secondly, we must consider the impact of activities on future generations to leave them an environmental asset, socially and economically to ensure them a better life."¹⁵

The action of the CAF, particularly that of Yvelines, lies completely in this perspective, in the footsteps shown by the COG goals. It remains to continue to associate the best possible the users-citizens in an innovative coproduction of services perspective.

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¹⁴ In French, « *répondre aux besoins du présent sans compromettre la capacité des générations futures de répondre aux leurs* » (rapport Brundtland, 1987).

¹⁵ In French, « *la vision du long terme est majeure ... d'une part, il faut être attentif aux impacts des activités sur l'environnement, en particulier sur les ressources présentes et à venir ; et, d'autre part, nous devons considérer les impacts des activités sur les générations futures afin de leur léguer un actif environnemental, social et économique pour leur assurer une vie meilleure* ».

- Convention d'Objectifs et de Gestion (COG) entre l'Etat et la CNAF (2013 – 2017). Available on : https://www.caf.fr/sites/default/files/cnaf/Documents/DCom/Presse/Communiqu%C3%A9s%202013/Cog2013_2017_integrale.pdf
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A NOTE ON SERVICES IN THE EUROPEAN UNION REGULATIONS: IS DIGITAL CONTENT A SERVICE?

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The first section analyses European Union legal texts on the goods-services distinction. They view the former as tangible entities, while the latter covers all intangible ones. The writing of the key article on services in the EU main Treaty may also be confusing. The second section explains the new approach of the service that the economic analysis has developed, especially relevant in the context of the knowledge economy. The third section shows that the Single Market Digital Strategy of the European Commission faces difficulties caused by the outdated service definition it uses. The problems affect the VAT rate applicable to intangible goods, regarded as services (e.g. e-books vs. tangible books), and the Directives or Communications handling the provision of Digital Content. This concept, coined among other things to bypass the outdated definition, induces a contorted law treatment of intangible goods and, at least, undue contractual idiosyncrasies. Adopting the new economic approach of the service would solve the problems underlined and help fostering the digital economy.

1. Introduction

In a judgment issued on March 2015 the 5th, about a dispute between, among other countries, the French Republic and the European Commission (EC), regarding the VAT rate applicable to digital books, the European Union Justice Court (EUJC) was driven to reiterate the criteria defining services and the VAT rate for “electronically supplied services”. The Court confirmed that, as for the European Union regulation, digital books were such services¹⁶. Since those services may not benefit from a reduced VAT rate, digital books are to be taxed at the standard rate. Many observers consider that traditional paper and digital books are two forms of the same product, thus should not be fiscally discriminated. On March 2015 the 19th, four countries

¹⁶ “The supply of electronic books is an ‘electronically supplied service ...’ within the meaning of the second subparagraph of Article 98(2).”

(France, Germany, Italy and Poland) have officially asked the EC to put an end to this situation. However, among several legal difficulties, this wish is confronted to the definition of services adopted by EU, which weaknesses the EUJC ruling underlines. These circumstances call for a study of the good-service distinction in effect in the EU, its adverse consequences and the potential ways to overcome them.

Beyond theoretical matters, this subject is of major consideration since the EC has launched a Digital Single Market Strategy (COM 2015/192), aiming at “maximising the growth potential of our European Digital Economy” and “Creating the right conditions for digital networks and services to flourish”. The present approach regarding digital content might be rather detrimental to this strategy as it will be suggested.

The paper is organised as follows. The first section studies the definition of the service as it appears in European legal texts. It will be the occasion to show that it owes much to the old economic conception of the service, but also that the European law writing induces some confusion. The second section explains the new economic approach on the service and shows that it may help solving the digital product problems. The third section focuses on the specific regulation difficulties, brought in by the European view on the service, within the Digital Strategy, especially regarding the VAT rate and Digital Content matters. It offers several suggestions to overcome them.

2. The service in European official texts: a confusionist concept?

Most frequently Directives and European regulations use the notion of service without explaining it, as if it was straightforward. It is not an uncommon practice, since for example, the Vienna 1980 United Nations Convention on Contracts for the International Sale of Goods (CCISG), never defines what a good, or conversely a service are¹⁷ (UNO 2010). Nonetheless, EU regulations happen to provide elements of characterisation, referring to the Rome Treaty n°60 article (respectively n°57 Treaty on the Functioning of the European Union, TFEU), which is dedicated to services. This article states that: “Services shall be considered to be ‘services’ (...), in so far as they are not governed by the provisions relating to freedom of movement for goods, capital and persons” (Box n°1). Although it is not giving true clues on what services are, this approach delineates them by default.

2.1. A residual notion: the service is a non-good

As a matter of act, it is worth noticing that the text begins by declaring that *services* shall be *services*¹⁸, which is not entirely illuminating¹⁹. Nevertheless, the reasoning of

¹⁷ The Article #1, only states: “This Convention applies to contracts of sale of goods (...)”

¹⁸ To be more specific, above all, the sentence aims at restricting services to those which maybe usually provided for a remuneration.

¹⁹ The French version does only better on a pure literary point of view, since it avoids using twice the same word. It states that: “sont considérées comme services les prestations... ».

the Rome treaty indeed defines services by lack; as such, they correspond to economic transactions that are not concerning goods, capital or persons. While everyone may easily understand that services are not capital or persons, even if the sentence may seem rather strange, the key difference between goods and services remains implicit and unexplained. However, this manner of defining services may be related to the fact that the treaty is interested in services in the perspective of international trade. Consequently, it is most probably influenced by the Balance of Payments approach, which Current Accounts are traditionally split between goods and a huge conglomerate of transactions that were, at the time of the Rome Treaty, called 'invisibles' and are generally associated with services. In this perspective services are a complementary set to goods.

Several European texts may illustrate this view, for instance the 2006 VAT Directive states in its article 24, § 1: "Supply of services' shall mean any transaction which does not constitute a supply of goods" (TVA 2006/112).

Since a service is primarily defined as opposed to a good, it is necessary to delineate the characteristics of goods. Again, they are not explained in the European treaties. However, it is rather easy to understand, when reading other European legal texts, that they are characterised by their materiality or tangibility. This view is illustrated, for instance, by the 2006 VAT Directive which states in its article n°14 §1, that "'Supply of goods' shall mean the transfer of the right to dispose of tangible property as owner", or else by Directive 1999/44 sale which states even more clearly in its art.1 (b) "*consumer goods*: shall mean any tangible movable item, (...)". The (COM 2011/635) proposal for a Common European Sales Law, which will be commented below, uses the same definition in its article n°2, § h: "'goods' means any tangible movable items (...)".

Since services are not typically immovable items, the main discrepancy between the two economic entities has to be the tangibility vs. intangibility opposition. As it may be deduced, a side effect of the European view is to establish a separation between tangible and intangible goods, only the formers are deemed proper goods. Consequently since it is neither an asset (capital transaction) nor a person, an intangible good must be viewed as a service. Confirming line of reasoning, the article n°25 of the 2006 VAT Directive states that a supply of services may, inter alia, consist in "the assignment of intangible property". Therefore, digital goods are services and, for instance, a digital book, regarded differently from its standard book counterpart, belongs to them. The conjoined twins are disconnected. Following this European approach, the March the 5th judgement of the European Union Justice Court (EUJC), recalls that the e-book is: "an electronically supplied service"²⁰, since it is digitalised. To prevent any misunderstanding, it has to be mentioned that this characterisation does not come from the type of supply digital products require, which departs from that of standard goods (i.e. they commonly need e-sale). It is the very fact that immaterial goods are intangible that legitimates the classification. Even if, the case of e-books has been very much publicised, the reasoning regards all digitalised goods, including music, images, movies, software... Let us notice that in the economic litera-

²⁰ The supply of electronic books is an 'electronically supplied service ...' within the meaning of the second subparagraph of Article 98(2).

ture these goods are most often regarded as information goods (Shapiro and Varian 1999). Anyhow, the EU approach has high stake regulation consequences, as it will be shown in next sections.

Once selected, despite growing problems of relevance, the tangibility criterion becomes resisting and resilient. For instance, a revision of the VAT Directive aimed in 2009 at taking into account the technical progress occurring in the book industry²¹, and changed the sentence: “supply (...) of books” into “supply (...) of books on all physical means of support » (TVA 2009/47; see Annex n°1). Regardless of this change, the EU Justice Court 2015 ruling did not see any will to extend the notion of book, to digital books: the tangibility criterion remains unaffected. Let us mention that the exemplification list, provided in the VAT 2009/47 Directive Annex III, was not truly helping on this matter. Finally, a digital book is still deemed to be a service, while a paper book is a good.

This kind of classification problem is not unique. For instance it appeared previously in a fiscal dispute regarding the taxation of the printing industry, where the French government argued that “printing is a service activity”. The Court stated that “printing works should not be characterised as services, since the direct outcome of a printer activity is a material entity (...)” (EUCJ 1985)²². From what we may respectively induce that, according to this approach, both digital books and software publishing activities are services-producing activities. However, it will be argued below that they should not be regarded as such, because both produce information, although intangible, goods.

When focusing on the materiality vs immateriality opposition, case and European laws mainly draw their inspiration from the traditional economic views. Indeed, if the standard economic approach uses several criteria to differentiate the service from the good, among which non storability or the necessity to provide services in presence of a customer, intangibility is certainly the most prominent one. The 2004 World Investment Report for example, illustrates these views: “Services are usually perceived as intangible, invisible, perishable and requiring simultaneous production and consumption, while goods are tangible, visible and storable and do not require interaction between producers and consumers” (UNCTAD 2004 p. 145). By essence, digital goods such as e-books, when considered out off their carrier are obviously intangible and invisible.

This should be kept in mind since it has also major consequences for the sale contracts (COM 2011/83) especially its aftermath, i.e. online sales and digital content proposal (COM 2015/634).

Box n°1: service(s) in European treaties **Article 60 (Rome)/50 (TEC)/57(TFEU)**

²¹ The n°4 recital of the Directive 2009/47 declares in its Annex III: “Directive 2006/112/EC should furthermore be amended (...) in order to clarify and update to technical progress the reference to books”.

²² « On ne saurait qualifier de « services » les travaux d'imprimerie, dès lors que les prestations de l'imprimeur conduisent directement à la fabrication d'un objet matériel » EUCJ/CJUE 1985.

Services shall be considered to be 'services' within the meaning of the Treaties where they are normally provided for remuneration, in so far as they are not governed by the provisions relating to freedom of movement for goods, capital and persons.

'Services' shall in particular include:

- (a) activities of an industrial character;
- (b) activities of a commercial character;
- (c) activities of craftsmen;
- (d) activities of the professions²³.

Without prejudice to the provisions of the Chapter relating to the right of establishment, the person providing a service may, in order to do so, temporarily pursue his activity in the Member State where the service is provided, under the same conditions as are imposed by that State on its own nationals

2.2. Service or services-producing activities?

The n°60 article of the Rome treaty depicts another peculiarity, when it specifies that services includes inter alia: "activities of an industrial character; activities of a commercial character; activities of craftsmen; activities of the professions" (Box n°1).

This second problem derives from the equivalence drawn between the term *service(s)*, which in the article primarily designates an outcome (i.e. service provision), and the expression *services activities*, which refers to an economic sector or activity²⁴. In doing so there is an implicit but unwarranted logical shift. Yet, if services are mostly provided by services firms, they are also provided by firms belonging to other economic sectors, such as, for instance, manufacturing or construction. *Activities of an industrial character or of craftsmen*, which are included in the article's list, are typical manufacturing activities, which nevertheless may provide services when they perform repair or installation.

For instance, the craftsman action of building a chimney falls under manufacturing, but its repair or else the installation of a chimney kit, fall under service provision²⁵.

²³ This last word is a poor translation of the French « professions libérales », which meaning would have been better rendered by "self-employed professionals".

« Professional: this Major Occupational Group (MOG) includes occupations concerned with the study, application, and/or administration of physical, mathematical, scientific, engineering, architectural, social, medical, legal statute, biological, behavioral, library, and/or religious laws, principles, practices or theories. Some occupations are concerned with interpreting, informing, expressing, or promoting ideas, products, etc. by written, artistic, sound or physical mediums. (...) » CF. Standard Occupational Classification 2010 manual BLS.

²⁴ It is worth stressing that this kind of mix-up would not have been possible with goods. Indeed the word goods may not designate an activity, whereas that of services may.

²⁵ In this regard, Art. 8 of Regulation (2011/282) or its n°12 recital accurately explains: « It is necessary, (...), to establish that a transaction which consists solely of assembling the various parts of a machine provided by a customer must be considered as a supply of services (...)».

The two outcomes refer to separate legal contracts, on the one hand the sale contract and on the other hand the service contract (see further on). Nevertheless, it should be obvious that craftsmen activities, as well as “activities of an industrial character” are not services (activities). They do not belong to the same economic category as, self-employed professionals, or telecommunications, or else transportation activities... In other words, it is not because there may be manufacturing or construction services, that manufacturing or construction become services-producing industries. The article’s line that tends to assert the opposite is embarrassing and incorrect.

Finally, including activities (an economic sector approach) in a characterisation of the service (product approach), tends to obscure the whole article.

It is worth reminding that, on a statistical point of view, the two perspectives are undoubtedly distinct. On the one side there are activities classifications, such as for instance the UNSTATS²⁶ International Standard Industry Classification (ISIC), on the other side product classifications, such as for instance the UNSTATS Central Product Classification (CPC). Consequently the service, as an outcome entity, cannot be mistaken with services activities. The Balance of Current Accounts’ approach, which understandably the writers of the Treaty article had in mind, basically follows a product rationale, inspired by the CPC²⁷.

The product / economic sector muddle, brought in by the Rome Treaty, eventually goes through most European regulations. Sometimes legal texts regard the service as a provided entity (product approach; VAT Directive), sometimes as an activity (economic sector approach; Services Directive), but they all refer to the same n°60 article without specifying what aspect is addressed. In this way, article n°4 of the 2006 Services Directive, when referring to the beginning of the aforementioned article, reads: “ ‘service’ means any self-employed economic activity, normally provided for remuneration” (DIR 2006/123), thus targeting services activities. The reference is rather incorrect since, in the article, the corresponding sentence concerns service provision and not services activities. It is thus inaccurately that the word service is here employed for services activities, even if it designates the Directive main object.

At this stage of the analysis, it is worth emphasising that, to avoid the confusion between the service and the services activities, the economic literature frequently save the singular service for the outcome, and uses the plural services to designate activities. But the n°60 (57 TFEU) article, from its very beginning, utilises the plural services, especially when designating an outcome, which certainly adds interpretation complications. Moreover, in the last paragraph the English version refers to “the person providing a service”, whereas the French text reads “le prestataire”, which may relate to a natural person, but more certainly to a moral one (i.e. a firm). The English version is more ambiguous, because many readers will read a *natural* person rather, than a *moral* person. For its part, the services Directive surely entertains the confu-

²⁶ United Nations Statistics Division.

²⁷ Sure enough the discussed wording of the Rome Treaty was probably a simplified writing. Nevertheless, being included in a seminal law Treaty, it produces undue consequences. Erroneous, because over simplified writings, may have adverse legal consequences.

sion, when it uses the singular service to designate a services activity. This kind of mix-up might illuminate the problems met with e-books (respectively digital products), which categorisation within the service category might come from reflections about the alleged services-producing firms that provide them. In a nutshell, there might be a mix-up between the potential cataloguing of the provider, and that of the provided outcome.

In this regard, in the VAT Directive (2006/112, article n°24; Box n°2), the provision of services is defined in relation with a delivery; in substance a service provision is a delivery of service²⁸. Yet above all, the delineation of the service as a product, like for all categories of products, should rather be done using fabrication specificities²⁹. In not doing so, when pointing on sale (delivery), the European law approach both, indecisively separates goods from services and incorporates Trade within Services provision.

Article 25 of the VAT 2006/112 Directive illustrates this extension: “A supply of services may consist, inter alia, in (...) the assignment of intangible property (...)” (Box n°2). A service provision may thus consist in the pure transfer of a good³⁰, i.e. a simple change in ownership, with no transformation³¹. From an economic point of view, this operation belongs to the Trade activities. Indeed, as underlines the 2008 ISIC manual: « sale without transformation » belongs to wholesale or retail trade (G major section)³². Providing a very service supposes at least a minimal transformation of the material object or the individual on which it is applied. Incidentally in agreement with this economic approach, the implementation regulation (REG 2011/282) creates a warranted exclusion to the VAT Directive general principles, when it states that: “The supply of prepared or unprepared food or beverages or both, whether or not including transport but without any other support services, shall not be considered restaurant or catering services (...)” (Article n°6 al.2). Although, the rationale of this considera-

²⁸ The French text is clearer than the English one: « Est considérée comme « prestation de services » toute opération qui ne constitue pas une livraison de biens ». The English translation refers to the term “supply” which is the counterpart of “offre” in French, whereas the word “prestation” designates both the making and the delivery of a service. Thus the expression “service provision” would have been better. The sentence would have been: “Shall be regarded as services provision any economic transaction that is not a delivery of goods”.

²⁹ Those circumstances may result from the definition of economic activity coined by the European Case Law, which ignores production and is only interested in exchange (Bernard 2009). In the economic sense, according to the French statistical division INSEE: “The economic activity of a productive unit is the process which leads to the manufacturing of a product or to the provision of a service” « l’activité économique d’une unité de production est le processus qui conduit à la fabrication d’un produit ou à la mise à disposition d’un service ».

³⁰ Provided it is intangible, this aspect will be addressed below.

³¹ « ‘Electronically supplied services’ (...) shall include services which are delivered over the Internet or an electronic network and the nature of which renders their **supply essentially automated and involving minimal human intervention**, (...) », (Regulation 2011 / 282, art. 7 al.1) bold emphasis added.

³² « This section includes wholesale and retail sale (i.e. sale without transformation) of any type of goods and the rendering of services incidental to the sale of these goods. Wholesaling and retailing are the final steps in the distribution of goods. (...) Sale without transformation is considered to include the usual operations (or manipulations) associated with trade (...) » (UNO 2008 p. 179).

tion is not explained to the reader and may seem illegitimate given EU references, its economic motive comes straightforwardly from the fact that, what the quoted sentence merely describes, is Trade.

Nonetheless, besides classification considerations, it is of major importance to analytically separate the economic operation of making available (Trade), and the entity which is subject to the transfer, which may be a good or a service. European texts under consideration tends to assimilate the former with the latter, when the delivery is made online (Cf. Article n°7 of the implementation regulation 2011/ 282 al.1&2). Yet in Trade, when VAT is at stake, the tax weights on the product sold, not on the economic operator.

Box n°2: Directive 2006/112/CE VAT **Supply of services**

Article 24

1. 'Supply of services' shall mean any transaction which does not constitute a supply of goods.

(...)

Article 25

A supply of services may consist, inter alia, in one of the following transactions:

(a) the assignment of intangible property, whether or not the subject of a document establishing title; (...)

This section explained that European texts regard service as a non-good, i.e. primarily a non tangible entity. Besides, the writing of the main Treaty article, give rise to confusion between the service as a product, and services as activities. The regulations also incorporate Trade in services. The major upshot is that digital goods are seen as services. For instance an e-book is regarded as a service, whereas a traditional book is with no question a good. The two forms of the same product are thus analysed in disconnected ways. The second section will show that recent economic analyses provide a way to overcome those inopportune views.

3. The new economic approach for the service

New Information and Communication Technologies (NICT), especially digitalisation and internet access, have made obsolete the traditional views on the service. On the one hand, they loosen the proximity relationship that linked consumers and providers, since several services can be provided from a distant place. On the other hand, several goods can be dematerialised and instantly provided to the consumer using download, conferring them the look of services, i.e. a combination of intangibility and customer-provider direct link. Several authors thus consider that the separation between goods and services has faded away, or even has lost significance (Pilat and Wölfl 2005). However, as maybe understood with the EU literature and at least for fiscal or legal matters, this difference is of critical interest. Yet, sticking to the old way of thinking, as UE law or CJEU do, is less and less defensible. Fortunately, based on Hill's works (1977, 1999) there has been a revival of the economic notion of service, which may help overcoming EU regulations ambiguities.

3.1. The ownership criterion

The new approach does not rely on tangibility to separate goods from services, but on the contrast between flows and stocks. A service is a flow, meaning that it is a transformation: “a change in the condition of a person, or of a good belonging to some economic unit, which is brought about as the result of the activity of some other economic unit, with the prior agreement of the former person or economic unit” Hill (1977, p. 318). Being a change, the service cannot be seized, thus is indeed not tangible. This fact has often been equated to immateriality, giving rise to the idea that the contrast between goods and services rested primarily on physicality. Sure enough, tangible movable items are goods as for instance the 1999/44 Directive on certain aspects of the sale of consumer goods states (Art. 2 al.b). However, this view is too narrow and is a misleading simplification: on the one hand goods are not only tangible items, on the other hand regarding services immateriality is a result, not a founding criterion. Intangibility is thus neither a decisive, nor an exclusive attribute. More decisive is the fact that a service cannot be cut off from its provider or recipient, i.e. is not in itself separable. As a consequence, it is not prone to ownership rights, whereas a good definitely is, whether tangible or not.

A flow is indeed not an identifiable, individualised entity, over which ownership rights could be established. Hill (1999 pp. 441-42) stresses that: “Because it [service] is not an entity, it is not possible to establish ownership rights over a service and hence to transfer ownership from one economic unit to another”. It is necessary to make clear the reasoning; the very service, i.e. the outcome of the productive process, cannot give rise to ownership rights, even if it may be applied on an object apt to ownership rights. This feature chiefly stems from an actual unfeasibility, owing to production specificities, which prevents to isolate the proper provided service. For instance, repair is a process which is applied on third party property, which outcome is not transferable disjointedly from the means (whether human or technical) that allow performing it. As for the repaired object, it accepts ownership rights. When the process applies to a natural person (e.g. health or education services), no ownership rights may be established.

This perspective may be connected to the traditional civil law partition between Real Rights, which are attached to a thing, and Personal Rights which a person possesses in relation strictly to the duties owed to him by others. Real Rights give an immediate and direct power on the considered thing, which is expressed in ownership rights; whereas Personal Rights posit their owner in front of a person with whom he is linked by a contractual agreement. They give their owner the right to require from others the fulfilment of obligations.

With the new approach, the good-service separation is preserved and grounded on more illuminating and effective principles. One, rather unexpected but decisive feature, is that proper services cannot be stolen, at least in the traditional sense that applies to goods. This feature stems indeed from the fact that, by essence a flow is not seizable or separable, thus stealing it, is out of reach. From an analytic point of view, this is entirely consistent with the fact that a service cannot bear ownership rights. For instance, stealing a service of transport supposes to rob either, the transportation means (whatever it may be), or the transportation voucher, or else to be a stowaway. In none of these circumstances the service itself is stolen, i.e. in a separated way that

might allow using it further on. Even the illegal taking of a transportation ticket is not stealing a service, but an instrument of purchase.

The new economic approach has been endorsed by the System of National Accounts (SNA) (see box n°3), and the Balance of Payments (BoP) manuals.

Box n°3: The service in the UNO 2009 SNA manual

« Services are the result of a production activity that changes the conditions of the consuming units, or facilitates the exchange of products or financial assets. (...) services are outputs produced to order and typically consist of changes in the conditions of the consuming units realized by the activities of producers at the demand of the consumers. [They] are not separate entities over which ownership rights can be established. They cannot be traded separately from their production. By the time their production is completed, they must have been provided to the consumers. »

SNA 2009 § 6.17

In a way EU law, acknowledges that ownership rights are connected to goods. The 2006/112 VAT Directive Art. 14 al.1. reads: “ ‘Supply of goods’ shall mean the *transfer of the right* to dispose of tangible property as owner”; the Directive on consumer rights (2011/83) art. 2. 5 states: “ ‘sales contract’ means any contract under which the trader *transfers or undertakes to transfer the ownership* of goods to the consumer” (italics emphases added). In both cases, goods are associated with ownership or transfer of rights; conversely services should be recognised being deprived from this characteristic. Nevertheless, EU regulations do not draw the full consequences of this feature, because they are not fully aware of its critical nature. This has adverse effects.

3.2. The case for intangible goods and originals

An adverse consequence of the EU traditional views on services is that intangible goods are treated as quasi-services. However, this view of principle is not workable (see third section). The new approach on the contrary promotes an integrated and more consistent treatment of both material and immaterial goods, distinct from that of services. As such, it allows conciliating the treatment of goods independently from their physical aspect. This sub-section explains the new approach on intangible goods, which are composed of two classes of goods: originals and copies.

The new economic approach calls immaterial goods such as patents, source code of software, architect plan, copyrights... “originals”. Even if an original may be embedded in a physical carrier, the original itself is immaterial, because it is the result of an intellectual creation. It must be stressed that the original is not the first physical materialisation of a plan, book, patent, music or movie, the original is the corresponding intellectual production that may be stored on a physical mean (Hill 2003). As Hill’s (2003 p. 13) puts it: “(...) the author’s manuscript of a book, such as a new Harry Potter book, is not the original. The original consists of the original story and ideas which are contained in the manuscript, and then copied into subsequent printed books”. Thus the original is pure information, but organised in a specific way that enhances knowledge. The term original has been chosen to highlight that it is the outcome of a creative process and that its value stems from the very first outcome of this process. An original is a good as Hill (1999 p. 441-42) has explained: “An original is the archetypal immaterial good. It is a good because it is an entity over which ownership rights

can be established and which is of economic value to its owner". It possesses all the features of merchandise, for the physical aspect.

Originals must be distinguished from their copies for two reasons.

On the one hand, contrary to a transaction concerning an original, a transaction concerning a copy is linked to its mode of transfer, i.e. to its final carrier. When an editor buys an original novel, it may have a paper or a file appearance. Nevertheless, the contingent carrier does not alter its value or the agreed price. When a customer buys a copy of a novel, he chooses between a paper book and an e-book (good purchase), or else a library or online temporary access (service purchase), the transaction and the price are attached to the form of the sale, i.e. the provision mode.

On the other hand an original is an asset, whereas a copy is an ordinary good. In other words originals belong to investment goods, because the expenses they have required will generate future incomes, i.e. will have durable revenue effects. Copies are consumption goods, whether final or intermediary. This perspective is now adopted by the last revisions of SNA and BOP (IMF 2009 § 10.138).

An original may be duplicated as many times as necessary with no alteration of information. These copies are ordinary goods, which, especially in the case of digital copies, might be viewed as, as effective as the original, since they are truly alike. Nevertheless, the contract, rights and obligations that are attached to each of them are not alike. For instance a consumer good contract does not permit extensive duplication. The type of the contract also determines within which category, i.e. goods or services, the provision of a good falls. When a good, whether tangible or not, is sold outright the transaction relates to a sale contract. When it is rendered accessible through a contract of license use (limited duration of use) or access (remote file operated on the cloud), i.e. being rented, the transaction is a service one. In this latter case there is no ownership transfer, only a temporary right to use. These views are essential to the treatment of digital content in the proposal Directive (COM 2015/634, see further on).

4. Services and information goods within the digital strategy

The EU views, regarding goods and services, have undesirable consequences on recent regulations aiming at fostering the Digital Economy. Because they are not entirely workable, they induce difficulties on the treatment of digital goods, they generate the need for special cases and contractual contortions. Those difficulties constitute a significant burden and might impede the goal sought. Two fields have especially been affected: VAT and online Digital Content provision, which both the Digital Strategy covers.

4.1. Adverse consequences for VAT of the outdated notion of service

In the Digital Single Market Strategy for Europe Communication the EC stresses states that: « The Commission is working to minimise burdens attached to cross-border e-commerce arising from different VAT regimes, provide a level playing field for EU business and ensure that VAT revenues accrue to the Member State of the consumer » (COM 2015/192 p. 8).

According to EU law, only goods and a few selected services may benefit from reduced VAT rates (Annex n°1). Consequently to fulfil the aforementioned goals, there is a need of a clear understanding of what a service is, and a precise delineation of the boundary between goods and services. But on these aspects, the EU approach is somewhat unworkable and surely outdated.

A minor consequence of the aforementioned problems is related to the categorisation of the production of public utilities, such as electricity, gas... At least, as from Directive 1999/44/EC (Art.1 al.2b), EU law regards their outcome as services³³, because prima facie they look intangible. It is worth remarking that this seeming intangibility is not of the same nature, as that of information goods. It is merely visual, because the public utilities outcomes may be tangible by other major senses, such as feeling or the sense of smell, or even in some circumstances that of hearing. Nonetheless, since several EU members wish to be able to apply reduced VAT rate to public utilities, an exception to EU principles had to be created. Indeed Art. 15. al.1 of the VAT 2006/112 Directive states: "Electricity, gas, heat, refrigeration and the like shall be treated as tangible property". In fact this special provision might have been avoided. Because they are separable from their provider as well as their recipient, and accept ownership rights, these outcomes are actually goods. Moreover, their sale, when priced by the volume, should plainly belong to the sale contract (see next sub section). There is hence no need of juridical complications or contortions; public utilities have only to be recognised as goods-producing, it would be much simpler and effective.

The major adverse effect nevertheless comes with the dichotomous treatment of information goods, depending on whether information is embedded in a carrier or not.

Indeed (intangible) digital goods are regarded by EU principles as services, whereas their material equivalents, are regarded as goods, thus inducing fiscal distortions (for instance with e-books). Since the carrier, i.e. the physical aspect, is not the main source of the economic value, it should not serve as a determining characteristic. EC is well aware of the problem and has proposed two ways to overcome it; both are contorted and rather unsatisfactory.

First, concerning the fiscal distortion, EC advertised in May 2015 his intention to re-examine the case of e-books in the next future³⁴: « The Commission will (...) explore

³³ For instance see recital 5 of Directive 2011/83 on Consumer Rights (Annex n°1).

³⁴ Reiterated it in April 2016 the 7th.

how to address the tax treatment of certain e-services, such as digital books and online publications, in the context of the general VAT reform.” COM (2015/192 p.8). This orientation however threatens creating a new particular case for “certain e-services”, especial to “online publication”. Since EC appropriately wishes to avoid “discriminations between suppliers” or “fragmentation between the different distribution channels” (recital 11 and 12 of COM 2015/634), it would be much simpler, more consistent and more effective, to regard those pseudo “e-services”, as what they actually are: an element of the intangible goods set. This would also prevent from creating distortions against others intangible electronically provided goods, such as music or movies, also incorrectly regarded as e-services. In other words, all information goods should be regarded as goods. It would be an effective way to foster e-economy, since all the corresponding digital goods would be on the same fiscal level as their tangible counterparts.

Since this approach might raise the fear that an adjustment of EU Treaties would be required. It is worth emphasising that the Treaties do not preclude intangible goods from being goods, only the derived regulations do so.

Second, EC endeavoured in 2015 to eliminate the dichotomous situation created for digital content, with the (DIR 2011/83) Consumer Rights Directive (See annex n°2), launching two combined proposals. The first “on certain aspects concerning contracts for the online and other distance sales of goods” (COM 2015/635), otherwise called the Online Sale Directive, aims at offering an European law framework for goods sold online. The second, the proposal “on certain aspects concerning contracts for the supply of digital content” (COM 2015/634), also called the Digital Content Directive, is devoted to all digital content (i.e. mainly service alike supposed entities).

Because digital content included in a carrier is correctly regarded as a good by EU principles, but for inappropriate reasons, the abovementioned effort has generated regulations complexities. At first the 2011/83 Consumer Rights Directive, had decided to include this so-called tangible digital content, within the sale of goods contract. Indeed its recital (19) states: “If digital content is supplied on a tangible medium, such as a CD or a DVD, it should be considered as goods within the meaning of this Directive”, i.e. within the scope of this Directive they belong to the sale contract (Annex n°2). But a second thought convinced the EC that, splitting information goods between tangible and intangible was not actually consistent. Accordingly, Recital 11 of the Digital Content proposal (COM 2015/634) declares: “this Directive should apply to all digital content independently of the medium used for its transmission”. The new proposal hence reverses EC views and intends to incorporate information goods in the same Directive irrespective to their tangible or intangible nature. Its Recital (12) reads: “this Directive should apply to goods such as DVDs and CDs, incorporating digital content in such a way that the goods function only as a carrier of the digital content. The Directive should apply to the digital content supplied on a durable medium, independently whether it is sold at a distance or in face-to-face situations, so as to avoid fragmentation between the different distribution channels”. But still, the EC did not change its erroneous “materialist” principles. In other words the implicit reasoning is: despite the fact that tangible digital content is a good but, intangible digital content a service, they will be addressed jointly. This move generates some sort of a paradox and calls for extraordinary legal provisions.

This contorted solution induces complexity on two grounds.

First it necessitates separating digital content integrated in physical goods such as CDs and DVDs, from that integrated in other goods, such as washing machine or cars... which cases would remain treated by the Online Sale Directive dedicated to standard goods (COM 2015/635). Indeed, recital (13) of this proposal Directive, states: “This Directive should not apply to goods like DVDs and CDs incorporating digital content in such a way that the goods function only as a carrier of the digital content. **However, this Directive should apply to digital content integrated in goods such as household appliances or toys** where the digital content is embedded in such a way that its functions are subordinate to the main functionalities of the goods and it operates as an integral part of the goods” (COM 2015/635; bold emphasis added). Yet, the separation between the two types of goods embedding digital content, does not seem so easy to implement. As Mak (2016) puts it: “(...) one may wonder **whether that distinction is workable in practice**. If, for example, the software in a car is hacked, that might also influence the safety of the car for driving. In that case, are we dealing with a case of non-conformity of goods or non-conformity of digital content (in relation to its security)?” (bold emphasis already in the original text).

Second not all the properties of the tangible information goods would be addressed by the extended (COM 2015/634) proposal on Digital Content. Several would remain addressed by the previous 2011/83 Consumer Rights Directive. The recital (12) of the 2015/634 proposal reads: “The Directive 2011/83 should continue to apply to those goods, including to obligations related to the delivery of goods, remedies in case of the failure to deliver and the nature of the contract under which those goods are supplied. The Directive is also without prejudice to the distribution right applicable to these goods under copyright law”³⁵. Therefore the juridical remits of CDs DVDs sale and use would be dealt by two Directives, although presently only one suffices.

Both envisioned solutions add complexity. It would be simpler and more effective to regard all these products as information goods, and address them as such. It is most probable that this complexity will constitute a burden for the strategy sought and for further regulation development. Besides, to fulfil its all-encompassing goal, the EC broadly extends the concept of Digital Content, so as to include as mentioned both intangible and tangible information goods, but also information services (see Annex n°2). This move, combined with the outdated view on goods and services, has consequences in the field of contracts, which the next sub-section addresses.

³⁵ As a matter of fact, the reading of this provision is far from being straightforward, especially in the French version. A clarifying suggestion would be to interchange “including to” with “especially concerning” in the published document. As for the French version: “La Directive 2011/83/UE devrait continuer à s’appliquer à ces produits, notamment aux obligations relatives à la livraison des biens, aux modes de dédommagement en cas de non-livraison et à la nature du contrat en vertu duquel sont fournis les biens ». An interchange of “notamment aux obligations », with « notamment pour ce qui est des obligations »... would help the reader.

4.2. A non sale, non service contract for on line sale and digital content?

The European digital single market strategy for a “*better access for consumers and businesses to online goods and services across Europe*” (COM 2015/633), aims at adapting the legal framework set by the 2011/83 Directive on Consumer Rights, to the quick economic change on online markets. It relies on the two complementary projected Directives that were already evoked above: i.e. the (COM 2015/635) Online Sale proposal and the (COM 2015/634) Digital Content proposal³⁶. As explained in the previous sub-sections, the first Directive neither applies to services, nor to digital content including “any durable medium incorporating digital content where the durable medium has been used exclusively as a carrier”. Hence all provisions concerning the supply of digital goods are gathered in the second Directive, together with those concerning digital services (see Annex n°2). As such the new strategy aims at creating a specific harmonised European legal frame for all types of digital supply. But in doing so it protracts old problems, while raising several new ones.

Indeed, the will for a global integrated approach is confronted to the wrong conception of the service vs. good delineation. This prevents giving a clear answer to the question: to what type(s) of contract(s) should the supply of digital content belong? Moreover this also prevents understanding that, if the true nature of that dissimilarity was understood, it would be much simpler and more effective, to relate digital content supply to the corresponding, sale, service or rental contracts.

4.2.1. The Consumer Rights Directive 2011/83 idiosyncratic approach.

Usually, depending on the nature of the supplied object, the supplier-customer relationship may belong to the sale, the service or the rental contracts. However, the present Directive (DIR 2011/83) on Consumer Rights, decided that the supply of public utilities and intangible information goods, would not belong to these known contracts (see Annex n°2).

Since EU regards Public Utilities and intangible information goods as services or so, their supply should understandably belong to the services contract. Yet, it does not fit, because supplying these products is not actually selling a service. Indeed these pseudo-services are provided like goods (see previous sub-section), for which a definite transfer and a time of possession may be identified. Whereas, for instance, the provision of a service is done on an extended period of time (Box n°3). As it may be understood, the dissimilarities in the supply of goods and services induce significant contractual divergences (see Mak 2016 and also next paragraphs)³⁷. Anyhow, be-

³⁶ Even if it belongs to the same package, the paper does not consider the (2015/627) proposal concerning the cross-border portability of online content services in the internal market, which object is too distant from that of the article. Anyhow, online content services should not be mistaken with the e-supply of digital content services.

³⁷ The Directive 2011/83 depicts one example, within its recital # 40: “In the case of service contracts, the withdrawal period should expire after 14 days *from the conclusion of the contract*. In the case of

cause of its superseded principles; EU law could not recognise the outcome of those activities under consideration as proper goods. Moreover, because of workable incompatibilities, it could not include them within the services contract. Consequently it created for them an idiosyncratic situation, which is neither that of sale, nor that of service contracts. Recital (19) of actual Directive 2011/83 Consumer Rights, indeed states: « (...) Similarly to contracts for the supply of water, gas or electricity, where they are not put up for sale in a limited volume or set quantity, or of district heating, contracts for digital content which is not supplied on a tangible medium should be classified, for the purpose of this Directive, neither as sales contracts nor as service contracts”. It is rather unexpected and inexplicable. On the one hand, why the sale of public utilities’ outcomes, which usually goes by volume and which bear the key characteristics of goods, do not belong to the sale contract? On the other hand, why intangible information goods, which are sold outright are not tied to the sale contract, while others are not linked to the appropriate, rental or service contract? The new Digital Strategy unfortunately prolongs that nebulous view.

4.2.2. The new 2015 Digital Strategy proposals protract the singularities

The “neither sales contracts, nor service contracts” orientation, is endorsed by the Single Market Digital Strategy proposals. Creating a specific approach for all Digital Content is certainly a way to bypass the lack of understanding of what truly distinguishes goods from services, but unfortunately it tends to develop contractual confusion and fragmentation.

The Digital Content Directive proposal purposely adopts a very broad approach encompassing both information goods and e-services: « the definition of digital content is deliberately broad and encompasses all types of digital content, including for example, downloaded or web streamed movies, cloud storage, social media or visual modelling files for 3D printing, in order to be future-proof and to avoid distortions of competition and to create a level playing field” (COM 2015/634 p. 11). But as Sénéchal (2015) already remarked about the Common European Sales Law Directive (COM 2011/635), the growth of digital supply does not cause the disappearance of the “logic of possession”. Thus it is crucial to remember that --for good reasons-- digital supply may still meet the sale economic model and its contractual framework. The attempt to create an idiosyncratic digital content supply contract, leads to something rather fuzzy. So she pleads that, it would be more consistent to separate the contractual treatment of the supply of “digital content”, in two different ways, depending on that “logic of possession”. On the one hand, the sale contract would fit for the possession compliant digital content (i.e. according to this paper: information goods). On the other hand, service or rental contracts would apply for the deprived “logic of possession” digital content (i.e. according to this paper: e-services). In the field of the Common European Sales Directive proposal (COM 2011/635), it could have been

sales contracts, the withdrawal period should expire after 14 days from the day on which the consumer or a third party other than the carrier and indicated by the consumer, *acquires physical possession of the goods*” (italic emphasis added).

achieved by simply removing all references to “access” in the definition of the contract for supply of digital contract (Sénéchal 2015 p.450). Needless to say, that those juridical suggestions would have matched with the new good-service approach and confirm its soundness.

The Common European Sales Directive (COM 2011/635) was postponed in late 2014, but the present Online Sale Directive proposal (COM 2015/635) is somehow its child. Many of its provisions find their origin in it (see COM 2015/635 p. 14). Unfortunately the clarifications called upon by Sénéchal (2015) have not been listened. On the contrary, all Digital Content has been included in the Digital Content Directive proposal (2015/634), taking away the link with the Online Sale of Goods for information goods.

The Digital Content proposal Directive (COM 2015/634) leaves to the Member States the choice to decide how to classify digital content supply between, sale, service, rental or *sui generis* contracts. This choice is surprising for a full harmonisation Directive, but it expresses an attempt to avoid cutting through practical and theoretical dilemmas, and probably conceals a desirable choice.

Two sources of dilemmas are at stake. On the practical hand, one stems from the fact that Member states have already begun to choose between the various contractual possibilities. This aspect is nevertheless out of the focus of this article. On the theoretical hand, the other dilemma stems from the will to apply an integrated approach to all digital content supply, irrespective of their good or service nature, which, as a matter of fact, is wrongly understood. Allowing Member States to choose may be viewed as a Solomon King’s type solution, but it is also a Pontius Pilate’s one. It will necessarily lead to various choices, hence a legal fragmentation among the EU. The truth however is that, the extent of choice is actually restricted, by definite specificities of the various types of supply addressed in the proposal. As Mak (2016 p. 15) points it: “Whereas certain types of digital content could be treated as goods—e.g. software, e-books, content delivered on a tangible medium—other types do not fit well in this framework. Services through which digital content provided by the consumer is stored or processed (e.g. cloud services or social media platforms) are not so much similar to contracts for the sale or supply of goods, as they are to services. In these types of contracts, the performance rendered by the supplier is not related to the supply of a good—tangible or intangible—but rather to the supply of a service, which exists in storing data provided by the consumer, or enabling the sharing of such data. In fact, the proposed Directive even refers to these types of digital content contracts as services (Art. 2(1))”. It may also be added that conformity to the contract, which is one of the main subjects of the proposal, does not embody the same obligations for the supplier of digital content, whether concerning goods-type supply, services-type provision or else rental-type. Anyhow, according to Mak (2016) a consistent and desirable solution appears to be the *sui generis* regime, in other words a “neither sales contracts, nor service contracts, nor rental contracts” solution.

While this solution prevents the legal fragmentation among Member States, it does not overcome the theoretical difficulties. The very source of juridical problems concerning the so-called digital content supply does not primarily stem from its digital nature, but from a poor understanding of where the critical boundary between goods and services is. What she points out is perfectly illustrating that weakness. When all information goods are regarded as goods, contractual exceptions are no more

needed, and the classification of digital content supply between sales or service contracts comes easily.

Surely enough Recital 11 of COM 2015/634 digital content Directive rightly stresses that: "Differentiating between different categories in this technologically fast changing market is not desirable because it would hardly be possible to avoid discriminations between suppliers". This goal would much better be fulfilled with a clear understanding of what goods and services are, than by setting a broad and fuzzy category of digital content, which necessarily remains technology dependant, associated to a *sui generis* contract.

5. Conclusion

It has been shown that EU regulations relies on an outdated conception of the good-service boundaries, based on tangibility. This view, largely shared in the 1960-70 economic literature, has now been challenged by a new one. The new perspective refers to the capacity to establish or not ownership rights and better fits to the knowledge economy. It was adopted by the SNA and the BoP in 2008.

Actually, the EC has launched a Digital Single Market Strategy aimed at fostering economic growth in the digital and internet fields. However, this strategy faces difficulties regarding the VAT rate and the legal framework to be set for the provision of Digital Content. In both domains the outdated definition of the service that the EU uses, creates fiscal distortions, induces legal contortion (inventing unnecessary exceptions, for instance for Public Utilities), and steers making up an idiosyncratic type of contract ("neither sale, nor service" contract). Altogether the superseded definition of the service generates complexity in the regulations. All these problems might be solved by adopting the new approach on the service and recognising that digital goods are goods, instead of services. Consequently, many legal exceptions would disappear and the legal ties between sellers and customers, applicable to digital content, would easily fall under the usual categories of sale, service or rent. This move would not need modifying the EU Treaties since, although the TFEU n°60 article on services incorporates several weaknesses, it does not state that their characteristic is intangibility.

ANNEXES

N°1: THE SUPPLY OF GOODS AND SERVICES IN VAT DIRECTIVES 2006/112 ANDD 2009/47 (EXCERPTS)

Art. 14

1. 'Supply of goods' shall mean the transfer of the right to dispose of tangible property as owner.

Art. 15

1 Electricity, gas, heat, refrigeration and the like shall be treated as tangible property. (...)

Art. 24

1. 'Supply of services' shall mean any transaction which does not constitute a supply of goods. (...)

Art.25

A supply of services may consist, inter alia, in one of the following transactions:

(a) the assignment of intangible property, whether or not the subject of a document establishing title; (...)

Art. 56 Supply of miscellaneous supply services (...)

(a) transfers and assignments of copyrights, patents, licences, trade marks and similar rights;

(...)

(k) electronically supplied services, such as those referred to in Annex II;

Art. 98

Reduced rates (...)

2. The reduced rates shall apply only to supplies of goods or services in the categories set out in Annex III

Of which (as modified by the 2009/47 Directive)

'(6) supply, including on loan by libraries, of books *on all physical means of support* (including brochures, leaflets and similar printed matter, children's picture, drawing or colouring books, music printed or in manuscript form, maps and hydrographic or similar charts), newspapers and periodicals, other than material wholly or predominantly devoted to advertising;'; (italic emphasis added)

N°2: SERVICES, GOODS AND DIGITAL CONTENT IN DIRECTIVE 2011/83 AND PROPOSAL 2015/634

A) in the Consumer Rights 2011/83 Directive (excerpts)

(5) (...) in particular in the services sector, for instance utilities, (...)

(19) Digital content means data which are produced and supplied in digital form, such as computer programs, applications, games, music, videos or texts, irrespective of whether they are accessed through downloading or streaming, from a tangible medium or through any other means. Contracts for the supply of digital content should fall within the scope of this Directive. If digital content is supplied on a tangible medium, such as a CD or a DVD, it should be considered as goods within the meaning of this Directive. Similarly to contracts for the supply of water, gas or electricity, where they are not put up for sale in a limited volume or set quantity, or of district heating, contracts for digital content which is not supplied on a tangible medium should be classified, for the purpose of this Directive, neither as sales contracts nor as service contracts. (...)

Art. 2

(3) 'goods' means any tangible movable items (...)

(5) 'sales contract' means any contract under which the trader transfers or undertakes to transfer the ownership of goods to the consumer and the consumer pays or undertakes to pay the price thereof, including any contract having as its object both goods and services;

(6) 'service contract' means any contract other than a sales contract under which the trader supplies or undertakes to supply a service to the consumer and the consumer pays or undertakes to pay the price thereof; (...)

(11) 'digital content' means data which are produced and supplied in digital form;

B) in the Digital Content proposal 2015/634 Directive (excerpts)

Art.2

1. 'digital content' means

(a) data which is produced and supplied in digital form, for example video, audio, applications, digital games and any other software,

(b) a service allowing the creation, processing or storage of data in digital form, where such data is provided by the consumer, and

(c) a service allowing sharing of and any other interaction with data in digital form provided by other users of the service; (...)

11. 'durable medium' means any instrument which enables the consumer or the supplier to store information addressed personally to that person in a way accessible for future reference for a period of time adequate for the purposes of the information and which allows the unchanged reproduction of the information stored.

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BUILDING LEGITIMACY FOR ENTREPRENEURIAL INNOVATIONS IN HEALTH SERVICE ECOSYSTEM: AN INSTITUTIONAL APPROACH

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Our objective is to describe how entrepreneurial service innovators build legitimacy required to initiate and implement institutional change. We study this by analysing four new ventures that aim to develop innovations for 'health at work' service ecosystem. Our initial analysis indicates that the legitimacy of new ventures relies on various types of legitimacy and entrepreneurs utilize diverse strategies to build organizational legitimacy. Our study contributes on the theory development by bridging service ecosystem and legitimacy streams of research. We thereby suggest that legitimacy theory can be also applied to analysing acceptance and appropriateness of innovations to internal and external audiences in (re)forming service ecosystems.

1. Introduction

Western healthcare systems have been in crises for years and there is increasing pressure for fundamental change of the whole health service ecosystem. Despite the major pressure at the landscape level (Geels & Schot, 2007), the institutional arrangements in the healthcare system have shown to be tremendously resilient against major changes. Whereas digitalization and niche innovators have profoundly changed the value creation of many other industries, business and institutional logics (Thornton, Ocasio, & Lounsbury, 2012) in the field of healthcare are still largely the same as in pre-digital era.

This study focuses on the niche level entrepreneurial innovators that aim to change the service ecosystem (S. L. Vargo & Akaka, 2012) related to health and wellbeing service provisioning. These often relatively unknown innovators rely on new kinds of service-based business models which challenge prevailing business and institutional logics of the field. Therefore, in order that these niche players can survive and succeed, they need to be able to build legitimacy (Suchman, 1995) to gain support and acceptance for their actions.

Our research question to be answered in this paper is: How entrepreneurial service innovators build legitimacy required to initiate and implement institutional change in health service ecosystem?

2. Related research

Legitimacy has been an important stream of research in organizational and management literature for years (Dowling & Pfeffer, 1975). However, already Suchman (1995) in his landmark article identified that the literature on organizational legitimacy is large but increasingly divided into two groups. In order to bridge the gap between strategic and institutional traditions, he introduced broad-based definition for legitimacy as “a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions”.

As legitimacy is wide concept there are also several taxonomies of the legitimacy. Aldrich & Fiol, (1994) divide organizational legitimacy into two main categories in their pioneering work of new venture legitimacy building. Cognitive legitimacy refers to spread of knowledge about the new venture, and socio-political legitimacy refers to the “process by which key stakeholders, the general public, key opinion leaders, or government officials accept a venture as appropriate and right, given existing norms and laws”. Suchman (1995) developed taxonomy further by dividing organizational legitimacy into three main categories of which all have subcategories. One of these three categories is cognitive legitimacy as in (Aldrich & Fiol, 1994), which is further divided into legitimacy based on comprehensibility and legitimacy based on taken-for-grantedness. Second main category is pragmatic legitimacy which is formed by the self-interested calculations of an organization’s most immediate audiences. Third, moral legitimacy reflects a positive normative evaluation of the organization and its activities.

Earlier work on legitimacy mainly considered legitimacy as given and achievable by conforming to rules and norms external for a new venture. However, more recent research has provided an evidence that legitimacy can be actively influenced and gained by pursuing appropriate strategies to build the perception of appropriateness, acceptance and desirability of new venture business (Kuckertz & Schröder, 2010; Zimmerman & Zeitz, 2002). Moreover, legitimacy is not only limited to socially constructed shared beliefs of external evaluators, but actors establish also internal legitimacy (Drori & Honig, 2013) in their own environment. Therefore, in addition to seeing strategies for building legitimacy as means to access external resources, legitimacy building works also as a tool for consolidating the reputation internally or externally (Drori & Honig, 2013)

Studies on legitimacy have been previously mainly conducted within organizational research where the unit of legitimacy analysis has been an organization and interest has been mainly on their actions and strategies to build organizational legitimacy. Service-dominant logic’s service ecosystems approach on innovation provides an opportunity to extend the legitimacy theory from the organizational analysis to the legitimization of innovations within service ecosystems. Lusch & Vargo (2014, p. 161) define service ecosystem as “relatively self-contained, self-adjusting system[s] of resource-integrating actors connected by shared institutional logics and mutual value creation through service exchange.” They develop a transcending view on innovation, where the innovation is regarded as collaborative combination or combinatorial evolution of practices that provide novel solutions for new or existing problems. Service ecosystems approach emphasizes the role of maintenance, disruption and change of institutions as central processes in technological and market innovations

(Vargo, Wieland, & Akaka, 2015). They also note that the maintaining elements of institutional change are important for achieving legitimacy for the innovation, but they do not focus on legitimacy itself. This highlights the need for research on building legitimacy for the innovations from the service ecosystems perspective. Hence, in this and the following article we will extend this perspective by viewing legitimacy from the perspective of service-dominant logic's service ecosystems approach on innovation.

3. Methodology

3.1. Research design and context

This paper is based on case study research strategy (Yin, 2009), and builds on the qualitative interviews and archival data. Case study is especially suitable as a research method in this context due to the high complexity of the phenomenon and early stage of this field of inquiry (Yin, 2009). Also, our study can be categorized to micro-approach of innovation, focusing on study of individual actors, especially on entrepreneurial founders and teams (Garud, Gehman, & Giuliani, 2014).

The article is based on cross-case analysis of four entrepreneurial companies aiming to introduce and diffuse digitally-enabled service innovation to transform specific niche area of health care system. Interviewees represented founders and/or managers of these companies. With help of these cases we aim to explore and explain how entrepreneurial innovators respond to various types of institutional constraints related to the introduction and adoption of innovations. Following table describes the case companies and the contexts of which they operate and aim to transform.

Table 1. Data related to case companies

	Type of innovation	Market	Data
Firm A	Market innovation – integration of external resources in new way	B2B	1 interview, videos and public web content analysis
Firm B	Technological innovations (SW) related to stress measurement, and market innovation	B2B	1 interview, 1339 tweets, website, public news, videos
Firm C	Technological (SW) and market innovation related to recovery from stress and mental health	B2B	1 interview, public web content analysis
Firm D	Technological (HW+SW) & market innovation related to improving wellbeing through performance measurement	B2C	1 interview, public web content analysis

3.2. Data collection and analysis

Data was initially collected by conducting narrative interviews with 20 start-up entrepreneurs working within European start-up accelerator program. Each of these entrepreneurial ventures was developing a digitally-enabled service innovation to health and wellbeing sector and faced challenge of introducing innovation to the market. Interviews were conducted either face-to-face or via video-conferencing tools such as Skype due to the geographical spread of companies. Each interview lasted on average 61 minutes (scale from 35 up to 90 minutes), and the interview was recorded and transcribed.

After the initial data collection, we made first round data analysis to identify recurrent themes from the data. As the challenges and strategies for building legitimacy were highlighted in the data, we decided to focus on the issue of legitimacy building in more detail. Consequently, in the second phase of the study we utilized purposive sampling (M. Patton, 2002) to select four information rich cases for more detailed analysis. This second round of data collection included collection of data inform of publicly available documents and social media data, which were used in to complement previously collected narratives.

The final case companies presented in this article were from Italy, UK, and two of them were from Finland. Data from each individual case were then analysed in-depth by content coding and theme based categorization with help of NVivo software. After each case was analysed individually, we turned to cross-case analysis with an aim to identify consistent patterns and themes between cases.

Throughout the research process we followed iterative process of cycling between empirical data and theories from existing literature (Dubois & Gadde, 2002). We started the study by focusing on the intersection of service research and theory of institutional entrepreneurship. However, as the data collection and analysis started to build new insights we broadened our analysis to the theory of legitimacy. Therefore, we utilized theoretical triangulation (Patton, 1999) to capture and interpret the phenomenon as a whole. Slowly this abductive process directed us to the formulation of practical managerial implications as well as refining our findings into contributions for ongoing theoretical discussions in service research.

4. Findings

Results of the study show that entrepreneurial innovators use various strategies to build legitimacy in order that their innovation would be accepted and diffused to markets. Based on our data we identify legitimacy and strategies to build legitimacy at four levels: 1) personal level (e.g. start-up entrepreneur), 2) the organizational level (new venture), 3) innovation level, and 4) service eco-system level. These levels are highly inter-connected; however, utilized legitimization strategies are dependent on what level of legitimacy building is main goal. Moreover, legitimacy building is highly dependent on available resources and actors social position within the organizational field.

4.1. Building the cognitive legitimacy

As innovations that entrepreneurs are promoting are new to the market, many of the entrepreneurs are faced with challenges not only to spread of knowledge about the new venture (Aldrich & Fiol) but also about the innovation. In recent years, social media has taken big role in building cognitive legitimacy which can be also seen in the data as most of the companies are actively promoting the innovation and new institutional logic it relies on via social media. In the cases where innovation requires change in behavioural patterns of consumers, companies aim to build cognitive legitimacy of an innovation for example through videos that explain clear why innovation is beneficial and how it should be used. Thereby, entrepreneurs aim to increase comprehensibility (Suchman, 1995) of an innovation and endeavours of the new venture. In B2B settings the building of cognitive legitimacy is more often approached through personal contacting, or professional events.

Discursive strategies that entrepreneurs use to promote innovations are often based on promoting the innovation superior to previous institutional arrangements in order to delegitimize existing arrangements. If the existing arrangements have become cognitive patterns that are taken-for-granted without questioning the means and the ends, then the delegitimizing work is highly necessary to break these cognitive patterns and force potential adopters of the innovations to re-evaluate their behaviour.

In all of our cases entrepreneurs not only aim to legitimize their organization and innovation, but they realize the need for legitimization of value co-creating actors within the service ecosystem which is promoting new institutional logic. Therefore, together with other actors in service ecosystem they spread knowledge on the benefits of new institutional arrangements transforming the field of healthcare and hence aim to increase cognitive legitimacy of the emerging field. As the resource of small start-up companies is very limited, the main activity in building cognitive legitimacy of the new arrangements in the field of healthcare is by sharing the content in social media. This content is mostly produced by other actors with the same purpose, and hence the work is very cost efficient.

4.2. Pragmatic legitimacy

In addition to cognitive aspects of legitimacy, legitimacy can be also based on self-interested calculations of an organization's or innovation's most interested audiences. This type of legitimacy is referred as pragmatic legitimacy (Suchman, 1995). From this perspective, entrepreneurs seek to increase legitimacy by building mutual value co-creation with business and academic partners that can increase legitimacy of the service ecosystem promoting the innovation. Collaborative partners are connected to the each other through shared institutional logic and value creation through service exchange; thereby they both have mutual interest to promote the innovation and institutional change it requires.

Entrepreneurs aim to build legitimacy also towards other actors to whom they are not in direct service-to-service exchange and therefore who they do not expected to benefit directly from the collaboration. This type of legitimacy is built, for example, to political actors who support and promote the innovation without clear exchange with the new venture. Nevertheless, value creation logic of political actors is often highly complex and linked to various service ecosystems. Thereby, in some cases entrepreneurs have been able to leverage political actors, who for example, want to be

seen as entrepreneurial oriented, innovative, modern, or see promotion activity as a part of their job or means to contribute to development of their larger interests.

4.3. Moral legitimacy

Moral legitimacy reflects a positive normative evaluation of the organization and its activities (Suchman, 1995). Also moral legitimacy can be applied from the level of individual entrepreneur, organization, innovation, or larger network of actors in service ecosystem aiming to introduce an innovation.

Our data indicates that one of the strongest type of legitimacy that new ventures may possess is so called consequential legitimacy (Suchman, 1995), which is judged by the outcome that person, organization, or the ecosystem aims to achieve (e.g. However, this type of legitimacy is usually dependent on the type of innovation developed or promoted. For example, company aiming to solve previously incurable disease or help those less fortunate in the society can benefit from the consequential legitimacy. In one of our case this kind of good cause enabled extensive amount of media exposure, basically for free, which in turn played crucial part in building the other types of legitimacy of the new venture, and the legitimacy of new type of healthcare innovation.

In the start-up scene, legitimacy is often also based on the utilization of specific techniques and procedures that are normatively evaluated to be right way of building successful businesses. From interview we identified that most of the companies, for example, used specific start-up oriented language of business development, and utilized agile, lean and customer-oriented development methodologies. Although this kind of *procedural legitimacy* can be very important, for example for accessing private funding, entrepreneurs didn't bring this up in interviews. The most likely reason is that the certain procedures have become normative in start-up world, and only if you don't follow those procedures you need to rationalize your choices.

Our data provides also proof of other type of moral legitimacy which builds on structural characteristics that locates person, organization, or service ecosystem within a morally favoured taxonomy category (Suchman, 1995). In our data *structural legitimacy* can be clearly seen as already the words entrepreneur and start-up that position person and company to certain category. Further labelling entrepreneur as serial entrepreneur or venture as digital health start-up puts the person or organization into more refined category. Start-ups utilize this categorical positioning to build the legitimacy of the new venture on the reputation of other actors positioned in these same categories. One of our case companies was also actively positioned as ex-Nokia start-up, which they used to overcome the liability of newness of the small start-up.

5. Discussion and conclusions

From the theoretical perspective our study builds stronger connection between service ecosystems approach on innovation and stream of legitimacy within the institution research. Opposed to conventional view, entrepreneurial niche innovators do not only build their organizational legitimacy of the new venture, but they participate on building the legitimacy of the innovation and (re)forming service ecosystem, which aims to change existing institutional logic of the field. Although actions of each niche

innovator are small, together these niche innovators and other key stakeholders of the service ecosystem are able to build the momentum for the change. This view is aligned with sociotechnical transition pathways (Geels & Schot, 2007), which however is higher level theory that recognizes accumulative nature of niche innovators change efforts, but doesn't take into account the legitimacy building activities of niche innovators.

On the other hand, niche innovators who are represented by strong entrepreneurial founders do not only build organizational legitimacy of the new venture, but they rely heavily and aim to further build the personal legitimacy of the entrepreneur. In some cases charismatic entrepreneurs even give their own face for promotion of the innovation. Therefore, in small start-up company entrepreneur's personal legitimacy may be tightly linked with organizational legitimacy, which are both intertwined with the internal and external audiences' evaluation for the acceptance and appropriateness of the promoted innovation.

From the managerial perspective this study provides insights for entrepreneurial innovators on how they can build legitimacy for their organization, and how they can promote the change in value creation in the service ecosystem by promoting the legitimacy of an innovation which is based on new competing institutional logic. Entrepreneurs should acknowledge the crucial role of legitimacy in changing institutions, since without legitimacy institutional change efforts are highly unlikely to succeed. However, they should also remember that the lack of legitimacy of new venture may be compensated by other actors' legitimacy in the service ecosystem. For example, renowned academic institutions or other highly legitimated associated ventures to which new ventures can tie themselves can be utmost important for the acceptance of new venture. For one thing, the positive evaluation of associated organizations may flow to the new venture, and for the second, associated organizations may be linked to the change efforts through value co-creation in case of pragmatic legitimacy.

6. Conclusions and further research

This article aimed to answer to the question how entrepreneurial service innovators build legitimacy required to initiate and implement institutional change in health service ecosystem. Our data indicated that the legitimacy of new ventures relies on various types of legitimacy and entrepreneurs utilize different strategies to build organization legitimacy.

Our study contributes on the theory by cross-fertilizing service ecosystem and legitimacy streams of research. Legitimacy stream has traditionally focused mostly on organizational legitimacy, but we claim that the legitimacy is also valuable concept to analyse acceptance and appropriateness of the service ecosystem to internal and external audiences.

This article is work in process with initial analysis of the data. In the future we aim to continue the data collection and analysis to gain more robust perspective on the legitimacy building in different kinds of service ecosystems. Moreover, the aim is to clarify in more detail the different levels of legitimacy building related to the extremely complex institutional change processes within the field of healthcare.

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CHALLENGES AND BENEFITS OF DEVELOPING A SERVICE-ORIENTED BUSINESS MODEL IN SMALL FIRMS – A CASE STUDY FROM FINLAND

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Little is known about the benefits, challenges and risks involved in small and medium-sized enterprises (SMEs) becoming more service-oriented. The results of our study that focuses on SMEs from different industries show that a service-oriented business model is a reality in many firms. It is noteworthy, however, that traditional service firms are not necessarily service-oriented. The perceived benefits and challenges vary according to the industry and size of the firm as well as the capabilities of the manager. SMEs pursuing enhanced service orientation should pay close attention especially to management and leadership processes as well as to cooperation and networking with customers and other business partners.

1. Introduction

The globalization of markets, competition from low-cost countries, decreased margins due to commoditization, heightened consumer awareness and increased customer demand promote the shift from product-orientation to service-orientation (Kindström; Kowalkowski, 2009; Lay et al., 2010). However, many manufacturers still see service-oriented business development as focusing on the idea of service additions and basic services, such as maintenance and spare parts (Fischer et al., 2010). Often, services are not managed strategically; they are developed ad hoc, added after the product is sold, and not integrated with product development or other business functions (Kindström; Kowalkowski, 2009). Consequently, services are not visible in the firms' financial statements and do not receive managers' attention, although they may have a significant impact on product sales, turnover and profitability (Kindström; Kowalkowski, 2009).

Also, in many service industries, competition has intensified, customer needs and preferences are rapidly changing and, consequently, service firms are looking for ways to profitably differentiate themselves and improve their customer-driven competitiveness (Kim, 2011; Yoon; Choi; Park, 2007). A way to pursue these goals is to become more service-oriented. Prior research has shown that through e.g. employee or job satisfaction, service orientation can enhance the performance of service firms (Yoon; Choi; Park, 2007; Lee; Park; Yoo, 1999).

In prior research, quite a lot of attention has been paid to the process of manufacturing firms transforming from being product-oriented to being more service-oriented and concepts like *servitization* (e.g. Baines et al., 2009) and *service infusion* (e.g. Eloranta; Turunen, 2015) have been introduced to the literature. In fact, the topic of facilitating servitization, service infusion and solutions has been raised as one of the three research priorities in service research (Ostrom et al., 2015). From this perspective, however, the research has mainly concentrated on manufacturers of heavy industrial goods, and more research is needed to study service strategies in a wider range of industries (Gebauer et al., 2012).

This study contributes to the prior literature by examining a broad range of small and medium-sized enterprises (SMEs) that are at different stages of becoming more service-oriented and operate in different industries. While prior literature has focused heavily on manufacturing firms and large enterprises, this study includes also SMEs that could be regarded as traditional service firms. All of the interviewed firms operated in B2B-markets and some of them also in B2C-markets. Thus, the results of this study give a deeper insight into service-oriented business models, and the factors of motivation and hindrance when SMEs are seeking ways to improve their competitiveness through services. Our research questions include the following: What kind of benefits are SMEs looking for when they develop and implement more service-oriented strategies? What are the challenges and risks involved in doing so? As SMEs cannot simply be regarded as miniature versions of their larger counterparts, the benefits, challenges and risks perceived from a service-oriented business model may differ from those of larger firms. These perceptions are important as they affect the way SMEs develop their businesses (Reijonen, 2008).

This paper is constructed as follows: In the literature review, we position the study with regard to different service concepts used in prior literature. Next, we discuss the process or phases of developing a service-oriented business and the related benefits, risks and challenges. After that, we describe the data collection and research methods and then, report the results. Finally, we draw conclusions and provide theoretical and managerial implications.

2. Literature review

2.1. Service concepts

According to Grönroos and Ravald (2011), *service logic* is about the provider supporting its customers' value creation with resources and interactive processes, which may include goods, service activities and information. Service logic differs from goods logic in that while *goods* can be regarded as resources that support value generation for customers, *services* can be considered processes where a firm's resources interact with those of its customers so that value is created or emerges in the customers' processes (Grönroos, 2006). The key notion is that although customers buy either goods or services, from their point of view, they are both consumed as services (e.g. Grönroos, 2008; Vargo; Lusch, 2004).

Successfully implementing service logic requires firms to be both customer-focused and relational (Grönroos; Gummerus, 2014). Grönroos and Helle (2010) state that for a firm operating in business-to-business markets, adopting service logic in full re-

quires it to coordinate all its activities and processes relevant to its customers' business with the customers' corresponding activities and processes. In consumer markets, too, the firm must be well informed about the needs and practices of its customers so that its services can support their value creation (Grönroos; Gummerus, 2014). The customer perspective has to be taken into account all the way from service design to service delivery and beyond. Consequently, this kind of service perspective makes customers omnipresent in the firm and highlights the importance of customer management everywhere in the organization (Grönroos; Gummerus, 2014).

Prior literature uses the concept of *service orientation* to reflect the organizational culture (e.g. Gebauer; Edvardsson; Bjurko, 2010) or to describe a business strategy that refers to the extent of how important services are for the firm (Homburg; Hoyer ; Fassnacht, 2002). Homburg, Hoyer and Fassnacht (2002) argue that the more service-oriented the business strategy is, the more actively the firm offers more services to a broader customer base. Service orientation that permeates the whole firm is essential for service success (Raddats; Burton; Ashman, 2015). In a truly service-oriented firm, service is at the center of the strategy because the firm believes that excellent service provides superior value to its customers and, consequently, leads to customer satisfaction, sustainable competitive advantage, business growth and profitability (Lytle; Timmerman, 2006). These benefits are considered to be independent of the firm's sector (Lynn; Lytle; Bobek, 2000).

When discussing the shift from product orientation to service orientation or "adding services," prior literature refers to many different concepts that are used more or less synonymously. In 1988, Vandermerwe and Rada were the first authors to utilize the concept of *servitization* (Baines et al., 2009). Now it is one of the terms most often applied to describe a situation where companies are adding services to their selection of products. Based on how different researchers had defined the concept, Baines et al. (2009) concluded servitization to be the development of organizational capabilities and processes to better create mutual value through a shift from selling products to selling product-service systems. Other terms that describe the same phenomenon include *service addition* (see Matthyssens; Vandenbempt, 2010), *service-based business model* (Kindström, 2010) or *service infusion* (see Eloranta; Turunen, 2015; Witell; Löfgren, 2013). Gebaur et al. (2012) use terms like *service-driven manufacturing* and *service provision*. Fischer et al. (2010) discuss *service-oriented business logic* and describe it as "part of service business development, known in the literature as servitization." These are a few examples of the variety of concepts used to describe the trend of manufacturers becoming more service-oriented (Eloranta; Turunen, 2015). In many articles, most of these terms are used as synonyms for servitization (see Eloranta; Turunen, 2015; Fischer et al., 2010; Raddats; Burton; Ashman, 2015), and often they are used but not very well described or defined.

Nordin and Kowalkowski (2010) found that researchers use the term *solution* to describe a situation where relatively wide offerings cover most of customers' needs (Nordin; Kowalkowski, 2010). This indicates that *solution* has a wider perspective than *servitization*. "Solution business" refers to customized bundles of products and services involving an ongoing relational process between the customer and the supplier in which the value is co-created (Ryynänen; Pekkarinen; Salminen, 2012). On the other hand, a recent study by Ostrom et al. (2015) combines the concepts of servitization and solution and uses the term *service-led and solution-based business* when referring to a business model focusing on servitization and solution-oriented

offerings. They use the term *service orientation* when referring to a change from product orientation to a service-led and solution-based business. In this study, we understand the basic difference between solution-based and service-oriented businesses to be that solution-based business focuses on co-creating solutions to customers' problems with the customers, while service-oriented business aims to become integrated into the customer's value chain by managing or doing things on behalf of the customer.

In this study, the term *service business* is used interchangeably with *service-oriented business model*. While the majority of the other concepts discussed above (e.g. servitization and service infusion) are mostly used in the context of manufacturing, the idea of service orientation (which can be regarded as an organizational culture and/or strategy) is more easily adopted in different fields of industry. However, in the literature review, we will take a closer look at the prior research on servitization that describes the process of becoming more service-oriented and also the benefits and challenges involved in it.

2.2. Developing a service-oriented business model

Shafer, Smith and Linder (2005, 202) defined a business model as "a representation of a firm's underlying core logic and strategic choices for creating and capturing value within a value network". According to Ristimäki et al. (2014), this definition emphasizes a dynamic and systemic nature of business. Many recent studies of business models describe, but cannot explain, how a comprehensive transformation proceeds because of a lack of empirical evidence on business logic transitions. However, in firms the transformation of business models cause tremendous changes in the logic of value creation and in work practices, as stated by Victor and Boynton (1998). According to findings from Sosna, Treviño-Rodríguez and Velamuri (2010), shifting from one business logic to another takes years or even decades without permanent, "final" solutions.

Hence, from a firm's point of view, it is not very realistic to assume that a shift towards service-oriented business will be quick and straightforward with clear objectives and comprehensive overviews (Kowalkowski et al., 2012). Usually, firms start with small experiments. Consequently, the process is more likely to be a step-by-step, exploratory one that proceeds by relatively small degrees (Kowalkowski et al., 2012). Moreover, the transition may not be linear as suggested by the product-service continuum, but rather like an expansion of business by the addition of services and the adoption of multiple roles as a supplier (Kowalkowski et al., 2015).

Paiola et al. (2013) described the steps of moving from a product-based strategy to a more service- or solution-based strategy to start with service augmentations that support sales. The next steps include providing after-sales services to repair products or prevent product failure and developing pre-sales services (e.g. consulting) to meet customers' business needs. Finally, the firm provides offerings with which it takes full responsibility for a customer's process.

Gebauer, Paiola and Edvardsson (2012) identified three pathways used in service business development in SMEs. In the first pathway, the focus shifts incrementally from a transaction orientation to a relationship orientation, and services are used to tighten the relationship bonds that serve as barriers against competition. The second pathway emphasizes the role of innovative new services that create a financial con-

tribution. The third pathway is about developing a radical innovation that opens up new business opportunities and a whole new competitive arena.

Homburg, Hoyer and Fassnacht (2002) found that the antecedents of service orientation include the innovativeness of the environment, customer orientation, and how price-conscious the customers are. Antioco et al. (2008) argued that the commitment of managers, service rewards, the use of technology, firm-wide crossfunctional communication, service training and customer treatment are essential in the development of service orientation. In addition, Mathieu (2001) pointed out that the collaboration with customers, service providers and traditional competitors helps to share the risks and to achieve a competitive advantage by providing resources and skills.

2.3. Benefits of service orientation

A general belief is that services create competitive advantage (Eloranta; Turunen, 2015). Many previous studies show that service orientation offers *economic benefits* by increasing revenue, facilitating the sales of goods, and reducing the vulnerability and volatility of cash flow, as well as offering higher shareholder value and profit margins (Mathieu, 2001; Oliva; Kallenberg, 2003; Brax, 2005; Gebauer; Friedli, 2005; Malleret, 2006; Baines et al., 2009; Gebauer; Paiola; Edvardsson, 2012).

Strategic benefits include advantages that relate to competing successfully in the markets. Services are seen as creating growth opportunities in mature markets and increasing the ability to respond to demand (Brax, 2005). In today's markets, the significance of price and product as means of differentiation is diminishing (Gebauer; Paiola; Edvardsson, 2012), and services have taken their place, while simultaneously offering possibilities to create greater barriers of imitation and entry (Mathieu, 2001; Gebauer; Friedli, 2005).

Marketing benefits relate, for example, to customer relationships. Being more service-oriented is seen to increase customer satisfaction (Mathieu, 2001), build customer loyalty (Malleret, 2006), and consequently enhance and lengthen customer relationships (Brax, 2005; Baines et al., 2009). Homburg, Fassnacht and Guenther (2003) found that industrial firms that concentrate on services and design their culture and resource management accordingly perform better, not necessarily due to the direct profits generated by services, but rather due to improved customer relationships. Increased service offerings also augment and make firms' selection more appealing (Mathieu, 2001). Services may also strengthen confidence in the supplier's credibility (Mathieu, 2001) and otherwise reinforce the corporate image (Malleret, 2006).

However, empirical research has shown that the benefits expected from services are not always realized. Lay et al. (2010) found that while a great majority of firms offer services, the turnover they generate is still low because the service strategies are not fully developed. Consequently, they suggest that firms need to fully commit to services and pay attention to the breadth of services as well as to the types of products offered. In addition, it seems that SMEs have a disadvantage in comparison with their larger counterparts with regard to the financial gains from moving towards more service-oriented business. Gebauer, Paiola and Edvardsson (2012) discovered that in the case of an incremental shift, the proportion of service revenue stays below that reported by large companies. Only when small firms make a radical move towards

service business (with innovations) are they able to match the financial results gained by their larger counterparts.

2.4. Risks and challenges of becoming service-oriented

Oliva and Kallenberg (2003) argue that challenges with regard to becoming more service-oriented are generated when a firm does not believe in the potential of services, when it does not have the competencies required to offer services, or when it fails to implement a successful service strategy. Fischer et al. (2010) point out that sensing and identifying the need to move towards service-oriented business are limited by managerial cognition. Indeed, the managerial challenge is substantial, as the transition requires changes in organizational principles, structures, processes, business model, capabilities, metrics, incentives, and resource allocation (Oliva; Kallenberg, 2003). Because of this firms should be prepared for resistance, as people are inclined to resist change and sometimes perceive a new service strategy as a threat that it affects their authority, expertise, responsibilities or resources (Mathieu, 2001). Other critical points identified in the transition include refined segmentation, scalability, organizational and relational competences, as well as network competences (Matthyssens; Vendenbempt, 2010). In fact, an effectively organized network could act as a primary source of competition with regard to service infusion (Eloranta; Turunen, 2015).

Brax's (2005) six categories of challenges hindering the servitization of firms include the marketing challenge, production challenge, delivery challenge, product-design challenge, communication challenge and relationship challenge. In Alghisi and Saccani (2015) the challenges relate to, for example, communicating with and training the network partners and sales personnel, as well as developing service capabilities and processes, the commitment and leadership of senior management, achieving a critical mass of customers, developing scalable offerings, and managing issues relating to brand and supplier competition.

Kindström and Kowalkowski (2009) argue that as customers are often incorporated in the process of service development, this can lead to highly customized and contextual offerings that might be difficult to offer to wider markets. During the sales phase, a frequent challenge is to visualize and show the value created that will generate cost savings and performance enhancements for customers (Kindström; Kowalkowski, 2009). Because selling services or hybrid-offerings requires different proficiencies than selling goods, the successful implementation of service strategy may be in jeopardy due to lack of skills in sales (Ulaga; Loveland, 2014). In the service delivery phase, the risk comes from some services having a long lifetime that require the building of trust and commitment, as well as constantly demonstrating why and how the service is beneficial to customers (Kindström; Kowalkowski, 2009).

According to Witell and Löfgren (2012), the traditional business model in manufacturing firms views the concrete product as the price carrier and services as a cost; thus, many firms have been including free services in their product sales. This development has led to a fundamental problem where customers are not willing to start paying for something that they are used to getting for free, especially where there is an unequal distribution of power (Witell; Löfgren, 2012). Consequently, setting a price for a service may be a salient risk for e.g. some subcontractors or micro-enterprises. Neely (2008) found that although servitized manufacturing firms generate higher revenues than pure manufacturing firms, at the same time they tend to generate lower

net profits. He also noted that compared to pure manufacturing firms, considerably more than expected the servitized firms had declared bankruptcy. Overall, the transition to a service-oriented business model calls for new roles for customers, service providers and partners in the value network, in order to make service infusion profitable (Witell; Löfgren, 2012). Kohtamäki et al. (2013) suggest that firms should invest in network capabilities in order to improve sales growth and through that the value creation of services.

Gebauer, Paiola and Edvardsson (2012) found that SMEs in particular face the following challenges and risks: They may not be able to reach the critical mass needed for profitable service business. They may lack the financial means to cover the costs of the investment in service business. They may not have the dynamic capabilities needed to identify and seize service opportunities and reconfigure operations accordingly. Often, they do not have adequate resources, so they need to partner with other firms. Thus, service business often involves other actors besides the customers, such as suppliers, subcontractors, buyers, users, and governmental agencies with varying resources (Hobday, 2000; Cantù et al., 2012). Nevertheless, Gebauer, Paiola and Sacconi (2013) note that service business networks do not emerge; the focal actor must intentionally build them. Furthermore, Epp and Price (2011) argue that the goals of actors in the customer network should also be taken into account as these goals affect customer satisfaction. Therefore, besides the fact that service business in a network requires the coordination of various actors, it also requires coordination outside the lifetime of the service and outside the service production network. In addition, the process of orchestrating a service business network requires coordination between the various actors (Ritala; Hurmelinna-Laukkanen; Nätti, 2012) and balancing the actors' diverging goals, perceptions, power constellations, and cultures (Corsaro et al., 2012). Kowalkowski, Witell and Gustafsson (2013) use the concept of *value constellation* to refer to intentionally created relationships in business networks, with the aim of pursuing repeated enduring exchanges with one another and working deliberately to create value. It can be argued that finding the right value constellation for service provision is crucial for service infusion (Witell; Löfgren, 2012).

3. Data collection and methods

The implementation of this study was tied to the preparation of a development project with the aim of training representatives of firms in Eastern Finland to move towards a service-oriented business model. The goal was to investigate the state of service orientation in these firms and how they viewed the benefits and challenges of introducing service-oriented business, as well as the possible risks of the service-oriented business model. A total of 27 firms of different sizes from the service sector and from manufacturing were selected for interview. The firms were selected to represent typical samples of their industry and scale. The companies interviewed were categorized into sector-specific groups: manufacturing industry (nine companies), subcontractors (four), trade and financing (three), information and communication (five), business services (six). All the interviewed firms operate in B2B-markets and a few of them also in B2C-markets. Other than one firm in the category of trade and financing, all the firms interviewed were small or medium-sized, meaning that they employ less than 250 people or have a turnover less than €50 million (see European Commission). Some of the companies were micro-enterprises with less than ten employees.

In the Finnish context, the sample can be regarded as being representative in terms of the firm size.

Most of the interviewees were corporate CEOs; ten of them were members of their company's management team or executive management. The interviews were conducted as thematic interviews where the interviewees were asked to share their views on what they consider service business to be, how the firm would benefit from introducing service business, what dangers and challenges are related to introducing service business, and what the interviewee regards their firm's service business level to be. In cases where interviewees were not familiar with the term "service business," they were first informed about how it is defined in the present study so that they would be ready for other questions. The interviews were recorded and transcribed.

In the analysis phase, the interviews were first processed as a whole by applying a content analysis method that prepares the empirical data for the interpretation process by repeatedly reading and organizing the data and classifying or thematizing it (Eriksson; Kovalainen 2008). Thereafter, the findings of each interview were compiled into a sector-specific observation matrix. After the sector-specific review, each sector's summaries were compiled into a chart summarizing all of the material, and enabling a better understanding of the differences and similarities between the sectors. Relevant quotations from the interviewees are included in the presentation of the findings in order to understand the perspectives of the respondents and make their interpretation more transparent.

4. Results

4.1. What is service-oriented business

The majority (22 of 27) of the companies interviewed regard service-oriented business as comprehensive, customer-oriented operations where the customer is provided with the company's product and with services, partly through network partners. As a rule, the interviewees were good at defining service business, even though some interviewees still, in practice, mainly provide services themselves to the customer.

Interviewees representing the manufacturing industry frequently used the terms "total service," "customer processes" and "understanding the customer."

I7: *"It is everything the company does on behalf of the customer and within the customer processes."*

Subcontracting firms and ICT companies also consider service-oriented business to be a comprehensive service where the customer is provided with added value through different services. All of the interviewees from the trade and financing sector consider service-oriented business to be modern business thinking and a comprehensive strategy. One of them is of the opinion that all business is ultimately service business:

I15: *"Service business is the only type of business that there is. Even when a company produces metal nuts and sells them to customers, it all comes down to service."*

It does not matter whether the company is a production company, a retail trade company, or a car shop – all operations are service business.”

Eleven interviewees mentioned that understanding the customer was at the core of service business. Six emphasized the offering of total service, and two interviewees emphasized account management. Other core themes mentioned included substance competence, service orientation, interaction, accuracy, and flexibility. Of the 27 companies interviewed, 22 companies are of the opinion that service business will grow in the future, and they consider it to be a future competitive factor in most sectors.

4.2. The level of the development of service-oriented business

Of the companies interviewed, ten have already progressed far in the development of service-oriented business, eleven have started conscious development, and the remaining six do not engage in service-oriented business yet or are not planning to introduce it for a variety of reasons. There are extensive, sector-specific differences among those interviewed, and in general. Trade, financing and ICT can be considered the most progressive sectors among those interviewed. In these three sectors, all the interviewees report that they engage in service-oriented business. This may also be our interpretation as researchers when looking at the activities of these businesses from the outside. In the manufacturing industry, the companies interviewed included a couple of progressive companies; one of them seems to be a pioneer in its sector, even on an international scale. One ICT firm seems to be a pioneer in Finland, in its own narrow business field, in implementing the principle of co-creation required by service-oriented business logic. For their part, subcontractors regard the introduction of service business as more difficult than in the industry in general.

All interviewees identify the significance of business networks in service business, but few of them are at a partnership level in their networks. Network comments emphasize the words “subcontractor” and “outsourcing.” Only a few interviewees commented consistently on partnership and cooperation when referring to their suppliers, but in regard to their relationships with their customers, many pointed out that both parties gain an advantage. Most interviewees do not pay more attention to the members of their supplier network, and no systematic steps have been consciously defined for network development.

4.3. Perceived benefits from service-oriented business model

Long-term customer relationships were considered the most significant benefits of introducing service-oriented business, as was better profitability resulting from bigger deals, which provides a clear competitive advantage. Better customer insight enables better, more comprehensive service, which makes it possible to stand out from competitors and provides new business opportunities.

Long-term customer relationships were the most frequently mentioned (14 interviewees) benefit of service business in the manufacturing industry. These relationships serve to build trust between customers and suppliers, and mutual learning reduces the need to switch suppliers. A service-based approach seeks, and hopefully finds, a competitive edge created through being able to stand out from competitors through services.

According to subcontracting companies, too, the benefits of service business include long-term customer relationships, customer understanding, and a competitive edge based on service business. However, service pricing involves challenges:

I11: *“If the customer relationships are long term and you understand the end product and customer processes, it does give a slight competitive edge, but the price continues to be a challenge.”*

Long-term customer relationships are also specified as a benefit of service-oriented business in the ICT sector. ICT companies usually also emphasize the better profitability and competitive advantage created through individualized service. In addition, long-term customer relationships help to reduce the required amount of resources when operating with the customer, and that leads to lower operating costs.

I21: *“When additional services and additional features and components are developed all the time, you can get a higher price from the same customer, which also improves profitability.”*

4.4. Challenges in developing a service-oriented business model

Factors related to staff competence (17 interviewees) and staff attitude (eight) were highlighted as absolutely the biggest challenge in interviewee comments in regard to introducing service-oriented business model. In technical sectors, in particular, many people underline that sales, developing an additional service, and selling comprehensive solutions require totally different know-how than selling an individual product. Customer encounters and personal customer service are not familiar to many engineers or financial administrators, who are accustomed to working independently and alone. Service-oriented business also requires an understanding of customer needs and the ability to see the big picture.

Pricing and price justification form another important group of challenges. When customers are accustomed to only comparing the price of a concrete core product or service, it is also difficult to persuade them to change their attitudes. In some interviews, finding suitable partners was also regarded as a challenge.

In the manufacturing industry, the major challenge comprises the competence development of internal staff, and sales staff in particular, as one business service representative commented:

I27: *“In many cases, services are related to a person’s competence, which makes them person-bound. In a way, personal competence is about specifying the service as a product and knowing the customer, and this should be successfully transferred to the organization. And perhaps do some organizing, specifying the service model as a product.”*

The attitude shift within the organization and in the customer organization is another challenge that is mentioned in many cases. Sales staff are accustomed to only selling the actual product and justifying the unit price to the customer, which makes it difficult to change their attitude to one of selling total services and justifying a higher price. A representative of a manufacturing firm put it like this:

I5: *“Our people also say that it’s a bit funny that our concept results in a scenario where it [Product X] costs the customer more than it does in the hardware store. I*

said that that's how it is, but the starting point of the entire packaging concept is that we can get a higher price for the product, but we provide the customer with services. We offer unit management and a delivery logistics service, so a higher price is justified."

Customer orientation and service competence are also considered to be challenges in the ICT sector:

I21: *"There is always room for development in the attitude of our staff. In the technical sector, it is not easy to encourage everyone to start thinking in a customer-oriented way. Some tend to process things too much through technology and process implementation. Sometimes they forget the customer."*

Many interviewees in the manufacturing industry pay attention to the fact that introducing service business is largely a management question, i.e. how service orientation can be implemented throughout the organization.

For their part, subcontractors regard the introduction of service-oriented business as more difficult than in the industry in general.

I10: *"We are also living in a reality of very intense competition. When you consider the role of a traditional subcontractor, the customer is often responsible for planning and carefully defining how things should be. And, in a way, subcontractors have a very small chance to innovate, because the customer does not want anything to be changed."*

As in other sectors, staff competence was regarded as a key challenge in trade and financing. The service sector expressly underlines personal customer service – service encounters are considered to be challenges in all companies interviewed.

H15: *"Regarding customer encounters, the competence pressure is the highest. When new people join and existing ones leave, comprehensively managing customer encounters is pivotal. Regardless of sector, expanding the customer relationship and achieving an emotional connection are a major challenge for all service production companies."*

All companies regard their own special competence related to the production of products, both physical and intangible, as a core of the business that cannot be outsourced. Many also consider sales work to be an activity that they must retain themselves, because it requires solid customer competence and also provides feedback that helps them better understand their customers. However, understandably, there are also sector-specific differences here.

4.5. Perceived risks involved in the development of service-oriented business

The significance of risks related to service-oriented business implementation varies by sector, but in general, the greatest number of risk factors were linked to network partners (ten interviewees). Network partners may grow and become competitors, or they may copy the service or constitute a quality risk. However, many companies that had progressed far in the development of service-oriented business regarded the risks as manageable, and they emphasized the fact that very detailed contracts need to be signed with partners. The difficulty of pricing services is another, oft-mentioned

risk that is extensively underlined in the subcontracting industry. A further risk relates to knowing how to communicate and justify the higher price to customers so that they can compare deals.

In service-oriented business, people may also forget their company's core competence and go astray. Many interviewees specified losing focus as a risk factor, as well as factors related to a lack of competence among staff, which are also linked to a lack of customer understanding and quality assurance issues.

Service pricing is considered to be a risk and a challenge in the manufacturing industry, as is the difficulty in assuring customers that the higher price resulting from the additional services will also provide more value to the customer:

I8: *"Not all costs can be charged at all times, but you always need to show the advantage [the consumer] gains."*

In the manufacturing industry, ensuring service quality is also considered to be a challenge, and poor service is considered to be a risk:

I2: *"Our service product is such that if we fail at it once, it is very likely that the customer will not buy it again. That is, like, where the background of trust is [in quality]."*

The subcontracting industry is based on solid, specialized expertise and competitive pricing, which means that it may be difficult to sell additional services or total solutions. The competition in subcontracting is intense, especially in terms of price. If a competitor is offering a simpler service and the customer fails to understand the difference between the content of the offers, the deal may be lost:

I12: *"Price is always the aspect that ultimately decides everything, and if someone offers a really low price, it is very likely that the customer will go for it."*

Risk factors in the ICT industry include risks related to network partners and staff, focusing on the wrong things, or failure to keep promises to customers. HR risks are related to service production competence and encounters with customers.

I18: *"In service business, the customer is in touch with the person who provides the service. If even one person fails in some aspect of the service, the customer may switch providers."*

Network-related risks include the loss of a partner or a partner being untrustworthy, i.e. they copy the company's product, for example. In addition, there seems to be the risk of committing too many resources to network management. A representative of the business service sector mentioned that one of the service business risks is that a partner providing outsourced services may offer its own service product directly to customers, which would destroy the foundation of the total service provided by the company.

I23: *"Corporate relations, in service business in particular, are largely based on trust, and trust is based on mutual trust between people – In a small town, everyone knows each other, and partners can go and directly offer their product to customers."*

Service business may also involve the temptation of following customer requests too far:

I21: “In a way, it is risky if you start going down other paths too much. There should be a focus of some kind. You should keep your eyes on your own product, and you can't implement everything [the customer wants].”

5. Discussion

Facilitating servitization, service infusion and solutions has been prioritized as one of the top themes in service research (Ostrom et al., 2015). This far, apart from a few studies, e.g. of Gebauer, Paiola and Edvardsson (2012) who examined manufacturing SMEs and their pathways for service business development and Kowalkowski et al. (2013) who studied value constellations used to operationalize different service strategies in SMEs, the research conducted in this area has concentrated heavily on large, manufacturing firms. This study contributes to prior research by examining broad range of SMEs from different industries, including services. Instead of focusing on the *process* of the development of service-oriented business model, the purpose was to investigate the benefits, challenges and risks SMEs perceive to be involved in becoming more service-oriented. These perceptions affect SMEs' decisions on how to develop their businesses (Reijonen, 2008). The results show that the main benefits SMEs perceive in service-oriented business models relate to customer relationships as well as to improved profitability and competitive advantage. On the other hand, main challenges are linked to staff's know-how and attitude as well as pricing matters. In addition to these, SMEs perceive risks in networking and in the inability to focus on the right things. Although the main benefits, challenges and risks seem to be quite consistent between SMEs, on a closer look differences can be detected according to the industry and size of the firm. Next, the results and their implications are discussed in more detail.

The great majority of the interviewees interpret the term *service-oriented business* in the same way as it has been described in the literature, referring to customer orientation, value co-creation, interactive processes with customers, and effective use of partnerships (e.g. Grönroos; Ravald, 2011). All representatives of ICT companies, subcontractors, and trade and finance businesses understood the service-oriented business model and were well aware of its potential benefits. This applied also to most of the manufacturing companies as well, independent of the size of the company. Hence, service-oriented business models are already a reality in many of the firms – especially in those involved in international business – but the differences between the sectors are significant. The interviewees in many sectors (e.g. trade and financing, ICT) see it as difficult for firms to compete on the core product or service attributes or prices, which means that service is the only competitive factor available. This is a common finding also in the prior literature (see e.g. Eloranta; Turunen, 2015). The majority of the interviewees from the other sectors seem to perceive the benefits and importance of service-oriented business model on a general level, but have different kinds of challenges and obstacles in transforming to this business model in their own businesses. Subcontractors in particular understand the benefits for their side, but they feel that their customers are not ready for the business model, as for most of them, price is the major factor affecting their decisions.

Nevertheless, in this dataset, an interesting notion was that part of the traditional business-to-business services sector (representing e.g. advertising agencies and business consultants) did not identify the existence of the service-oriented business

model in the market, or did not perceive any benefits from it after the interviewer had explained the meaning of the concept. One of the manufacturers interviewed could see the benefits for other fields of industry but could not imagine the business model for his firm. These firms were micro-enterprises and firms that were led by older managers who did not seem to be growth-oriented. They did not see the benefits of a service-oriented business model, and they were not keen to develop their businesses in areas other than their specific core competences. They also seemed to want to keep matters in their own hands. Consequently, they did not recognize the potential in networking and outsourcing. For them, partnering could mean a loss of control, which they were not prepared to accept. There were also firms that could not see the benefits of stakeholder relationships beyond direct customers and suppliers. Consequently, they overlooked possibilities to develop with other stakeholders value-adding services that influence customer's buying decisions, although SMEs often need partners to complement their resources and abilities to identify and seize service opportunities as well as to reconfigure their operations accordingly (Gebauer; Paiola; Edvardsson, 2012). One manufacturer did not recognize the concept, however, when describing the marketing approach of the company, this interviewee seemed to have applied the business model without being conscious of it. Often small firms pay only little attention to plans and strategies, the main focus being on the needs of the moment (Stokes, 2000).

The differences identifying and implementing service-oriented business models between the companies could partly be attributed to the size of the company and to the personalities or capabilities of the managers, and especially to their attitudes towards outsourcing, networking and partnerships, in other words their collaborative orientation. As McCartan-Quinn and Carson (2003) have argued, the attitudes of owner-managers of small firms, their experience and expertise are essentially those of the firm itself. Consequently, the recognized need to move towards a service-oriented business model is limited by managerial cognition (Fischer et al., 2010) and that is why it is important to identify the perceptions owner-managers attach to becoming more service-oriented.

The major challenges in developing a service-oriented business model identified in this study were similar to those reported in prior literature and related to the competencies of the personnel (e.g. Alghisi ; Saccani, 2015), as well as the management and leadership of the process, i.e. how service orientation can be implemented throughout the organization (e.g. Alghisi ; Saccani, 2015; Brax, 2005). An attitudinal change from products to service-led solutions requires a lot of training at all levels of the organization, and especially in the sales of technical solutions, which in Finland are, in most cases, in the hands of engineers, whose approach is often focused on the technical attributes of the equipment, not the customer value of the solution. According to the interviewees, capabilities for customer-oriented thinking may also be limited. The transformation requires a change in organizational culture, which is often a project that spans several years. The goal of value co-creation is to comprehensively, yet profitably, provide value to customers, in cooperation with them and with other partners of the company. Several interviewees also note, especially in the subcontracting field, that there is also a need for a change in attitudes on the customer side; it should be possible to shift from a focus on price to a focus on value of the entire solution. As Brax (2005) puts it, it is important for both suppliers and customers to fully understand the concept of the service.

The role of networks in service business is found to be substantial, especially for SMEs who need complementary value-creating capabilities (Hobday, 2000; Cantù et al., 2012). However, according to the results, networks are also seen as a major source of risk. Managing networks and negotiations with partners may bind resources and time, which are limited commodities in SMEs. Thus, focusing resources on functions and tasks that may not pay off is a risk for SMEs. Creating a networking strategy that defines criteria for partners, for example, offers a tool that can be used to find suitable partners, evaluate them and their behavior, and determine when it is time to end the partnership. Yet, the absence of these kinds of plans and strategies are a challenge for SMEs (Reijonen, 2010). The trustworthiness of partners is, therefore, emphasized strongly, and it is recommended that this risk is managed through rigorous and detailed contracts. All in all, the findings indicate that finding suitable partners and managing networks seems to be a major challenge for companies taking their first steps on the transformation to a service-oriented business model.

Regardless of the level of service orientation in their operations, most of the interviewees were able to perceive several benefits in the transformation to and implementation of a service-oriented business model. The benefits of long-term customer relationships were recognized most often, including those who were not yet acting in a service-oriented way. Among those who were familiar with the service-oriented business model in practice, better profitability was also mentioned. Homburg, Fassnacht and Guenther (2003) have pointed out that becoming more service-oriented helps firms to perform better – not necessarily by generating direct profits, but due to improved customer relationships. Eventually, improved customer relationships are expected to show in the profitability of the firm.

To conclude, traditional service firms are not necessarily service-oriented. An inability to identify the opportunities of partnerships, perhaps stemming from mistrust or bad experiences, may lead a firm to try to deliver all the services the customer might need on its own. As Gebauer, Paiola and Edvardsson (2012) note, small firms need partners, as the set of required capabilities for a service-led and solution-based business model is extensive, and small firms cannot gain all possible knowledge and skills.

From a managerial perspective, the results show that there are a multitude of things that small firm owner-managers consider when they develop their businesses towards service orientation. Most likely they weigh the benefits with risks and challenges and see which side comes out the heaviest. There are many uncertainties to take into account. For example, SMEs recognize the risks and challenges related to the staff, at the same time, being labor intensive investing in services means often also investing in recruiting new employees which in turn affects the financial outcome. Networking is deemed to be important, but building, developing and coordinating a profitable network takes expertise, time and other resources that are usually quite limited in SMEs. Finally, the transition from a business logic to another takes years and even decades (Sosna; Trevinyo-Rodriguez; Velamuri, 2010) and a lot can happen in between. However, here SMEs may benefit from their tendency not to make strict plans and strategies (Stokes, 2000) and nimbly change the course when needed and experiment new ways of utilizing services in the quest of better competitive advantage. Further studies are needed to examine, for example, the impact of the staff and networking to the development of service-oriented business models in SMEs. Longitudinal studies on dynamic capabilities and strategic development in SMEs would also shed new light to the matter.

This study has some limitations. This is a case study implemented in a regional context. Although the aim is to introduce a representative collection of companies, the sample is still small and limited to one region. However, we believe that it represents quite a good picture of companies acting outside of the capitol region. The aim is not to generalize but put forward the topic in a small business context which has been neglected, although the majority still is small and micro business, which, in many cases operate more close to their customers (McCartan-Quinn; Carson, 2003) than the large companies.

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CHANGES IN THE INTELLECTUAL STRUCTURE OF SERVICE INNOVATION AND SERVICE SYSTEM IN THE DIGITAL AGE: AN INTERDISCIPLINARY ANALYSIS FROM 1986 TO 2015

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In the past thirty years, growth in all service sectors and rapid advances in information and communication technologies (ICT) have revealed new challenges for improving service systems through service innovation. Although, these areas of researches are closely related, few studies have investigated the relationship between these areas. This study aims to analyse the changes in the intellectual structure of service innovation and service system research in the digital age in order to a better understand its origins, current state, and future directions. Drawing on bibliometric methods, our proposed methodological approach combines the co-words, co-citation analysis with the qualitative thematic analysis. We perform an extensive co-words and co-citation analysis using multidimensional scaling (MDS), as well as factor analysis and principal component analysis (PCA) to examine 20.950 key terms. These key terms, extracted from 796 articles, published in 277 journals over three decades (1986-2015), indexed in ISI Web of Science and/or Scopus. Subsequently, we examine topics of the recent studies, over the period of the last 5 years, through a thematic analysis. Results provide a 'comprehensive view' of the intellectual structure of service innovation and service system in the digital age, how they both are evolved and their related topics over time; Moreover, it clarifies the main players in bridging conceptual domains of research.

Keywords: service innovation, service system, science mapping, bibliometric methods, co-word analysis, co-citation analysis.

1. Introduction

In the new global services economy of the digital age, service innovation and service system have become a central issue for researchers, firms, and governments. However, these areas of researches are closely interrelated, few studies have investigated the evolution, interactions and overlaps between the intellectual structures of them.

Service innovation in the digital age is defined in terms of this paper as the combination of ICT with other resources, so that a service system is able to process the in-

formation received in real-time to offer sensitive and adaptable services in different contexts (Barret et al., 2015; Medina-Borja, 2015).

Furthermore, in this paper the term of the service system will be used in its broadest context to refer to the co-creation of dynamical configurations between human, technological and organisational resources, as well as, internal and external service systems and shared information (such as language processes, metrics, prices, policies and laws). In other words, whatever creates and offers value to providers and users through the service (Maglio & Spohrer, 2008, p. 18).

Service innovation and service system are intimately related from theoretical and practical points of view (Spohrer & Maglio, 2010b; Stoshikj, Kryvinska & Strauss, 2016). An example of this might be an urban service system, which integrated into the Internet of Things (IoT) through service innovation processes. As the result, the city can offer the users the possibility to access innovative services at anytime and anyplace by the use of a digital platform of services and connected objects. It involves the integration and the coordination of new actors with new resources (e.g. skills, knowledge, digital infrastructures and sensors), which are necessary for services to be interoperable, context-sensitive, generative and usable in mobility conditions. Briefly, agility in technology evolution has created several opportunities for the innovation in services as well as service systems in organisational and social levels (Osborne, 2015). In this sense, recent studies combine physical and digital components (Yoo, Henfridsson, & Lyytinen, 2010), in digital platforms (Ghazawneh & Henfridsson, 2013) and digital infrastructure (Tilson et al., 2010) show the evidence of a generative nature in digital technologies (Henfridsson & Byzstad, 2013). Indeed, digital technologies facilitate the combinatory potential of service innovation and service systems (Yoo et al., 2012). However, it allows an overlap of multiple research topics and the birth of multidisciplinary approaches such as the one proposed for Service Science, Management, Engineering, and Design (SSMED) (Spohrer & Kwan, 2010; Spohrer & Maglio, 2010a; Spohrer & Maglio, 2010b). Maglio and Spohrer (2009) define SSMED as the study of innovation in service systems where the concepts of service systems and service innovations are both pillars (Stoshikj, Kryvinska & Strauss, 2016).

Despite the importance of service innovation, previous studies (Miles, 2016; Barret et al., 2015; Carlborg, Kindström & Kowalkowski, 2014) have revealed that service innovation is a commonly used notion which is difficult to define precisely. This is also what it has been mentioned by Snyder et al., (2016, p. 2401) that “the concept [service innovation] remains fuzzy and poorly defined”. Moreover, a key aspect of service innovation in the digital age is the growing digitalisation and embedded technology in IoT objects to enhance service systems (Barret et al., 2015; Medina-Borja, 2015). The evolution towards mobile-based “smart service systems” fed in the real time because of the geographic position of users which brings the topic of digital resources and technologies to the foreground of service innovation research agenda (Maglio & Lim, 2016; Carlborg, Kindström & Kowalkowski, 2014). This technological agility has highlighted a growing concern in the different disciplines such as digital innovation (Sørensen & Landau, 2015) and service innovation (Carlborg, Kindström & Kowalkowski, 2014). As Sørensen & Landau clarified, for improving academic agility in digital innovation research is necessary that the scientific community progress toward the understanding of emerging research topics at the same time that traditional research topics are studied. Elsewhere, Sørensen & Landau have suggested an “academic ambidexterity”, which means, dealing with traditional research subjects

while studying emergent subjects in the same time (Sørensen & Landau, 2015). In this sense, recent researches have suggested a lack of rigorous qualitative/quantitative methods to determine the emergent topics and future research horizons (Small, Boyack, & Klavans, 2014; Small & Upham, 2009). According to Miles (2016, p. 6) bibliometric approaches can be used to explore the development of the literature on “service innovation” and “innovation in services”.

Bibliometric approaches are used to analyse and visualise the “intellectual structure” or “knowledge base” of a research theme or discipline (White and Griffith, 1981). Therefore, the consequence would be one of the following items: detecting the existence of scientific schools and/or academic networks called “Invisible Colleges” (De Solla Price, 1966; Vogel, 2013), identifying potential “research fronts” (Price, 1965; Daim, Chiavetta, Porter, & Saritas, 2016), or to conduct studies on production performance about authors, institutions or countries in relation to a particular discipline or thematic field.

Cobo et al., (2011b) define the bibliometric approaches as a set of methods, which can be used to study and measure texts and information, especially large data sets and through applying two types of procedures: performance analysis and science mapping. The purpose of the performance analysis is to evaluate the different groups of scientific actors (e.g. countries, universities, departments, researchers) and to study the impact of their activity based on bibliographic data. Science mapping, in the other hand, allows a longitudinal or temporal analysis to obtain the structural changes perceived from scientific information over a specified period of time (Cobo et al., 2012). According to Small & Upham (2009), this method, also allows us to rigorously determine the most important topics. So this method receives lots of attention from scientific community. Likewise, Zupic & Čater (2015) hold the view that, whereas a traditional qualitative evaluation gives us a good depth with a reduced amount of documents, bibliographic methods allow us to rigorously handle a big amount and even thousands of documents resulting into a graphic description of the structure of knowledge base in a research field.

According to Shafique (2013) the term “knowledge base” makes reference to ideas, perspectives, approaches, theories and methods used to create a new knowledge in a given scientific domain. While the term “intellectual structure, refers to a set of outstanding attributes of the knowledge base that may provide an organised and integral comprehension of a given scientific domain or research topic. In the same way, the intellectual structure of a scientific domain includes the traditions for doing research on that domain, its disciplinary composition, its related research topics and the pattern of their mutual relationships (Shafique, 2013). The pattern of relation provides the evidence of how particular groups emerge, grow or disappear in a period of time (Vogel, 2012). Previously It has been clarified, bibliometric methods are useful to introduce quantitative rigor to traditional literature reviews and outline the knowledge base research topics in various disciplines (Shafique, 2013) and tracking researchers (Latour, 1987). But despite their importance they received little attention regarding to their combination and complementarity with traditional qualitative methods of extensive reading, synthesis and interpretation of the scientific literature.

Up to now, few studies have had quantitative-qualitative investigation on the association between the intellectual structure of service innovation and service systems to reach a better understanding of its origins, current state, and future directions.

Hence, to fulfil the existing gaps presented so far, this study aims at bringing up a methodological approach, which provides some longitudinal analyses between the interactions and evaluative dynamics of the intellectual structure of research subjects. In addition, this approach leads us to the detection of emerging research topics by the use of quantitative and qualitative methods for literature analysis.

The quantitative phase is based on science mapping by using bibliometric methods (co-citation and co-word analysis), which provides a global view of the evolution of service innovation and service system research. It followed with a qualitative analysis of future research topics, which aims at analysing recent horizons more in-depth and through a thematic analysis.

This paper adopts an interdisciplinary approach. This approach is supported, by the work of Beverungen et al., (2016): “Addressing these challenges requires researchers to extend beyond traditional disciplinary boundaries to reach beyond their disciplinary silos”.

Briefly, this study provides an interdisciplinary global view of the intellectual structure of service innovation and service system over a specific period of time (1986-2015), patterns of evolution. This study also reviews the works of the authors that have contributed over the time and future research horizons. We study all of the most relevant publications (in English) that have contributed to the research of service innovation and service system through a quantitative longitudinal analysis.

The following section discusses some related studies and how they have reviewed and analysed the subjects proposed for this paper by the use of qualitative or bibliometric techniques. In section 3, we present the methodological approach that we used to this purpose. Then, in section 4 we show the results of the study. Finally, we present the conclusions and the limitations of this research.

2. Related research

This section discusses several related research, especially, recent reviews and bibliometric studies aiming at answer following questions: Which databases were used for the study? How periods and sub-periods were determined? How many different documents were counted for the analysis? Which bibliometric or qualitative methods were used? What types of documents have been analysed (e.g. papers, books, proceeding papers)?

2.1. Service innovation/Innovation in services/Service innovation in the digital age: imbroglio or misunderstanding?

In the last 30 years, a huge number of studies concerning service innovation have been published. According to Carlborg, Kindström & Kowalkowski (2014), the first serious discussions and analysis emerged during the 80s with the study of Barras (1986), however, there are still many shortcomings in the service innovation research to date. Service innovation has been studied and characterised through different disciplines and by different authors from different points of view. (Snyder et al., 2016).

As it has been mentioned before, the lack of clarity in the definition of service innovation and the variety of characteristics present in some interrelated perspectives makes it difficult to delimitate this subject. The multiplicity of existing terms in service innovation such as, innovation in services, new service development and service design, is one of the greatest challenge of defining key terms in order to data collection in several previous bibliometric works and literature reviews (cf. Carlborg, Kindström & Kowalkowski, 2014; Snyder et al., 2016). The first group, which perceives these two terms as a single concept and the second group, which distinguishes between these concepts. As mentioned by Menor, Tatikonda, & Sampson in (2002) “in past research the constructs ‘service development’ and ‘service innovation’ have been used interchangeably in the works of Sundbo (1997) and Barras (1986)”. Barret et al. (2015) is another researcher who suggested it is possible to indistinctly use the notion of “innovation in services” and “service innovation”. In contrast, according to Carlborg, Kindström & Kowalkowski (2014 p. 386) states there is difference between these two concepts. “Distinguishing the notion of innovation in service firms from that of service innovation is important”.

Moreover, there are new research fronts by the use of the IT dimension such as “digital innovation” and “IT-enabled service innovation” in the academic discourse related to technology-enabled service (Huang & Rust, 2013). Barret et al. (2015) transposed for the first time relevant works in service innovation in the domain of marketing and operations to the domain of management of information systems. They indistinctly grouped the notions of “service innovation”, “digital innovation” and “IT-enabled service innovation”. Mentioned study, used the service innovation in the digital age as its central focus, highlighted that early or traditional approaches in service innovation and apply ICT as technological tools in the process of service delivery. This study contributes in the productivity and the efficacy of the companies active in service area, resulting new markets and service categories.

Although previous studies distinguish service innovation of innovation in service industries, their differences have been questioned in the last few years. Lusch & Vargo in (2014), Vargo & Lusch in (2004, 2008a, 2008b) and Barret et al. in (2015), suggest that every economic exchange is in essence a service exchange, where ICT plays a fundamental role of resources that can be combined to facilitate the transport, the transformation and the contextualisation of information in different contexts, creating new opportunities for the exchange of services and for innovation. In this matter, Barret et al. (2015) affirm that the field of digital innovation has emerged as a new speech in the domain of information systems that goes beyond the usual study of technology adoption processes. Digital innovation is defined by Yoo, Henfridsson, & Lyytinen (2010) as the realisation of new combinations of digital and physical components for producing new products [or services]. It differs from other forms of innovation mainly due to digital features such as modularity and generativity of digital technology (Tilson, Lyytinen, & Sørensen, 2010; Yoo, Henfridsson, & Lyytinen, 2010; Yoo, 2010). By the means of digital innovation, a company extends its limits beyond the environment of individual organisations towards network-connected markets (Lyytinen & Yoo, 2002). Hence, digital innovation progressively becomes a centre of focus in service innovation research (Barret et al., 2015).

In this sense, Sørensen and Landau (2015) developed a bibliometric study to analyse the scientific production in digital innovation, where they found 3189 papers published between 2000 and 2014 in the “basket of eight journals” in information systems management. At the end, 102 papers were particularly selected for “mobile ICT”

using 3 periods of 5 years each. Their study discusses about the challenges for the IS field academic agility in the ever-changing landscape of digital innovations research. Sørensen and Landau concludes: “these challenges involve dealing with highly decentralised and distributed phenomena challenging boundaries of employment and non-employment, human versus non-human agency and a wide array of unanticipated consequences.... For any of this to come to fruition, academic agility is at the core of the challenge” (Sørensen and Landau, 2015, p. 168). To understand these challenges, they propose an “academic ambidexterity” to deal with existing topics in parallel with emerging topics. This “academic ambidexterity” is based on the “contextual ambidexterity” (cf. Gibson and Birkinshaw, 2004).

Furthermore, Nardelli showed in (2015) how researchers have conceived and defined the relationship between ICT and innovation in services, by the use of qualitative analysis based on a concept-centric approach. Final data in that work include 41 papers organised in five umbrella themes: 1) management of ICT-based technological innovation; 2) management of organisational innovation resulting from ICT adoption; 3) NSD and innovation in service delivery; 4) business model innovation; and 5) relationship between ICT and innovation in services. The result of that study is a conceptual typology that organises and summarises the relationships between ICT and innovation in services while revealing theoretical gaps and an agenda for future research.

Concerning the research of scientific production in service innovation, the bibliometric study from Carlborg, Kindström & Kowalkowski (2014) point of view, includes the period between 1986 and 2010 taking Barras (1986) as the starting point. Their review includes a study on digital innovation, service innovation and innovation in services in the fields of service management and service marketing. The study defines three different phases to study and analysis existing literature review, with the purpose of giving a clearer vision of how the field of research in service innovation has evolved. These phases include: 1) formation phase: 1986–2000; 2) maturity phase 2001–2005; 3) multidimensional phase: 2006–2010. This work is in contrast with recent studies such as Lusch & Vargo (2014); Vargo & Lusch, (2004, 2008a, 2008b) and Barret et al. (2015), Carlborg, Kindström & Kowalkowski (2014) who explain it is important to make the distinction between the concepts of “innovation in service firms” and “service innovation”. Besides, they also suggest that it is important to study the interaction between new service development (NSD), new product development (NPD) and their possible combinations from theoretical and practical points of view. In addition, they propose future horizons of research such as the development and conceptualisation of service innovation typologies instead of focusing on the intrinsic differences between services and products. Besides that, they suggest studying the growing number of digitally-enabled innovations including new combinations of digital and physical components, in line with the work of Yoo, Henfridsson, & Lyytinen (2010). Carlborg, Kindström & Kowalkowski in (2014) affirm digital innovations make a call towards a better comprehension of the barriers and the motors of technological service innovations and towards the inclusion of other disciplines such as design, information systems, theory of organisations, operations, public policies and strategy. In their work, they mention the necessity of further work including other countries because the biggest part of the documents reviewed for their study come from Western Europe.

Snyder et al. (2016) argued that the term “service innovation” has become an inaccurate and vague, although it is still important to explain the growing service sector as

they hold that “Despite the considerable attention given to studying service innovation, research still struggles to answer the most basic question: What is service innovation?”. They also show that previous works mainly made use of assimilation, demarcation and synthesis perspectives for research in service innovation such as those of Miles (2016); Carlborg, Kindström & Kowalkowski (2014); Coombs & Miles (2000) and Ordanini & Parasuraman, (2010). According to Snyder et al. (2014), it is necessary to establish new perspectives to categorise studies in service innovation. Hence, their work proposed a new categorisation based on changes, which is composed of: 1) degree of change, 2) type of change, 3) newness, and 4) means of provision. In this context, their work provides an analysis from a new perspective on the meaning of “service innovation” through a literature review at the same time that they remark a lack of methodological rigor in previous reviews of literature concerning service innovation.

Miles (2016) presented a bibliometric study including trends and main topics in service innovation literature, which shows the impossibility of reviewing every paper, report, or even every book in the matter. His analysis is based on four approaches, for categorisation of service innovation studies: Techno-assimilation; Technodemarcation; Servo-demarcation; Servo-assimilation. Miles (2016, p. 4) argues: “Because ‘services’ refers to both industries and their products, it is unclear whether ‘innovation in services’ means new or improved service (products) or new or improved ways of creating these services (processes). ‘Service innovation’, in contrast, might be expected to focus more centrally on new or improved services (products), though there is some inconsistency in the literature here”. Miles concludes that “service activities are being transformed by the application of new technological opportunities, by organisational change and innovation in a globalising world which changing attitudes and expectations on the part of citizens, consumers and employees. There will be much need to deepen our understanding of particular service activities, their evolution and the ways in which they can be practised more effectively and sustainably (Miles 2016, p.30).

Table 1: Synthesis of several related research presented in section 2.1 and 2.2.

Authors	Objective	Methodological approach	Field	Database	Key terms	Period	Type of document	#
Barret et al., (2015)	Advance theoretical developments on service innovation in a digital age.	Qualitative	Management of information systems, Marketing, Operation	Non specified	Non specified	Non specified	Books; Journal articles	148
Carlborg, Kindström & Kowalkowski (2014)	Analyses the progression of service innovation research according to topicality and perspective	Qualitative content analysis	No specified	ISIWoS	"service/s innovation", "innovation in service/s", or "service/s development"	1986-2010 divided in 3 phases	Journals articles	128
Hsu & Chiang (2015)	Study SSME in information systems research	Bibliometric performance analysis	50 social sciences disciplines.	ISIWoS	"Service science", "Information system", "Service management", and "Service engineering"	1991-2012	Journals articles	4513
Miles (2016)	Summarise the research fronts and the main trends of literature in service innovation	Bibliometric performance analysis. Co-words analysis	Non specified	Google scholar	"service innovation", "innovation in services"	1960-2014	Books, official reports and journals articles	No specified
Nardelli (2015)	Study the relationship between ICT and innovation in services	Qualitative analysis based on a concept-centric approach	Non specified	Principally ABI Inform, but too in Scopus&ISIWoS	Combination of "ICT", "service" and "innovat"	Non specified	Journal articles	41
Oliveira, Mendes & Rozenfeld (2015)	Described the main quantitative characteristics of PSS research field	Bibliometric performance analysis and science mapping	Interdisciplinary	ISIWoS	"product service system" or "servitization".	2002-2013	Journal articles	118
Sakata et al., (2013)	Determine the structure and geographical distribution of knowledge, and the structure of research collaboration in service innovation	Bibliometric performance analysis and science mapping	Interdisciplinary	ISIWoS	"service* and (science* or management* or engineering*)"	1970-2008	Journal articles	54928
Snyder et al., (2016)	Propose different categories for service innovation research	Qualitative	Non specified	Scopus	"Service/es innovation" and "Innovation in service/es"	Non specified	Journal articles	1046; Selected:255; Final sample: 43
Sørensen and Landau (2015)	Study the challenges for the IS field academic agility in the ever-changing landscape of digital innovations research	bibliometric	Management of information system	"basket of eight IS journals"	Digital innovation, Mobile ICT	2000–2014 divided in 3 sub-period of 5 years	Journal articles	3189; Final sample: 102

2.1. Service System

There is a very reduced amount of bibliometric studies or reviews about service system in literature. Hsu & Chiang (2015) as well as Sakata et al., (2013) presented bibliometric studies including performance analysis of publications about SSME. In contrast, Oliveira, Mendes & Rozenfeld (2015) presented a bibliometric analysis limited to the study of scientific production in the field of "product-service system". Table 1 shows a summary of the different related works presented in sections 2.1 and 2. 2.

3. Methodology

In this section, we will present 9 steps which define the methodological approach used to study the intellectual structure of « innovation service » and « system of service » from 1986 to 2015. The approach is based on 2 stages. The first stage is founded on a quantitative analysis based on science mapping with bibliometric method and data mining. The second stage is based on a qualitative examination through a thematic analysis (Braun & Clarke, 2006; Gioia and al., 2012). The steps of the methodological approach are shown the Figure 1.

3.1. Research design

This first step is divided in three sub-steps: a) Define a research question; b) chose an appropriate bibliometric method to answer the research question; c) chose a suitable data-mining, bibliometric or science mapping tool.

Regarding the research question, taking into account that the goal of this work is to study the interaction between the intellectual structures of “service systems” and “innovation services”, the following question were defined:

How the intellectual structure of service innovation and service system linked and evolved over time (1986-2015)? What are the dynamics of the conceptual structure evolution and associated topics over time? Which authors play a key role in bridging conceptual domains of research? and what are the future research horizons?

Appendix 1 shows different bibliometric methods and several research questions associated with each method. Several studies present a detailed review of different bibliometric methods (cf. Zupic & Cater, 2015; Cobo et al., 2011a).

Several bibliometric methods were studied (i.e. citation, bibliographic coupling, co-citation, co-author, co -words analysis). This study selected the co-citation analysis (Small & Upham, 2009) and the co -word analysis (Callon et al., 1983) as appropriate bibliometric methods to answer the research questions.

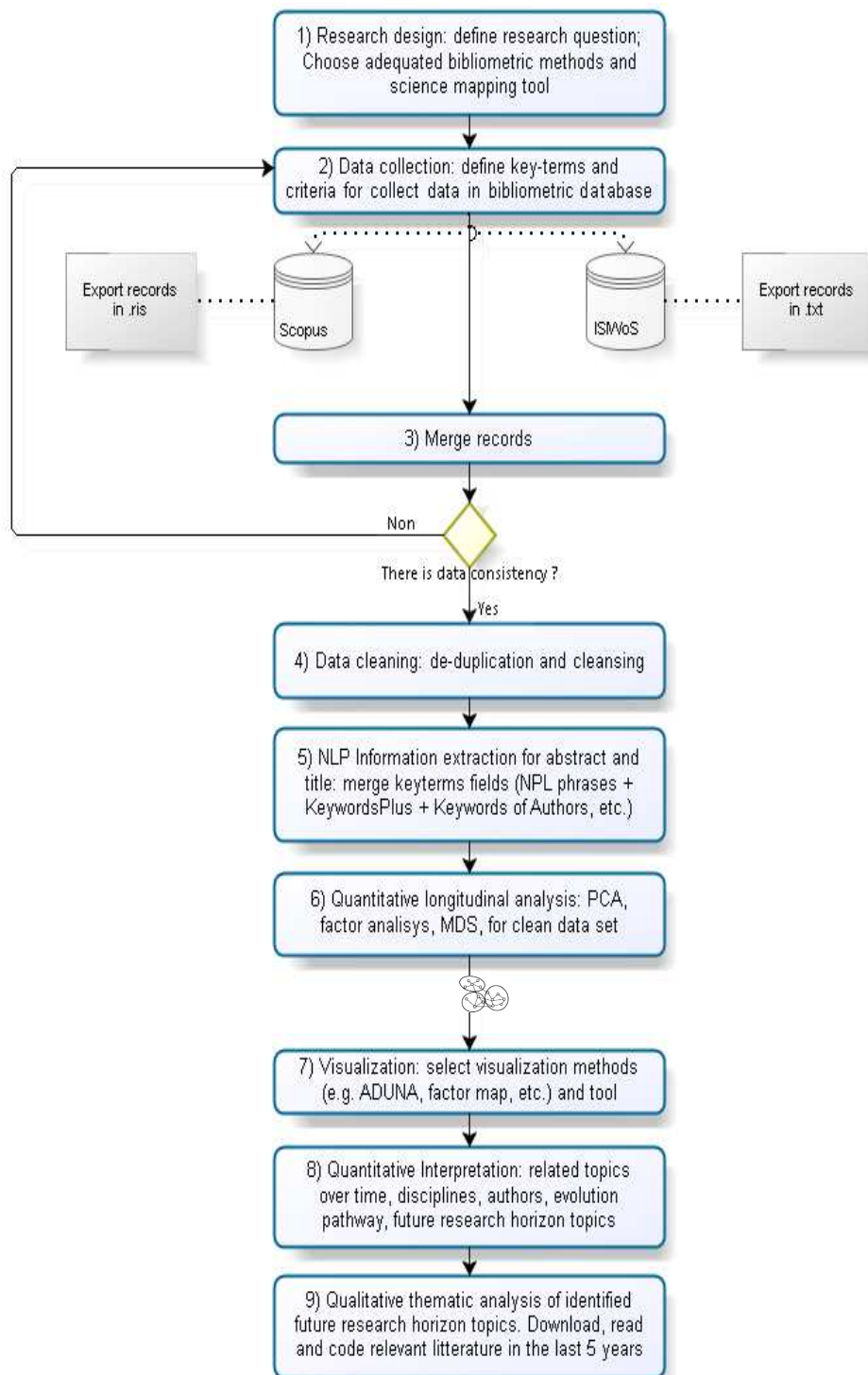


Figure 1: Methodological approach. Source: Authors

The co-citation analysis was chosen because it maps the structure of a research field through pairs of documents that are commonly cited together (Coulter et al., 1998). Additionally, this method has been used in the literature to identify emerging topics (Small, Boyack, & Klavans, 2014; Small & Upham, 2009) and discover the invisible colleges (Vogel, 2012; Noma, 1984). The result of co-citation analysis returns a set

of groups that can be understood as the intellectual basis of the different subfields of a research area.

On the other hand, the co-word analysis was chosen because it allows mapping the strength of association between information elements in textual data via keywords. The results of a co-words analysis can be understood as semantic or conceptual groups of different topics covered in the research field (Callon et al., 1983).

According to Munoz et al., (2016) although analyses by co-citation and co-words allow to analyse the evolution of a field of research by a longitudinal study, each of them allows us to study a different and complementary evolution. As Munoz et al., reminds us while a longitudinal study using co-words analysis allows us to analyse the evolution of research topics, a longitudinal study based on co-citation allows us to analyse the continuity in the intellectual structure.

Different units of analysis can be used as the bibliometric method to build the analytical network (Zupic & Cater, 2015; Cobo et al., 2011a). For example: document, author, journal (in the case of citation, bibliographic coupling, co-citation analysis); words, keywords, or terms retrieved from title, abstract or document 's body (in the case of co-words analysis); authors (in the case of co-author analysis). In this study we use analysis units for co-words and co-citation.

Finally, regarding to the selection of the analysis tool, different bibliometric tools presented by Cobo et al., (2011a) and Zupic & Cater (2015) were reviewed. In this sense, VantagePoint© was selected as text-mining and science mapping tool in order to discover knowledge in titles, abstracts and keywords. This selection involved the acquisition of associated license.

3.2. Data collection using research terms

The table 1 shows several approach to choose the key terms for data collection in past related research. Considering the work of Carlborg, Kindström, & Kowalkowski (2014); Miles (2016) and Snyder et al., (2016) we used the terms “Service(s) innovation”, “Innovation in service(s)”, “digital innovation”, and “service system” as key search terms. Barret et al., (2015) have used the notion “Service innovation in the digital age” to split the set of terms used in this study. In this sense, Huang and Rust (2013) have used a multidisciplinary perspective. Appendix 1 shows the search terms used in this study. Moreover, Barras’s research (1986) consider as one of the first research in service innovation. In this study, as in the case of Carlborg, Kindström & Kowalkowski (2014), we took the year 1986 as the starting date for the present study. Therefore, the study period was from 1986 to 2015. Our chosen keywords are searched in titles, abstracts and keywords of articles. Data were collected from ISI Web of Science (ISIWoS) (Science Citation Index Expanded SCI-EXPANDED; Social Sciences Citation Index SSCI; Arts & Humanities Citation Index A&HCI; Emerging Sources Citation Index ESCI) and Scopus because they are the most important and consistent bibliometric databases. They included eight cycles of data collection between 16 April and 15 May 2016. The final data was limited to only scientific articles in English, peer reviewed. In this sense, the total data collected were 2439 records, of which 1004 derived from ISIWoS and 1435 Scopus. For each record was exported all available information in formats .RIS and CSV for Scopus and, formats .TXT and .CSW for ISIWoS.

3.3. Merge of records

After connecting consistent data, all records collected in ISIWoS and Scopus were imported and combined into the text-mining tool VantagePoint. The import of records was performed using appropriate filters ("Scopus Filter" and "ISIWoS Filter").

3.4. Data cleaning

Data cleaning is very important to ensure the quality of the results. In this step, several cleaning procedures were performed to eliminate duplicate or irrelevant records, consolidate similar terms and combine similar entities. A proprietary algorithm to clean the data was used with VantagePoint, however, manually review was necessary for the abstracts, author's names, titles, sources (i.e. review or journal name) and affiliations of each record. This function is important when combining data from multiple databases (Kongthon, 2004). For example, it allowed detecting cases where the same article appears in Scopus and ISIWoS, due for example to differences in writing the names of the authors. After cleaning the number of records was reduced from 2439 to 796 published in 255 different journals. The Figure 2 illustrates the final 796 records (articles or reviews) by year. For analysis from 1986 to 2015, 3 periods of 10 years P1 (1986-1995), P2 (1996-2005) and P3 (2006-2015) were defined. P1 is composed of 12 articles, P2 of 57 and P3 of 727 records.

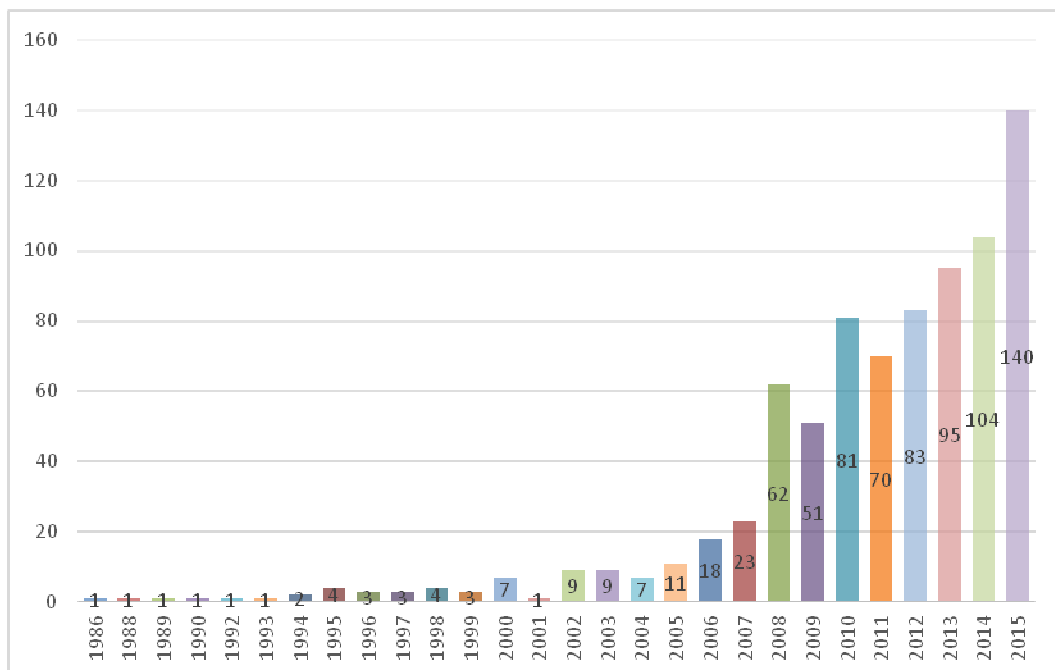


Figure 2. The sample of articles included in this study concerning service innovation and service system in the digital age research from 1986 to 2015.

3.5. NLP Information extraction

In order to mining key information titles and abstracts, a procedure of text mining was performed through Natural Language Processing (NLP) for extract information of articles. This function is especially useful for analysing all abstract or all text of an article. NLP allows to decompose the abstract or all the text in an article, beyond the

keywords proposed by the authors or keywords indexed by a database provider. A new field was created to group items resulting from the combination of all categories of key terms of 796 articles: Abstract (NLP) (Phrases) (18655 items) + Title (NLP) (Phrases) (1991 items) + Keywords (author 's) (1277 items) Keywords Plus + (942 items) + Scopus Keywords (3026). A cleaning procedure has reduced the total items to 20950. These final items were used for co-words and co-citation analysis. Before, a first thesaurus for records was performed to related topics over time, authors' names and sources. A thesaurus is defined for Kongthon (2004) as a grouping of terms or key phrases, into certain concepts. This is important for ensure the quality of cluster analysis, factor analysis or principal component results.

3.6. Quantitative longitudinal analysis

In order to map the changes and interactions in the intellectual structure, it is necessary to define several periods. The total period (1986-2015) was divided into three equal periods of ten years 1986-1995 (P1) 1996-2005 (P2) and 2006-2015 (P3) (cf. Vogel, 2012). After we perform a multivariate analysis to reduce the dimension of the resulting network of co-words or co-citation data analysis, so that it is easily understood (Shafique, 2013). According to Cobo et al, (2012) the most frequently used methods of reduction are: principal component analysis (PCA); multi-dimensional scaling (MDS); exploratory factor analysis and cluster analysis. These methods help to find relationships among topics and concepts and to reduce the dimensionality of the original large set of variables. In order to ensure the robustness of the results, researchers generally use various grouping methods simultaneously, for example, similar studies have used these MDS and PCA techniques complementary (i.e., Shafique, 2013; Nerur et al, 2008). These techniques grouped a set of items in various subsets, which must have a high similarity to each other and must be quite different from other items in the other groups. Such techniques were used during different periods studied (P1, P2 and P3) to determine the relationships, the mapping of patterns and trends in bibliometric networks service innovation and service system. It was also possible to establish various relationships between the units of analysis such as co-occurrence, coupling, cross-correlation, auto-correlation (Cobo et al., 2011b). We perform a supplementary quantitative analysis on P3 for identifying the emergent topics.

3.7. Visualisation

Each type of analysis produces a different view, therefore, there are several visualization techniques of the results: MDS (Shafique, 2013), auto-correlation map (Leone et al, 2012), Pajek (Wallin, 2012). After generating the map, we perform some analysis to extract knowledge of the map. For example, the "networks analysis" (Vogel & Güttel, 2013) allows different statistical analysis on the generated maps, determine the total number of nodes, the number of isolated nodes, the average degree of the network, the number of loosely connected components, the network density, etc. On the other hand, if a clustering algorithm is applied to build the map, the density and centrality of the various clusters can be measured or even other measures could be established considering the relationships between clusters.

3.8. Quantitative interpretation

At this step, the obtaining results during the quantitative analysis were interpreted based on the experience and knowledge of the authors. In order to obtain appropriate conclusions about the evolution of the interaction between service innovation, the results were contrasted with recent studies as the one which was done by Barret et al. and 2015 Huang & Rust, 2013.

3.9. Qualitative in-depth themes analysis/interpretation

By considering the study of Zupic & Cater (2015), we perform a qualitative thematic analysis which is useful to complement and extend quantitative analyses, based on science mapping and bibliometrics methods. By considering Sørensen & Landau (2015) proposed "academic ambidexterity", the qualitative analysis focus on future research horizons topics for a review of emerging issues identified in the step 3.7. This thematic analysis was focused in the last 5 years (2011-2015). A co-occurrence matrix between future research horizons and existing publication was constructed to identify the articles to download. Consequently, 184 articles of last 5 years of emerging topics were identified. A total number of 182 studies were downloaded and the 2 articles were not accessible. All articles were imported in a qualitative data analysis computer software (NVIVO 11.3) and emerging topic were coded. After reviewing all article, 59 of them were chosen for a complete reading. The NVivo software was used for thematic content analysis through an adaptation of the methodology Gioia (Gioia et al., 2012). We began by generating first-order concepts derived from quantitative phase. Second, we looked for relationships between first-order concepts. By grouping convergent categories at a higher level of abstraction, we identified theoretical categories or second-order themes. For instance, we grouped the aforementioned first-order emergent topics into the second-order theme. Third, we looked for aggregate analytical theoretical dimensions. These were organized through a "data structure". Finally, we constructed a model by identifying relationships between second-order themes and aggregate analytical/theoretical dimensions.

4. Results

The objective of this paper is to analyse the intellectual structure of service innovation and service system literature, interactions, related topics and changes over time. The results obtained after completing the different stages included in the analysis developed for P1, P2 and P3 are shown below.

4.1. Changes of the intellectual structure

4.1.1. Intellectual structure of P1 (1986-1995)

The resulting thesaurus of P1 allow us to reduce to 496 terms in 20 groups for the factor analysis. In the period 1986-1995, the service innovation and service system research revolved around 20 main topics: 1) Innovation in services. 2) Adoption and diffusion, 3) Consumer/customer/user, 4) Service sector/Service industries, 5) Infor-

mation Technology, 6) Reverse product cycle theory, 7) Service innovation, 8) Service system, 9) Absorptive capacity/ACAP, 10) Complex service systems, 11) Generation of new types of services, 12) Institutional, 13) National government, 14) National systems of innovation, 15) Product-service innovation, 16) Quality of service, 17) Schumpeterian, 18) Service logic, 19) Technological innovation, 20) Technology policy.

Innovation, services and technology and reverse product cycle theory, were the most important motors themes.

The application of multivariate analysis technique to the co-words analysis developed allows us to check the existence of up to 4 different groups or clusters (see, Figure 3 and 4), some of which are closely linked.

The visualisation through a MDS allows us to delineate the first 10 years of relation between service innovation, service system and technology research. The study of Barras (1986), Miles (1993), Kingmanbrundage George & Bowen (1995) and Buzzacchi, Colombo & Mariotti (1995) are at the top of the ranking in most cited papers with a total of 274, 74, 34 and 28 citations received, respectively.

The works of Smith (1994), Latour & Roberts (1992), Kerkhof (1994), Evangelista & Sirilli (1995), Beltramini (1988), Metcalfe (1995) and Barras (1990) complete the total of documents that includes 12 research paper. In this period there are a differentiation between innovation in service and service innovation, but both perspectives are theoretically influenced by the reverse product cycle theory and the Schumpeterian approach.

In the late 1980s and early 1990, the literature started showing an inclination of companies moving towards adoption and diffusion of technology and technology policy. Regarding Service system, the works of Smith (1994) about complex service system and the work of Kingman-Brundage, George & Bowen (1995) about service logic and service system are theoretically influenced by the marketing and operations theory. A large proportion of these papers published in marketing and innovation journals (Table 3). Each article in the Thomson Reuters Web of Knowledge database is assigned to one or more subject categories³⁸, according to the journal in which it was published. In this period, the remaining works are related to the web of science categories of Management, planning & development and Economics. Figure 4 depicts several associated authors for P1 topics.

Table 3. Journals ordered by number of articles concerning P1.

	Journals/Reviews	Number of articles (1986-1995)
1	RESEARCH POLICY	3
2	CAMBRIDGE JOURNAL OF ECONOMICS	1
3	FUTURES	
4	INTERNATIONAL JOURNAL OF COMPUTER APPLICATIONS IN TECHNOLOGY	1
5	INTERNATIONAL JOURNAL OF SERVICE INDUSTRY MANAGEMENT	1

³⁸ http://incites.isiknowledge.com/common/help/h_field_category_wos.html

6	JOURNAL OF BUSINESS VENTURING	1
7	JOURNAL OF PERSONAL SELLING AND SALES MANAGEMENT	1
8	JOURNAL OF SERVICES MARKETING	1
9	RESEARCH EVALUATION	1
10	SERVICE INDUSTRIES JOURNAL	1
	Total	12

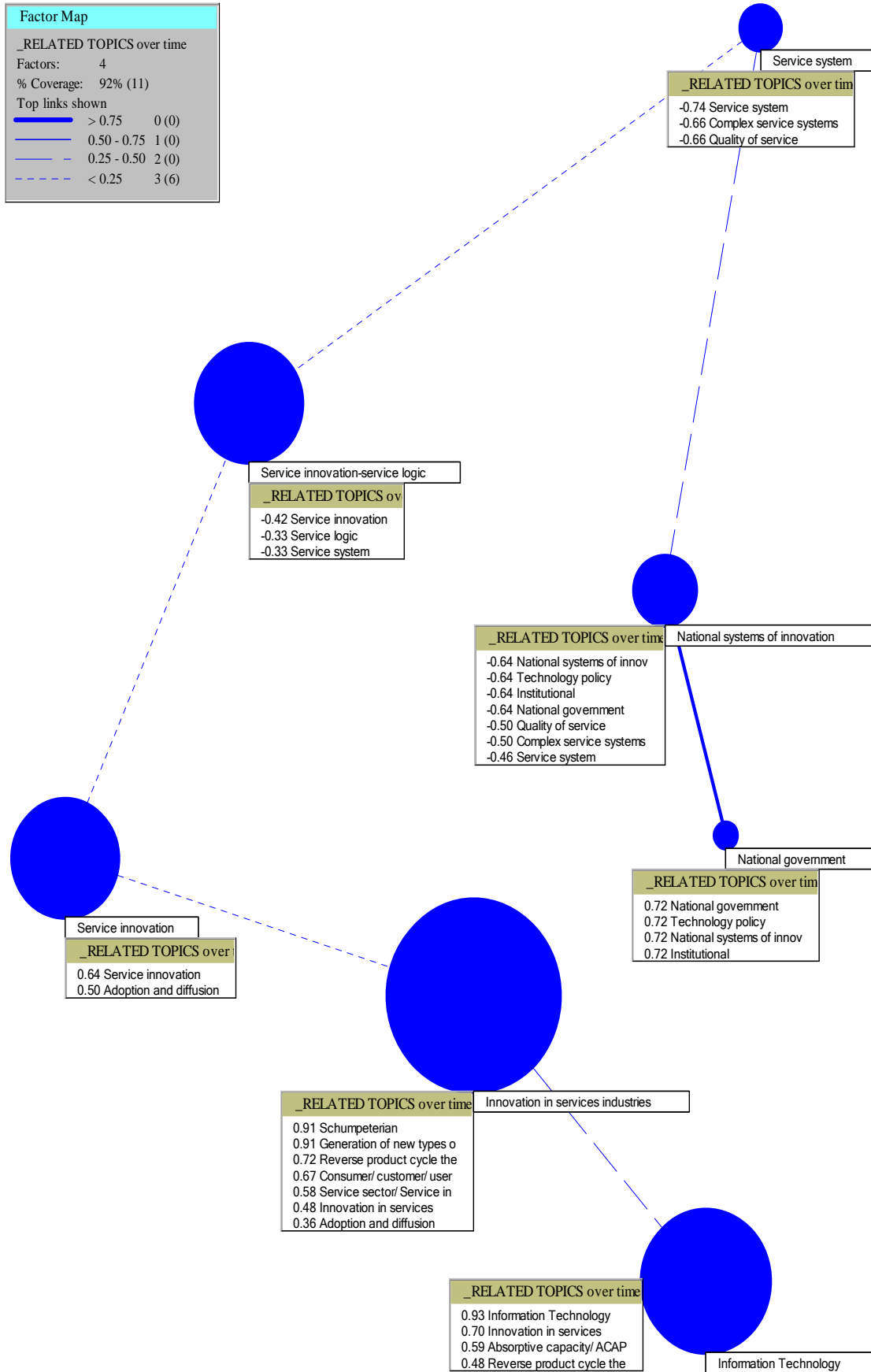


Figure 3: Identification of P1 period factors.

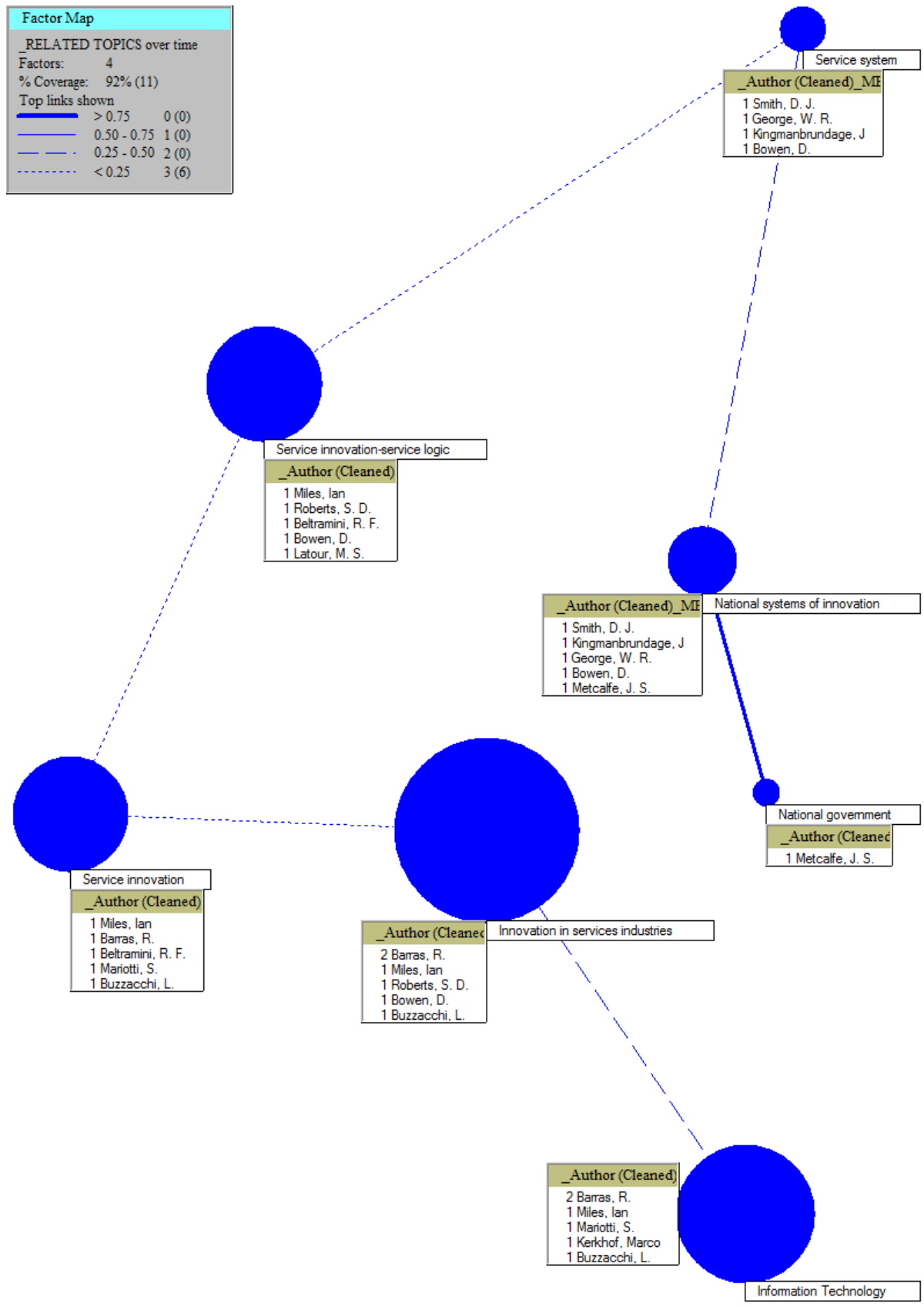


Figure 4: Factor map with some several authors concerning P1 period.

4.1.2. Intellectual structure of Period 2 (1996-2005)

In this period, the resulting thesaurus allow us to reduce to 1950 terms in 41 groups for a factor analysis. We generated a factor map via VantagePoint's Factor analysis. We obtained twelve factors in figure 5.

The theories predominant in the P2 centres on Structuration theory, Actor network theory (ANT), Consumer Theory, Diffusion of innovation theory, neo-Schumpeterian theory, Organization theory and Resource-based theory

In 1997 Gallouj propose a neo-Schumpeterian appropriate theory of innovation. The same year Gallouj and Weinstein (1997) proposes an approach Lancasterian to interpret innovation processes in the service sector.

Lee (2003) is the only study on service system in this period. Lee discusses how to design smart products and service systems using web-based intelligence technologies and about the trends of product and service innovation in industry.

Around 2004, the concept of value co-creation came into importance from the pivotal work of Vargo and Lush (2004) about new perspectives to a new dominant logic for marketing, the service-dominant logic.

Johnson and Walker (2004), discusses technology-enabled service innovations. Johnson and Walker states that diffusion of innovation theory warrants review in order to accommodate better the case provided by technology-enabled service innovations.

Lyytinen, Yang and Yoo (2005) discusses the evolution of the mobile infrastructure in South Korea through the lens of actor network theory. These authors analysed the roles of standards in promoting, enabling and constraining innovation in broadband mobile services over a 10-year period. According of Lyytinen, Yang and Yoo, successful innovation and diffusion of broadband mobile services are collective achievements and firms need to deploy strategies that enable them to mobilize broad socio-technical networks that include technological, institutional, political, financial resources and standards.

Barney, Muhanna and Ray (2005) presents an empirical study that examines the extent to which IT impacts customer service through a resource-based analysis.

The five most cited studies in this period are Vargo and Lush (2004) with 2132 citations, Gallouj and Weinstein (1997) with 389 citations, Atuahene-Gima (1996) with 216 citations, Sundbo (1997) with 191 citations, Evangelista and Sirilli (1998) with 125 citations.

In P2 articles composed 9 web of science categories: Management, Business, Engineering, Industrial, Operations Research & Management Science, Planning & Development, Engineering, Multidisciplinary, Information Science & Library Science, Political Science, Public Administration.

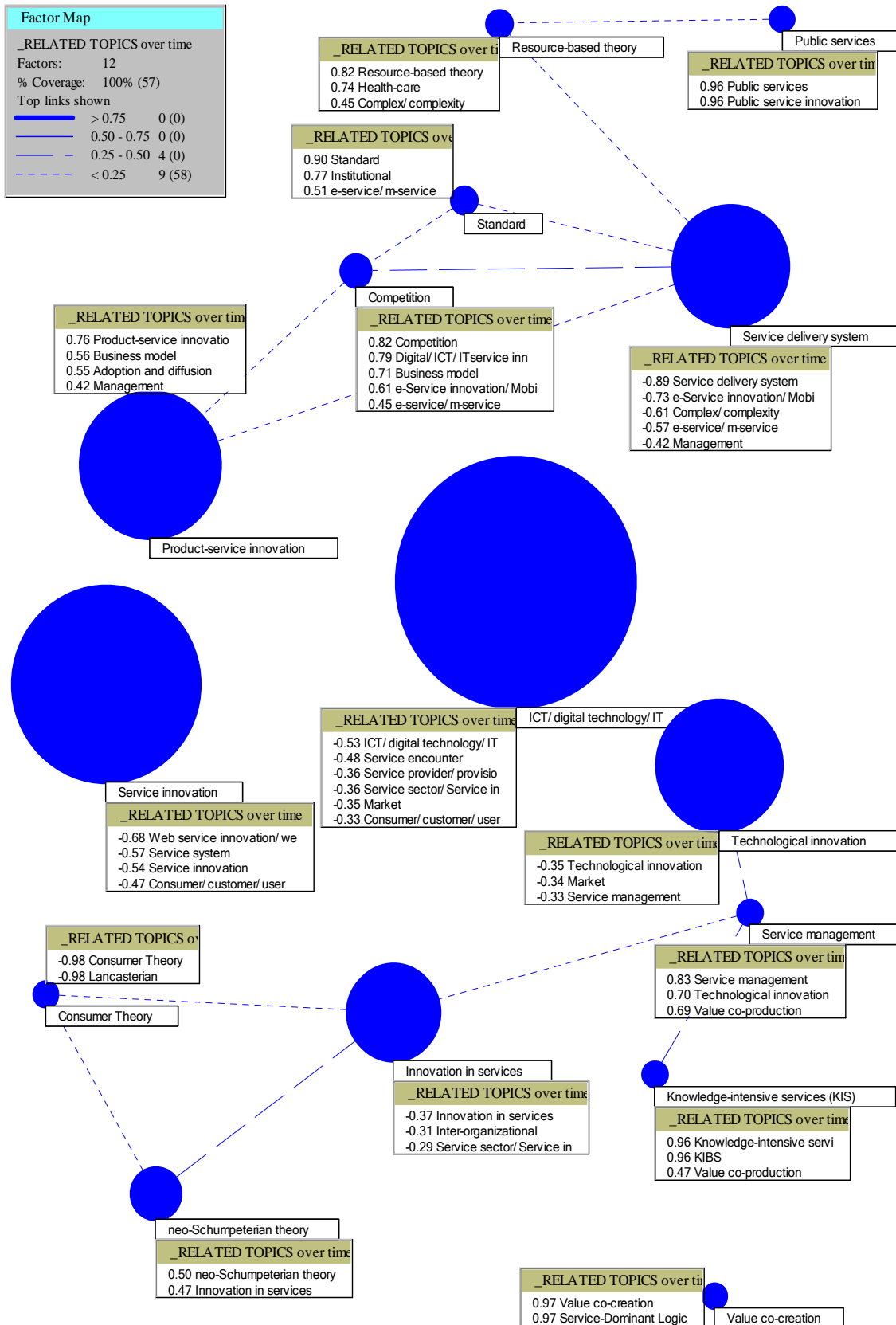


Figure 5: Identification of P2 period factors.

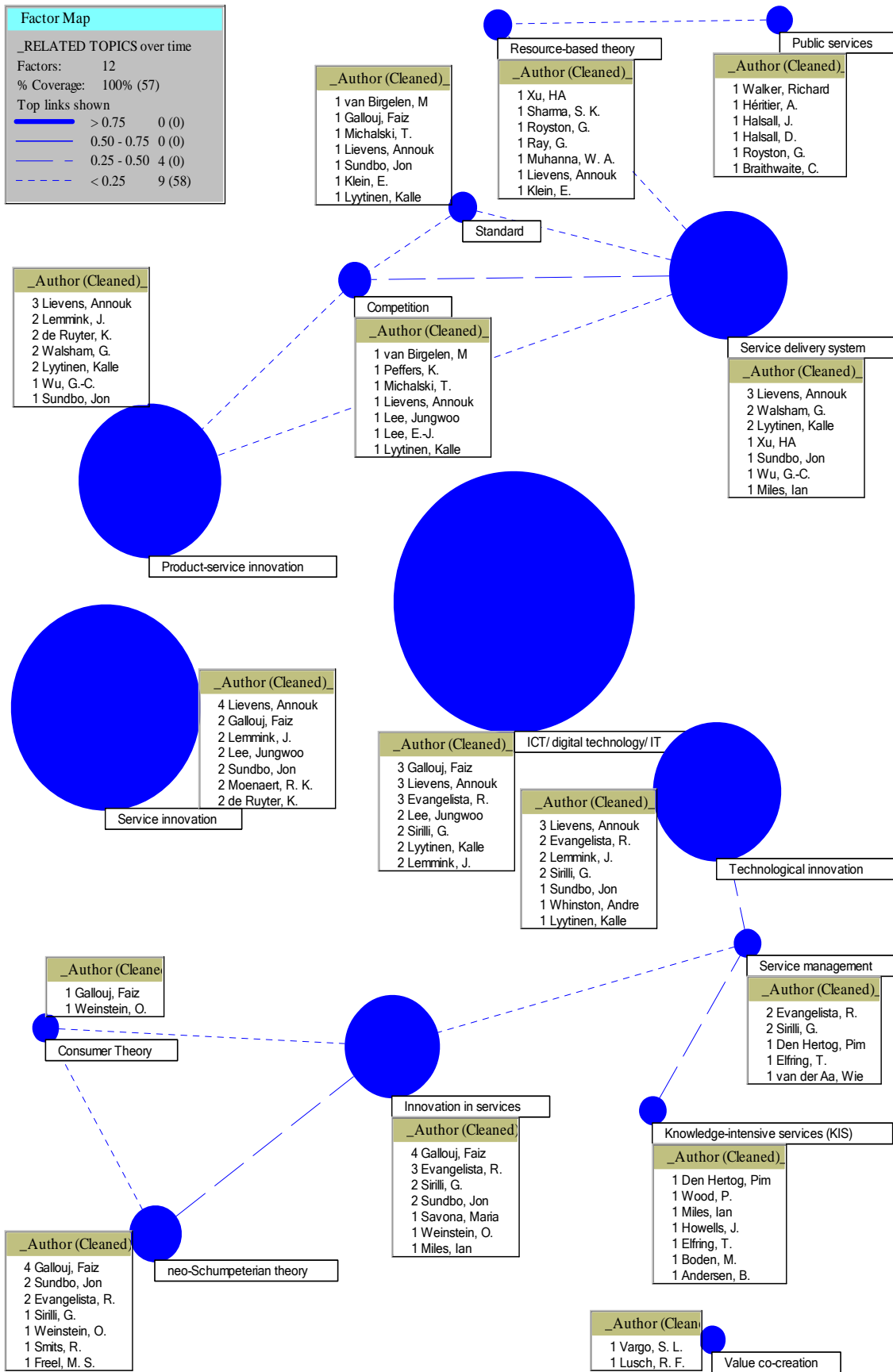


Figure 6: several authors concerning Factor of P2 period.

Table 4 lists the journal of P2 period.

	Journals/Reviews	Number of articles (1996-2005)
1	MIS QUARTERLY: MANAGEMENT INFORMATION SYSTEMS	5
2	INTERNATIONAL JOURNAL OF TECHNOLOGY MANAGEMENT	3
3	JOURNAL OF PRODUCT INNOVATION MANAGEMENT	3
4	IEEE TRANSACTIONS ON ENGINEERING MANAGEMENT	2
5	INTERNATIONAL JOURNAL OF SERVICE INDUSTRY MANAGEMENT	2
6	INTERNATIONAL JOURNAL OF SERVICES, TECHNOLOGY AND MANAGEMENT	2
7	JOURNAL OF BUSINESS RESEARCH	2
8	JOURNAL OF SERVICE RESEARCH	2
9	RESEARCH POLICY	2
10	TECHNOLOGICAL FORECASTING AND SOCIAL CHANGE	2
	Others 32 journals	32
	Total	57

4.1.3. Intellectual structure of Period 3 (2006-2015)

The resulting thesaurus allows us reducing 19607 terms in 164 groups in order to perform the factor analysis. We generated a factor map via VantagePoint's Factor analysis. We obtained 23 factors in figure 7. Emerging topics identified in this P3 through a VantagePoint's emergent topic analysis will be presented in section 4.2.

P1 and P2 researchers of discipline of information systems focused on the adoption of information technology in organizations (Lyytinen and Yoo, 2002; Swanson, 1994). In P3, it has arisen digital innovation and digital service innovation as a research topic. In this period, researchers from various disciplines have contributed to the study of innovation services, for example, Management of Information system (Lusch et Nambisan, 2015; Eaton et al., 2015; Barrett et al., 2015; Srivastava & Shainesh, 2015; Um, Yoo, & Wattal, 2015); Marketing (Echeverri & Skålén, 2011; Skalen, Aal & Edvardsson, 2015;) and public management (Osborne et al., 2015). Figure 7 show new related topics in P3 as Smart City, Open Data, Big Data, Internet of Things, smart service systems.

The top 5 of most cited articles are: Rai, Patnayakuni & Seth (2006) with 360 citations; Ostrom et al., (2010) with 296 citations, Maglio, Bailey & Gruhl (2007) with 264 citations, Maglio & Sphorer (2008) and Zammuto, Griffith, Majchrzak, Dougherty, & Faraj (2007). Figure 8 list several authors concerning the P3 period.

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For example, in March 2015, a special edition of the journal, Management Information Systems Quarterly entitled "Service Innovation in the Digital Age" presented a first Literature transposition of Marketing and Operations in the field of Information Systems Management. The aim of this special issue was to light the latest contributions on innovation services in the digital age and service systems (Barret et al., 2015). Three of five articles of this special edition were treated to both innovation services in the digital age and service systems (Lusch & Nambisan, 2015; Eaton et al, 2015. Shainesh & Srivastava, 2015).

In this period IT-related service is customer-centric as technology advances over time and multidisciplinary. As Huang and Rust (2013) concludes: *“IT transforms and renovates service into two seemingly polarized directions; making service more goods-like (more tangible, separable, homogeneous, and storable) or even more service-like (less tangible and separable, but more personalize and perishable) that provide two paths of evolution for service and manufacturing firms to follow that eventually blurs the distinction between goods and service... researchers from diversified disciplines participate in service research that broadens and enriches our understanding about IT-related service. It makes a clear statement that IT-related service is everywhere and the study of it requires interdisciplinary collaboration. (Huang and Rust, 2013, p. 257)”*.

Theories used in P3 are: Innovation diffusion theory (IDT), Institutional Theory, Action theory, Contingency theory, Design theory, Dynamic capability, Structuration theory, Dynamic capability theory, Practice theory, Activity Theory, Agency theory, Characteristics-based approach/theory, Complex adaptive systems theory, Modularity theory, Service logic, Abrahamson 's management fashion theory, Absorptive capacity ACAP theory, Actor network theory (ANT), Behavioral reasoning theory, Collective action theory, Competence-based theory, Conservation of resources theory, Consumer culture theory, Consumer resistance theory, Disruptive innovation theory, Knowledge-based theory, Lancaster's theory, Miller's theory of living systems and systemic thinking, Modular systems theory, neo-Institutional Theory, Queueing theory, Reasoned Action Theory, Resource-based theory, Service-oriented theory, Social Capital Theory, Systemic innovation theory, User innovation theory.

Journals of the period P3 are listed in the table 5. This period is characterised by multidisciplinary and increasing publications

Table 5. Journals ordered by number of articles concerning P3.

	Journals/Reviews	Number of articles (2006-2015)
1	MIS QUARTERLY: MANAGEMENT INFORMATION SYSTEMS	31
2	INTERNATIONAL JOURNAL OF SERVICES, TECHNOLOGY AND MANAGEMENT	27
3	SERVICE INDUSTRIES JOURNAL	26
4	JOURNAL OF SERVICE MANAGEMENT	23
5	INFORMATION SYSTEMS RESEARCH	16
6	JOURNAL OF SERVICE RESEARCH	14
7	RESEARCH POLICY	14
8	INDUSTRIAL MARKETING MANAGEMENT	13
9	JOURNAL OF BUSINESS RESEARCH	12
10	JOURNAL OF BUSINESS & INDUSTRIAL MARKETING	11
11	JOURNAL OF MANAGEMENT INFORMATION SYSTEMS	11
12	TECHNOLOGICAL FORECASTING AND SOCIAL CHANGE	11
13	JOURNAL OF SERVICES MARKETING	10
14	TECHNOVATION	10
15	MANAGING SERVICE QUALITY	9
16	JOURNAL OF INFORMATION TECHNOLOGY	8
17	JOURNAL OF PRODUCT INNOVATION MANAGEMENT	8
18	JOURNAL OF THE ACADEMY OF MARKETING SCIENCE	8
19	SERVICE SCIENCE	8
20	EUROPEAN MANAGEMENT JOURNAL	7
21	INFORMATION SYSTEMS AND E-BUSINESS MANAGEMENT	7
22	INTERNATIONAL JOURNAL OF OPERATIONS & PRODUCTION MANAGEMENT	6
23	MARKETING THEORY	6
24	ORGANIZATION SCIENCE	6
25	EUROPEAN JOURNAL OF INFORMATION SYSTEMS	5
26	EUROPEAN JOURNAL OF MARKETING	5
27	EXPERT SYSTEMS WITH APPLICATIONS	5
28	INDUSTRIAL MANAGEMENT & DATA SYSTEMS	5
29	Info	5
30	INTERNATIONAL JOURNAL OF INNOVATION AND TECHNOLOGY MANAGEMENT	5
	Others 225 journals	395
	Total	727

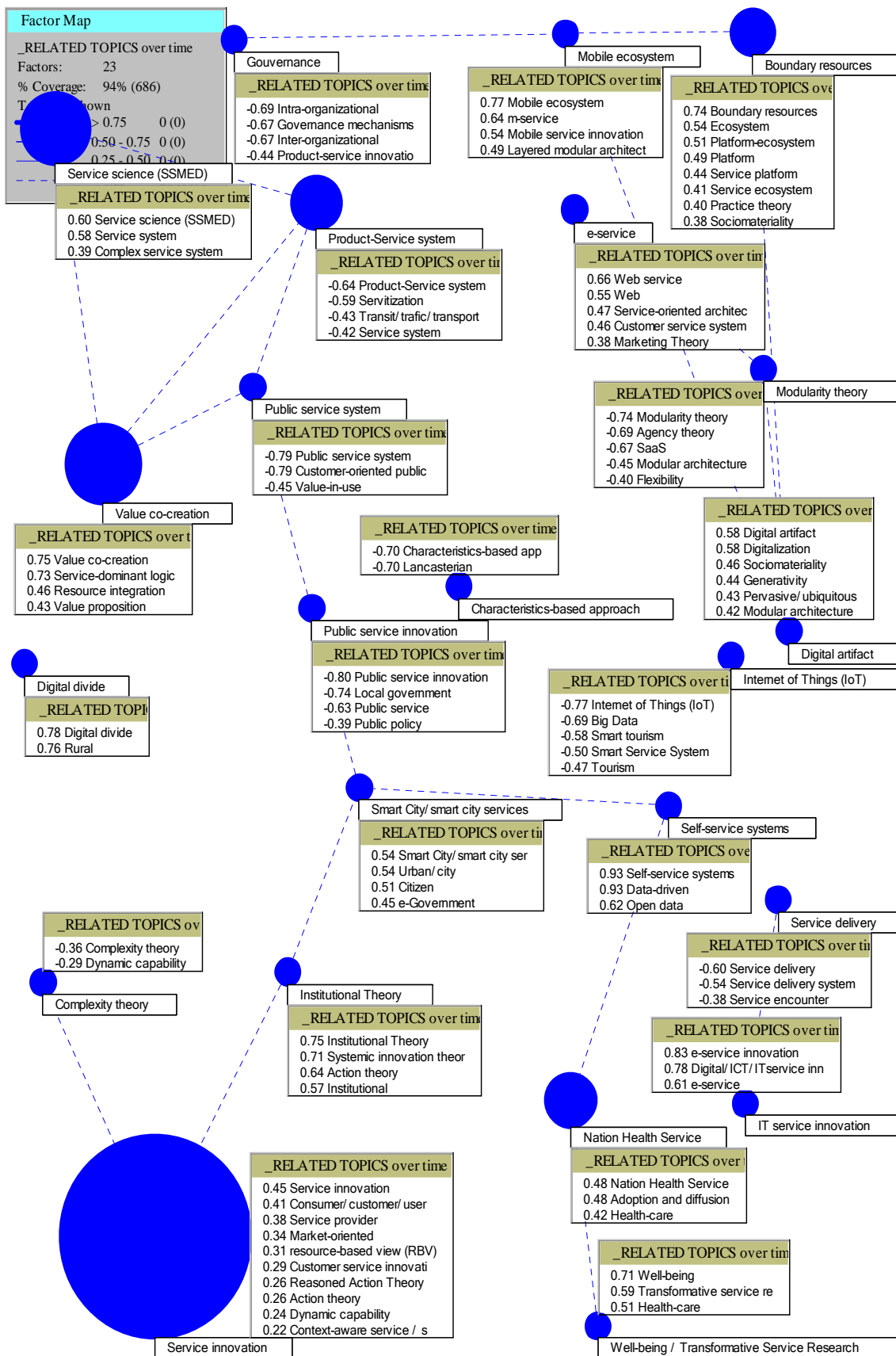


figure 7. Identification of P1 period factors.

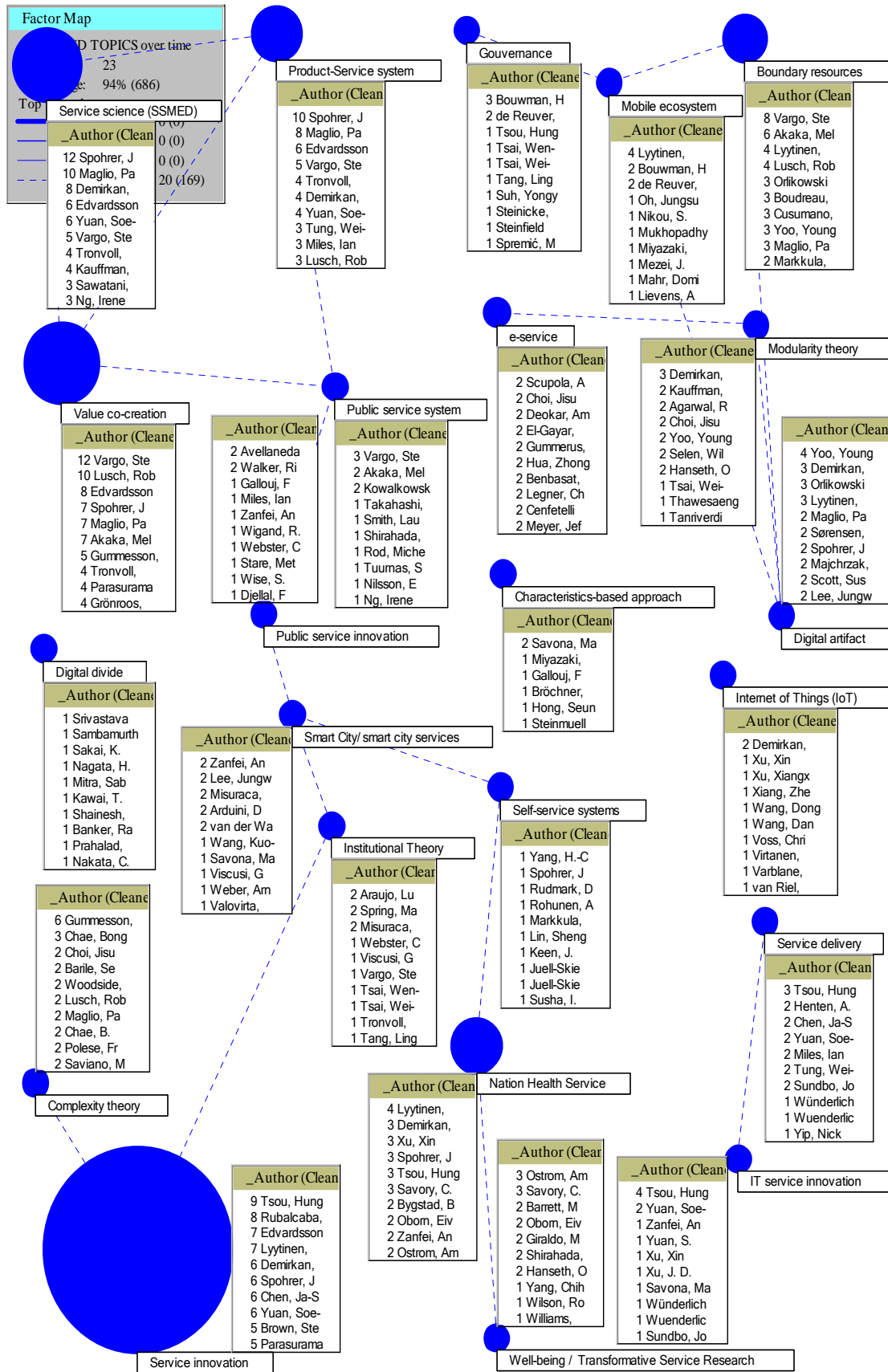


Figure 8: several authors concerning Factor of P3 period.

Figure 9 and figure 10 show a broadened view of thematic evolution service innovation and service system over time.

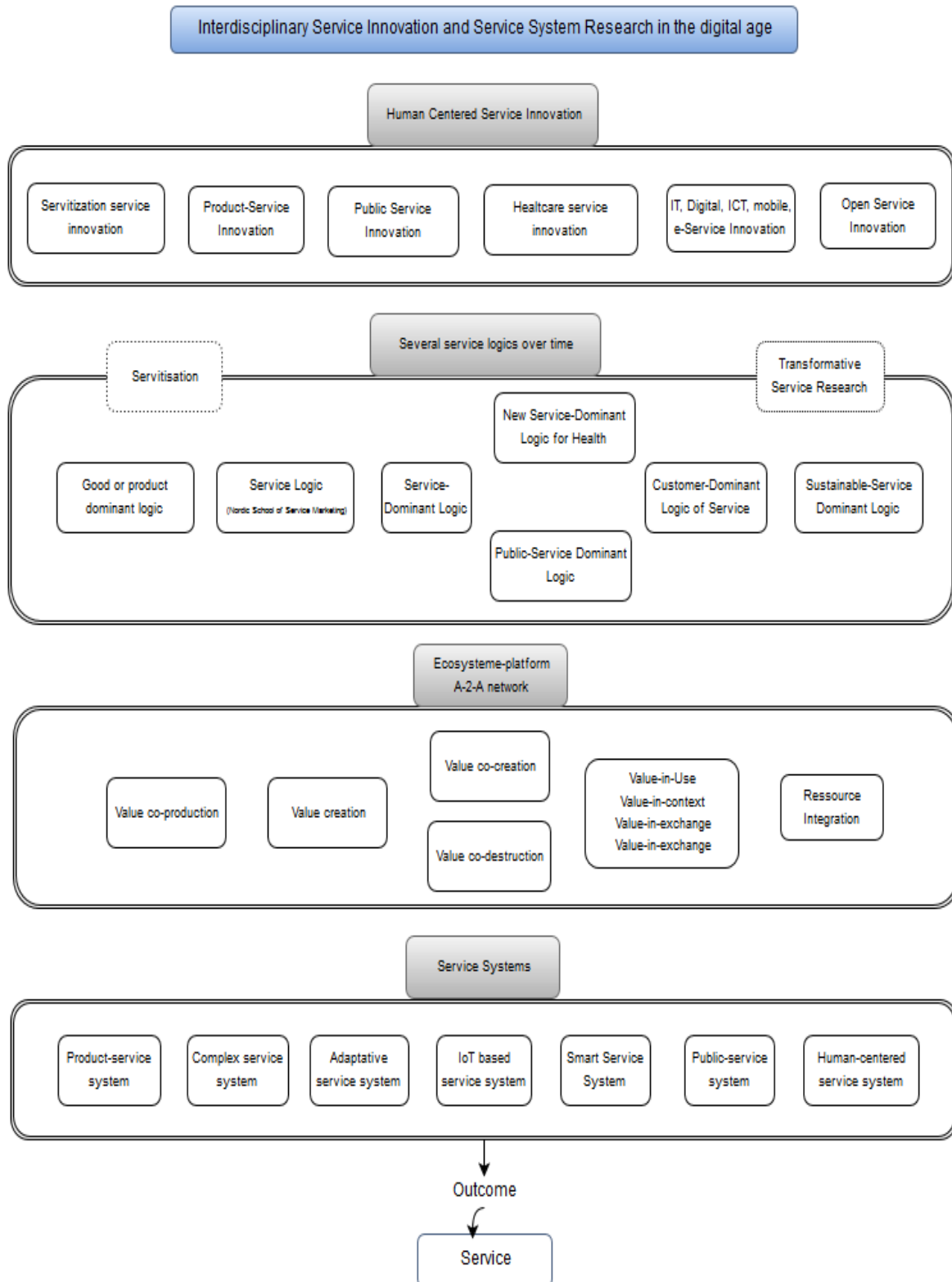


Figure 9: Interdisciplinary service innovation and service system research in the digital age

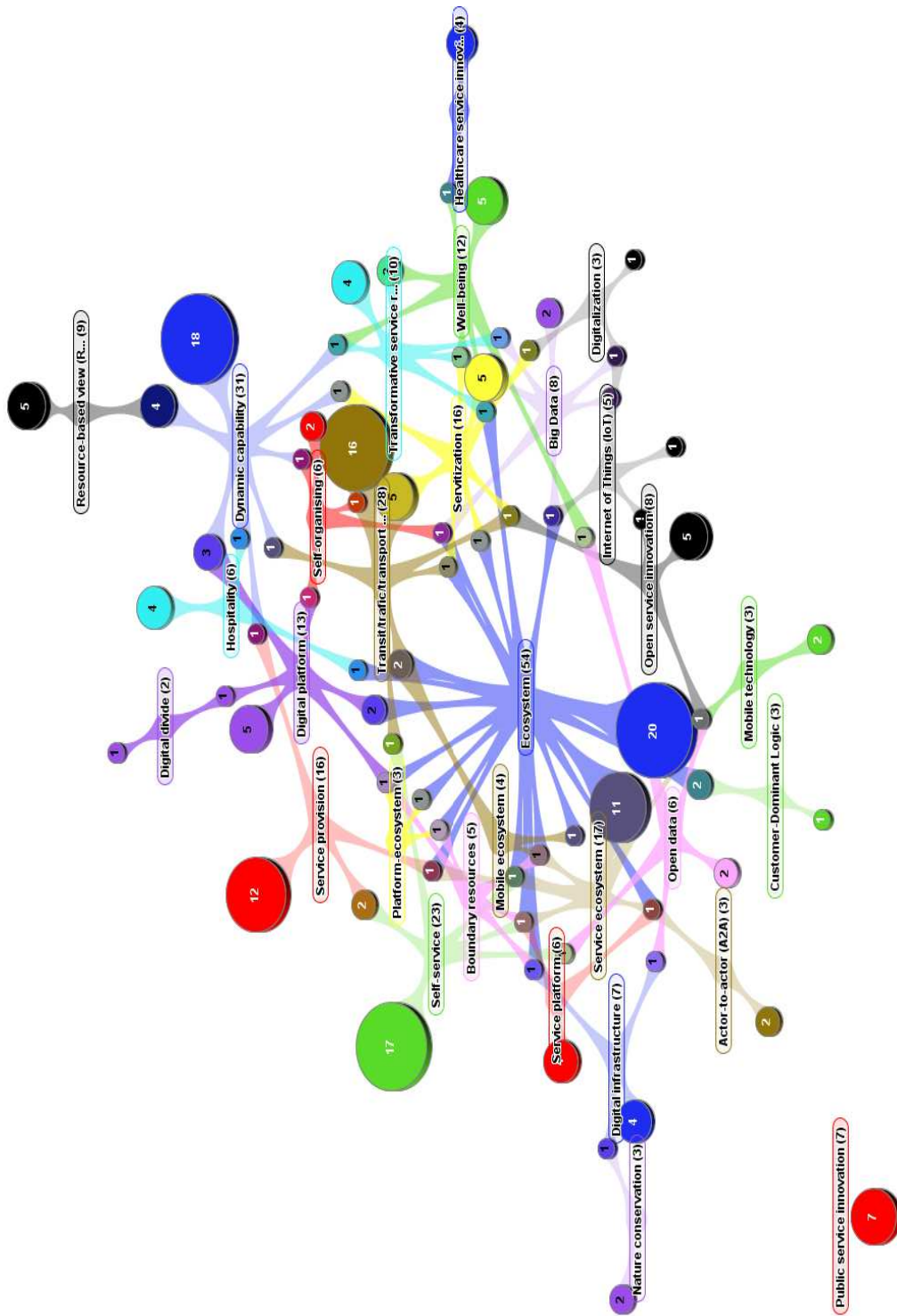


Figure 10: Potential areas for future research horizons

5. Conclusions and limitations

The goal of this study is to delineate the structure conceptual of service innovation and service system in the digital age from 1986 to 2015 to examine empirically how they evolve in the course of time. We apply the structure intellectual of service innovation and service system research, identification of related topics, pivot authors, journals and their interactions over three decades to advance knowledge in the field and support future interdisciplinary research. Dividing service innovation and service system research into three distinct phases helps to clarify its evolution, which in turn provides a clearer view of how the field has developed, in terms of both volume and related topics.

The research answers the raised questions, "How have the intellectual structure of service innovation and service system linked and evolved over time (1986-2015)? What are the dynamics of the conceptual structure evolution and associated topics overs time? Which authors play a key role in bridging conceptual domains of research? and What are the emergent research topics for service innovation and service system in the digital age? were answered by a co-word, co-citation and thematic qualitative analysis. The outcome of the analysis is an approach of the intellectual structure of service innovation and service system that delineate the relationship between service innovation and service system in the digital age. The present intellectual structure of research domains may therefore be used as a support to plan and execute future research and future research pathway.

However, the analyses show important changes within these fields, e.g., the gradual integration of the Service Dominant Logic field and Service science the emergence of data-drive service innovation or human-centered service innovation.

We recognize some limitations of this study. Futures research will develop time-sliced analyses with others longitudinal science mapping tools as SCIMAT® or CiteSpace®. For future research, it would be of interest to employ other bibliometric techniques (e.g., bibliographic coupling or co-author analysis c.f. appendix 1) that complement this study.

Other studies may fix 5-year periods for analysing changes in the service innovation and service system research fronts over the last 30 years and include proceeding papers and books.

This paper focuses on intellectual structure to examine the evolution of service innovation and service system over time. Other studies may focus on the analyse of the **conceptual structure** to study similarities, differences and boundaries between Service Innovation, Innovation in Services, Service Design, New Service Development. Moreover, others studies may analyse the patrons evolutive of Invisible Colleges (Vogel, 2012) of Service innovation and Service System research in the digital age as appearance, differentiation, transformation, drift, fusion of sub-disciplines in the last 30 years

This study opens up new possibilities to uncover important research areas a approach for identify potential areas for future research horizons.

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Appendix 1: Bibliometric methods. Source: Cobo et al., (2011a p. 1384) and Zupic & Čater (2015 pp. 4; 11).

Bibliometric method Description	Units of analysis	Research questions answered by different bibliometric methods
Citation: Estimates influence of documents, authors, or journals through citation rates.	Document Author Journal	- Which authors most influenced the research in a journal? - Which journals and disciplines had the most impact on a research stream? - What is the "balance of trade" between journals/disciplines? - Who are the experts in a given research field? - What is the recommended "reading list" for a specific area?
Co-citation: connects documents, authors, or journals on the basis of joint appearances in reference lists. Kind of relation: co-cited document, author or journal.	Document Author Journal	- What is the intellectual structure of literature X? - Who are the central, peripheral, or bridging researchers in this field? - How has the diffusion of the concept through research literature taken place? - What is the structure of the scientific community in a particular field? - How has the structure of this field developed over time?
Bibliographic coupling: connects documents, authors, or journals on the basis of the number of shared references. Kind of relation: common references among document, author or journal.	Document Author Journal	- What is the intellectual structure of recent/emerging literature? - How does the intellectual structure of the research stream reflect the richness of the theoretical approaches? - How has the intellectual structure of small niche X developed through time?
Co-author: connects authors when they co-author the paper. Kind of relation: co-occurrence of: authors, countries or institution.	Author's name. Country from affiliation. Institution from affiliation	- Are authors from different disciplinary backgrounds working together on a new research field, or do they remain within disciplinary boundaries? - Which factors determine co-authorship? - What is the effect of collaboration on the impact? - Are co-authored articles more cited? - Do more prolific authors collaborate more frequently? - Are internationally co-authored papers more cited? - What is the social structure of the field?
Co-word: connects keywords when they appear in the same title, abstract, or keyword list. Its permit to study the thematic evolution of a research field. Kind of relation: terms' co-occurrence.	Words, key-words, or terms extracted from title, abstract or document's body	- What are the dynamics of the conceptual structure of a field over time? - Uncover the conceptual building blocks of a literature. - What are the topics associated with a particular line of research? - Track the evolution of concept X.

Appendix 2: Research terms

Scopus	
Service system (TITLE-ABS-KEY ("service science") OR TITLE-ABS-KEY ("Service science, management, and engineering") AND TITLE-ABS-KEY ("service system") OR TITLE-ABS-KEY ("science of service systems") AND TITLE-ABS-KEY ("complex service system") OR TITLE-ABS-KEY ("smart service system") TITLE-ABS-KEY ("urban service system")) AND DOCTYPE (ar OR re) AND SUBJAREA (mult OR ceng OR CHEM OR comp OR earth OR ener OR engi OR envi OR mate OR math OR phys OR mult OR arts OR busi OR deci OR econ OR psyc OR soci) AND PUBYEAR > 1986 AND PUBYEAR < 2015 AND (LIMIT-TO (LANGUAGE , "English"))	57 records
Service innovation / Innovation in services (TITLE-ABS-KEY ("service innovation") OR TITLE-ABS-KEY ("innovation in services") OR TITLE-ABS-KEY ("innovation in service systems") OR TITLE-ABS-KEY ("digital innovation") OR TITLE-ABS-KEY ("smart service system") AND TITLE-ABS-KEY (service) OR TITLE-ABS-KEY ("digital innovation") OR TITLE-ABS-KEY ("service system")) AND PUBYEAR > 1986 AND PUBYEAR < 2015 AND (LIMIT-TO (LANGUAGE , "English"))	1,378 records
Web of Science Service system TOPIC: ("service science") OR TOPIC: ("Service science, management, and engineering") AND TOPIC: ("service system") OR TOPIC: ("urban service system") OR TOPIC: ("science of service systems") OR TOPIC: ("complex service system") OR TOPIC: ("Smart Service System") Refined by: LANGUAGES: (ENGLISH) Indexes=SCI-EXPANDED, SSCI, A&HCI, ESCI Timespan=1986-2015	319 records
Service innovation / Innovation in services TOPIC: ("service innovation") OR TOPIC: ("innovation in services") OR TOPIC: ("innovation in service systems") OR TOPIC: ("digital innovation") OR TOPIC: ("smart service system") AND TOPIC: (service) AND TOPIC: ("digital innovation") AND TOPIC: ("service system") Refined by: DOCUMENT TYPES: (ARTICLE OR EDITORIAL MATERIAL OR REVIEW OR PROCEEDINGS PAPER) AND LANGUAGES: (ENGLISH) AND DOCUMENT TYPES: (ARTICLE OR REVIEW) Indexes=SCI-EXPANDED, SSCI, A&HCI, ESCI Timespan=1986-2015	685 records

CO-CREATING AN EVENT THROUGH SOCIAL NETWORKS. A DIFFERENT EVENT PLANNING STRATEGY

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In the last years, the rise of social networks and web 2.0 strategies has contributed to radical changes as they have a key role in generating and managing information. In order to plan an event in the best way possible, it is, therefore, necessary to know, interact and exchange information with people who are going to attend or with those who are interested in the organizational aspect. This study aims to analyze how social networks could be used by event organizers, in order to improve and manage the whole planning process. It wants to offer a general panoramic on social networks literature with a special focus on the method used for the research, which consists of a multiple case study design of 5 Italian events.

1. Introduction

Nowadays there's a constant interaction between people and a large use of technology, in fact, the use of social networks is considered actual *modus operandi*.

February 4th 2004 is the birth date of a new world in which there's no limits nor boundaries: Facebook's world. A few years later, in 2006, Twitter was born, a microblogging platform where users can express themselves in 140 characters, share opinions and stay updated with the latest news in real time; Twitter counts 58 million tweets shared per day. Facebook and Twitter represent just a small part of today's social networks; to those ones, we can add a lot more, not less important as the growing success suggests, we are talking about Instagram, YouTube and Yahoo (Statistic Brain, 2015).

We are not in front of a trend, we are witnessing a real digital revolution: you only need a click to get yourself into all of the world's facets; through all the posts, the things being shared and other online information, we can be informed on all kinds of news, from politics to sports, from current events to crime news, in real time.

It looks like there are always less and less limits in terms of time and space because of new technologies and users' interaction with them. The world entered a *virtuous flatness* phase, in which lots of people have access to information and how things are done with no boundaries (Friedman, 2007).

It's easy to comprehend that using new web 2.0 technologies based on social networks, it's an essential aspect of people's life as it radically transformed every aspect of life, helping the growth of sharing processes that have a strong impact on other users' behavior (Zhang et al., 2008; Mangold; Faulds, 2009).

In terms of event marketing, it becomes imperative to build a digital identity of the event, in order to allow a bigger interaction, sharing and participation of online users (Kaplan; Haenlein, 2010). This study aims to comprehend how events planner can use social networks such as Facebook, Twitter, Youtube and Instagram to listen to people, observe and interact with them, making all of the ideation and development process of the event as good as possible.

Not so long ago creating an event and its related communication activity, were taken care of by the management, who, based on interested subjects' needs, used to make decisions; communication activities was only happening through traditional tools, such as releases in local and national press, or radio announcements. Today, thanks to social networks, users interact and take part to the creation of contents, there's a more active relationship between users and event planners; in contexts like those, people have a huge power (Cova; White, 2010). Web 2.0 tools and social networks platforms represent very good tools to collaborate with participants and create a specific value (Cova; Cova, 2002).

This study aims to address most of the specific knowledge on social networks and 2.0 tools to the event sector. The literature regarding social networks for the event sector is in its starting phase, few studies analyzed Internet influence on tourism, but very few information on using Web 2.0 technologies are known (Pan et al., 2007; Kepler et al., 2000; Hede; Kellet, 2012). This study wants to offer a general panoramic on social networks literature and virtual community, with a special focus on the method used for the research, which consists of a multiple case study design of 5 Italian events; following to that, there're a presentation and discussion on the results, then we analyze the limits of the research and we will make suggestions for a future research.

2. Theoretical background

The Academic literature on the use of social networks for events is very limited and, most of the studies on this matter, refers to future researches (Hudson et al.; 2015). However, it's possible to consider some studies on the use of social networks regarding tourism, as events are an integral part of tourism industry (Getz; 2000). Some researchers studied the role of social media platforms as a promotional tool, highlighting risks and benefits that come with them; but other researchers focused more on the study of the implicit bond between users that creates online communities (Dury, 2008; Kaplan; Haenlein, 2010; Montanari et al., 2014; Aula, 2010; Wang et al., 2002).

Social networks allow to maintain relationships, they allow to spread contents faster through posts, shares and online users' participation and make a significant contribution to the achievement of new targets (Kaplan; Haelein, 2010; Constantinides; Fountain, 2008); they can offer companies a more personal, reliable and direct access to users (Drury; 2008). If used correctly, social media can help satisfy future partici-

pants' needs; improve the degree of credibility of provided contents, have a relationship based on trust with people involved; give a clear picture of the event; give the event notoriety (Kaplan; Haelein, 2011; Kaplan; Haelein, 2012). We can state that this *social* character of web 2.0 strategies offers a high credibility degree when it comes to the information provided regarding an event (Mavoothu, 2010). Users involved, can add to the communicational message by sharing photos, videos and posts on their own social page; the power of the communicational message becomes much stronger when it is generated by a reliable source of friends and acquaintances (Slater; Rounier, 1996).

The development of different social platforms represents, for event planners, a way to promote their events and manage to maintain a good relationship with users over the years, creating true permanent legacies; it is a sort of intangible heritage that can keep the memory alive even after its realization (Montanari et al. 2013). Thanks to social networks, it is possible to focus more on users interests, trying to satisfy their needs. It can happen, in some cases, that the user decides what is going to happen at the event, what must be changed and, sometimes, he suggests new ideas (Thanckeray et al., 2008). It obviously becomes easier for event organizers to define the theme, present the theme to future participants and gaining consents becomes easier too, as users are involved first-hand and they suggest other users to attend as well, becoming event co-creators (Shapira et al., 2013). The creation of brand communities offers to members of social networks mutual support in their choices and helps co-create value (Vargo; Lusch, 2004; Brown et al., 2003). People can count on other people's opinion, advance expectations and get to know the event (Litvin et al., 2008). Users feel as they are part of a community based on a value such as trust, which can play a big role and have an important influence on the deciding to attend the event (Wang et al., 2002).

Through social networks, event planners and creators, not only promote the event, but they work on event engagement, which is very helpful to set expectations in order to understand if changes must occur in the process of the organization (Yoo; Gretzel, 2011; Hudson; Hudson, 2013). The key to a successful organization is making sure that people promote the event sharing pictures, images and comments that tell others more about their own experience (Ejarque, 2016); in this sense, the most important resource is the crowd, that, spontaneously, create value (Cova; White, 2010; McAlexander et al., 2002; Hoffman; Fodor, 2010).

In the light of the above considerations, the advantages of using social networks are many, however, it is important to consider a few negative aspects that one might encounter. Being present on platforms online means that everybody is entitled to their own opinion and it's not always easy to manage a negative comment. Opinions released on social media represent a double-edged sword: if positive comments and recommendations help the event growth, on the other hand, negative experiences and opinions can create damages. While studying the attitude of a group of a virtual community members towards some products and tourism services, Zehrer et al.(2011) noticed the importance of a good management of the online communication, as it can significantly affect the brand value.

Whether or not event planners are present online, users share their opinions and ideas; with increasing frequency they create non-official pages online dedicated to the event that represents actual communities of people passionate about the same thing sharing their emotions (Schmallegger, Carson 2008); this generates an uncon-

trolled flow of information, which can represent a problem for event planners (Muniz, Schau, 2005). In an interaction perspective, success means to manage dangers of being “social” to his own advantage, listening to feedbacks, understanding problems and trying to solve them.

3. Method

The idea of this research is based on a study conducted by Hede and Kellet (2012); they analyzed event planners’ strategies regarding the development of online brand communities. In their study, they defined the use of a few social networks, such as Facebook, Twitter, Flickr/YouTube and the website during the three phases of creation and realization of an event (pre-event, event and post-event). Their study was our main reference for the method of data collection and results analysis; however, events’ profile is different, the goal of the research has a different connotation, in our case the website is not taken into consideration because we are focusing on social networks and their different perspectives.

Data are collected from the beginning of 2016 via an interpretive case method drawing on in-depth interviews with marketing and communication managers of 5 Italian events. A multiple case study allows a better description of reality, even though data are more difficult to organize (Carson, 2008).

The first step was picking the events to observe, a few aspects were considered, such as: the type of festival, only cultural festival were taken into consideration; how many times the event has been occurring, preferring the older ones; the proportion of the event, events with a bigger impact on the territory were included; the presence of the event online, obviously, in order to analyze social networks impacts, it was necessary that the events had pages online already. Once we picked the events based on the parameters, the second step was to contact festivals’ organization through their e-mail on their sites; the e-mail explained our purpose and invited them to participate. Out of 20 Italian festivals, 5 of them decided to take part in this research. Festivals that joined our project, have a complex structure and their teams are made of a lot of people. All of the festivals have a marketing department with a social media manager.

Table 1. The event profile and social networks used

Event Profile			Platforms used				
Event	Event Frequency		Facebook	Twitter	Instagram	YouTube	
1	Annual	1980	√	√		√	
2	Annual	2000	√	√	√	√	
3	Annual	2003	√	√	√	√	√
4	Annual	2005	√	√	√		
5	Annual	2006	√	√	√		

Before starting our data collection, we developed an interview protocol, which consists of the definition of the main points to address. In order to do that, we studied the literature regarding the use of social networks to define a marketing plan and we analyzed the web site of each event and the official pages on social networks to focus more on what seemed unclear and to avoid asking for the description of the activities when these are already explained somewhere.

The interview protocol invited the person who was responding to describe both the online and offline activity, so we could have the whole picture of marketing activities, with a special focus on the social networks that were used; after that we asked to describe their activity on social networks, in particular the use of social networks and the benefits they had on the event planning strategy. In conclusion, we asked to tell us more about their professional background and current role within the event. Interviews were recorded and transcribed with the consent of the people interviewed. Once the interviews were transcribed, data were, at first, analyzed individually and then they were compared using a content analysis (Yin, 1984; Eisenhardt; Graebner, 2007). Once the analysis and organizational process were done, data were used to identify the key points of our research goal.

4. Findings and discussion

After completing the analysis process and data organization, data were recorded to identify the main points of the research. All of the festivals we took into consideration use social networks to interact with their users. However, the choice of the social network depends on its characteristics. In particular, with Facebook one can build a diary made of posts, images and pictures that tell others more about the event; Twitter is basically a microblogging that allows sharing, in real time, people's experience in 140 characters, this helps the event become more popular and helps to spread information about it while it's happening; YouTube is a platform dedicated to videos, it offers the possibility to build an archive that keeps the historical memory of the event; Instagram is a social network exclusively devoted to images, it creates an il-

Illustrative archive that tells more about the behind the scene of an event too. The informant said:

Facebook is used to promote events, Twitter is to tell people what is going on during them and Instagram should be used to describe the atmosphere, the behind the scene, in an informal way.

Two events only activated an Instagram account this year, while an event uses Flickr for an online photographic archive accessible to all users.

The intensity of the use of social networks changes depending on the phase one is going through (pre-event, event, post-event). The pre-event phase is the moment before the event, in which all the activities are devoted to the ideation, planning and promoting the event itself (Moise, Cruceru, 2014); in this phase important decisions are made. Four out of five festivals reveal having an intense pre-event phase, the theme of the event is defined and announced months before, using the web to share posts, comments and pictures of the guests who are going to attend, attracting users and stimulating, this way, curiosity around the event; The informant said:

We use Facebook a lot during the year in order to listen to what users have to say, receive their comments and their opinions, we provide a preview of famous guests that are going to be with us, so we can, in this way, have an open confrontation with them...

The role of social networks in the pre-event phase is fundamental to satisfy the needs of the attendee; increase the credibility degree of provided contents, building a good relationship with users based on trust; define the image of the event; increase event's popularity.

When the event is occurring, the activities are devoted to guide people throughout their experience. All of the festivals conduct communication activities both online and offline; in particular, sometimes, there are commercials on local televisions talking about the event, radio announcements and posters with date, time and place are provided in order to improve the visibility and remind people of the upcoming event. The use of social networks, or we could also talk about the online communication, facilitates the interaction with users, it represents a fast way to spread information and offers the possibility to reach different targets. In this phase the involvement and the interaction with users are very strong: people spontaneously upload pictures, videos and share comments on Facebook, they write about the event on Twitter and show the world what the event is about on Instagram. For example, the informant said:

...During the event we use Twitter a lot to describe what is going on so people who didn't attend can get information about it as well, while we use Instagram to show the behind the scene... Facebook is really helpful when it comes to share information, for example if the event is going to be somewhere else or if it starts at a different time.

In this phase social networks are really helpful to improve some organizational aspects as well, helping people who are going to attend to reach the destination too: through social networks, users can see what's happening at the event in real time and they can define their own meeting program (Xiang, Gretzel, 2010). For example, the informant said:

It's way easier for attendees to check event's updates on social networks instead of checking their official websites; it's this rapidity that characterizes these tools.

In the phase following the event, activities are devoted reminding people of it. In this phase, all of the events use social networks such as Facebook and YouTube, a lot, besides one of them that uses Flickr to create a photo gallery, as we already stated. The informant said:

The event only lasts a few days, so, through the web and social networks, it's possible to propose again interventions and meetings through videos, images and pictures of particular moments, so users online can re-experience the event.

The possibility to discover more about the event, relive past editions of it, have access to all of the online archives, created thanks to the interaction between event planners and users, strengthens the image of the event.

Figure 1. The use of social networks through event stages

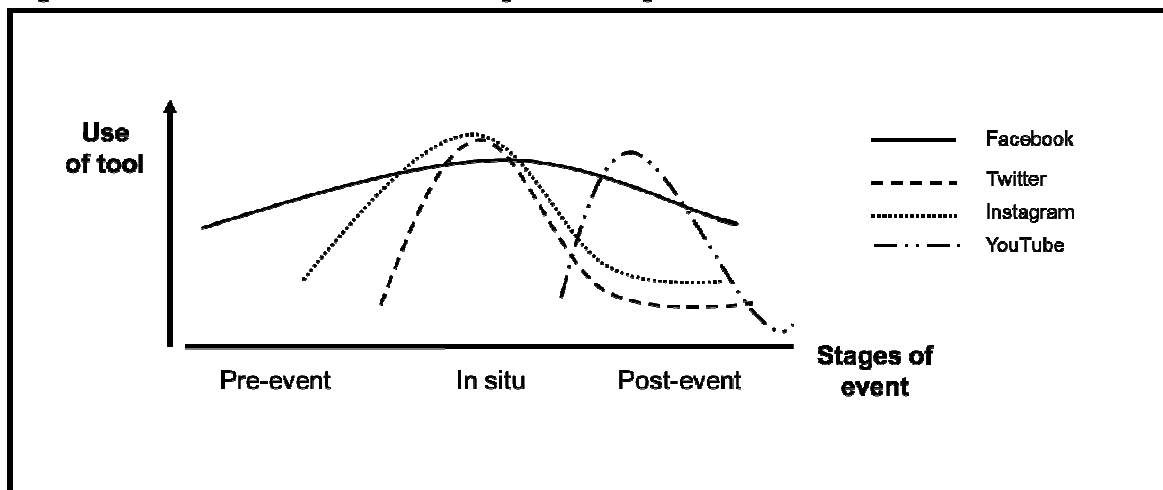


Figure n.1 shows how events analyzed in this study use Facebook, Twitter, Instagram and YouTube across the pre-stage, during stage and post-stage of their events. Facebook is used in a consistent manner throughout all of the stages, the use reaches its peak during the event; Instagram is usually used in the pre-event stage and during the event, while YouTube is mostly used after the event, to relive the most important moments.

Another important aspect of our research is the proactive attitude of event organizers towards their users. All of the events confirmed having a social media plan, with an

exact program for each post, picture and message. However, the creation of a plan only includes guidelines, as there is a constant interaction with online users and within users' community, a constant exchange of opinions, information that goes beyond the program; this generates an uncontrolled flow of information that gives the online public, the whole picture of the event.

Despite the proactive attitude, we cannot talk about an unstructured way of being "social", but we would define it more as semi-structured, because conversations are started by event organizers, based on the program they planned and user feed these conversations creating value. All of the event we analyzed, confirmed having an office with people working exclusively on managing social networks pages. The informant said:

... We have an office dedicated to the coordination of all social networks' activities and, during the festival, we hire extra collaborators too.

This statement doesn't support the finding of Hede and Kellet research (2011), as the interaction with users and among users, is triggered by the organizers. Often users create new non-official pages dedicated to the event, communities of people who share the same interests and passion and share their emotions; the risk of these non-official brand communities is very high. For this reason, during the interview, we asked how to act in front of these non-official online communities, not managed by them; all of the informants stated that they asked the members of these non-official communities, to join the official ones, in order to gain value. One of the informants, who works for a quite important event, stated that he managed to push all of the users of a non-official page, to join the official one in a few months.

5. Conclusions and further research

This study aims to add its contribution to the literature regarding events sector, shedding a light on the importance of using Web 2.0 platforms. As we've already stated here, an intense activity on social networks can help create an event that is much closer to people's needs.

The choice of a qualitative study allowed to conduct a deeper analysis that shows different aspects; the small number of events taken into consideration, allowed us to identify important aspect to address in further researches.

This study generated the following conclusions. First, social media do not only represent a promotional tool, but they help the creation of the event itself, as users decide what they want to experience according to their needs, tastes and preferences. Second, despite the effort of building and define a social media plan, this is not taken into consideration if it does not reflect people's need, so a proactive attitude is the smartest move; a successful strategy consists of managing the interaction among users and adjust the entire event planning. Third, the speed of methods changes led the event organizers to adopt social media marketing strategies with the awareness of acting carefully, because they can either promote and increase subscriptions, or put the event in a bad light, ruining the brand.

Hence, this study gives a full picture of the different aspects of using social media and can help event organizers create an event and manage the contents shared online. A further research will display a sample of more events and it will include events of other countries as well, with different features.

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CO-CREATING WELL-BEING SERVICES IN ECOSYSTEMS: TWO CASE STUDIES

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This paper explores how the co-creation of well-being services can be implemented in a specific context of a well-being service ecosystem consisting of multiple actors in different roles and positions. We analyse, with the help of two case studies, how the ecosystem challenge the co-creation processes and what kinds of prerequisites need to be taken into account. Our findings indicate that co-creation in the context of well-being ecosystem demands methods enabling multivoicedness and making it visible. Instead of traditional problem-based view the well-being services should rely on empowerment-based orientation.

1. Introduction

Ecosystems have become a central concept in studying services in various fields, and the concept of ecosystem has become widely used in non-biological contexts. During recent years, business ecosystems have been a widely discussed topic. In our paper we focus on *well-being service ecosystems* that can be seen as closely related to business ecosystems. A well-being service ecosystem, the way we understand it, is quite a wide environment containing public, private, third sector and volunteer organizations. However, it needs to be observed as a system of collective value creation, as a network of participants, a governance system, and a shared logic as Thomas and Autio (2014) have defined ecosystems. In an ecosystem, participants co-create customer-centered services. The ecosystem should enable value co-creation by providing structures, methods and tools for participants to coordinate their collaboration. When the research object is facilitation of multi-professional collaboration in the well-being service ecosystem it is essential to understand how the system functions, its structures, processes, actors and their relations. Facilitating tools and methods should be developed based on this understanding. Facilitation is on the other hand also one tool to examine and to understand ecosystems and their actors in different roles, as our work with Case HUS and Case Porvoo (Meristö, Kantola, & Tuohimaa, 2016) has shown.

The ultimate goal of our research is to enable the co-creation of customer-centered services in multi-professional well-being service ecosystems. The evolvement of these social ecosystems is based on choices the participants make. James F. Moore

(1993) introduced a systematic approach to strategy by using the term “business ecosystem”. In a business ecosystem, companies form a social system and coevolve capabilities cooperatively and competitively, aiming at fulfilling customer needs and creating innovations. Correspondingly, the well-being service ecosystem is here seen as a community, which aims to co-create services to fit the needs of the clients. To behave intelligently in an ecosystem, its actors, their relations, their needs and obligations, need to be distinguished. Information and knowledge sharing are essential in a multi-actor collaboration network like well-being service ecosystems. In addition, based on the Case Porvoo, the shared vision of the future direction as well as clear roles of different actors in the ecosystem are essential for a successful co-creation (Meristö, Kantola, & Tuohimaa, 2016).

However, not enough is known about the co-creation taking place within the ecosystems, as a collaboration between the participants or stakeholders of the ecosystem. Co-creation between multiple stakeholders with various interests and backgrounds is a complex phenomenon, and new knowledge needs to be produced about the specific characteristics and prerequisites of co-creation in service ecosystems.

In this paper we explore how the co-creation of services can be implemented in a specific context of a service ecosystem consisting of multiple actors in different roles and positions. In this paper we report two case studies carried out in the context of well-being services. We analyse how the ecosystem potentially challenge the co-creation processes and what kinds of prerequisites need to be taken into account. As our research approach was action research (see e.g., Kemmis & Wilkinson, 1998), the ultimate goal of our research was to enable the co-creation of customer-centred services in the multi-professional well-being ecosystems in question.

The objective of this paper is twofold:

- 1) to present two case studies targeting user-centered co-development of well-being services, and
- 2) to analyse and discuss the use of participatory methods such as service design (Sanders, 2002; Sanders & Tappers, 2008) and scenario based concept design (Leppimäki et al., 2008) methods in the specific context of a service ecosystem.

Our research is cross-disciplinary, bringing together several perspectives on service co-creation and co-design, including the perspective to the future, too. We analyse the process of co-creating well-being services with the help of concepts and theories developed in the fields of user-centred and participatory design. As a theoretical framework we use a combination of the following concepts and theories: service ecosystems, co-creation and co-design of services, action scenario approach, multi-voiced collaboration, and practice research.

Based on the analysis of our empirical cases we will answer three research questions in the context of the paradigm shift in the well-being services:

- 1) How co-creation was organized in the context of a well-being service ecosystems?
- 2) What kinds of challenges were faced when carrying out co-creation in the well-being ecosystems?
- 3) How were the end-users’ authentic voices heard in the co-creation process?

Our paper is structured as follows: The central theoretical concepts are introduced in the next section, followed by a description of the case context and the two case studies. Next, the findings of the studies are presented, followed by conclusions and discussion.

2. Theory

Our research is cross-disciplinary, bringing together several perspectives such as service ecosystems, co-creation and co-design of services, action scenario approach, multi-voiced collaboration, and practice research.

Systems (e.g., Senge, 1990) and ecosystems (e.g., Moore, 1993) thinking emphasize the understanding of cause-and-effect chains in the system in question, the need for awareness of one's own influence in the system. When we observe well-being services as an ecosystem, activities appear as a whole: they influence and are influenced by the system in its entirety. Business ecosystems aim at fulfilling customer needs and creating innovations. The same should apply to well-being service ecosystems. The focus in systems thinking is to empower actors to achieve the goals they desire when operating in a particular system and to enhance their ability to self-direction.

The research object of the MORFEUS³⁹ project is facilitation of multi-professional collaboration in well-being service ecosystems. Digitalization offers novel options to create tools to realize the facilitation and new kind of governance. Digital platforms allow co-creation and knowledge sharing as well as illustration of the whole ecosystem. The public sector, which has the legal responsibility to enhance the well-being of citizens, could put into operation new kinds of management tools by forming digital well-being service platforms. By creating interfaces for different user-groups like customers, well-being service professionals and public sector decision makers, digital information can be modelled for individual needs. If all data is on the same data exchange layer, like in Estonia, connections between different databases is fluent. The case studies produce understanding for the creation of these tools.

The framework of *co-creation* (e.g., Sanders & Tappers, 2008) and *co-configuration* (Victor & Boynton, 1998) and the idea of multivoiced developmental forums for it were seen as *enablers and mediators* (Jyrämä & Äyväri, 2007; Kantola et al., 2010) for perceiving the existing ecosystem as an entity with its strengths and weaknesses and the future of it, from the perspective of information modelling.

³⁹ MORFEUS is a joint cross-disciplinary research project of Aalto University (SimLab) and Laurea University of Applied Sciences (01/01/2015–30/6/2017) and funded by Tekes – the Finnish Funding Agency for Innovation. The ultimate goal of MORFEUS is to enable the co-creation of customer-centered services in multi-professional well-being service ecosystems. The services in focus are mental health, pupil service, child protection and substance abuse related services. The partners of the research project comprehensively represent well-being service actors in Uusimaa from the municipality sector, the producers of well-being services and the producers of digital tools and consulting services.

For example in Case HUS we explore multiple perspectives with specialist interviews and service probe -method. A workshop and online service design are fostering dialogue between different actors and we also map the processes in existing networks.

On the other hand, in Case Porvoo we combine futures research methodology to service design approaches (Leppimäki et al., 2008). We produced various service concepts based on alternative scenarios for the case family in child protection mode. In Case Porvoo well-being services needed not only today but in the future were designed in the series of futures workshops in the participatory co-creation process with the real-life members of the child protection ecosystem in Porvoo region and more widely as well (Meristö, Kantola, & Tuohimaa, 2016).

In addition, our research is rooted in the *practice-based perspective on studying knowledge and organizations* (e.g., Carlile, 2002; Orlikowski, 2002; Nicolini, 2011). In our case study we adopted a 'practice lens' (Orlikowski, 2000) for studying the inter-organisational processes of co-creation. In addition, in our research we found interesting Carlile's (2002, 2004) model for analysing the boundary-crossing or boundary-spanning knowledge processes. With the term boundary-spanning we refer to the activities needed to navigate and negotiate the meanings and practices across boundaries (Levina & Vaast, 2005; Ratcheva, 2009), that in our case are interorganisational and inter-disciplinary. The boundary spanners are people that engage in spanning the boundaries in question. Both the boundary spanners and *boundary objects/objects of collaboration* are crucial for crossing the different boundaries successfully. (Levina & Vaast, 2005) Boundary spanning is expected to enable the emergence of interorganisational creation of practices and boundary spanning activities as complex innovations (Dougherty & Dunne, 2011). In Case Porvoo the boundary objects were represented by various practical tools developed for action scenario process and for its progressive phases (Meristö, 1989, 1991). One specific feature in Case Porvoo was the use of time frame as a boundary object in the form of steps towards the vision, where the time frame is divided into past, present, near future and longer future (Meristö, 1990). Different time frames can cause conflicts between different actors if not specifying the concrete steps on co-creation process towards citizen-centric services in the course of time.

We analyse the process of co-creating well-being services with the help of concepts and theories developed in the fields of *user-centered and participatory design* (e.g. Sanders, 2002; Robertson & Simonsen, 2013). Further, we found essential the concepts of co-creation and co-design (Sanders & Stappers, 2008) and especially in Case Porvoo futures research methodology in the form of *action scenario approach* (Meristö, 1989, 1991).

At the core of the co-creation process the participants use boundary objects (Star, 2010) and triological objects (Hakkarainen & Paavola, 2009). First, the boundary objects facilitate the sharing of information and knowledge between the participants of co-creation. Boundary objects enable transferring, translating, and transforming knowledge between people across different knowledge boundaries (Carlile, 2004). The boundary objects 'reside between social worlds' and enables people with diverse backgrounds to collaborate (Star, 2010). In our research we also found important Nicolini, Mengis, & Swan's (2012) synthesis describing the use of objects in boundary-crossing collaboration (see also Salmi, Pöyry-Lassila, & Kronqvist, 2012). Second, the triological objects mediate the collaborative creation of new knowledge and services within the innovating community, group, or ecosystem. When new knowl-

edge is created in the collaborative process, the actions are oriented towards generating shared objects, called dialogical objects. They are concrete epistemic artefacts that are created, shared and elaborated by the group's participants, often facilitated or mediated by technology. The dialogical objects may be both epistemic entities and physically embodied, conceptual or material, or they may be practices that are collectively transformed (Hakkarainen & Paavola, 2009).

The knowledge concerning the future development and directions is by definition uncertain (Bell, 1997; Masini, 1993). That is why in Case Porvoo we decided to use multiple scenarios in the form of action scenario approach to cover this uncertainty (Meristö, 1991). Scenarios as possible descriptions of the future have opened this uncertainty in the form of development paths to the future for the workshop participants from the child protection ecosystem in Porvoo region. This approach has helped the ecosystem members to focus on services relevant to the citizens not only today, but in long run in the future, too. This visionary knowledge creation process has been multi-voiced process including interviews, web-surveys and participatory futures workshops to reach the whole range of possible, probable and/or desirable futures (Meristö, Kantola, & Tuohimaa, 2016).

In MORFEUS we have found essential to try to construct the shared forums for co-creation as multivoiced (Kantola, Lassila, & Sipilä, 2011) as possible. E.g. in Porvoo's child protection case the participatory workshops consists of participants of different actors representing public, private and NGO actors in child protection. The voice of family was heard in the workshops mediated by the experience expert. Also the interview of the real case family was done for strengthening the voice of customers.

These aspects are considered together in order to create different endpoint scenarios and imagine the digital and other services that could be needed/created to fulfil the gap between current and predicted future.

3. Implementation of the research

We implemented our research as two case studies. In the two cases we used a combination of user-centred and participatory service design (e.g., Brandt, Binder, & Sanders, 2013), action scenario approach (Meristö, 1989) and various research methods. These methods included several data collection techniques, such as, thematic interviews, stimulated interview (Cicourel et al., 1974; Jokinen & Pelkonen, 1996; Kantola, 2010), service design probes, and facilitated workshops, including future scenario workshops.

As a part of the workshops, various kinds of artefacts were utilised as boundary objects for sharing knowledge (Star, 2010) and dialogical objects for promoting new knowledge creation (Hakkarainen & Paavola, 2009) facilitating and mediating the collaboration.

We adopted the action research approach (see e.g., Kemmis & Wilkinson, 1998) and we both facilitated the development of the services and at the same time collected empirical data from the cases. Our role as both researchers and facilitators of co-creation was however a neutral one, and the participants of the ecosystem were responsible for the goals and results of the co-creation. We as researchers and facilitators tried not to affect the goals and results, but to help the ecosystem to collaborate

and to advance the co-creation activities. We did not provide the actors with ready-made solutions, but offered research-based information and methodological support for the actors to create the solutions themselves.

From the two cases we collected a rich set of empirical data to form a comprehensive picture of co-creation taking place in these two contexts. Our data includes transcribed interviews, stimulated interviews, artefacts, video-recordings and memos of workshops, and mobile app -messages and pictures of the service users and the ecosystems.

We analysed the data with qualitative methods, such as content analysis (Krippendorff, 2004) and artefact analysis (Reischauer, 2015). In the interpretation phase we combined the various data sources in order to form a holistic view of the case. The two cases were first analysed separately (within-case analysis) and then considered together to produce insights about the differences and similarities between the cases.

Next, the two case studies will be described in detail.

Case 1, “HUS”: participatory and user-centred development of a new service concept related to mental well-being of young males

The Case HUS was conducted by Aalto University research group in co-operation with Laurea researchers and students.

The aim of the Case HUS was to explore, how to prevent young men from social marginalization. The case started with a goal setting session with the researchers of the MORFEUS project and two leading specialists - the administrative chief physician and the medical director who had earlier worked as a chief of the department of psychiatry - at the Hospital District of Helsinki and Uusimaa. In their work with the management of psychiatric clinics, our specialists had achieved a good general impression of development needs in the field. Social marginalization is a nation-wide problem, especially among young men. Without good proactive and preventive services, those young men are psychiatric patients in some point in life. From humane as well as from economical point of view, it is significant to prevent the youth from marginalization. A lot have been done for the youth in Finland and a lot of projects are going on. In MORFEUS we wanted to research, what kind of digital tools and information modelling could help the specialists to help the youth and how to empower young men to take responsibility over their own life.

The research methods were 1) interviews of the authorities (8 organizations, 19 people), 2) the "design probe" (4 young men, sending WhatsApp-messages during one week, interviews, diaries of the parents) 3) workshop for the specialists (service ideas and solutions for the young men), 4) modelling the processes of the pupil welfare services and the adolescent psychiatry outpatient treatment (on the grounds of the interviews of the 8 staff members of the processes), 5) an experiment in "online service design".

The aim of the interviews was to achieve understanding about the world of the youth, how it looks from the perspective of the professionals, what are the root causes of the social marginalization and how to prevent young men from it. Altogether 19 professionals were interviewed from following organizations: SPO (Finnish association of Case Management), FimFami Uusimaa (an organization helping and supporting families and relatives of people with mental health problems), HUS (The Hospital Dis-

district of Helsinki and Uusimaa), Pupil welfare services of the City of Espoo (Municipal pupil welfare services foster the pupils' physical, mental and social well-being), Save the Children (a specialist in foster care and adoption; in addition, it provides municipalities throughout Finland with open and social welfare support family services related to child protection), Porvoo Vocational College, Amisto (is part of the Intermunicipal Federation in Eastern Uusimaa region in Southern Finland, offers vocational education to comprehensive school graduates in the technical and service sectors), Finnish Central Association for Mental Health (an association for people suffering and recovering from psychiatric problems) and the Finnish Blue Ribbon association (a nationwide central association of substance abuse organizations, through a basis of Christian values).

The *design probe* (e.g., Mattelmäki, 2006) was selected as a tool to get more underlying information about the everyday life of young men in addition to interviews. Almost all young people in Finland have a smartphone access. WhatsApp elected to the probe tool as it is widely used mobile application and easy to use. At first the aim was to include young men who were at the risk of exclusion from society, but it turned out to be almost impossible because of their difficult accessibility. The solution was to target the secondary schools social workers to get access to those male pupils who have problems and are at risk of dropping out from the school system. Four informants finally agreed to become involved in research and with them we carried out the whole probe and interview process. The aim was to get information about the everyday life from the young men's perspective: what aspects the young men value most in their lives at the moment, what kind of future dreams they have, how they cope with difficult situations/things in their lives, who are the most important people they rely on and where do they see themselves standing in relation to service providers (subject/object). The WhatsApp mobile application turned out to be an easy way to get photos and comments from informants about their everyday life highs and lows. After the two week research period the interviews were carried out with an encouraging and empowering twist. Also the parents were asked to fill in a diary on their thoughts and discussions with the youngster. The whole probe and diary process was an intervention to these young men's and their families' lives so the approach had to be kept very encouraging and empowering.

As a result of the interviews and design probe, we had a holistic picture about the world of the young men, their needs, causes of the social marginalization and solution ideas, how to support the young in early phases in their life. We developed further the preventive service ideas in a workshop and in an online environment. We also conducted a modelling of the existing processes of student welfare services and adolescent psychiatry outpatient treatment in order to understand, how the current processes enable and disable multi-professional information sharing and cooperation. For modelling the processes we interviewed 8 professionals working in the processes in question.

Case 2, "Porvoo": participatory visionary concept design process based on action scenario work in the child protection ecosystem in Porvoo region.

Case Porvoo was run by Laurea UAS research group, conducted by two researchers. In Case Porvoo the objective was to recognize the existing actors, their positions and roles in the ecosystem of child protection in Porvoo region, as well as, the need for changes in the various situations in alternative futures (Meristö, Kantola, & Tuohimaa, 2016). The methodological approach used in Case Porvoo and its workshops

was *action scenario approach* developed by Tarja Meristö during last decades in 1979-2016 (e.g., Meristö, 1989). It has its background in futures studies (Masini, 1993; Bell, 1997) with the focus on possible, not necessarily on probable or on desirable futures (Amara, 1981). The participants in Case Porvoo represented public and private organizations as well as NGOs and experience experts from the field of child protection.⁴⁰

The *multi-voiced* participatory workshops were run according to the participatory action scenario approach during one year 5/2015-5/2016. The action scenario approach (Meristö, 1991) consists of six consecutive stages, from which the three first were run in Case Porvoo during the process.

- 1. Who and where are we?**
- 2. What are the possible worlds?**
- 3. Where can we go and how?**
- (4. Where do we decide to go?)
- (5. Choice of strategy).
- (6. Action plan).

The workshops consisted of multiple actors of child protection services in Porvoo City including the Manager of Child Family Work in Porvoo City, the Planner of the Competence Center of Social and Welfare in Porvoo area, the Experience Expert and the various workers from the Substance Abuse Treatment Unit, the Manager of Maternity Clinic, the School Social Worker, the Specialist Psychiatric Nurse from Porvoo Hospital of HUS (The Hospital District of Helsinki and Uusimaa) and the researchers and students from Laurea UAS. In the final session one student from Aalto University participated to the workshop as well.

The timetable for the action scenario workshops in Case Porvoo was as follows:

- An Orientation Workshop, focusing on the shared vision: May 11, 2015 (three hours)
- The 1st Future Workshop, focusing on the present situation: September 8, 2015 (three hours)
- The 2nd Future Workshop, focusing on the alternative scenarios: October 6, 2015 (three hours)
- The 3rd Future Workshop, focusing on action alternatives in each scenario: November 24, 2015 (three hours)

⁴⁰ See also the other RESER 2016 Conference paper related to the MORFEUS project and the Case Porvoo (Meristö, Kantola, & Lankinen-Lifländer. 2016: Smart Tools and Service Opportunities for Child Protection Ecosystem in the Future: Case Family View). The paper presented for RESER 2016 and published in the Conference Proceedings.

- Two Conclusive Workshops: The 1st one with MORFEUS Steering Group, focusing on information modelling, December 1, 2015 (one hour), The 2nd one with preventive child protection actor from Porvoo city, April 15, 2016 (two hours).
- The Thematic Workshop, focusing on service opportunities from different viewpoints and from various customer groups, May 13, 2016 in Porvoo (three hours)

The scenario work was supported by the complementary interviews conducted by the researchers and students of Laurea UAS:

- The pair theme interview of the Director of Social and Health Care at the City of Porvoo and the Development Manager of Social and Welfare at the City of Porvoo, March 5, 2015
- Theme interview of the Manager of Child Family Work at the City of Porvoo, April 29, 2015 (conducted together by Laurea UAS and Aalto Univ. researchers)
- Theme interview of the Planner of the Competence Center of Social and Welfare in Porvoo area, May 6, 2015.
- An interview of the child protection family, focusing on a child protection service ecosystem from the family's own viewpoint, Spring 2016.
- Several interviews of the child protection experts (special kindergarten teachers and school social workers) at the City of Porvoo conducted by Laurea UAS's students, Spring 2016.

The data analysis includes various methods depending on the nature of the collected information, including qualitative and quantitative approaches as well as facts and visionary knowledge that were used as a basis for the visionary concept design when developing novel concepts and services for proactive child protection in Porvoo ecosystem.

The primary data collection comprises the carefully documented discussions of the future-oriented workshops based on documented work in small groups and written memos from the facilitated sessions. In addition, the web-based surveys to the participants between each future-oriented workshop will form an essential part of the primary data. Background data for the work will consist of documented interviews among the actors in the Porvoo region before the series of intensive future workshops. All these interviews were audiotaped and written to memos. Complementary data collected from the Steering Group of the entire MORFEUS research project both through web-surveys and one mini workshop as well.

The participants from different parts of the child protection ecosystem did not yet estimate the most preferable future among alternative scenarios but they developed visionary concepts for well-being services and service opportunities in alternative scenarios, which will later on form the basis for the strategy work in Porvoo region. Also, the shared vision constructed in the very beginning of the process gives some guidelines to continue the work in this field there (Meristö, Kantola, & Tuohimaa, 2016).

Also the voice of child protection family was heard mediated by the experience expert participating the workshops and by interviewing the real child protection family

(stimulated interview, using the picture of the child protection ecosystem constructed in the action scenario workshops).

Child protection families were difficult to get into the trial for several reasons. The social worker of the child protection asked families to participate to the study but only three volunteered. One of the three families refused when the interview was to take place and did not want to participate. The baby of another family became ill at the agreed time of the interview and the meeting had to be cancelled. New appointment with the family could not be agreed due to mother's refusal to answer calls or text messages. The third client family was successfully interviewed and the same illustrative tools as in the action scenario workshops were used as a stimulus in the interview (stimulated interview). With the tool the role of the various players in relation to the family was visualized and discussed with family members. The results of the family interview and illustrative tool usage were used to map the intervention, support and empowering possibilities and furthermore, experiences of the family members of current practices. Also the understanding of the family as a subject and independent operator in the ecosystem of service providers was discussed further.

As a conclusion, based on the analysis of our empirical cases, we will answer three research questions in the context of the paradigm shift in the well-being services:

- 1) How co-creation was organized in the context of a well-being service ecosystems?
- 2) What kinds of challenges were faced when carrying out co-creation in the well-being ecosystems?
- 3) How were the end-users' authentic voices heard in the co-creation process?

Major findings from both cases will be described separately in the next section and will be considered then together.

4. Findings from the research

The results of our research indicate that collaboration within an ecosystem first requires identifying the existing actors and their positions in the ecosystem. The both cases enriched each other's perceptions of the ecosystems and the critical bottlenecks and success factors in the information flow. Even organizing the cases in practice made it visible, that the ecosystems of the child protection and the pupil welfare tangled in many ways and will challenge the information modelling developed in the research project.

The major findings of the Case HUS

For the young, as for anybody, meaningful doing is central for well-being. People without hobbies, studies or job are at risk of social marginalization. Also the meaningful others like families and friends play a central role in the life of young. Today's life is complicated, there is much information available and the young have opportunities to choose. That is inspiring and confusing at the same time. The results of the Case HUS show, that there is need for supporting the development of self-reflective abilities of the youth. The young need help with their life management.

The current social and health care system sees clients/patients through their problems. Evidently a digital tool, based on an empowerment-based view (instead of problem-based view) would help the young perceive their own life, reflect their needs, wishes and expectations and to build a safety net consisted of friends, relatives and professionals.

In the Case HUS the voice of the service user (end customer) was heard by means of our research collection methods. The interviews of the authorities, workshop for the specialists, interviews of the staff of pupil welfare services and the adolescent psychiatry outpatient treatment and online service design experiment were mediating the end customers' perspective through the professionals working with them. Authentic customer voice was achieved through the service probe method. Both direct and indirect perspectives to the customer's needs completed each other.

The major findings of the Case Porvoo

In Case Porvoo the main results based on the scenario based approach were as follows. The answers will follow each question presented in the beginning of this paper.

First, how co-creation was organized in the context of a well-being service ecosystems in this specific case?

In Case Porvoo we organized a series of futures workshops in co-operation with all the actor groups from the child protection ecosystem. We facilitators were working in pair, one researcher having the responsibility of methodology and running the practical sessions, while another researcher communicated, contacted and invited the actors from the region, while other two research team members carried their responsibilities of reporting (memos and taping). In addition, the research group organized several web-surveys to the participants during the process before and between the sessions to improve the participation rate also to those, who could not attend the sessions (Meristö, Kantola, & Tuohimaa, 2016).

In Case Porvoo the action scenario approach enabled to pick up worries as a weak signal and to understand *worry as a knowledge* based on the futures research paradigm concerning dealing with uncertainty (ibid., 2016; Kantola & Meristö, 2016; see also, Meristö, Kantola, & Lankinen-Lifländer, 2016). *Worry management* (Meristö, Kantola, & Tuohimaa, 2016; Kantola & Meristö, 2016) in the context of social and health care sector is one of the key findings in the field of future oriented leadership and management research field, which earlier has focused more on business cases (e.g., Nanus, 1992). In Case Porvoo four alternative future scenarios for the child protection were formulated for the next 20 years: 1. Promo (proactive, virtual), 2. Primary (preventive, face to face), 3. Secondary (reactive, face to face), 4. Tertiary (reactive, virtual). These scenarios were used as wind tunnels for ecosystem evaluation and what if -questions for the continuous development were presented. These scenarios were used also as mediators for information modelling in the form of what if this scenario will happen to find the bottlenecks and success factors in the information flow between actors in the ecosystem (Meristö, Kantola, & Tuohimaa, 2016; see also, Meristö, Kantola, & Lankinen-Lifländer, 2016).

Second, what kinds of challenges were faced when carrying out co-creation in the well-being ecosystem in this specific case?

In Case Porvoo we discovered that well-being service ecosystems thinking emphasizes that individual services do not occur in a vacuum but interconnect with other services, processes and structures as well as with the everyday life of customers. Thus, co-creation of services requires perception of the multiple realities in the ecosystem. The perceptions of the existing actors and their positions in the ecosystem of child protection are still confusing and the views even from the present situation vary a lot. Before the co-creation of well-being services with the ecosystem can happen fruitfully and fluently, the perceptions of the ecosystem itself have to be defined with the shared vision (ibid.). Also, the information flows and the systems enabling the knowledge sharing have to be safe and secure. Without trust the multi-actor co-creation work does not work.

Third, were the end-users' authentic voices heard in this specific co-creation process?

In Case Porvoo we got the customers' voice as end-users' voice involved in three different ways: First, one experience expert took part in the sessions and web-surveys during the whole process. Second, the real-life case family from the region was interviewed by one of the Laurea UAS students preparing her thesis in this field. The student also participated the futures workshops and sessions. Third, the web-survey to the group of experience experts were sent before starting the case.

The professionals and service providers of well-being services can be perceived as end-users of knowledge and information modelling, as well. They were diversely represented in workshops and in data collection (interviews), as well. Also decision makers were investigated through interviews and web-surveys and they were participated in some of the workshops.

More research work in the MORFEUS-project is still needed in the near future to get the end-users authentic voice for testing and evaluating the information modellings created in the project.

The both cases enriched each other's perceptions of the ecosystems and the critical bottlenecks and success factors in the information flow. Even organizing the cases in practice made it visible, that the ecosystems of the child protection and e.g. the pupil welfare could not be separated, but they tangled in many ways and will challenge the information modelling in MORFEUS.

5. Conclusions and discussion

The objective of this paper was twofold: 1) to present two case studies related to user-centred co-development of well-being services, and 2) to analyse and discuss the use of participatory service design methods in the specific context of a service ecosystem. In order to meet these objectives, we collected and analysed empirical data from two cases where a service ecosystem was collected to co-create around a well-being service.

In the ecosystem of various services, channels and providers the individual is brought closer and to interact with business and producers. New technologies challenge the former customer - provider -thinking and create easier but at the same time more challenging access to individuals' lives.

In the world of complex networks and system of services the customer insight is easily forgotten. Also interfaces between services are critical when transferring information or customers to one service provider to another. Current economic-challenges require streamlining the structures and in some cases easily lead to partial optimization of services.

It has become apparent in workshops and interviews that self-directed, comprehensive multi-task job descriptions are needed. Self-direction requires good support structures. Another discovery, which has surfaced, is the importance of focusing on the resources – and not only on the problems – of customers as well as offering tools for self-reflection and self-governing. Enabling the actors in the ecosystem to act in a self-directed way requires suitable working methods and tools. This means a paradigm shift from the hierarchical and siloed organization viewpoint to empowering both employees and customers. Instead of defining tasks for employees in detail, they need to be allowed to make their own decisions to arrange their tasks. To be able to do this in a proper way, they need to understand the premises for their work, the big picture as well as have an easy access to information and support. Correspondingly, customers need to be taken as subjects in their own life instead of objects of care. We study what kind of tools and practices would be suitable to enable self-directed work and empowered customers.

In social and health care services the customer is traditionally seen through his/her problems. In both of our research cases, in student welfare services as well as in child protection services, the empowerment-based view (instead of problem based) can be seen as one of the key issues for developing meaningful services.

Based on Case Porvoo, the future-orientation and the new definition of information in the futures research paradigm context will lead to the concept, how to deal with uncertainty in the field of child protection and more broadly, in the field of well-being services. The ecosystem of different actors will face the question: how to treat the data still being more or less like early warning signal by nature? The word used in the field instead of a weak signal is a worry and we decided to call this approach needed in the context of ecosystem as *worry management* (Kantola & Meristö, 2016) instead of visionary leadership used usually in business context (e.g., by Nanus, 1992). These findings were supported by Case HUS as well.

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CONCEPTUALIZING RESOURCE INTEGRATION IN VALUE CO-CREATION USING THEORIES OF MOTIVATION

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Although resource integration plays a vital role in value co-creation not much attention has been on defining, conceptualizing and theorizing this phenomenon within Service dominant logic. The focus has so far been on actors' knowledge and skills, but not on how motivation drives actors in their resource integration. By bringing theories of motivation to resource integration process, this paper extends the conceptualization of resource integration within service dominant logic to encompass drivers of actors' activities including factors affecting the prioritizing and intensity of effort, and sustainability of the service ecosystem. This paper offers eight premises that conceptualize resource integration in value co-creation processes.

1. Introduction

All engaged actors are integrating resources as part of their value co-creation processes within the service ecosystem (Akaka et al., 2012, Vargo and Akaka, 2012, Vargo and Lusch, 2008). Although resource integration plays a vital role in value co-creation, not much attention has been on defining, conceptualizing and theorizing this phenomenon. The focus has so far primarily been on actors' knowledge and skills, although how motivation drives actors' resource integration is missing. From other sciences such as psychology (e.g. Cerasoli et al., 2014), organization (e.g. Mitchell and Daniels, 2003), management (e.g. Locke and Latham, 2004, Steel and König, 2006), economic (e.g. Ariely et al., 2009, Xia and Suri, 2014), sociology (e.g. Turner, 1987), and pedagogy (e.g. Cameron and Pierce, 1994, Oxford and Shearin, 1994) research has showed that motivation is an important factor for all human activity.

While resource integration has received attention in the academic literature during the last decades, the discussions have only recently been framed in a Service Dominant logic (S-D logic) context (Peters et al., 2014). Kleinaltenkamp et al. (2012) refer to resource integration as the process(es) and form(s) of collaboration through which resource integrators (actors) co-create phenomenologically determined value-in-context (Chandler and Vargo, 2011). Further, resource integrators are viewed as actors with agency (Kleinaltenkamp et al., 2012, Edvardsson et al., 2014, Bandura, 2001) using operant resources (e.g. competences) acting on operand resources in the resource integration process (Peters et al., 2014). Using competences imply an agency effort, meaning; it is the actors who drive resource integration. However,

competences in itself do not directly drive actors due to agency. Actors with agency are not just on looking hosts of internal mechanisms orchestrated by environmental events, but are agents of experiences rather than simply undergoes of experiences (Bandura, 2001). Agency, here defined as the ability of self-reflexive actors to act with choice (Archer, 2000), verify the need to extend our understanding of what drives actors and influence their choices, in order to conceptualize resource integration. However, research within S-D logic is not so clear on how competences lead to resource integration. For example, Akaka et al. (2014) argue that actors must judge the integration of particular resources will be valuable, leaving them better off than before, in order to choose to interact and coordinate action (Vargo et al., 2008). This paper argues actors are enabled and constrained to integrate resources by the accessibility of operant and operand resources as well as the institutions (e.g. norms, values) present in the focal service ecosystem. This is affecting the actors' performance during activities and interactions resulting in the intended value-in-context.

In psychology motivation is emphasized as an important driver for activity (e.g. Mitchell and Daniels, 2003, Locke and Latham, 2004, Cerasoli et al., 2014), and is a fundamental component of any credible model of human performance (Cerasoli et al., 2014). According to Locke and Latham (2004) motivation can affect direction (choice), intensity (effort), and duration (persistence) of an activity. Despite being extensively been researched within several scientific fields (e.g. Deci and Ryan, 1985, Cameron and Pierce, 1994, Mitchell and Daniels, 2003, Xia and Suri, 2014), motivation has received inadequate attention within S-D logic. Thus, by bringing theories of motivation to resource integration process, this article extends the conceptualization resource integration within S-D logic to encompass drivers of actors' activities including factors affecting the prioritizing and intensity of effort, and sustainability of the service ecosystem. In doing so, explaining effects of related constructs (e.g. institutions) on resource integration. Institutions representing the 'rules' of resource integration and coordinate actors' efforts to make joint value co-creation possible (Koskela-Huotari and Vargo, 2016, Vargo and Lusch, 2015).

A service ecosystem view is needed to understand actors' choices in resource integration processes, since "the usefulness of any particular potential resource from one source is moderated by the availability of other potential resources from the other sources" (Vargo and Lusch, 2011, 184), and no actor has all the resources required to operate in isolation (Frow et al., 2014). Thus, choices available to the actors on how to attain intended value-in-context might be limited by the resources they have available in the context. Further, a systems view involving a network of integrated actors complicates motivational drivers from agency, since an individual may have individual interests, goals or intentions that conflict with other involved actors. For instance, when a front-line employee face conflicts between the pressure on efficiency from management and the need to please the customer (Bélanger and Edwards, 2013).

This paper answers a call (e.g. Kleinaltenkamp et al., 2012, Peters et al., 2014) to focus on conceptualizing resource integration, and actors' motivational drivers, as well as the performative prerequisites of actors' efforts during resource integration for value co-creation (Edvardsson et al., 2014). We argue that motivation is the fundamental driver for actors' resource integration efforts and act as a key variable for understanding resource integration. Motivation gives energy, direction and persistence to resource integration and value co-creation. By conceptualizing resource integration and include motivation we contribute to evolving understanding of S-D logic.

Against this backdrop, this study aims to extend and conceptualize resource integration by using theories of motivation to enhance the understanding of the role resource integration plays in actors' value co-creation processes within a service ecosystem. The remainder of the paper is organized as follows. First, a brief introduction to motivation theory in general is presented. Second, key characteristics of resource integration from a S-D logic perspective implementing motivation theory form a foundation of which eight premises of resource integration is suggested. The paper concludes with summary of the main contributions of the study, and directions for future research.

2. Using motivational theories to conceptualizing resource integration

2.1. Motivation theory

Motivation theories are used to explain human behavior and refers to internal factors that impel action and to external factors that can act as inducements to action (Locke and Latham, 2004). Accordingly, it explains why a person in a given situation selects one response over another (for example integrating one resource instead of another) or makes a given response with greater energy or frequency (Gollwitzer and Oettingen, 2012). According to Ryan and Deci (2000) motivation is highly valued because of its consequences, as it produces. It is not the only cause of behavior, but it is usually part of the picture (Mitchell and Daniels, 2003). Further, motivation in combination with ability produce behavior and performance (Mitchell and Daniels, 2003, Ambrose and Kulik, 1999).

Motivation theories have evolved from a sole focus on biology to more complex social-cognitive motivations, where the paradigms of motivation theory have a long, interconnected history (Pincus, 2004), and has progressed in multiple directions over the last several decades (Locke and Latham, 2004). For the most part, these theories do not so much contradict one another as focus on different aspects of the motivation process (Locke and Latham, 2004, see also Steel and König, 2006). Deciding what motivational theory is most effective in explaining the behavior depends on factors such as context (e.g. Ryan and Deci, 2000, Latham, 2009), social influence (e.g. Bandura, 2009), personality traits (e.g. Steel and König, 2006) or the nature of the task (Xia and Suri, 2014). Further, the purpose of this study is to conceptualize resource integration using theories of motivation, hence, this study use elements from different motivation theories to elaborate on how variables are related rather than focus on a single theory. Nevertheless, it is a consensus that motivation can affect direction (choice), intensity (effort), and duration (persistence) of an activity (e.g. Locke and Latham, 2004, Schunk and Usher, 2012, Latham, 2009). Several scholars also include a forth element in addition to the previous mentioned, such as form of behavior (e.g. Ambrose and Kulik, 1999, Pinder, 2011), equifinality (e.g. Ryan and Deci, 2000), or task strategies (e.g. Mitchell and Daniels, 2003), where the two latter defines the patterns of behavior produced to reach a particular goal (Mitchell and Daniels, 2003).

Motivation has an important relevance to resource integration and value co-creation since the actors needs to not only to be able, but also willing to engage (Dörnyei and

Ushioda, 2013). It is generally assumed in economic theory that an intelligent and well-informed actor formulates probabilities and estimates expected utilities for alternative actions prior to deciding and acting (Emerson, 1976). However, the assumption of rationality and well-informed decision making is a utopia, but not realistic in the real world (Steel and König, 2006). Further, motivation Crowding theory with crowding out effect, is one of the most important anomalies in economics, as it suggests the opposite of this fundamental economic law (Frey and Jegen, 2001).

2.2. Definitions of resource integration in service dominant logic literature

Following the steps of MacKenzie et al. (2011) for construct conceptualization, we first review how resource integration has been defined and used in previous research. To conceptualize resource integration we draw on literature and theory that address value co-creation to examine the conceptual theme of resource integration. This study is founded in a literature review on (1) value co-creation, and (2) resource integration, preferably from a S-D logic perspective. We searched for literature containing the keywords value cocreation, value co-creation, value creation, or resource integration in the topic, using ISI Web of Science during 2015. On value cocreation 75 publications were elected based on number of citations and relevance, weighing number of citations after 2014. Secondly, search for resource integration resulted in election of 45 publications. All 120 publications were read with the purpose of identifying similarities and differences regarding definitions, conceptualizations, prerequisites, and underlying assumptions. Other databases (e.g EBSCO host and Google Scholar), and references lists in the identified articles (i.e. snowball sampling) were controlled for significant publication missing from ISI.

Most of the publications who described resource integration only did so in a superficial manner, and only a few of them define resource integration. Resource integration may intuitively be of a nature where scholars assume that the name in itself is equivalent to defining it, as the word integration means combining into a whole, thus, resource integration is combining resources into something new. However, the literature review reveals a diverse set of characteristics. To accurately define resource integration consensuses and characteristics of resource integration need to be elaborated for necessity and sufficiency in comparison with motivation theory.

Table 1 is a representative set of definition, where their characteristics is extracted (MacKenzie et al., 2011, see also Sartori, 1984). Based on the key characteristics a set of eight premises for resource integration is developed. Further, these premises provide a conceptualization of resource integration. It is not in the scope of this article to conceptually define neither value creation nor value co-creation, but it is to identify the characteristics of resource integration, both common and the unique that separates resource integration from value creation and value co-creation.

Table 1. Conceptualizations and definitions of resource integration

Author	Description	Behavioral dimension ¹	Resources ²	Process	Interaction with other actors	Combination /Incorporation	Outcome
Xie et al. (2008)	Consumers act as resource integrators when they use their competence, tools, raw materials, and some times professional services to produce maintenance services, entertainment, meals, etc. for themselves.		*				
Vargo (2008)	Each actor is its own primary resource integrator, using the application of its uniquely configured resources as the currency for resource enrichment through the exchange (economic and otherwise) of service.		**				
Grönroos (2011)	As resource integrators, customers operate on resources made available to them by a given provider, by other market actors or by themselves in order to increase their well-being.						
Haase and Kleinaltenkamp (2011)	Resource integration is application of skills.		*				
Witell et al. (2011)	Applying uniquely configured skills and resources						
Díaz-Méndez and Gummesson (2012)	Resource integration is largely an interaction process between the parties.						
Hibbert et al. (2012)	Customer resource integration refers to “the processes by which customers deploy their resources as they undertake bundles of activities that create value directly or that will facilitate subsequent consumption/use from which they derive value”.						
Kleinaltenkamp et al. (2012)	Integration requires process(es) and forms of collaboration.						
McColl-Kennedy et al. (2012)	Resource integration occur through activities and interaction with collaborators.						
Hilton et al. (2013)	The tasks performed by the actors are achieved by drawing upon their resources.						
Löbler (2013)	Whenever people act, they use operant resources along with operand resources. In so doing, they integrate resources.		*				**
Edvardsson et al. (2014)	Resource integration consists of cooperative and collaborative processes between actors, leading to experiential outcomes and outputs, as well as mutual behavioral outcomes for all actors involved.						
Peters et al. (2014)	Resource integration is a continuing process consisting of ‘a series of activities performed by an actor’ for the benefit of another party						
Frow et al. (2015)	Resource integration involves a process of ongoing combination of resources by actors (resource integrators) in co-creating value.						
Laud et al. (2015)	Resource integration refers to actors’ interaction with and/or use of resources.						
Skålén et al. (2015)	Resource integration refers to actors’ efforts to combine and use resources to create intended value.						
Singaraju et al. (2016)	Resource integration is defined as “the incorporation of an actor’s resources into the processes of other actors”						
Hilton et al. (2013)	The tasks performed by the actors are achieved by drawing upon their resources.						
Löbler (2013)	Whenever people act, they use operant resources along with operand resources. In so doing, they integrate resources.		*				**
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Frow et al. (2015)	Resource integration involves a process of ongoing combination of resources by actors (resource integrators) in co-creating value.						
Laud et al. (2015)	Resource integration refers to actors’ interaction with and/or use of resources.						
Skålén et al. (2015)	Resource integration refers to actors’ efforts to combine and use resources to create intended value.						
Singaraju et al. (2016)	Resource integration is defined as “the incorporation of an actor’s resources into the processes of other actors”						
Koskela-Huotari and Vargo (2016)	Resource-integrating actors apply, exchange and integrate potential resources with other available potential resources through human appraisal and action of transforming potential resources into realized ones to accomplish something desirable.						

¹ e.g. activity, use, application, operate on, interaction with, etc. ² Specification of Operant* or Operand**

2.3. Applying motivation theory to resource integration

According to Vargo and Lusch (2015) the narrative and process of S-D logic starts with actors involved in resource integration, and engage in service exchange, all in the process of co-creating value. Resources can be classified as (1) operand resources, which are resources that must be acted on by some other resource to create an effect, or (2) operant resources, which are resources that are capable of acting on other resources to create an effect (Lusch and Vargo, 2014). According to Vargo and Lusch (2011) service provision implies the ongoing combination of resources, through integration, and their application, driven by operant resources — the activities of actors. Hence, the underlying assumption is that *resource integration is driven by the activities of actors and through their operant resources*. However, key elements of motivation theories state motivation is a mental state that influences the actor's effort in term of direction, intensity and persistence, driven by extrinsic and intrinsic motivational factors, that in turn with competences acts as a function for performance. It is the contention of this study that motivation is important in driving actors engaging in resource integration in value co-creation processes, and can expand the understanding of why actors integrate resources in regard to direction and intensity of effort, why they stay engaged in the value co-creation process, and how context and service ecosystems shape actors' resource integration activities.

Within the theoretical framework of structuration theory resource integrators are viewed as actors with agency (Kleinaltenkamp et al., 2012, Peters et al., 2014). However, agency is not always necessary for resource integration. From a wider ecosystem perspective (e.g. ecological research) a tree may be considered an resource integrator, as the tree use sunlight, water, carbon dioxide and nutrients from the soil it integrate resources to grow and produce oxygen, and it has the operant resources necessary to combine these resources to a new resource. However, human actors have agency and can make a conscious choice of whether to integrate resources or not. A functional consciousness involves purposive accessing and deliberative processing of information for selecting, constructing, regulating, and evaluating courses of action (Bandura, 2001). Although we acknowledge the view where a tree may be considered an actor, this paper focus on human actors. Accordingly, an actor in this paper is understood as an individual, a group of individuals (e.g. family, neighborhood or professional group) or a formalized group of individuals (e.g. a business, public sector organization or a non-for-profit organization), and resource integrators are viewed as human actors with agency. As actors have agency, they also have free will to integrate resources or not, and, hence, an actor is necessary, but not sufficient, for resource integration to occur.

Actors' motivation to participate and to achieve specific intended outcomes is critical for effective co-creation, as the actors must be willing to get involved (Auh et al., 2007, see also Dörnyei and Ushioda, 2013). An actors' willingness to co-create value refers to whether they have the necessary motivation to actively participate in a co-creation process (Merz et al., 2013). This study argues that operant resources do not directly drive actors, but it is motivation that initiates and drives actors, and in extension initiates and drives resource integration. Operant resources cannot be the driver of resource integration because it is not sufficient for activity to occur. For example, most people have the ability to exercise, but many choose not to exercise. Exercising often is unpleasant and can involve pain. Since motivation research generally show that actors prefer pleasure to pain (Mitchell and Daniels, 2003) the logical choice would be not to exercise. However, other factors (e.g. feeling of accomplishment,

fear of bad health, participation in a race, competitive instinct, social pressure to have the ideal body, acknowledgement from peers, etc.) may weigh in with greater motivational force than the fear of pain, and thus making actors choose to exercise. Arguably, operant resources are not sufficient for resource integration to occur. Motivation, on the other hand, is sufficient for resource integration to occur. Highly level of motivation will drive the actor to either learn the necessary operant resources, get access to the necessary resources, or involve other actors to realize the intended value outcome.

Motivational forces can generally be described as either extrinsic or intrinsic, where extrinsically motivated behavior is governed by the prospect of instrumental gain or loss (e.g. economic reward or pain avoidance), whereas the intrinsically motivated behaviors are engaged for their own sake (e.g. task enjoyment) not being instrumental toward some other outcome (Cerasoli et al., 2014). According to Ryan and Deci (2000) intrinsic motivation show humans' inherent tendency to seek out novelty and challenges, to extend and exercise one's capabilities, to explore, and to learn. Further, actors whose motivation is intrinsic, have more interest, excitement, and confidence, which in turn is manifest both as enhanced performance, persistence, and creativity (Ryan and Deci, 2000). Research by Cerasoli et al. (2014) show that intrinsic motivation is a better predictor of performance when the extrinsic incentives are not directly salient to performance. However, when the extrinsic incentives are directly related to performance then intrinsic motivation is a poorer predictor of performance. Enabled by their ability to perform the task, operant resources enable resource integration, while motivational factors drives resource integration.

Accordingly,

Premise 1: Resource integration is performed by actors driven by extrinsic and/or intrinsic motivational factors enabled by operant resources.

S-D logic highlight operant resources as the fundamental source of strategic benefit (Vargo and Lusch, 2015). However, operant resources play an even more fundamental role for two reasons. First, since operand resources need operant resources to be utilized, resource integration cannot occur without operant resources (see definition by Haase and Kleinaltenkamp 2011, Löber 2013, and Xie et al. 2007 in table 1). Second, a key assumption in S-D logic, fostered by Zimmermann (1951) and Pels et al. (2009), is that resources do not have value per se. Resources have potential value and is activated through resource integration in the value co-creation process (Edvardsson et al., 2011, Díaz-Méndez and Gummesson, 2012), depending on how they are integrated and operated on in specific contexts with specific intentions (Edvardsson et al., 2014).

A resource represents a carrier of capabilities, enabling an intended activity only when used (Peters et al., 2014). According to Vargo and Lusch (2011) resource integration provides opportunities for the creation of new potential resources that can be used, to access additional resources, and thus to create new. Furthermore, Peters et al. (2014) presents resource integration as emergent, defined as the interactive combination of resources generates a new resource with different dispositional properties than the integrated resource (see also Smith, 2010). Knowledge on how resources can be combined and how they emerge to achieve the intended outcome will influence how much of the potential value is realized. Koskela-Huotari and Vargo (2016) use resourceness as label for the usefulness of resources to enable the accomplish-

ment of something desirable and is achieved through human appraisal and action of transforming potential resources into realized ones, where actors' other available potential resources (e.g. skills and knowledge) determine the 'resourceness' of potential resources (Lusch and Vargo, 2014).

Operant resources (e.g. competences, knowledge, skills, ability, capability, etc.) prominently occur in S-D logic and motivation literature alike. Competences, or comparable variables, appear in motivational theories such as self-determination theory (e.g. Ryan and Deci, 2000), self-efficacy (e.g. Bandura, 2009, Yim et al., 2012), goal-setting theory (e.g. Wofford et al., 1992, Latham, 2009), and flow theory (Csikszentmihalyi and LeFevre, 1989). According to Dong et al. (2008) ability refers to customers' knowledge and skills that enable them to perform effectively in future value co-creation. One element of ability seen more in motivational theories than S-D logic is learning capabilities, which is a significant operant resource. In motivation literature abilities are often seen as innate or accomplished through arduous and lengthy training and development activities (Mitchell and Daniels, 2003). Latham (2009) argue among the most important resources necessary for accruing the positive benefits of goal setting is the actor's ability. According to flow theory it is more likely to achieve flow, which is a very positive psychological state, when perceived challenges are commensurate with perceived capacities for actions (Csikszentmihalyi and LeFevre, 1989). Theoretically, an individual who is intrinsically motivated should be more likely to experience flow, because the actor will be extremely interested in the task at hand (Jackson et al., 1998, Deci and Ryan, 1985). Bandura (2001) argue with self-efficacy that it is not just an actor's ability that is important, but it is also the actor's perception of own ability.

Accordingly,

Premise 2: Operant resources are fundamental for resource integration, and essential for the value realization.

Since resources only have potential value that needs to be realized through activity, resource integration requires a behavioral element. This can be behavioral and cognitive and is defined as "performing" or "doing" (McColl-Kennedy et al., 2012). As table 1 show all explanations of resource integration have a behavioral element either directly (activity, use, application, operate on, exchange, incorporation or combination) or indirectly using process (a process by definition consist of activities, see Payne et al., 2008), most often in interaction with either resources (e.g. Laud et al. 2015) or other actors (e.g. Kleinaltenkamp et al. 2012). For example, when driving a car the driver combine the car (operand resource) with knowledge how to control and operate the car (operant resource), knowledge on the rules of driving, knowledge on the meaning of signs and symbols, etc. Resource integration involves the activity of combining (including applying, operating on, incorporating, etc.) resources and in doing so, the actor is using resources in specific context to achieve specific outcomes at different levels of activation. The level of activation may vary from very active (e.g. driving a car) to very passive (e.g. watching television) (Löbner, 2013). Further, if other actors are viewed as resources (Löbner, 2013) then integration is always between actor and resources.

In S-D logic terms, interaction often refers to the collaboration between actors or the ways actors engage with others in their service network to integrate resources (McColl-Kennedy et al., 2012). However, acknowledging interaction to include inter-

action with resources, where resources provide feedback to the actors throughout the integration activities, is needed within S-D logic. A car will continuously provide the driver with feedback, through for instance touch, sound, or smell. The driver's ability to interpret this feedback, and the experience the driver get from the feedback, will influence the driver's next activities, how motivated the driver are to do new activities, maintain or increase activity level, or the adjustments the driver make, in order to achieve the intended goal. The interaction creates a learning process where the actor increases their competences and skillset through experience, and the likelihood of generate intended value. This feedback from resources, including actors, provides value outcomes (e.g. experience, information, or increase in well-being) that if positive can conduce toward feeling of competence during action, and hence, can enhance intrinsic motivation for that action (Ryan and Deci, 2000).

Premise 3: Resource integration involves using and interacting with resources, including other actors, and the process provides feedback to involved actors influencing their motivation.

The lack of conceptualization of resource integration becomes evident as some definitions and conceptualizations of resource integration lack demarcation to value creation and value co-creation. For example, Peters et al. (2014, 254) define resource integration as a continuing process consisting of 'a series of activities performed by an actor'. They base their definition on Payne et al. (2008) definition of a customer's value creation process. Kleinaltenkamp et al. (2012) define resource integration as a process of value creation activities. From these definitions it can be assumed that Peters et al. (2014) and Kleinaltenkamp et al. (2012) interpret value creation and resource integration as close to identical. However, the concepts arguably have unique characteristics that conceptually differentiate resource integration, value creation, and value co-creation. Value creation does not just take place in the activities of a single actor (customer or otherwise) or between a firm and its customers but through the integration of resources, provided by many sources, including a full range of market-facing, private and public actors (Vargo and Lusch, 2015). Moreover, resource integration may be conducted by one actor in isolation from other actors when creating value-in-use (Skålén et al., 2015). Accordingly, Löbler (2013) argue the pure process of resource integration might be carried out by a single person, several people, or many people. Lusch and Nambisan (2015) claim that value co-creation underlie resource integration, whereas Vargo and Lusch (2015) argue resource integration is a *part* of the value co-creation process. Furthermore, since value only can be co-created by multiple actors integrating resources, whereas resource integration can be performed by a single actor, then resource integration must precede value co-creation. Accordingly,

Premise 4: Resource integration can be performed by a single actor.

This premise is in line with motivation research where the main focus is on individual motivation, since humans are all unique individuals with genetic and personal backgrounds that shape our wants, desires, and reactions to events (Mitchell and Daniels, 2003). Further, cognitive theories of motivation postulate that individual's thoughts, beliefs, and emotions are central processes that underlie motivation (Schunk and Usher, 2012).

One frequent dimension used when conceptualizing resource integration is the outcome, where the purpose is to create value (e.g. Frow et al., 2015, Skålén et al.,

2015, Hibbert et al., 2012), provide benefit for another party (e.g. Peters et al., 2014), increase well-being (e.g. Grönroos and Ravald, 2011), accomplish something desirable (e.g. Koskela-Huotari and Vargo, 2016), or for experiential outcomes and outputs, as well as mutual behavioral outcomes for all actors involved (e.g. Edvardsson et al., 2014). Kleinaltenkamp et al. (2012) argue that actors need to recognize the benefit from participation since collaborations are usually voluntary otherwise is collaborative activity unlikely. Since actors must judge that the integration of particular resources will be valuable in order to choose to interact (Akaka et al., 2014), *resource integration always have an intended outcome*.

In motivation literature goals play a major role (Mitchell and Daniels, 2003). Social cognitive theory has goals as a precondition for behavior, but goals does not ensure that an individual will actually pursue the goal (Bandura, 2009). Hence, forming a goal is a necessary, but not sufficient, condition for behavior. Both goal setting theory and empirical research within work performance indicate that in the absence of goal setting, feedback has no effect on performance (Latham, 2009), because feedback is only information, and its effect on action depends on how it is appraised and what decisions are made with respect to it (see premise 3).

According to Bandura (2001) agency refers to acts done intentionally, where an intention is a representation of a future course of action to be performed. Further, outcomes are not the characteristics of agentive acts, but the consequences of them (Bandura, 2001). Hence, future events cannot, be causes of current motivation and action because they have no actual existence. However, by being represented cognitively in the present, foreseeable future events are converted into current motivators and regulators of behavior (Bandura, 2001).

In general, specific difficult goals lead to better performance than specific easy goals, general goals such as "do your best", or no goals (Ambrose and Kulik, 1999, Latham and Locke, 1991, Latham, 2009), and is based on feedback and self-monitoring advantages (Gollwitzer, 1999). Second, goals are most effective when there is feedback showing progress toward the goal (Ambrose and Kulik, 1999, Latham and Locke, 1991). Further, goal attainment are also more likely when people frame their good intentions as learning goals rather than performance goals, or when they frame their intentions as promotion goals rather than prevention goals. It matters if the actor can shield an ongoing goal pursuit from distractions (Gollwitzer, 1999).

According to Locke (2009) emotions are the form in which one experience automatic, subconscious value judgments, indicating that emotions may influence a subconscious motivation. The concept of the subconscious refers to information that is "in consciousness" but not, at a given time, in focal awareness (Locke and Latham, 2004). People also have ability to act without being aware of the motives and values underlying their behavior, in other words, act unconsciously (Locke and Latham, 2004). Many of the early motivation theories emphasize this subconscious, automatic, biological and/or instinctual drives in lower-order theories of motivation (see Pincus, 2004). Motivation research offer insight into this subconscious thought and non-economic values (e.g. symbolic values), and thus contributing to establish the 'real' motives underpinning actor behavior from those espoused (Tadajewski, 2006). Failure to include the effects of the subconscious on action could form a limitation (Locke and Latham, 2004). Accordingly,

Premise 5: Resource integration always has a conscious, subconscious, or unconscious intended value outcome

However, the intended value outcomes are not necessarily known or agreed upon by all involved actors. Also, actors may have multiple goals at different levels. For instance, a person may act not purposefully in the context due to a lifetime goal, or more commonly, act against lifetime goal due to short time contextual rewards. Time to value attainment will decrease the motivational effects (Steel and König, 2006), and the actors will thus be more motivated to act according to contextual institutions than to attain a more distant value outcome. As a result, specific events of resource integration that enhances the accomplishment of some value outcomes might have no effect on the accomplishment of others and even detract from the accomplishment of still others (c.f. Motowildo et al., 1997). According to Wieland et al. (2012) contextual value creation (value-in-context) in service systems can also be conceptualized as an increase in the viability (survivability and well-being) of the system. However, these multiple value outcomes need not be symmetrical across parties, as a positive value outcome from one point of view can be coupled with a negative value outcome from another point of view (Gummerus, 2013). Resource integration is complex since it can involve both individual and collaboration behaviors influenced by context and multiple systems on multiple levels, within multiple value co-creation processes (Laud et al., 2015, Jaakkola and Hakanen, 2013).

Accordingly,

Premise 6: Resource integration is always within multiple value co-creation processes on multiple levels.

Further, resource integration must merge the dualism between personal and social influence on activity. Social influences operate through psychological mechanisms to produce behavioral effects (Bandura, 2001). For contexts to regulate motivation, people must grasp its meaning and synthesize that meaning with respect to their other goals and values (Ryan and Deci, 2000). Resource integration is described as a context dependent construct, since resource integration is enabled by the multidimensional and complex institutional context implied by service ecosystems (Koskela-Huotari and Vargo, 2016), and behavior which is driven by self-interest, as any non-legit behavior will lead to negative consequences (Edvardsson et al., 2014). Thus, as the actor always is within many value co-creation processes simultaneously, actors generally will act according to norms and rules in order to avoid negative consequences determined by the context and the suitability of the behavior within the context. Even seeing people similar to oneself succeed by perseverant effort raises observers' beliefs in their own abilities (Bandura, 2009). Therefore,

Premise 7: Resource integration is shaped by context and service ecosystems

No actor may have all resources required to operate in complete isolation in every situation (Frow et al., 2014). Thus, choices available to the actors may be limited by the resources they have available in the context. As stated by Vargo and Lusch (2011): "The usefulness of any particular potential resource from one source is moderated by the availability of other potential resources from the other sources". Actors need to understand how to access each other's resources (Haase and Kleinaltenkamp, 2011). According to Grönroos and Voima (2013, 136): "...it is not resources per se, but the ability to access, deploy, exchange, and combine them that lies at the heart of value creation...". To apply their competences and integrate re-

sources, individuals need access to relevant resources, which they often acquire from social relationships in their broader social structure (Laud et al., 2015). This paper separate between resource availability, which is presence of resources in the service ecosystem, and resource accessibility, which we define as the resources the actor can access at the time and place of resource integration. To apply their competencies and integrate resources, individuals need access to relevant resources, which they often acquire from social relationships in their broader social structure (Laud et al., 2015). According to goal setting theory (Latham, 2009) resources needed to attain the goal must to be accessible. Research has shown that when people lack the requisite knowledge to master a task, because they are in the early stages of learning, urging them to do their best results in higher performance than setting a specific difficult goal (Latham, 2009). Being able to access resources is especially relevant in today's society considering the technological developments to the point where business models are build around the concept (e.g. Netflix and Spotify). According to Vargo and Akaka (2012), S-D logic's primacy of operant resources in value co-creation also emphasizes the idea that, although having access to particular resources, it always requires the knowledge and skills to solve a particular problem or create a solution. Hence, resource integration is affected by the accessibility of necessary resources in the context. We have previously argued that competences are enablers of resource integration and motivation is the driver of direction, intensity and persistence in resource integration activities. Accordingly,

Premise 8: Resource integration is a function of the actors' competence, motivation and accessibility of other resources.

3. Conclusion and further research

This paper contributes to conceptualize resource integration using theories of motivation within S-D logic. The conceptualization of resource integration can be summarized in eight premises (see table 2), offering premises that contribute to demarcating resource integration from value creation and value co-creation. Resource integration is behavior, which can be evaluated as value creating (positive) or value destructive (negative) for the value co-creation process. The outcome of a value co-creation process can either be positive or negative, but the states and conditions for actors or resources are changed by resource integration and consequently either contribute to or detract from the intended outcome of the value co-creation process.

Table 2. Summary of premises of resource integration

P1	Resource integration is performed by actors driven by extrinsic and/or intrinsic motivational factors enabled by operant resources.
P2	Operant resources are fundamental for resource integration, and essential for the value realization.
P3	Resource integration involves using and interacting with resources, including other actors, and the process provides feedback to involved actors influencing their motivation.
P4	Resource integration can be performed by a single actor.
P5	Resource integration always has a conscious, subconscious, or unconscious intended value outcome
P6	Resource integration is always within multiple value co-creation processes on multiple levels
P7	Resource integration is shaped by context and service ecosystems
P8	Resource integration is a function of the actors' competence, motivation and accessibility of other resources.

This study has provided a conceptual framework for resource integration through eight premises. Together the premises extend existing knowledge in S-D logic when it comes to theoretically explain how and why actors integrate resources to co-create value for themselves and others and how resources are becoming. Thus the next step is to generate a set of items that fully represents the conceptual domain of resource integration (MacKenzie et al., 2011). A challenge in combining motivation theories is how to integrate the general with the specific, as there is no such thing as action in general and every action is task and situational specific (Locke and Latham, 2004). According to Locke and Latham (2004) specific measures virtually always predict action better than general measures, but general measures predict more widely.

Second, for constructs with multiple sub-dimensions as formative indicators, a question that needs to be considered is how the sub-dimensions combine to form the focal construct (MacKenzie et al., 2011). Thus, it would be beneficial for future research to examine the relationship between motivation, competences and resource accessibility.

Finally, the meaning of specific goals is culturally influenced, so that how specific goals relate to well-being can vary across cultures (Ryan and Deci, 2000). Accordingly, examining motivation in resource integration across cultures may offer interesting insight.

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CONNECTING SMART TECHNOLOGIES AND ECOSYSTEMS THROUGH THE INTERNET OF THINGS

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The paper aim is to make sense and clarify more in-depth the key concept of a smart ecosystem. Dealing with the new ecosystem concepts in business and technology literature and going in depth in the study of IoT literature through a bibliometric analysis, the paper identifies the main elements composing a smart ecosystem. The identified categories – interconnetedness, instrumentation, intelligence, institutions – allow the definition of a smart ecosystem by means of conceptual clarification and illustrations through the example of the DATABenC project experience.

1. Introduction

The ecosystem approach to business dates back to Moore's contribution (1993) with his notion of business ecosystem as referring to the mutual relations and co-evolution of the complex network of business actors involved in the co-creation of a value provision. This starting point led to different studies on the business ecosystem, focusing on firms' strategies and roles (Iansiti; Levien, 2004), in particular on the pivotal role of the focal firm, usually called the platform (Gawer; Cusumano, 2002; Gawer, 2011). However, a different perspective emerged within the marketing literature thanks to the combination of the ecosystem approach with service-dominant logic (Vargo; Lusch, 2004) and the service system (Spohrer; Maglio, 2008), which led to a focus on the importance of the dynamic integration of resources among multiple actors (Lusch & Nambisan, 2015; Vargo *et al.*, 2015).

The technologies are always seen as a key element in service (Akaka *et al.*, 2015; Lusch; Nambisan, 2015, Vargo *et al.*, 2015), as they are an integral part of service provision (beneficially applied useful knowledge) and have been seen as having greater potential in achieving value for interconnected service systems (Maglio *et al.*, 2010; Maglio; Spohrer, 2013). New technologies allow for and advance interactions at multiple levels (Barile; Polese, 2010; Maglio; Spohrer, 2013) and a smart environment has been recognized as the best approach to improving ecosystem effectiveness and realizing its viability (Maglio; Spohrer, 2013; Maglio, 2014; Akaka *et al.*, 2015; Lusch; Nambisan, 2015). Recently, Vargo *et al.* (2015) claimed a new view of technology seen as endogenous to value creation processes and as an outcome and a medium of new social practices at the core of ecosystem emergence.

Similarly, Maglio (2014) stated that service systems have been getting smarter over time as new technologies have been used to generate much more information, creating ever more value for people.

The role of intelligent platforms enabling communication between people and new smart devices within the new paradigm of the Internet of things (Toivanen *et al.*, 2015) have started to be affirmed as the key context for the innovation ecosystem approach.

However, most contributions to the ecosystem still keep their focus on the importance of technology; it is mostly seen as a facilitator and a connector among the different actors that interact to co-create value, as it has emerged also in the growing role of smart technologies (Maglio, 2014; Russo Spina *et al.*, 2015) and the Internet of Things (IoT) (Atzori *et al.*, 2010; Toivanen *et al.*, 2015).

Thus, the intersection of information and communication technology research (ICT) and ecosystem studies has remained fragmented, while the need for additional research linking information systems research with innovation research has emerged as a priority for business and service scholars (Ostrom *et al.*, 2015; Vargo *et al.*, 2016). The understanding of sensing and arrangement in relation to the multiple human-technology-based context of interactions (Maglio, 2014; Akaka *et al.*, 2015; Vargo *et al.*, 2015) remains underdeveloped, especially in business and marketing studies, or largely constrained to strictly technology boundaries discourse.

In this paper, our aim is to make sense of and clarify more in-depth the key concept of the smart ecosystem. Dealing with the new ecosystem concepts in business and technology literature and going in depth into the analysis of IoT literature and its related elements, the paper offers a framework to conceptualise the ecosystem perspective in the new smart environment

2. Development of the Field of Study

2.1. Ecosystem perspectives and the role of technology

Since the introduction of the business ecosystem conceptualisation by Moore (1993), technology has played a central role in promoting the creation of a firm's living environment with actors from different industries, all cooperating in the co-evolution processes. The model of platform ecosystem highlights the well-connected network of different business and technology partners producing complements and innovations around a core technological platform that performs as the real engine and core catalyst for innovation development and diffusion (Gawer; Cusumano, 2002; Adomavicius *et al.*, 2007; Gawer 2011; Thomas *et al.*, 2014).

From a different perspective, some service scholars have introduced the new concept of service systems (Spohrer; Maglio, 2008; Maglio *et al.*, 2010) and more recently service ecosystems (Vargo; Lusch, 2010) to depict the new reality of service business seen as value co-creation processes developed in a collaborative configuration of people, technologies, and organisations. Service ecosystems are characterised by dynamism and self-adjusting properties (Lusch; Nambisan, 2015), as well as by an important role of technology and institutions seen respectively as hard and soft

infrastructures influencing the interactions and the co-creation of value in ecosystems (Vargo *et al.*, 2015). In detail, the service ecosystem approach shows the importance of both technology (i.e., processes, factors, and symbols) and institutions (i.e., norms, values, and beliefs) in favouring innovation, as these elements could be both an outcome of and a medium for innovation processes. Technology and institutions are constitutive elements of service ecosystems and both contribute to shaping the way in which multiple actors participate in and arrange each other's value co-creation processes (Vargo; Akaka, 2012; Akaka *et al.*, 2015; Vargo *et al.*, 2015; Koskela-Houtari *et al.*, 2016; Vargo *et al.*, 2016). In particular, the different actors participating in service ecosystems have been recently analysed (Lusch *et al.*, 2016) following the sociological assumption on socio-materiality (Orlikowsky, 2007) that considers human actors (e.g., individual people and organizations), but also non-human actors, natural and artificial elements such as technological and digital artefacts. This perspective confirms the role of technology as both an operand resource and an operant resource (Akaka; Vargo, 2014) and represents an input to include the digital technology studies within the service ecosystem approach (Lusch *et al.*, 2016).

Furthermore, as recently stated by Storbacka *et al.* (2016), the service ecosystems are systems of systems in which the A-to-A perspective is enlarged with the consideration of humans, but also machines and various combinations of humans and machines. This issue highlights and enhances the importance of technology in the engagement of a variety of actors.

Similarly, Maglio and Spohrer (2013) have identified Smart Service Systems (SSS) as smart systems with the integration of IoT technologies that allow for the creation of Human-Centred service systems (Maglio, 2014), with the importance of interactions among physical and virtual realities and people leading to value co-creation. The SSS are characterised by learning capabilities and dynamic adaptation to different situations, and require collaboration among multiple actors with an important role played by both people and their decision-making choices, as well as smart technologies for resource configuration and relationship shaping. These interactions for the creation of value are the foundation of SSS and are based on the understanding, capture, and use of data and technology to sense human behaviour, develop models of human behaviour, and apply these models to support or automate the actions (Maglio, 2015).

Ecosystem has also been related to studies on engineering and computer fields. Some authors (Khriyenko, 2012; Kim; Keum, 2015) have adopted the concept of the 'smart service ecosystem' to underline the important role of different actors' collaboration, especially users, within business ecosystems based on the Ubiquitous Services vision. These studies connect the concept of smart service with the ecosystem approach due to their focus on the human component considered both a part of the end process and an expert enabling the interoperability process. In addition, other studies have coined the term 'IoT Ecosystem' to highlight the collaboration of ICT firms through "a common set of core assets related to the interconnection of the physical world of things with the virtual world of Internet" (Mazhelis *et al.*, 2012, 8) and around IoT platforms that allow for connection and communication between people and smart devices through Internet technologies (Toivanen *et al.*, 2015).

2.2. Internet of Things

The Internet of Things (IoT) started to gain space in scholars' agenda in recent years to depict the new realm of a technology era (Ashton, 2009). The term highlights the emergence of a new reality mediated by technologies and related to the fuzzy concept of the Future Internet (FI), which concerns technologies to integrate different actors and resources, especially in relation to both knowledge sharing and creation when providing services (Atzori *et al.*, 2010; Hernández-Muñoz *et al.*, 2011). The main paradigm of the FI, that is the Internet of Things (IoT), is based on the interconnections of everyday objects among themselves and with applications; the Internet of Things is considered a set of "things or objects" (Giusto *et al.*, 2010) that interact due to the support of technologies to reach specific goals (Atzori *et al.*, 2010; Nolin; Olson, 2016). It allows for the envisioning of a reality in which interactions among digital and physical entities enable new ways of working, entertainment, and living (Miorandi *et al.*, 2012).

The focus is on both infrastructures and new capabilities in accordance with the European Research Cluster (IERC) definition as quoted by Uckelmann *et al.* (2011, 5): IoT is "a dynamic global network infrastructure with self-configuring capabilities based on standard and interoperable communication protocols where physical and virtual 'things' have identities, physical attributes, and virtual personalities, use intelligent interfaces, and are seamlessly integrated into the information network." In addition, 'things' are also "expected to become active participants in business, information and social processes" (Liu; Li, 2014, 220) and Uckelmann *et al.* (2011, 4) quoted the Cluster of European Research Projects when stating that things are "reacting autonomously to the 'physical world' events and influencing it by running processes that trigger actions and create services with or without direct human intervention".

Harmon *et al.* (2015) state that the Internet of Things can be depicted as "an integrated smart system architecture of sensors, software, networks, and corresponding interfaces that hold the promise to do just that" (p. 488). Authors depicted the IoT as providing real-time awareness and favouring integration among people, processes, knowledge, and data. It leads to the achievement of collective intelligence as a tool to support decision making, allowing for the fulfilment of information requirements and improving the time response of operations, leading to efficiency (Yang *et al.*, 2013).

Aside from technology literature, few studies in business domains have started to address the potential of IoT to improve the effectiveness and efficiency of business processes, especially concerning customer services, logistics, and supply chain management, products and services development, and data management and analysis (Ferretti; Schiavone, 2016; Scuto *et al.*, 2016). In particular, some scholars highlight how data obtained thanks to the implementation of IoT needs to be transformed in useful knowledge for the development of new services (Zancul *et al.*, 2016) and its contribution to the growth of immaterial components such as intellectual capital (Murray *et al.*, 2016). Other interesting perspectives in business literature are focused on both the influence of regulation on the acceptance and diffusion of IoT (Trequattrini *et al.*, 2016) and the network-based analysis proposed by Prince *et al.* (2014), showing how IoT can be useful in driving strategic innovation initiatives through the involvement of different actors brought together by a focal actor.

The previous literature provides a venue to further explore the possibility of linking ecosystem concepts and IoT in the figuring of the integrated smart ecosystem perspective (Khriyenko, 2012; Kim; Keum, 2015). Some overlapping concepts can be detached and quite similar terms used to look at the same reality by a different focus as well. There is an opportunity for combining concepts in an insightful way so as to foster a better understanding of the new business and technology complexity.

3. Research Process

This research is conceptual and involves both theoretical and empirical work articulated in three main steps.

In the first step our interest was devoted to identifying the key issues shaping literature on the Internet of Things in order to acquire an overview of the content of the contributions already available on this topic; as a consequence, we chose to clarify the concept of the Internet of Things and how this concept has been addressed in the literature border crossing the business and technology fields of science (Atzori *et al.*, 2010; Hsu, 2014). A bibliometric literature analysis was conducted to highlight the key issues arising from contributions about the Internet of Things; this choice of analysis stands on the high precision, objectivity, and reliability achievable (Scherngell *et al.*, 2013) through a bibliometric analysis and, in more detail, due to a co-word analysis, as it is useful to group the most relevant issues with one another. Furthermore, a co-word analysis is suitable to map the association between words and to deduce frames (van der Meer, 2014). The analyses we conducted took place through Web of Knowledge - Web of Science, as it is considered one of the most reliable databases for the performance of such a process (Bremholm, 2004). As our study is framed in the business and management literature, we selected the contributions classified in this area of research because the Internet of Things is based mainly on several fields of science, mainly IT studies; the dataset we received consists of 106 contributions ranging from 2009 to 2016. In performing this research step, we used the software Bibexcel because it favours different analyses and its features are aligned with our choice to investigate contributions from Web of Knowledge - Web of Science due to the details provided when acquiring information in comparison with other databases.

The second step of our research was based on the categorization of the issues that emerged from the first step of our investigation, namely the above-described co-word analysis. All researchers took part in this activity to combine in the most suitable way the words that emerged under a unique topic after grouping the issues because of the similarities they have. The usage of categorization (Zeng *et al.*, 2014) is helpful to refine the previous results of the analysis, better focus on topics, decrease subjectivity, and achieve higher reliability in terms of the results. Each author performed the categorization as a stand-alone; then we discussed it together. The efforts performed in this phase of the research regard the necessity of identifying only one category for each issue to get over the presence of one of them in more than one category and to achieve a homogeneous thematic categorization. We analyzed the content of the contributions taken into account in our bibliometric analysis to better contextualize some of the topics that emerged.

Finally, the insights from literature were translated into theoretical and empirical contexts of business and service literature to generate context-specific knowledge. We used the categories from the previous step of our research process and their content to define the smart ecosystem concept by means of conceptual clarification and illustrations. In more detail, the main components of the proposed conceptual framework were defined by an iterative process that enriched theoretical arguments via a context-specific analysis. The purpose of doing this was to empirically illustrate and further extend the concepts at the core of the proposed conceptual framework; for each category we thoroughly pinpointed elements from the contributions shaping our theoretical approach and evidences emerging from the context of the analysis we chose (Flyvbjerg, 2006).

As concerns the latter, examples involved the evidence from an empirical context we can investigate from the inside. The project representing the context of analysis we investigated is named DATaBenC and it started in 2011 to promote both the conservation and valorisation of the cultural heritage of Campania, a region in Southern Italy. The project was carried out by the university to which we belong, together with about 50 partners, both private companies and public-based actors like local agencies and national research centres. Performing an investigation in a context from the inside led us to benefit from greater insights in conducting our research. Moreover, the aim of this project is to promote a more fulfilling experience for users, parallel with the fundamental idea of sustainable fruition. The University of Naples is one of the promoters of this project, together with another university, research centres and private organizations.

The examples in this study help generate more concrete and context-specific knowledge to advance this area of research (Flyvbjerg, 2006).

4. Findings

The results of our bibliometric analysis represent the first step of the investigation and provide us with the list of the most relevant elements highlighted in the business and management literature addressed in their analysis of IoT phenomenon. The bibliometric analysis proposed at the beginning a set shaped by 89 words, but when looking for relevant ties among words, the co-word analysis returned a list of 36 words.

The second step of our investigation is useful in making a further selection of the topics emerging from the previous step. This selection takes place as described above, namely with the authors setting apart the words with more than one specific meaning (identification, transformation, perspective, and so on) and the ones with too-general content (economy, delivery, performance, and so on). Then we identify four categories of words based on their meanings and on the way they can be related to one another through a similar meaning. We discuss the meaning; when particular differences emerge, the content of the papers has been checked to better grasp the intended meaning. After grouping words, we look for a pivotal topic to be used as a describing element of the entire category.

The following table (Table 1) provides evidence as to how often words (viz., item) are cited and how we categorize them; the citation rate refers to the frequency with which

words have arisen from the co-word analysis as relevant compared to the total number of couples emerging as relevant.

Table 1 - Results from co-words and categorization

Item	Citation rate	Category	Item	Citation rate	Category
Algorithm	2,60%	2	Internet	8,09%	2
Business	2,60%	4	Knowledge	5,78%	3
Collaboration	2,60%	1	Knowledge diffusion	2,60%	3
Constraints	2,60%	4	Legitimacy	2,60%	4
Corporate environment	2,60%	4	Networks	2,02%	1
Data adoption	1,73%	3	Organizations	2,60%	4
Dynamic capabilities	2,60%	3	Platform	2,31%	2
Electronic data	1,73%	2	Power	1,73%	4
Enterprise system	7,51%	1	Sensor	1,73%	2
Information	8,38%	3	Supply chain	7,80%	1
Information system	2,60%	2	Systems	3,76%	1
Information technology	2,60%	2	Terminals	2,60%	2
Integration	2,60%	1	Things (IoT)	6,94%	4
Intelligent systems	2,60%	2	Trust	4,05%	4

Source: authors' elaboration

The first category of words is related to the interconnections and interactions among actors, leading to activities performed together and mainly to resource integration and shared processes; we named this group 'interconnectedness' because it consists of topics representing the ways actors are interrelated to perform activities together towards common aims: collaboration, enterprise systems, integration, networks, supply chain and systems. Among these topics, 'enterprise system' (7,51%) and 'supply chain' (7,80%) are the most frequently used ways to introduce the interconnections among actors.

The second category we created is composed of words representing the technological tools supporting the performance of some activities, namely the instruments available through innovative and recent technologies to make processes faster and more efficient than in the past as main aims. In total, the words shaping the second category are: algorithm, electronic data, information systems, information technology, intelligent systems, internet, platform, sensor, terminals, and things (IoT) and we labelled this group 'instrumentation'. 'Internet' (8,09%) and 'Things' (6,94%) - viz., IoT - are the two main topics in terms of frequency of usage and coupling with the other issues. This result should not be intended as an obvious one, as the word 'Internet' is often proposed by scholars as a stand-alone topic and not always used together with things to shape the 'IoT' perspective.

Another set of words we decided to group in a category depended on the closeness of the topics they represent to the notion of knowledge and learning; thus, we called the third category 'intelligence' because the elements shaping it are all directly linked to the usage of information and capabilities to advance or create knowledge. It contains: data adoption, dynamic capabilities, information, knowledge diffusion and knowledge. 'Information' (8,38%) is the most commonly used word in both this category and the whole dataset acquired through the co-word analysis; even 'knowledge' has a high citation rate (5,78%) and represents the essence of the expected output of intelligent processes.

Finally, in the last category we grouped the words representing actors, rules, norms and behaviours; we decided to use the label 'institutions' due to the way in which these words are commonly considered in business and management literature. Thus,

we referred to institutions as the whole set of elements and not just the actors that can be classified as institutions. We consider together the following words: business, constraints, corporate environment, legitimacy, organizations, power and trust. The latter is the most frequently used word (4,05%) and represents one of the features of the mechanisms taking place in collaborative contexts.

5. Proposal Model: A smart ecosystem conceptualisation

The model we propose is built on the third step of our research approach; in essence, it depends on the two research steps depicted previously and on the assessment of the topics and the linkages previously proposed into categories. In this way we aimed to provide an interpretation of these issues into an ecosystem-based perspective.

Furthermore, the analysis of overlapping concepts debated both in the ecosystem literature and under the IoT label was deepened for the proposition of a conceptual model to enable the understanding of what smart ecosystem means and how it should be conceived.

In particular, the model established four basic elements which we named under the categories that emerged in the second step of our research process, namely: 1) interconnectedness, 2) instrumentation, 3) intelligence and 4) institutions, which should help deal more effectively with the future vision of a smart and sustainable ecosystem (see Fig. 1).

Some empirical illustrations based on a case study are also used to detail the content of each dimension and provide an indication of the usefulness of the proposed conceptual framework.

Thus, the focus is on the key elements at the basis of the smart ecosystem as we identified conceptually, and here theoretically and empirically argued more in-depth. These features try to capture the complexity of a path moving towards a smart ecosystem conceptualisation.

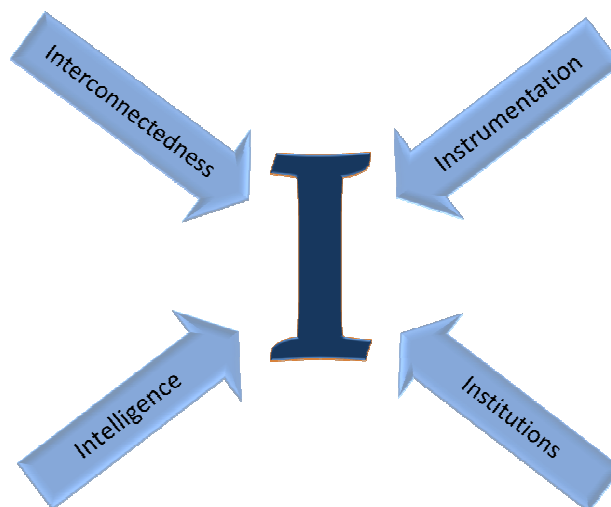


Fig. 1 - I⁴ Model of Smart Ecosystem

Source: authors' elaboration

5.1. Interconnectedness

The view of scholars which has stimulated the founding debates that arose around the ecosystem and IoT labels illustrated how they felt a common need to explore complexity as a constitutive element of the reality under investigation. Interconnectedness is an essential requirement in depicting a reality as a complex smart ecosystem, namely characterized by growing variety, variability and indeterminacy (Maglio, 2014; Vargo *et al.*, 2015; Yang *et al.*, 2013). In this sense, interconnectedness is not only reduced to interaction among the different parts of systems, but means interactions where the results exhibit emergence and non-linear and predictable properties.

It plays a relevant role in depicting the dynamic feature of a smart ecosystem (Maglio, 2015).

In this sense the experience of the DATaBenC district shows well how interacting agents from various business and knowledge scientific domains become able to develop an integrated way of working by articulating aims and objectives along with the metrics and tests on common projects.

First, the District project identifies three main strategic interventions as interdependent modular activities, namely SNECS (Social Network of the Entities for Historic Centers) centred on the distribution of knowledge in historical city centres; OPS (Talking Museum Show) for an engaging and sustainable fruition of cultural heritage in museums; and RIPA (Archaeological Parks Intelligent Network) for the safeguard of archaeological parks. The projects are also settled in the empirical context, as six Demonstrators (i.e., archaeological parks, museums and historical centres) lead the collaborative efforts of actors in advancing the innovative projects towards common goals.

As supporting and transversal research intervention is also established a four strategic intervention, namely the CHIS (Cultural Heritage Information System), a technology project focused on the development of a smart platform for cultural heritage. CHIS has been conceived with a focus on promoting working interactions and collaborations that aim to exploit the potential overlapping of competencies and activities to be performed and resources integration among actors and projects. The actors' activities and roles are continuously adjusted and re-defined according to the needed tasks and results, and the technology platform works as a facilitator to identify and involve the skilful actors. Thus, the milestones and results are monitored while activities are ongoing, and the impact of these results is evaluated to identify the beneficiaries and the possibility of further exploitation within the ecosystem.

Furthermore, the searching for interactions goes beyond the permeable boundaries of the core DATaBenC actor network. New partnerships have been established with public and private actors clustered in tourist districts within the Region Campania, enabling the variety in the ecosystem to increase and develop. The sharing of resources and the reaching of unpredictable results emerge thanks to the enrichment of the activities and the enlargement of the actors' scopes.

5.2. Instrumentation

Interconnections among the actors within a smart ecosystem are facilitated and enhanced through the use of various technological infrastructures (Toivanen *et al.*, 2015), above all the online platform allowing the sharing of data, knowledge and other resources among the partners (Kim; Keum, 2015).

Also, the greater flexibility provided due to the usage of new embedded technological instruments like sensors directly affects the way actors can stay connected by performing its activities (Bi *et al.*, 2016).

A smart ecosystem conveys a thought of technology and its embedded instrumentations as having a multifaceted nature. Moreover, it includes technology seen as a component of products and applications, as well as of support and infrastructure. The new technology tools, as with many new IOT technologies, face both hardware and software issues that may hamper widespread adoption.

The role of IoT and smart technologies in DATaBenC is pivotal, as they are implemented to provide an innovative ICT architecture based on cloud computing and the Internet of Things (IoT) which collects sensors (nanotechnologies, RFID, Smart-dust, etc.), network infrastructures, geographic information systems (GIS) for georeferencing contents and maps, multimedia databases for digital libraries, and multichannel and multimodal platforms. In detail, the prototyping of this architecture is based on cloud computing; IoT is the main goal of CHIS that represents the common and horizontal element connecting the other sub-projects and sustaining them in the provision of real-time information and the creation of innovative and context-aware services. In this scope, new tools are created, such as models for Linked Open Data and for big data analytics for cultural heritage, cloud computing for the delivery of services (IaaS - Infrastructure as a Service), both commercial and open-source, and innovative wireless technologies based on cognitive and cooperative paradigms for the integration and management of sensor networks and users' localisation and tracking. All these technologies are conceived according to the Future Internet (FI) view to promote complete integration between actors, process, data, and things able to make the networked connections relevant and valuable.

5.3. Intelligence

One of the challenging aims of the smart ecosystem is the integration of different kinds of knowledge, skills and expertise to co-create cross-sectional knowledge and smart competencies required to face the growing opportunities and interdependencies (Khriyenko, 2012; Maglio; Spohrer, 2013). The focus is on how different typologies of knowledge are integrated and new ones are deployed to assure ecosystem dynamic and viability in a smart environment.

The experience of DATaBenC makes sense of how the need to cross boundaries between different knowledge fields (especially concerning technology as well as the historical, archaeological, urban, strategy and management fields of study) is seen as urgent in order to recover towards a unitary view of cultural heritage reality.

DATaBenC is focused on the creation of a system of knowledge integration for the cognitive safeguard of cultural heritage, diagnostic monitoring and sustainable fruition through smart technologies and innovative ways of learning. The achievement of

these aims has been related to the creation of a 'cultural heritage smart space' (CHESS) concerning the "*creation of smart innovation within a smart environment through smart learning processes*". The variety of actors' knowledge bases and experiences leads to the creation of a common integrated knowledge-based platform able to interoperate with different database systems and to align and integrate the mixed typologies of data. For example, the creation of a common knowledge base is represented by the ongoing and additive process of data modelling that exploits the georeferencing of data and the related spatial analysis processes. These widespread and heterogeneous database systems are based on technologically advanced data mining processes and semantic meta-dating, and they represent one of the activities shared throughout the three strategic interventions on which the entire project is based.

The aim of knowledge, skills and expertise integration is continuously shaped, as the District has enlarged interactions with other actors involved in different business and/or technology-based industries (i.e., tourism and transport, ICT and engineering). The need to cross the boundaries of the various knowledge domains has also been considered a starting point for the development of more focused and deeper vertical knowledge due to the results achieved through the different activities carried out.

5.4. Institutions

Institutions deal with the social setting dimension of an ecosystem made up of actors lived in and the set of norms, habits and rules determining how they relate, mean, behave, learn and use their resources (Vargo, 2016). Smart environments enable actors to accomplish an ever-increasing level of interactions and collaborations, often under time and cognitive effectiveness. To result in a network effect with increasing returns, the interactions in a smart ecosystem need to be organised and arranged. Thus, an institution has a central role in a smart ecosystem, and technology actively participates in the institutional process, as it shapes how actors interact and build up the setting within which these interactions take form. Institutions represent the way actors are coordinated towards common goals, as this represents the main novelty when comparing the service system with the service ecosystem (Koskela-Houtari *et al.*, 2016). Coordinating mechanisms are necessary to define the rules favouring the ways actors cooperate. In our context of analysis, at the beginning the coordinating mechanisms have been defined and applied by universities; then they have been negotiated, as the actors planned to purposefully arrange round tables, meetings and decision-making processes into groups and thematic sub-groups.

The way DATaBenC actors distribute tasks and integrate their resources and competencies across the different project tasks and the use of the online platform and technologies to provide for and allow interactions and integration represent the key elements to the workability and success of the DATaBenC project. Actors are provided with methodological tools and support to assess how they perform against needed competencies and practices, to evaluate their competent participation in different project activities and to improve actors' practices to succeed in advancing their activities and goals. For some actors, this way of interacting created a strong commitment to the formation of more collaborative decision and control processes; at the same time, it supported other actors in their decision to leave the project because of the misalignment of their goals or competencies. Common rules and standards are created, though not simply as normative and behavioural instrumental tools to adjust and

combine the needs and practices of different actors. They constitute a way of doing in the ecosystem in which actors shape their relationships as members of a community, continuously reinforce the co-creation of behavioural rules, and try to overcome the emerging problems and conflicts through which DATaBenC goals are not only created and shared but mainly realized.

Thus, institutions are dynamic and continuously co-configured in the District as new norms and rules within the social setting are shaped to facilitate the interactions among actors, especially when new relationships are also established with other networks, collecting a wide range of actors.

6. Implication and Conclusion

The paper offers a framework to conceptualise an ecosystem perspective in the new smart environment. The paper opens with the inherent complexity of a smart ecosystem conceptualisation through the identification of the constitutive and most representative elements of IoT in the business and management literature. The results have allowed us to delineate a definition of the smart ecosystem through the use of four constitutive elements, namely interconnectedness, instrumentation, intelligence and institutions.

The empirical context, the DATaBenC ecosystem, has allowed us to use the four constitutive elements to define a smart ecosystem, filling the gap that emerged in the analysis of recent scholars' contributions to the ecosystem and IoT (Mazhelis *et al.*, 2012; Toivanen *et al.*, 2015).

The DATaBenC experience provides for the role of technology in shaping interconnectedness. Interactions and relationships, as well as resource integration, emerge through the support of IoT, in line with the expected role proposed by scholars (Nolin; Olson, 2016). Technologies enable the ongoing and co-evolving delineation of a community of various actors as an ecosystem where every individual actor perceives the chance to participate in and actively collaborate to reach specific and common goals towards value co-creation for multiple actors (Vargo; Akaka, 2012, Akaka *et al.*, 2015).

As a consequence, innovation is one of the key results expected through the deployment of activities due to the new paradigm of IoT. The usage of new technologies favours easier interconnections among the actors, namely, the resource integrators, the object - viz., the resources to be integrated, and the intelligence - that is to say, the knowledge - brought by each actor and embedded in technology and objects. Instrumentations are pivotal and include different hardware and software solutions designed to raise awareness that the growth of innovation opportunities increasingly stems from the integration of multiple data and sources of knowledge. The innovation outcomes are highlighted because they depend on dynamic resource integration (Lusch; Nambisan, 2015; Vargo *et al.*, 2015).

The knowledge deployed by multiple actors through new technologies into an ecosystem is itself an expected result of a continuous learning process; organizations in service ecosystems are seen as learning entities (Lusch, 2011). In this sense, technology is not simply seen as an enabling tool or a supportive platform. It has a distinctive competence identity process that triggers innovation at the multiple and eco-

system level. Working as an integrated knowledge-based platform, the IoT enables multiple actors to engage in developing new intelligent systems.

In such a complex context, the role of institutions is crucial in favouring innovation in a smart ecosystem (Lusch, 2011; Vargo; Lusch, 2016); when considering institutions, the focus should be on rules, norms, constraints and enablers as well as on actors and all the other elements directly and indirectly affecting the way different actors operate in an ecosystem context (Vargo; Lusch, 2016). The role of institutions in a smart ecosystem is multi-fold, because outputs are expected as it concerns the way each actor behaves, the knowledge flow into the ecosystem and the resources that are created and strengthened as a consequence of resource integration and recombination efforts.

A smart ecosystem is configured as a complex context shaped by technology seen as a means to develop interactions, objects, competencies, innovations, norms and rules suitable to the context in which they are used. Technology is not simply an infrastructural resource that improves the connections in smart service systems; it can be seen as a cross-cutting resource because it is interrelated with each of the other resources and has the potential to influence almost every aspect of smart ecosystems by creating new competencies, new solutions, new tools and new practices.

7. Limitations and Further Research

The paper is based on an analysis of the extant literature on new topics, as IoT and ecosystem are. In particular, because the contributions on IoT will inspire further research, it is necessary to grasp new meanings from the advances proposed by scholars. In addition, the usage of a single database, even if consistent with our research approach, represents a limitation as well, because there are other contributions proposed by scholars that we did not have the chance to take into account due to the ways in which the database has been proposed by WoS.

Finally, the empirical context we chose to further illustrate the findings of our research can be investigated again to verify the considerations proposed in this paper and to complement them with new insights as soon as they arise. Similarly, other empirical contexts will enforce the evidence we provided by highlighting new and different elements or by modifying the perspective we adopted in this research.

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COUPLING MECHANISM AND INFLUENCE PATH OF PRODUCER SERVICES AGGLOMERATION ON MANUFACTURING UPGRADE: PLS-SEM ANALYSIS OF CHINA'S ABOVE PREFECTURE LEVEL CITIES

Liu Yi

1. Introduction

World Economic Forum (WEF) divides economic development from backwardness to advancement into several stages like element-driven stage, transitional stage from element-driven to efficiency-driven, efficiency-driven stage, transitional stage from efficiency-driven to innovation-driven, and innovation-driven stage. According to Global Competitiveness Report 2013-2014, China is still in the third stage, the efficiency-driven stage. For a long time, embedded in the global value chain led by foreign capital, manufacturing industry of China is being locked in the low-end processing and assembly part. Without core technology and “smiling curve” on both ends of service function as well as with the product quality severely falling behind scale increase, China’s manufacturing industry is gradually falling into the downward spiral in low cost competition. Owing to features like high degree of industrial mutual relation, knowledge-intensive and human-capital-intensive and strong radiometric force, producer services deserve to be “the pluming wings” and “smart heads” of the manufacturing. As an effective organization form, producer services agglomeration is the main carrier for the transfer of human and knowledge capital to manufacturing. Relying on the radiometric force and diffusion of the producer services agglomeration zone to drive Chinese manufacturing to leap into the high-end industry under the governance system of the global value chain, which will facilitate the exciting breakthrough in the transition from produce-oriented manufacturing to service-oriented manufacturing and thus realize the transition of mode of economic development from efficiency-driven to innovation-driven.

In the Guiding Opinions of the State Council on Accelerating the Development of Producer Services to Promote Industrial Restructuring and Upgrading produced by the state council in August, 2014, points, “we shall adapt to the development tendency of new industrialization, informatization, urbanization and agricultural modernization with Chinese characteristics, deeply implement the overall strategy of regional development and the strategy of major function oriented zoning, and guide the gathering of producer services at central cities, manufacturing industry concentration regions, industrial base of modern agriculture and qualified cities and towns according to local conditions to realize economies of scale and characteristic development.” It demonstrates that the thought of relying on the policy of producer services agglomeration to drive the acceleration of industry is gradually bright and clear. However, in the aspect of theoretical research, more concentration upon the relation between input and output of manufacturing and producer services, hasn’t broken an influence path to implement the producer services to the inherent

mechanism of the manufacturing acceleration. Some key factors and related interaction relationship are more like a “black box”, which hinders the formation of available evaluation and policy measures for all-round support system. Therefore, on the basis of organizing the related influencing factors between the producer services agglomeration and the manufacturing acceleration, this paper explores the logic behind the coupling of the two through the construction of “soft models”, that is to say the effective utilization of structural equation model based on partial least squares, and makes an empirical analysis by using the data covering Chinese cities at prefecture level and above in 2005-2012. The research findings will offer beneficial reference to the formulation of related policies relying on producer services to drive the manufacturing acceleration.

2. Mechanism of the Influence on the Upgrade of Manufacturing from Productive Service Industry assemblage

There are two kinds of research perspectives regarding industrial upgrade: one is industrial restructuring or upgrade perspectives between industries, and another are global value chain perspectives or upgrade perspectives within the industry. The former one refers to harmonious development between industries and the corresponding structure upgrade, and the latter one refers to four levels from low to high which respectively are technological process upgrade, product upgrade, function upgrade and cross the value chain upgrade. By contrast, the literature to quantitatively study the industrial upgrade under the frame of global value chain deficiency is still in deficiency. The industrial upgrade here is the meaning of promoting the status in division of labor to get higher additional value in the global value chain.

2.1 Mechanism of manufacturing upgrade promoted by productive service industry assemblage

Traditionally, it is well acknowledged that the import of high-tech is a main way to change the relatively backward status of Chinese manufacturing in technological equipment, management technology and production organization. However, as a transmission link to manpower and knowledge, producer service is a bonding agent and impetus to push forward the growth in other apartment (Riddle, 1986) . With the deepening degree of division of labor in society, economic efficiency in industries depending increasingly on the relevance between enterprise productive activities and outsourcing service enterprises (Gruber and Walker, 1989). From the perspective of intra-production specialization, service links itself will generate agglomeration in order to realize scale economies effect (Jones and Kierzkowski, 2005). Manufacturing enterprises have a tendency to pitch decentralized production processes into the place with low cost service-correlation, and the accumulative effect of cycle will take shape owing to the increasing number of manufacturers (Kimura and Ando, 2005) . But, considering the effective control of transaction cost, the share of intermediate input products and the acquisition of knowledge spillover effect, as well as the will to close geographically, upstream and downstream firms then form the spatial agglomeration between producer services and manufacturing (Ando and Kimura, 2009). Assuming that the downstream manufacturing enterprise has various preferences to intermedia-

te product, then the producer services agglomeration of the upstream enterprise means increasing its intermediate input categories, therefore the operating cost of manufacturing will be effectively reduced (Ethier, 1982). From the perspective of network structure of industrial cluster, producer service enterprise, scientific research institution, local government and industry association are able to realize knowledge spillover and collective learning (Camagni, 1991) through local labor force flowing within enterprises, technological and organizational exchange between consumers and suppliers, and imitating process, etc, speed up technological innovation and manpower accumulation (Ellison and Glaeser, 1997). However, the interconnected and interactional network formed by the link between producer service enterprises and manufacturing enterprises enables manufacturing enterprises in the cluster to obtain advanced factor input like transportation, financing, knowledge technology and commercial services by relatively low cost, and generate knowledge spillover that occurs because of the effective communication between manufacturing links and service links which was found in the French case by Charlot and Duranton (2004), thus helping enterprises to move from manufacturing links with low additional value to value chain with high additional value. And at the same time, producer services agglomeration will also add local appeal to FDI, then generating the spillover effect of the promotion of manufacturing competitiveness.

2.2. Coupling model of the upgrade of productive service industry and manufacturing industry

In the aspect of coupling interaction mechanism of producer services and manufacturing, with the reference to the research made by Porter (2002), if the value chain of manufacturing enterprises is distributed into some basic activities including manufacturing, marketing, transportation, and after-sale service, as well as into supportive activities like infrastructure, human resource, R&D and financing, the original value chain of the manufacturing industry and producer services will break up into scattered value chain by ways of permeating and extending or regrouping as deregulation and technological advance happens, and will realize reintegration through ways like service outsourcing, manufacturing industry servicing or “the integration of value-added links⁴¹”. The functional integration of fundamental value chain activities in producer services and manufacturing industry is the result of adjustment and optimization of manufacturing value chain by further refined division of labor and the competition and cooperation between different types of business, thus enhancing productivity while reducing manufacturing operating costs. But structural convergence of supportive activities of value chain in producer services and manufacturing will enable manufacturing enterprises to better share the knowledge spilled out of the internal industries and partner enterprises of each link in the value chain, and consolidate cooperative relationship with one another by more than once trust games, thus optimizing allocation of resources and strengthening the manufacturing competitiveness.

⁴¹See B. Wirtz, 2001. “Reconfiguration of Value Chains in Converging Media and Communications Markets”, Long Range Planning, 34: 489-507.

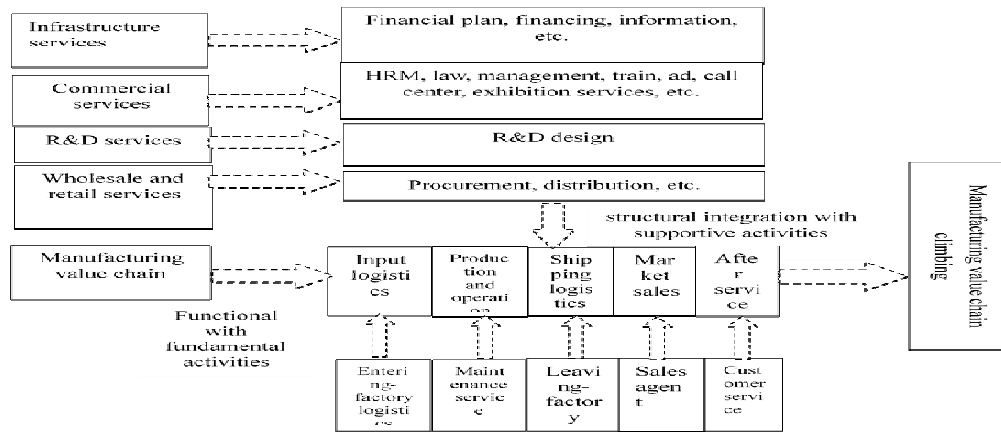


Figure 1 Two value chain coupling modes of producer services and manufacturing

Apart from different with the spillover mechanism of manufacturing transformation and upgrading, the location characteristics of the producer services agglomeration will also show significant variation because of different ways to mix manufacturing value chain together and undertaking different functions. Functional service tends to assemble around the manufacturing industry, and is producer services cluster which relies on the development of manufacturing industry. Supportive service, however, is usually inclined to separate with manufacturing industry, reflecting the tendency to gather in the CBD of regional central city and metropolitan, and it reveals the positive correlation with city-level and is pure producer services agglomeration, and it is relatively far way to the distance of manufacturing spatial spillover., and even show the characteristic of crossing border.

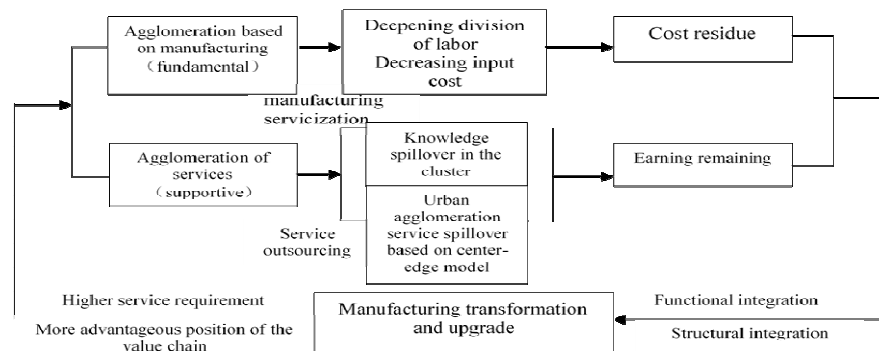


Figure 2 Location characteristics of productive services agglomeration and manufacturing coupling

3. Literature review

From the perspective of research methods, the existing literature can be divided into three categories regarding the upgrade of producer services and manufacturing. The first one is the research on the correlation between theory and experience. The second one is to utilize the analytical method of input-output to empirically research on the promotion of manufacturing competitiveness. For instance, Arnold et al. (2011) , Arnold et al. (2008) and Wolfmayr (2008) respectively used the input-output data of enterprises and industries in Czech Republic, Sub-Saharan Africa and OECD, and

then proved that the development of producer services facilitates the escalation of manufacturing in developed countries and developing countries, the promotion of total factor productivity and competitiveness. The third is the empirical research based on methods of panel data, error correction model and system dynamics. A classic example for Gu Naihua (2006) is the research on producer services' influence on the competitiveness and comparison between its energy levels, and resulting in revealing that there are prominent positive correlation between producer services and the promotion of China's manufacturing efficiency, of which technical research and development and finance and insurance industry have made the biggest influence. As a whole, there exist four angles of view including need-to-comply theory, supply-leading theory, interaction theory and integration theory when we theoretically narrate the relationship between producer services and manufacturing, but the research results are still far from consistence. For example, Tanaka (2009) didn't find producer services any promotion to manufacturing productivity on the study of Japanesebetween1980 to 2005, and Dai Zhongqiang (2008) also point out in his research that there merely exist one-way causation between producer services and manufacturing in the majority of cities. The possible explanation to the above argument can be that the character and function of producer services are dynamic during each stage of economic development, and it maybe undergoes unceasingly prominent and reinforced processes(Hutton, 2004), which also demonstrates there are theoretically coupling relation between them and requires different quantitative methods and bigger sample capacity to do more empirical researches. Moreover, there have already empirical documents to only prove that whether there exists the competitive relationship between producer services and manufacturing or not, how is the influence direction and the comparison between different service industries, however haven't revealed the logic behind the relationship and its influence factors. Currently, only Gu Naihua (2010) uses urban panel data and random frontier function model and introduces several variables like geographical distance, policy environment and the ability of value chain in industry and enterprise integration to try to analyze the spillover channel from producer services to manufacturing industries. But concerning the mechanism of action, key factors and influence path, this research is merely preliminary on the ground that it overlooks some important factors like service delivery cost, manpower resource that influence the knowledge spillover of producer services, and those key factors like international trade and technological innovation that influence the upgrade of manufacturing industry are not taken into account either. While the quantitative analysis method based on panel data lowers the application value of articles because the description of the soft factors in the influence of producer services' action on manufacturing is too easy. This paper attempts to make up for the above-mentioned regret by bringing producer services agglomeration and the upgrade of manufacturing into an impact theoretical framework to make an analysis, and creatively applies structural equation model based on partial least squares estimation that is the common way used in market research to macro-economic data, in an effort to building systematically correlative mechanism between producer services agglomeration and the upgrade of manufacturing, and uncovers regional demand scale, policy environment, human capital, the difference of technological innovation, transaction cost and other factors that affect producer services agglomeration, and these factors are also the inner driving mechanism that further causes the upgrade of manufacturing.

3.1. Hypotheses Development

How to clearly define the productive services in statistics remain controversial. For example, the service subject of traffic transportation, finance, wholesale and retail and other industries can either be manufacturing enterprise or consumer. Concerning the connotation and extension of productive services and the separability and availability of data, taking the example by Gu Naihua(2010), we choose “transportation, storage and postal industry”, “information transmission, computer service and software industry”, “financial industry”, “lease and commercial service industry”, “scientific research, technical service and geological prospecting industry” to represent producer services. We choose employment figure of producer services as the benchmark, and represent agglomeration by the proportion of one urban producer services in all urban producer services(see the formula 1), and PE_i is the employment figure of producer services in city i , and PE is the employment of all urban producer services. In order to differentiate influence exerted by functional integration of the basic production services from the influence exerted by structural integration of supportive production services, we divided the urban producer services agglomeration into basic producer services agglomeration and supportive services agglomeration and define basic services into “transportation, storage and postal industry” according to Porter’s definition(2002), and supportive services into the remaining four producer services.

$$A_i = \frac{PE_i}{PE} \quad (1)$$

Furthermore, the existing research has pointed out that besides specialization (namely Marshallian externality), the diversification of industrial structure (namely Jacob externality) is beneficial in the formation of innovation, and knowledge spillover and diffusion mainly exist in different industries (Jacobs, 1969). Therefore, using the methods of Duranton and Puga (2001) for reference, we utilize Herfindahl-Hirschman Index to measure the diversity of services (formula 2), and N_i us the service types of city i , which means the proportion of the employment figure of the n th service industry of city i in employment figures of all services in city i , and the larger this index means the higher degree of the diversity of service industry in this city.

$$Div_i = 1 - \sum_{n=1}^{N_i} S_{i,n}^2 \quad (2)$$

As previously mentioned, as the intermediate input product, producer services agglomeration and its diversification will prominently affect the manufacturing productivity, thus we get the following hypothesis.

H1: producer services agglomeration exerts directly positive influence to the upgrade of manufacturing.

From the perspective of vertical linkages between industries, the relationship between upstream industry and downstream industry not only influences each other, but also suffers from co-influence exerted by market scale, production cost and transaction cost (Venables, 1996). Producer services tend to locate in place with intensive suppliers and demanders (Glaeser and Kohlhase, 2004), and knowledge-intensive producer services in particular are inclined to gather beside their clients including service provider, manufacturing enterprise headquarter and large community organization (Shearmur and Doloreux, 2008). Manufacturing availability and the ability to conveniently obtain the required manpower resource are the main factors to influence producer services agglomeration. The developmental ability of competitive

service economy depends on the structure of the manufacturing sector that remains the most intensive user of producer services (Andersson, 2004). Therefore, we adopt total industrial output value and total freight volume to respectively denote local demand and foreign demand from manufacturing. According to Cheng Dazhong (2008), only a part of producer services is used to develop manufacturing. Each city is different from other cities owing to different developmental levels, but because of the deficiency in input-output stable of each city, the coefficient is about 0.547, thus population density and average income as the variable to influence producer services agglomeration are taken into account. Besides, large industrial enterprises, especially those with relatively low content of technology, regard university as the main source of technology, small enterprises, however, tend to introduce knowledge-intensive producer service enterprises as external knowledge sources (Siegel et al., 2007). Empirical research based on China also demonstrates that service outsourcing and manufacturing industry servicization caused by division of labor, specialization and industry competition will be affected by industrial enterprise scale, and relatively large-scale enterprise's self-services like R&D, marketing, commerce and logistics have a higher proportion so that restrain the transformation from potential demand of producer services for manufacturing to effective demand (Fan Wenjing, 2013). We use reciprocal of average output value of industrial enterprise above designated scale to denote the influence of demand of industrial enterprise's service outsourcing.

H2: the demand scale imposes positive effect on the upgrade of manufacturing through producer services agglomeration.

In the aspect of explaining supportive service, labor pool and the sharing effect of intermediate input products have certain limitations. Knowledge and technology spillover and diffusion in a certain geographical range as well as the generated increasing returns to scale are important reasons for knowledge-intensive producer services agglomeration. The spillover of knowledge and interactive process of collective learning enable individual service enterprise in the cluster to gain knowledge easily, and especially the implicit knowledge can be explicit after innovation and then be able to create new forms of knowledge that advance the former one, thus enabling "collective learning process" to gradually become a kind of regional "innovation environment" (Liu Yi etc., 2009). If technological innovation is one of the leading factors to drive the manufacturing upgrade, producer services agglomeration is the leading method to import human capital and knowledge capital in manufacturing industry. Scientific research institution and higher learning institution constitute the first knowledge base of regional innovation system, and they play a role in producing new knowledge and technology, and generate new knowledge by combining with the original knowledge in the manufacturing. In this process, it is vital for manufacturing enterprise to integrate the external new knowledge and internal existing knowledge, to escalate them and to inflict reasonable application of transfer capability on them (Wei Jiang etc., 2011). As a kind of supplement to external knowledge source instead of replacement, producer services can not only facilitate effective diffusion of new knowledge created by the first knowledge base, but also enhance the absorption and transfer ability of the manufacturing enterprise (Muller, 2001). Acquire knowledge, integrate knowledge and deliver knowledge, these three stages are interacting with manufacturing in regional innovation system, which is called the second knowledge base. Especially, for enterprise who is lack of professionals and far away from the central market, knowledge-intensive producer services play a leading intermediary agent between internal knowledge and comprehensive knowledge of its local clients

(Aslesen and Isaksen, 2007). Over here, Numbers of student enrollment and scientific expense of general institutions of higher education owned by every ten thousand people are used to depict regional innovation system.

H3: social innovation system indirectly affects the upgrade of manufacturing through producer services agglomeration and imposes a positive effect on it.

From the perspective of factor endowment, besides the based demand basis and high-quality labor, the formation and advance of producer services agglomeration also require capital, land(the garden carrier) and other factors, such as development space and capital investment, and manufacturing upgrade will directly suffer from the influence of land resource constrains and capital investment as well. Based on above, we bring urban land resource investment into factor endowment to consideration, and here we use newly-added state-owned construction land area to denote it. In addition, many foreign documents have verified the FDI ' s forward technology spillover effect on host country's industries, but some research still indicate that China failed to exchange market for technology, and even backward foreign knowledge spillover atmosphere appears in some districts like Yangtze River Delta(Wu Fuxiang etc., 2013). Based on this, we bring urban foreign capital abundance into factor endowment to consideration, and here we use the proportion of the amount of actual use of foreign capital in GDP to denote it.

H4: factor endowment imposes indirectly positive influence on the upgrade of manufacturing through producer services agglomeration, and also directly affects the upgrade of manufacturing.

Fundamental impetus affecting the integration of producer services agglomeration and manufacturing, besides high correlation of value chain, also requires to give consideration to transaction cost of correlative industry. As the core content in which new economic geography accounts for industry agglomeration, although increasing return to scale and "iceberg" transportation cost assumption aim at manufacturing, the characteristics of specialization and refinement determine the lower elasticity of substitution of consumption of producer services. Therefore, producer services should possess more the characteristic of increasing return to scale than the manufacturing does, and then the influence on transaction cost will be more prominent. Tradability urges producer service enterprises located in central city to exchange frequently the information flow, capital flow, talent flow and other factors with manufacturing enterprises in its corresponding level of market region. And accessibility supported by infrastructure of supply and demand parties and comprehensive spillover cost combined with various transportation and information and communication technology will affect the integration of producer services and manufacturing (Fang Yuanping etc.,2008) The advanced level of informatization will not merely facilitate the agglomeration of producer services(Coffey et al.,1992), but also enable the spatial interaction cost of producer services and manufacturing to decrease gradually, and then greatly accelerate the producer services outsourcing. In addition, we cannot regard information technology as the substitute of face-to-dace communication. Non-standardized producer services complete the process of production and consumption by relying on "face-to-face" contact. With reference to communication externality model, if we use the face-to-face communication between enterprises and producer services as input, then there is significant correlation between communication cost and commuting distance. Moreover, according to center-edge model, high

level city usually offers more advanced productive service, and central city easily generates knowledge spillover effect. As a result, the location of the city in regional spatial hierarchy exerts vital influence to the integration of producer services agglomeration and manufacturing (O' Connor and Hutton, 1998). Concerning that provincial cities are all relatively well-developed city in each provincial producer services, here we use employment figure of producer services in each province to reflect that different positions will influence the assimilation of regional producer services spillover, and we use the smallest distance of service center between Beijing and Shanghai and the distance between provincial city and the service center in the province to measure the transaction cost of the face-to-face services, and use per capita telecommunication business income to measure information cost.

H5: comprehensive transaction cost on the basis of information technology and commuting distance will have a significant negative influence on the spillover from producer services agglomeration to the upgrade of manufacturing.

The uncertainty of service effectiveness caused by the industrial characteristics of "prior pricing" and "back testing" in producer services enables the production and transaction of the producer services to involve in dense and complicate contractual arrangements (Wang Dehua etc., 2007). Thus the sophisticated economic rule becomes the premise of facilitating transaction between producer services and manufacturing and reducing credit cost. Different from developed countries, the investment and programmer of government have played vital role in both market-oriented and government-oriented producer services gathering area. The size of the government and the supportive degree to service industry will affect the development of producer services gathering area, and further affect the productivity of the manufacturing industry. But from another perspective, the more intervention of the government, the allocation and availability efficiency of resources are more likely to be restrained and contort, consequently it goes against agglomeration.

We adopt the reciprocal of the proportion of fiscal expenditure of different regions in GDP to measure the intervention degree imposed by local government in the economy, and the higher the number, the smaller degree of the intervention of government in economy. Furthermore, here we use urban GDP growth and the proportion of service industry to signify the supportive degree of local government in the development of service industry, because under the background of official promotion mechanism of GDP championships, the promotion of local officer greatly depends on the local GDP growth rate. Concerning that currently the proportion of the added value of service industry in GDP is the same significant index to evaluate the local officer, the local government is more easily to choose a path to industrialization rather than to develop service industry under the circumstances of relatively higher proportion of tertiary industry and decreasing GDP growth rate. In addition, concerning that practitioners of producer services often belong to creative class with high level and creativity, besides products and the diversity of services, the pursuit of soft factors especially the pursuit of public service is also one of important determinants to locational choice. Therefore, for soft environment (denoted by the number of theater and cinema) and the investment in public products (denoted by per capita number of bed in the hospital and health-center), government will also improve them through producer services agglomeration to promote the manufacturing productivity.

H6: policy environment can directly affect the upgrade of manufacturing, and also have the indirectly positive influence on the upgrade of manufacturing through producer services agglomeration.

The manufacturing value chain climbing mainly manifests the improvement of manufacturing productivity as well as the increase of additional value, and manufacturing can realize the integration with producer services through service outsourcing or manufacturing industry servicization, and the fundamental driving force is also the pursuit of profit maximization. In the aspect of representation of productivity, production value of unit workforce, namely overall labor productivity, is adopted. Some research show that organic composition of capital and total factor productivity are positively associated with each other (Jiang jing, 2007), so we add per capita fixed assets to denote organic composition of capital. In the aspect of description of manufacturing additional value, because both manufacturing value chain climbing and the transformation and upgrading from traditional manufacturing to advanced one are able to use the value-added promotion in the value chain to reflect. Compared with non-market-oriented efficiency index like industrial added value and labor productivity, here we take the research made by Druck, an American managerialist, using “contributed value”, namely the difference value between the total amount of the products or services of the enterprise and the purchasing amount of the raw material or services bought outside, to represent the output value of the enterprise and create the ultimate profitability. This definition is identical with the index “profit and tax” in China’s statistical system, so this paper adopts the profit and tax amount of industrial enterprises above designated size to represent the position of industrial enterprise in the value chain. Moreover, in order to reflect the profitable effect of comprehensive utilization of enterprise assets, here we adopt return on total assets as another dimensionality to measure manufacturing additional value, and use the proportion of total profits in total assets to denote it.

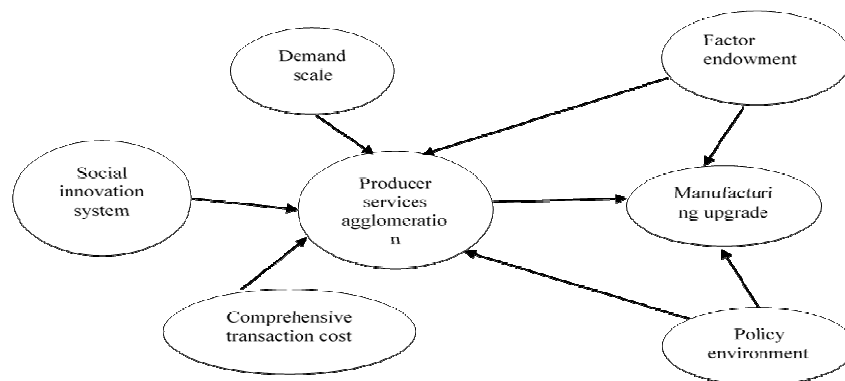


Figure 3 Research model

4. Results

4.1. Sample and Variables

In consideration of the relatively big sample required by structural equation model, this paper chooses 287 cities at prefecture level and above in China (excluding Bijie

and Tongren) in 2005-2012 as research sample, with a total number of 2296. All the data come from *China City Statistical Yearbook* and *China National Resources Statistical Yearbook* over the years, and the data of commuting distance comes from Google Maps. Each latent variable in the model and the structure of measured variable are shown in table 1.

Table 1 Variables and Code

Index clarification	Latent variable	Code	Instrument items	Code
Endogenous variable	Producer services agglomeration	η_1	concentration rate in producer services area	y_{11}
			Jacob externality	y_{12}
			Supportive services agglomeration	y_{13}
			The proportion of producer services	y_{14}
	The upgrade of manufacturing	η_2	Labor productivity	y_{21}
			Organic composition of capital	y_{22}
			The position of enterprise in the value chain	y_{23}
			Returns at total assets	y_{24}
Exogenous variable	Demand size	ξ_1	Total industrial output value	x_{11}
			Population density	x_{12}
			enterprise service outsourcing requirement	x_{13}
			Freight tonnages	x_{14}
			Purchasing power of residents	x_{15}
	Social innovation system	ξ_2	Innovative talent	x_{21}
			First knowledge base	x_{22}
	Comprehensive transaction cost	ξ_3	Producer services supply in the relatively remote area	x_{31}
			Cost in assimilating the spillover of the supreme grade city	x_{32}
			cost in assimilating the spillover of the regional central city	x_{33}
			Information cost	x_{34}
	Factor endowment	ξ_4	Land resource	x_{41}
			Capital input	x_{42}
			Foreign capital abundance	x_{43}
	Policy environment	ξ_5	Intervention degree of government	x_{51}
			Supportive degree of the local government to developing the service industry	x_{52}
			Soft environment	x_{53}
			Public service	x_{54}

4.2. Data analysis technique

Structural equation modeling by the estimation based on covariance matrix (Covariance-based SEM, CB-SEM) has relatively high demand to the quality of research data. For example, sample data require conforming to normal distribution and large sample. Meanwhile CB-SEM has rigid rule for the identifiability of the whole structural equation model, and any carelessness in defining model will be caught in the plight where we cannot identify the model, so CB-SEM is not suit for the analysis of macro-economic data. Therefore, this paper chooses partial least squares-SEM, PLS-SEM, which is based on estimate of variance. With respect to CB-SEM, PLS-

SEM possesses better resilience, and has relatively loose requirements for sample volume and data normality, thus it has a greater advantage to analyze macro-economic data. Moreover, PLS-SEM has relatively high degree of interpretation towards endogenous variable in the model. Under the premise of the forgoing theory, the use of PLS-SEM to verify the model theory will possess favorable predictive ability and seldom does PLS-SEM generate the problem that model cannot be identified. To sum up, PLS-SEM is more suitable for our research.

4.3. Result

This research adopts SmartPLS2.0 to analyze data and parameter estimation method adopts Path Weighting Scheme recommended by SmartPLS2.0. The result secured by this method has relatively high degree of interpretation to endogenous variable in the model, namely the obtain of a larger R^2 . The significance testing of model parameter adopts the method of bootstrap, namely the method of self-help sample, whose theory is that independently extract some bootstrap samples from original samples and then use them to do statistical inference for overall. Meanwhile, combined with PLS-SEM's related requirement for measuring factor loading coefficient in the model, model parameter and significance testing result will be obtained by removing items with low loadings (the absolute value of factor loading coefficient less than 0.3 is regarded as low load) (Figure 4 and 5).

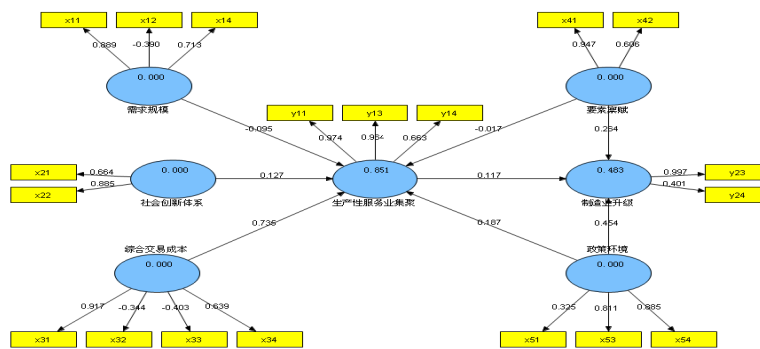


Figure 4 The estimate result of factor load coefficient and standardized path coefficient

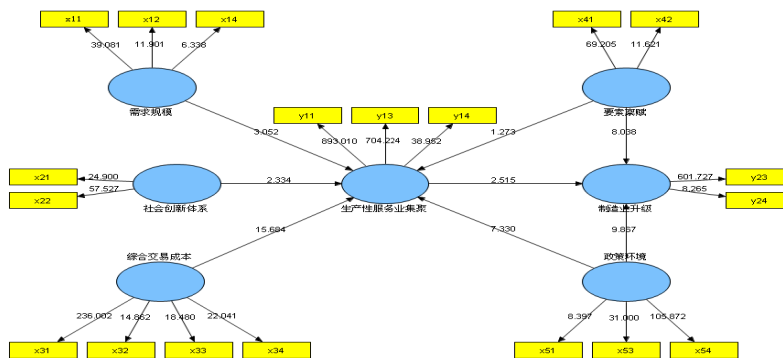


Figure 5 Significance testing result

We can see from Figure 5 that the factor loading coefficient significance testing T value of all measured variables are greater than 1.96 ($P < 0.05$), and apart from that factor endowment failed to pass the significance testing ($t = 1.273 < 1.96$, $P > 0.05$) for

standardized path coefficient of producer services agglomeration, the rest standardized path coefficients between the latent variables in path coefficient pass the significance testing. Hence, after removing the non-significance path coefficients, we need to do anew parameter estimation and significance testing of the structural equation model (the result is shown in Figure 6 and 7).

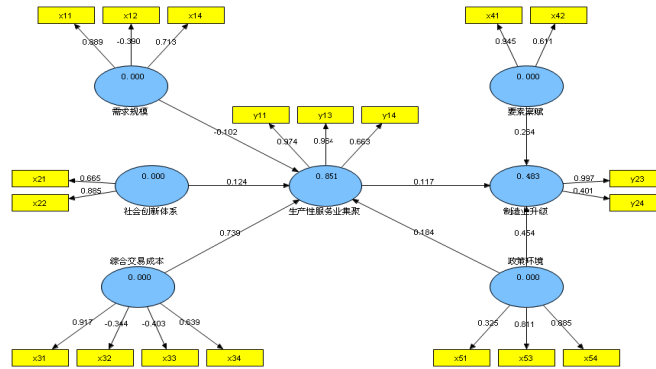


Figure 6 The estimate result of factor load coefficient and standardized path coefficient (remove partial path coefficient)

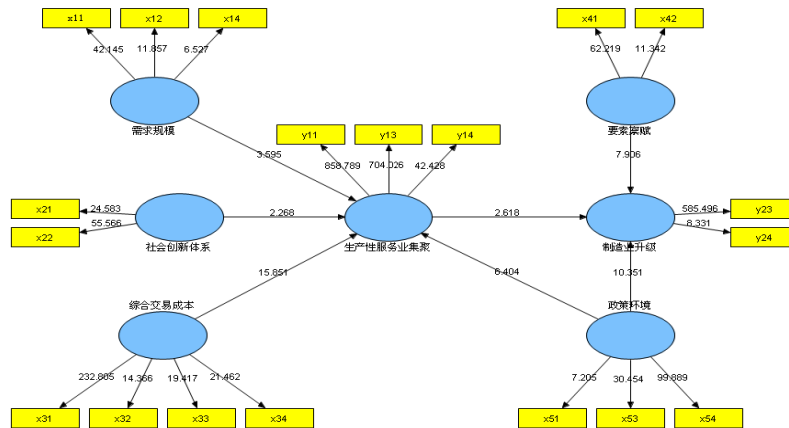


Figure 7 significance testing result (remove partial path coefficient)

We can see from Figure 6, the absolute value of the factor loading coefficient of all measured variables are greater than 0.3. Composite reliability (ρ_c) of latent variable in measured model, Communality and the average variation extraction volume, AVE (ρ_v , $AVE = \text{Communality}$) are in Table 2. Except ρ_c and ρ_v of composite reliable are relatively low, ρ_c and ρ_v of the remaining latent variables are relatively high, which means that the measured model is comparatively reasonable.

Table 2 Composite Reliability and AVE

Variables	ρ_v	ρ_c	Communality
Manufacturing upgrade	0.5774	0.6981	0.5774
Producer services agglomeration	0.7723	0.9083	0.7723
Demand scale	0.4836	0.4865	0.4836
Social innovation system	0.6120	0.7556	0.6120
Comprehensive transaction cost	0.3824	0.2098	0.3824
Factor endowment	0.6329	0.7672	0.6329
Policy environment	0.5154	0.7375	0.5154

$R^2=0.851$ of latent variable of producer services agglomeration in the structural model and $R^2=0.483$ of the manufacturing upgrade, all demonstrate that model has good abilities to interpret and predict for the two endogenous latent variables and at the same time standardized path coefficient between latent variables all pass significance testing(Figure 7). The effect analysis between all exogenous latent variables and endogenous latent variables have been organized in Table3.

Table 3 Path analytical structure and mode and the effect f decomposition

Independent variable	Dependent variable				
	Producer services agglomeration η_1		Manufacturing upgrade η_2		
	Normalization effect	t value	Normalization effect	t value	
Demand scale ξ_1	Direct effect	-0.1020	4.1069***	—	—
	Indirect effect	—	—	-0.0119	2.1501*
	Total effect	-0.101969	4.1069***	-0.0119	2.1501*
Social innovation system ξ_2	Direct effect	0.1240	2.1971*	—	—
	Indirect effect	—	—	0.0145	1.3514
	Total effect	0.1240	2.1971*	0.0145	1.3514
Comprehensive transaction cost ξ_3	Direct effect	0.7391	15.4207***	—	—
	Indirect effect	—	—	0.0863	2.8102**
	Total effect	0.7391	15.4207***	0.0863	2.8102**
Factor endowment ξ_4					

	Direct effect	—	—	0.2641	8.0377 ^{***}
	Indirect effect	—	—	—	—
	Total effect	—	—	0.2641	8.0377 ^{***}
	Policy environment ξ_5				
	Direct effect	0.1839	8.2408 ^{***}	0.4543	10.4974 ^{***}
	Indirect effect	—	—	0.0215	2.4160 [*]
	Total effect	0.1839	8.2408 ^{***}	0.4758	12.7165 ^{***}
	Producer services agglomeration η_1				
endogenous	Direct effect			0.1168	2.6767 ^{**}
	Indirect effect			—	—
	Total effect			0.1168	2.6767 ^{**}

Note: when t value is greater than 1.96, *P<0.05; when is greater than 2.58, **P<0.01; when it greater than 3.29, ***P<0.001.

5. Conclusion

Combined with Chart 3, we can obtain each exogenous variable's standardized effect in producer services agglomeration and manufacturing upgrade as follow:

① Producer services agglomeration has a directly positive effect on manufacturing upgrade, and the standardized effect is 0.1168.

② Demand scale has a directly negative effect on producer services agglomeration, and the standardized effect is -0.1020. Demand scale has an indirectly negative effect on manufacturing upgrade, and the standardized effect is -0.119.

③ Social innovation system has a directly positive effect on producer services agglomeration, and the standardized effect is 0.1240. Social innovation system has an indirectly positive effect on manufacturing upgrade, and the standardized effect is 0.0145.

④ Comprehensive transaction cost has a directly positive effect on producer services agglomeration, and the standardized effect is 0.7391. Comprehensive transaction cost has an indirectly positive effect on manufacturing upgrade, and the standardized effect is 0.0863.

⑤ Factor endowment has a directly positive effect on manufacturing upgrade, and the standardized effect is 0.2641.

⑥ Policy environment has a directly positive effect on producer services agglomeration, and the standardized effect is 0.1839. Policy environment has a directly positive effect on manufacturing upgrade, and the standardized effect is 0.4543, and

simultaneously has an indirectly positive effect, and the standardized effect is 0.021473, and the total effect is 0.4758.

5. Index Weight Calculation

In order to calculate each three-grade indicator, firstly we process weight normalization for indicator contained in separate latent variable. That is to say, the weight of each indicator equals to its path coefficient dividing the total sum of path coefficients of all indicators, and the formula is as follow:

$$W_i = K_i / \sum K_i \quad (i = 1, 2, 3 \dots i)$$

W_i is the i th three-grade indicator's weight of influence on its latent variable, and K_i is the i th three-grade indicator's standardized path coefficient of its latent variable.

Thus, observation indicator x_{21} 's weight of influence on social innovation system is:

$$W_{x_{21}} = \frac{K_i}{\sum K_i} \quad (i=1, 2) = \frac{0.665}{0.665 + 0.885} = 0.429$$

Because social innovation system, demand scale, comprehensive transaction cost, policy environment, y_{11} , y_{13} , and y_{14} co-affect producer services agglomeration, social innovation system's weight of influence on producer services agglomeration is:

$$W_{\text{social innovation system}} = 0.0331$$

In a similar way, producer services agglomeration's weight of influence on manufacturing upgrade is:

$$W_{\text{producer services agglomeration}} = 0.0524$$

x_{21} 's final weight of influence on manufacturing upgrade equals to it's weight of influence on social innovation system multiplies the social innovation system's weight of influence on producer services agglomeration and manufacturing grade is:

$$W_{x_{21}} = W_{x_{21}} \times W_{\text{social innovation system}} \times W_{\text{producer services agglomeration}} = 0.429 \times 0.0331 \times 0.0524 = 0.000744$$

Therefore, we can get each three-grade indicator's weight of influence on manufacturing upgrade, as shown in Chart 4. By empirical results, we can draw the following meaningful conclusion:

① Producers services agglomeration, supportive service industry in particular, has a prominent positive effect on the4 formation of manufacturing cost and efficiency advantages, which is contrary to Chen Weida's and other people's opinion that transportation and other traditional service industries have a stronger influence on the promotion of manufacturing competitiveness. Compared with diversified economy, namely Jacob externality, the scale economics effect formed by the specialized economy of producer services, namely MAR externality, is more meaningful to manufacturing upgrade.

② City size (denoted by population dense) has an important positive effect on collaboration between producer services agglomeration and manufacturing upgrade, that is to say, the bigger the regional population scale and the higher the income level, the more high-quality talents to match the development of producer services, and the higher requirements for manufacturing caused by residents' diversified demands for products, the higher degree of manufacturing servitization.

③ Manufacturing scale (denoted by total industrial output value), low-end manufacturing scale (denoted by total freight) in particular, has an indirectly prominent negative effect on manufacturing upgrade. The research results show that the bigger scale of regional manufacturing, the easier occurrence of "elephant economy" effect. From the perspective of industrial characteristics, although the volume of manufacturing mainly featured by original equipment manufacturer and processing trade is big, it objectively gives rise to the lack of effective demand of manufacturing for supportive services, thus splitting the relationship between producer services agglomeration and manufacturing upgrade. From the perspective of the micro level, there is an inverted-U relation between manufacturing scale and productive service input and service externalization (Fan Wenjing, 2013), and the bigger scale of the manufacturing, the easier occurrence of self-service tendency, as well as the lower level of productive service externalization and specialization.

④ Development space and funding have prominent positive influence on manufacturing upgrade as well. The research results show that although innovation and information technology elements play an increasing role in industrial upgrade, land and capital elements are still prominent influencing factors in current developmental stage. Land dividend not only stimulates the passion of local government to develop economy, but becomes the vital driving force for manufacturing upgrade. In the middle and later stage of industrialization, land element will gradually come back as a roll booster and coordinator to upgrade industries (Zhou Xia, 2013). The implement of land development of particular district and simultaneously setting up certain industrial threshold to force manufacturing upgrade still possess a relatively strong practical significance. The further research of the spatial carrier of producer services agglomeration⁴² shows that the area of land for commercial use and the area proportion of land for commercial use in land for mining and industry have a prominent positive influence on producer services agglomeration, which demonstrates that producer services agglomeration still needs land as carrier support to drive industrial upgrade.

⑤ Talent and first knowledge base have indirectly positive influence on manufacturing upgrade, but the effect of human resource inventory is still relatively limited in current developmental stage, and government investment on science and technology is a fundamental determinant for social innovation system's role in manufacturing upgrade. Producer services agglomeration realizes the integration and diffusion of knowledge through integrated innovation and re-innovation after assimilation, and will effectively facilitate the integration between external innovative network and

⁴² Because of the deficiency in data of area of land for commercial use and land for mining and industry in each prefecture-level city before 2009, we here use panel data in 2009-2012 to the estimation. Due to the limited space, the results are omitted.

internal knowledge of manufacturing, and promote the knowledge innovation of colleges and universities and research institutions to better service enterprise practice.

⑥ The agglomeration degree of producer services within provincial range is an important element that affects the spillover of producer services to manufacturing upgrade, and information infrastructure construction and the degree of informationization have relatively large role in the coupling interaction with each other. In the process of the spillover of producer services agglomeration to manufacturing, geographical distance reflects the delivery cost of the service, and the position in the urban spatial system will determine the accessibility and diversity of producer services in this district, thus which will generate a “distance punishment” for remote regions. Among them, approaching degree to the regional central city is the main element that producer services agglomeration poses effects on manufacturing upgrade. However, national services central cities like Beijing, Shanghai, Canton and Shenzhen, their spillover intensity will also generate prominent influence on local manufacturing, and the more distance between the four cities and the local city, the more obstacles that will hinder the process of manufacturing upgrade.

⑦ The proportion of economic resources allocated by the government will play a prominent negative role in producer services agglomeration and the upgrade of manufacturing. The research result shows that the deeper involvement made by the government to urban economic activities, like inappropriate industrial policy formulation, excessive local protectionism and the restriction on market competition, the process of manufacturing upgrade will be postponed or even stopped. The main obstacles for producer services agglomeration and manufacturing coupling are resource allocation system dominated by the government, deficiency in innovation atmosphere and cultural environment, as well as low-quality public services.

Table 4 Each variable and indicator's weight of influence on manufacturing upgrade

First-grade index		Second-grade index		Third-grade index		Ultimate weight
Index name	Corresponding weight	Index name	Corresponding weight	Index name	Corresponding weight	
y ₂₃	0.4465	—	—	—	—	0.446
y ₂₄	0.1796	—	—	—	—	0.1796
		y ₁₁	0.2597	—	—	0.0136
		y ₁₃	0.2571	—	—	0.0135
		y ₁₄	0.1768	—	—	0.0093
Producer services agglomeration	0.0524			x ₁₁	0.4463	-0.0006
		Demand scale	-0.0272	x ₁₂	0.1958	0.0003
				x ₁₄	0.3579	-0.0001
		Social innovation sys-	0.0331	x ₂₁	0.4290	0.0007
				x ₂₂	0.5710	0.0099

		tem					
				X ₃₁	0.3982	0.0041	
		Compreh ensive transac- tion cost	0.1971	X ₃₂	-0.1494	-0.0015	
				X ₃₃	-0.1750	-0.0018	
				X ₃₄	0.2775	0.0029	
Factor endowment	0.1182	X ₄₁	0.6073	—	—	0.0718	
		X ₄₂	0.3927	—	—	0.0464	
		X ₅₁	0.1608	—	—	0.0327	
Policy envi- ronment	0.2033	X ₅₃	0.4012	—	—	0.0816	
		X ₅₄	0.4379	—	—	0.0890	

6. The Main Conclusion and Policy Implication

The collaboration between producer services agglomeration and manufacturing upgrade is a dynamic system, and the existing research in input-output tables have a lot of deficiencies that affect the comprehensive understanding towards collaborative path and also restrict the formation of supply and demand environment that will promote manufacturing upgrade. This paper analyzes coupling mechanism and influence path between producer services agglomeration and manufacturing upgrade by utilizing PLS-SEM model, and empirically tests samples based on 287 Chinese cities at prefecture level and above in 2005-2012. The research result supports the opinion on supply-dominated theory in the documents of Markusen (1989), Karaomerlioglu and Carlsson (1990). It has proved that producer services agglomeration, especially supportive services agglomeration, is highly-associated with manufacturing upgrade and has internal dynamic connection to integrate and accelerate with each other. Factor endowment and policy environment also have directly positive influences on manufacturing upgrade. Social innovation system, comprehensive transaction cost and demand scale are all important role in affecting the coupling between producer services agglomeration and manufacturing upgrade, and the former two impose indirectly positive influences on manufacturing upgrade through producer services agglomeration, and the later one, however, possesses indirectly negative influence.

To test direct or indirect path influence between producer services agglomeration and manufacturing upgrade, and to reveal the complicated hierarchical relationship influenced by some elements between them, this paper builds a structural model that producer services agglomeration imposes an effect on manufacturing upgrade inasmuch as the traditional CB-SEM model has relatively rigid requirements for model structure, form of data as well as sample size, which is not suit for analyzing macro-economic data. Therefore, this paper creatively applies the PLS-SEM model frequently used in market research to theoretically verify the relationship between them, and brings about great predictive ability and analysis effect. Nonetheless, because some related observing indicators' failure to pass the internal consistency

reliability examination, and lack of micro data of manufacturing service externalization requirements and all data of land for commercial use and land for residential use in cities at prefecture level and above, we failed to take manufacturing service outsourcing requirements, foreign capital abundance, developmental carrier cost and other latent variables that influence producer services agglomeration or manufacturing upgrade into consideration, which remains a big regret for this paper. Besides, confined to the limitation for the model setting by Smart PLS, the dynamic relationship between producer services agglomeration and manufacturing upgrade in the future research still need to continue the verification with the constant perfection of the software and model.

From above conclusions, we can obtain the following policy suggestions in the paper:

First, we should actively promote producer services agglomeration by quickly constructing productive service platform oriented to advanced manufacturing. On the one hand, we should adopt co-construction with government, equity investment, loan with discounted interest, PPP and other patterns to vigorously support the construction of advanced manufacturing base equipped with functional productive service center. On the other hand, we should put effects to build supportive production service system matched with advanced manufacturing development, and guiding funds for services development should be prior to support to quickly build up a batch of high-level, widely-covered supportive service industry development carriers with high-end service elements in key industries and fields, forming the developmental highland for producer services.

Second, we should facilitate manufacturing stripping of producer services to promote the transformation of manufacturing industries from “endogenous” self-service to “exogenous” developmental mode relying on external service organization. Regarding China’s manufacturing facing the pressure of transformation and upgrading, all core activities offered by manufacturing itself are either unpractical or inefficient, thus it is an inevitable choice for manufacturing climbing the global value chain that manufacturing enterprise should strip a part of productive services to more professional external supplier. We should grasp the trend of the integration and interaction of worldwide manufacturing enterprises and service industries to drive manufacturing onshore service outsourcing guided by market demand, and offer industry-oriented socialized and professionalized services by business process reengineering to realize the externalization and agglomeration development of supportive service industry. We should focus on the supporting convergence and overall linkage of the stripping policy and by utilizing the opportunity of “BT (business tax) reforms to VAT (value-added tax)”, we should further remove the policy not suitable for producer services stripping in the existing law and regulation, such as transfer vehicle ownership fees generated in logistics enterprise stripping and related taxes and dues involved in manufacturing enterprise stripping. We should give financing subsidies and reduction and exemption from income to producer services which are separately established, and support the after-stripping science- and technology- type and innovation-type producer service enterprises with R&D design, inspection certification testing, energy conservation and environment protection, the new generation of information technology(NGIT), etc., to apply for the affirmation of high-tech technology enterprise and technology advanced service industry, and reliably eliminate the discrimination against producer services in investment and financing as well as production factor price.

Third, we should facilitate producer services to extend and permeate to manufacturing, driving the process of manufacturing industry servicization. To expand product value-added services as the core, we should promote O2O(online and offline) to integrate with manufacturing to build large-scale personalized customization, life-cycle management, crowdsourcing and crowdesigning R&D, network accurate marketing, cloud manufacturing, online service platform, accurate supply chain and other service-oriented manufacturing modes, and put into efforts to popularize finance lease, system integration, integrated solution and other new types of integrated industry, and actively promote the interactive integration and co-development of producer services and manufacturing. We should construct policy system to drive the transformation from production manufacturer to service manufacturer, support manufacturing enterprises to cultivate cooperation network of integrated solution, vigorously develop virtual enterprise, participate in the enterprise tax preference or integrated tax policy, and get rid of qualification restrictions of whole set operation and overall responsibility for non-state owned enterprises

Fourth, from the perspective of current situation, regional central city with mainly provincial capital is the main part in the urban agglomeration spatial system to spill over knowledge to surrounding manufacturing industries, thus the manufacturing upgrade of edge cities prominently falls behind areas close to regional central city. Hereby, under the future background of urban agglomeration construction, regional policies of utilizing producer services to drive manufacturing upgrade should focus on using regional central city to develop producer services and accelerated form a new center-edge structure with the connotation of “producer services-manufacturing”. We should give play to radiating and driving function of service industries in the central city, and use market force to bring regional manufacturing into the spatial system of service industry’s development in central city to mobilize manufacturing upgrade in surrounding districts through the incessant circulation of agglomeration effect and scale merit. Using spatial coordinated regulation in metropolitan area and strategic service facility layout as tongs, we should actively promote the regional industrial development pattern relying on urban circle and urban belt, and form spatially mutual-coordinated layout for producer services agglomeration and manufacturing to create competitive regional division of industry chain and industry agglomeration in wide area. In addition, we should also put effects on build service network with open cross-geographical boundary while gathering high-end productive service factors in national central city, and keep lowering the delivery cost of supportive service in these cities by improving transportation conditions, strengthening regional industry coordination, enhancing the popularizing rate and level of communication network infrastructure, and so on.

Fifth, we should comprehensively utilize financing, banking, tax and other political tools to increase investment in the first knowledge base and simultaneously strengthen manufacturing’s horizontal ties with regional innovation system and vertical linkages with government administrative department. We should give priority support in capital and policy to common technology and key technology in favor of industrial upgrading and optimization. Through formulating strategic planning in key field, we can guide colleges and universities, research institution, producer services institution to reinforce regional knowledge development and accumulation, thus improving local manufacturing value chain climbing. We should integrate regional scientific and technological innovation resources to form new scientific and technological innovation system and mechanism with innovative elements gathering and clear transformation path. We should reduce the time and cost for manufacturing to search

for knowledge and promote the closely connection and knowledge relay between the second knowledge base and manufacturing industries, which are based on the construction of public service platform with many functions like technical cooperation, outcome trade, financial support, scientific and technological enterprise incubator. We should implement supply-side structural reform of producer services to promote the scale development and structure optimization of producer services, and focus on improving the extent of specialization of the offered service, to stimulate manufacturing's effective demand for producer services.

Sixth, we should cut down administrative control and lower admittance threshold to improve the transmission mechanism and economic environment caused by excessive intervention of government to producer services' role in industry upgrade. The accelerating transformation of government functions enables market to play the fundamental role in allocating service resources, and to promote the reform of managerial system in the service industry, and we should set up managerial philosophy of "heavy supervision, light examination and approval" to construct a transparent, high-efficient and fair market mechanism. Starting with building up soft environment beneficial to producer services development, and making attract and retain innovative talents as the priority, we could build up a tolerant, diverse and open cultural environment as well as high-quality public services to form an atmosphere to encourage innovation.

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CREATING SERVICE EXPERIENCE IN DIGITAL BUSINESS

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This study increases the understanding of the characteristics of the customer experience in digital business. Because the global economy is increasingly driven by digital businesses, the need exists for a theory that elucidates what the actual value-creating elements are. Despite the increasing amount of literature on value creation in the digitalized world, theory is still lacking that reflects the complexity and dynamism of the delivery of value to customers through digitality. This study contributes to this research gap by presenting the characteristics of customer value in digital business that contribute to value creation.

1. Introduction

Digitalization has brought major changes related to the delivery of products and services, markets, customers, and business itself. One way in which to react to this change is to focus on the development of digital services as well as on customer value creation. Focusing on elements of customer value in digital business enables organizations to achieve better relationships with their customers and to increase the service experience.

The importance of customer value creation has increased continuously in recent years due to fiercer competition (Grönroos, 2011; Grönroos and Voima; 2013). The competition in digital business is even harder than in other industries since the capital required to start something that operates in the digital environment is less than what is needed in the traditional industry. In addition, digital businesses are not bound to their origin countries, so companies are easily operating in many countries across the world.

It is already proven that customer value can increase a provider's profits since the value increases the customer's intention to buy again. This has been the situation in all industries in recent years, and digital business is not an exception (McDougall and Levesque, 2000). Digitalism is blurring the boundaries of different companies, so organizations are working more closely with their customers and their partners (Morabito, 2014). Closer relationships are maintained only when both of the parties expect to gain mutual benefits. This is one reason why customer value creation is becoming increasingly important for organizations to be able to survive in digital business. This study will provide guidance for organizations operating in digital business environments so that they can create and manage customer value.

The objective of the study is to explore the characteristics of customer value in digital business that contribute to value creation in terms of high company performance. The characteristics are analyzed based on the following distinction: service process–related elements, product-related elements, and cost-related elements.

2. Literature review

2.1. Customer value creation

A new business logic, focusing on customers instead of on the market share, as traditional transactional business models did, has been emphasized during the past few years (Vargo and Lusch, 2004; 2008). According to Byus and Lomerson (2004), this change has forced organizations to design all of their operations in a way that creates and maintains satisfied customers. Value can be seen as the fundamental basis for all marketing activities, as market exchanges occur because all actors involved expect to gain value in the exchange, as Ulaga (2003) stated. Therefore, no interaction between different companies occurs without value being created and delivered. Companies are also trying to find a superior competitive advantage by providing customer value based on the belief that a high level of customer value and satisfaction are related to sales, brand and company loyalty, market share, and profitability (Woodruff et al., 1993).

It is thus fundamental to understand that value is not the product or the service itself but the thing that customers get out of using it (Vandermerwe, 1996). Value is formed from the difference between positive and negative consequences, also known as the benefits and the sacrifices, as Huber et al. showed (2001). Sacrifices refer to the things that are given up to acquire the market offering, and benefits are the positive impacts caused by the acquisition. The positive impacts can be some monetary worth that a product or service provides or some nonmonetary benefits, such as competitive gains, competencies, social relationships, and knowledge (Möller and Törrönen, 2003). According to Thorpe and Holloway (2008), a customer's source of happiness can be time, quality, service, or cost. The sacrifices that a customer has to make are related to time, effort, money, and energy.

Since value is subjective, as different customer and market segments value different things, it is not easy to know how a specific customer views the provider organization. As a result, customer value cannot be generalized easily, which makes it harder for companies to create it and manage value creation. Ulaga and Chacour (2001) identified that organizations need to consider different kinds of customers, meaning former, present, and potential customers, to cover the variety of different customers. According to Blocker and Flint (2007), companies are facing an intense rivalry based on what customers currently value. The current knowledge about what customers value will not hold in the future. To gain and maintain a sustainable advantage, companies need to anticipate what customers will value in the future. For this reason, Blocker and Flint (2007) divided the causes of change into four categories, which are customers' desires, customers' competitors' actions, offerings that customers' suppliers make, and the macro-environment, such as technology and regulation. Changes in one or more of these categories will change what customers will value in the future.

Understanding what customers value currently and in the future requires a comprehensive understanding of the customer (Woodruff et al., 1993). Without knowledge of what customers need, an organization is not capable of providing value. According to Ravald and Grönroos (1996), this means an organization can create value only when it understands what customers are seeking to gain with the organization's product or service. Therefore, a provider needs to know the customer's operations, understand the market in which the customer is operating, and know what the product or service is used for and how it is used. The provider needs to understand the value the company is creating for its customers; when it understands it, it will be able to protect the organization more effectively from its competitors. Value creation can then be seen as a competitive advantage.

When concentrating on providing a service, it has to be acknowledged that the customer must experience the service (Grönroos and Voima, 2013). Likewise, the customer has to use the product being offered. Therefore, not all value is created by the provider or through the cooperation of the provider and the customer. The customer creates some part of the value alone, which means the provider cannot affect all phases of value creation. The organization providing the market offering and the customer can create value alone or jointly. This results in different forms of value creation and co-creation. The customer alone creates value in a use situation, which can be called value-in-use. Also, the provider and its partners create value together, as Payne and Holt (2001) identified. According to them, customer value creation includes three types of actors, which are the customer, the company employees, and the external stakeholders. Value can, in turn, create at least four interactions: the partner's and provider's interaction; the provider alone; the customer's and provider's interaction; and the customer alone.

2.2. The elements of customer value

Exploring which elements and drivers create value for customers has been a prerequisite for all businesses and thus an interesting and ongoing issue for both practitioners and academics. These value elements can be categorized in many different layers or dimensions (e.g., Ravald and Grönroos, 1996; Lapierre, 2000; Ulaga and Chacour, 2001; Möller and Törrönen 2003). Previous research, for example, divided the elements of time, place, price, and needs, as Byus and Lomerson identified (2004), or time, quality, service, and cost, as Thorpe and Holloway (2008) stated. These elements can also be the product, service, or relationship, as Ravald and Grönroos (1996) mentioned. As a theoretical framework of the study, the elements of customer value are combined from previous works and presented in Table 1.

In Table 1, the value elements are divided into three categories based on their specific characteristics. Service process-related value elements are intended to increase customer value by renewing and reorganizing the service delivery and service availability. Product-related value elements are intended to increase customer value by creating, for example, new product innovations and exploiting new technologies. Cost-related value elements are focused on the lower product and service costs by utilizing continuous improvement and different partnerships. Regarding the current study, it is interesting to explore whether these elements can be facilitated by digitalization in a way that affects the different performances of the studied organizations.

As a result of digitalization, companies are in a situation where the competition is fiercer and the changes taking place in the business environment are more massive than ever before. However, this also provides good opportunities for growing the business both in terms of turnover as well as regionally. The essential issue is what types of drivers are emphasized in digital business in a way that increases customer value and further performance. In this study, the focus is on digital business, and therefore, the value elements presented are considered to fit the special features of digital business.

Table 1. The elements of customer value

Elements		References	
Service process related	Service delivery	Process records: accuracy, flexibility in emergency cases, reliability, on time Reliability and speed of supply	Ulaga and Chacour, 2001; Möller and Törrönen, 2003; Ulaga, 2003
	Service availability	Availability Time and place of service delivery Responsiveness Customer understanding Technical support Service support: services and information flow, outsourcing activities	Fitzgerald et al., 1994; Raval and Grönroos, 1996; Lapierre, 2000; Ulaga and Chacour, 2001; Möller and Törrönen 2003; Ulaga, 2003; Heinonen, 2004
	Service quality	Quality Flexibility Reliability Order-handling, storing, warranties	Fitzgerald et al., 1994; Lapierre, 2000; Ulaga, 2003; Walter et al., 2003
Product related	Production process	Effective production and supply chain Process records (capacity, speed, quality, flexibility) Prototype development, product testing	Möller and Törrönen, 2003; Ulaga, 2003; Mejttoft, 2011
	Product quality	Quality Performance, reliability Usability Consistency of product Product's characters	Raval and Grönroos, 1996; Lapierre, 2000; Sweeney and Soutar, 2001; Ulaga and Chacour, 2001; Ulaga, 2003
	Technology	Product customization Technical competence and new technologies Product innovation Radical innovations Product functionality	Sheth et al., 1991; Lapierre, 2000; Ulaga and Chacour, 2001; Möller and Törrönen, 2003; Walter et al., 2003
Cost related	Continuous improvement	Cost reductions by process and incremental improvements Alternative solutions	Lapierre, 2000; Möller and Törrönen, 2003
	Relationship	Efficiency, effectiveness, and quality of relationships Networks Supplier knowhow Supplier solidarity with customers	Raval and Grönroos, 1996; Lapierre, 2000; Weil and Vitale, 2001; Möller and Törrönen, 2003; Ulaga, 2003; Walter et al., 2003; Mejttoft 2011
	Price	Product costs Product/service related price	Sheth et al., 1991; Lapierre, 2000; Sweeney and Soutar, 2001; Weil and Vitale, 2001; Ulaga, 2003

2.3. Characteristics of customer value creation in digital business

Digital resources are nowadays harnessed to find new sources of competitive advantage and new sources of customer value, as digital technologies can be used to deliver value to customers in ways that extend customers' normal conscious experiences in the contexts of time and space, as Watson et al. (2002) said. The main idea

of digital business is that it is changing the existing business world in a holistic and customer-driven way by renewing the processes, for example, by digitizing processes and developing electrical services. Digital technologies are affecting every aspect of people's lives, and that is why those are the main drivers of innovations, and thus customer value, nowadays.

Digital technologies have three dimensions in which they are normally used. These dimensions are the customer interface, the partner interface, and internal information flow. Digital technologies improve the processes related to these dimensions. All of these processes are related to customer value creation, and in all of these, some amount of customer value can be created. Therefore, it is important to pay attention to all of these interfaces. More in detail, the partner interface is an important dimension since the entire supply chain needs to be considered when creating customer value. Most of the networking value is created in these interactions. Internal information flow is important since everyone in the company needs to be providing customer value. In addition, internal processes have a large impact on product-related value creation. Probably, most of the value is created in the customer interface since all services provided are due to the interaction between the customer and the provider (Chaffey, 2015).

Digitality can be effecting in three different categories. One category is the new digital products and services themselves that the company is providing to its customers. Using digital resources to transform either business processes or business strategies represents two more categories of digitality (Bharadwaj et al., 2013). This makes it possible for digitality to be used as an interacting platform between the provider and the customer, to be a market offering, or to be a part of some operational process while producing the offering. In addition, digital business could be referring to the changes in how goods and services are produced and designed (the process), the kinds of goods and services offered (the market offering), or how goods and services are brought to the market (the business model), as Brynjolfsson and Kahin (2000) defined. Whichever is the case, a similar way of creating customer value is occurring, and these three categories of digitality are not exclusive, so these can be in force simultaneously. Especially when operating with digital market offerings, a provider has to focus strongly on its offering's reliability and trustworthiness. These two elements are the most important qualities in digital business, and they are related to the product.

Since digital business is changing rapidly all of the time and there is a lot of competition, product quality is a given in the industry. If one cannot provide the same quality as one's competitors can, one cannot survive in the market. Product quality and customer service levels that are substantially below those of the competition will be judged unacceptable. Also, as no traditional production takes place in digital business, this makes this industry different from other industries. Product-related characteristics therefore are not the main source of customer value in digital business, but they do need to be acceptable.

3. Research methodology

In this study, the focus was on traditional industrial companies, as those companies have been doing business as usual for several decades. Now, as the business envi-

ronment is changing a lot, it is important to examine if they have been making changes in their businesses related to digitalization.

Both quantitative and qualitative methods of data collection were utilized in the study. First, a survey was conducted to trace the important factors of customer value that constitute the service experience. Second, interviews were conducted to clarify how the mechanisms of creating the service experience through customer value elements operate in practice.

3.1. Quantitative methods

The quantitative part of the study consisted of a Web-based survey, which was sent to 23 industrial companies in Finland. These companies were selected since they suited the scope of digital business. Although these companies have done traditional business for years, it can be noticed that big changes are happening due to digitalization and the accelerating use of digital resources. The respondents were intentionally from different units and work assignments to avoid some specific views and biases. For example, it can be acknowledged that sales representatives and research and development workers have quite different states of mind. That is why they probably appreciate different aspects of their products and services. The survey featured four sections and themes: background, digitalization, dimensions of customer value, and characteristics of customer value. The items and their references are presented in Table 2.

Table 2. The survey of customer experience

Themes	Items	Scale	References
Back-ground questions	Company size	Open field	
	Operating unit	Management/marketing, R&D, production	
	Performance dimensions (financial, operational, renewal, sales, sustainability)	From 1 to 4 (from weak to excellent)	
Digitalization	What is the level of digitality in your company	From 1 to 4 (from no digital resources in use to everything digital)	Moore, 1999
	How digitality is shown in your 1) market offering (product/service), 2) process, and 3) business model	From 1 to 4 (from no digital resources in use to everything digital)	Brynjolfsson and Kahin, 2000
	How digitality is shown in your company's strategy	From 1 to 4 ("not digital strategy," "doing something digital," "making a totally new digital strategy," and "transforming the old business model to be digital")	Moore, 1999
Dimensions of customer value	How significant you consider the following things in customer value creation: 1) Characteristics of end product/service (e.g., quality, production, price), 2) Characteristics of services (e.g., price, delivery support services), and 3) Characteristics of the relationships with customers and partners (e.g., networks, customer relationship, brand)	From 1 to 5 (not significant to very significant)	e.g., Ravald and Grönroos, 1996; Lapierre, 2000
Characteristics of customer value	1) Qualitative characteristics of end product/service	From 1 to 5 (strongly disagree to strongly agree)	e.g., Fitzgerald et al., 1994; Ravald and Grönroos, 1996; Lapierre, 2000; Sweeney and Soutar, 2001; Ulaga and Chacour, 2001;
	2) Production characteristics of end product/service		
	3) Additional innovations for existing product/service		

4) The price of the end product/service	Weil and Vitale, 2001; Möller and Törrönen 2003; Ulaga, 2003; Walter et al., 2003; Heinonen, 2004; Mejttoft 2011
5) The prices of other services	
6) R&D functions	
7) The characteristics of deliveries	
8) Characteristics associated with the level of service	
9) Cooperation networks	
10) Characteristics of the customer relationship	
11) Understanding the customer's business environment and the competition	
12) Brand	

The quantitative data were analyzed by means and standard deviations after which the analysis of variance test was utilized to test differences between different groups. Also, regression analyses were conducted to trace the relationship between customer value elements and different performance dimensions.

3.2. Qualitative methods

To deepen the results of the survey, five interviews were conducted. The interviewees included managers of industrial companies and representatives of development organizations. Three of the respondents were working in industrial companies where digitalization has brought many changes in recent years. Their views and opinions were relevant to see how things are really happening. These representatives were in manager positions since the study needed a key informant approach. It was necessary that the respondents had been working for the company for several years. The three industrial companies were all in different stages of how much digitality they have implemented in their market offerings. One company has a modelling tool, one makes physical products that are needed in the construction industry, and one makes automation solutions, including modelling and physical products. That sample gave the study the needed comprehensive view, how the topic is dealt with in industrial companies. The respondents were chief executive officers (CEOs) and chief business officers (CBO) because the study needed a comprehensive view and understanding of companies and how all of the functions and operations relate to one another. In addition, the information obtained from the study regarding investments was needed. These three companies were suitable for the study since they are operating in the changing industrial business.

Two respondents were from development organizations, which represent entrepreneurs in South Karelia and Tavastia. Their opinions were relevant to get a bigger picture of what is happening in these regions. Two representatives were from organizations that help entrepreneurs, companies, and public organizations to grow and acquire the needed education and information. One is more focused on entrepreneurs and smaller companies, with only private companies being a part of that organization. The other organization has public-sector organizations as its members, with private companies being bigger. The respondents were the CEOs of these organizations because they have the most comprehensive views of how these firms operate.

The interviews focused on the same three levels of service experience that were utilized in the survey tool. The key themes in these interviews were as follows: How would you assess the level of digitality in your company and how digitality is shown in action: for example, in terms of customer behavior, processes, and the markets; What forms the customer value in your products and services; How much do you in-

vest in customer value creation; and What are the benefits of investments in customer-value creation? The interview questions were decided in advance, but the discussions were informal and were facilitated using supporting questions and comments that the researchers made. All the interviews were recorded and transcribed to enable in-depth analysis. In this study, a thematic qualitative analysis approach was taken. It meant that the interviews consisted of several themes and the answers were arranged so that the respondents replied to all of these themes.

4. Results

4.1. Results of the survey

4.1.1. Description of the data

A description of the data by means and standard deviations is presented in Table 3. In all of the companies, digitality was exposed, and it was present in all of the categories: the market offering, the processes, and the business model. Based on the questions about the dimensions in which digitality was used and the extent to which it was used, it could be stated that digitality was most commonly used in production processes, meaning the technologies used in production.

The level of digitality in a company's strategy was also inquired about. Most of the respondents were transforming their old business models to be digital, so quite a lot of digitality was implemented in the organizations' strategies. Only one respondent answered that there was no digitality strategy in their company. It can be stated that companies in Finland nowadays are focusing more and more on implementing digitality in their strategies.

The dimensions of customer value included the product, service, and relationship. Based on the survey, it was noticed that the product dimensions were perceived as the most significant and relationship as the least significant.

Table 3. Description of the data

	Mean	St. Dev.
Level of digitality (overall)	2,62	,498
Digitality in 1) market offering	2,43	,870
Digitality in 2) process	2,67	,796
Digitality in 3) business model	2,19	,680
Digitality in company's strategy	2,86	,854
Significance in customer-value creation:		
1) Characteristics of end product/service	4,24	,436
2) Characteristics of services	4,05	,590
3) Characteristics of the relationships with customers and partners	3,67	,730

The top five characteristics of customer value in which the companies invested their money and efforts were related to product dimensions (Table 4). The most invested element was considered to be the qualitative characteristics of a product or service. It could be that the quality was perceived as necessary to compete in the markets, but the actual value through service experience was created by means of collaboration and an effective customer relationship. Networks were not seen as important; however, subcontractors are included here, as they are important for a company's success.

4.1.2. Statistical analysis results

In this section, it is studied whether differences can be found between the responses of company customer-value characteristics based on level of digitality and level of digitality in strategy. Also, the effect of the level of digitality and level of digitality in strategy on different performance dimensions is tested. The differences have been studied via a comparison of means, where the analysis of variance has been utilized.

First, the differences in the characteristics of customer value creation have been studied according to the levels of digitality in companies. The significant differences concerning all of the questions are illustrated in Table 4. As Table 4 indicates, no significant differences were found. The level of digitality does not affect the investments made in different characteristics of customer value creation.

Next, the differences were studied between companies that have digitality well represented in their strategies and those that have no or only a little digitality represented in their strategies. As Table 4 illustrates, significant differences were found in eight questions. The companies with digitality well represented in their strategies invest more in many characteristics of customer value creation than do those who do not have digitality well represented in their strategies. Especially, the qualitative characteristics of an end product/service and additional innovations for an existing product/service receive more emphasis in companies with digitality in their strategies.

Table 4. Results of the analyses

	Mean	St. Dev.	Level of digitality			Digitality in strategy		
			Low	High	F	Low	High	F
			Mean	Mean		Mean	Mean	
1) Qualitative characteristics of end product/service	4,19	,750	4,13	4,23	,094	3,57	4,50	10,597**
2) Production characteristics of end product/service	4,00	,973	3,63	4,25	2,093	3,67	4,14	1,006
3) Additional innovations to existing product/service	3,76	1,136	3,63	3,85	,180	2,86	4,21	9,487**
4) The price of the end product/service	4,00	,707	4,00	4,00	,000	4,00	4,00	,000
5) The price of other services	3,19	1,030	3,13	3,23	,050	2,86	3,36	1,104
6) R&D functions	3,70	,979	4,13	3,42	2,745	3,14	4,00	4,050+
7) The characteristics of deliveries	3,67	,966	3,50	3,77	,373	3,29	3,86	1,689
8) Characteristics associated with the level of service	3,86	,910	3,75	3,92	,172	3,29	4,14	4,957*
9) Cooperation networks	3,48	,873	3,63	3,38	,364	3,00	3,71	3,519+
10) Characteristics of the customer relationship	4,00	1,049	4,25	3,85	,724	3,43	4,29	3,508+
11) Understanding the customer's business environment and the competition	3,76	,995	4,00	3,62	,730	3,14	4,07	4,843*
12) Brand	3,95	,973	4,00	3,92	,029	3,43	4,21	3,406+

Sign. *** ≤ 0.001 , ** $0.001 < p \leq 0.01$, * $0.01 < p \leq 0.05$, + $0.05 < p \leq 0.1$

In Table 5, the significant differences in different dimensions of performance are studied. The differences in performance dimensions were studied based on the level of digitality and level of digitality in a company's strategy.

In total, only one significant difference was found in the performance dimensions in companies with low and high levels of digitality. In contrast, when examining the differences based on the level of digitality in a company's strategy, significant differences were found in three dimensions. Companies with a high representability of digitality in their strategies performed better in terms of renewal, operational performance, and sustainable performance.

Table 5. Results of the analyses

	Mean	St. Dev.	Level of digitality		F	Digitality in strategy		
			Low	High		Low	High	F
			Mean	Mean		Mean	Mean	
1) Financial performance	2,48	,981	2,38	2,54	,132	2,43	2,50	,024
2) Operational performance	2,52	,814	2,13	2,77	3,492+	2,00	2,79	5,285*
3) Renewal	2,52	,680	2,38	2,62	,607	1,86	2,86	19,396***
4) Sales performance	2,71	,784	2,88	2,62	,531	2,43	2,86	1,425
5) Sustainable performance	2,67	,730	2,63	2,69	,040	2,14	2,93	7,031*

Sign. *** ≤ 0.001 , ** $0.001 < p \leq 0.01$, * $0.01 < p \leq 0.05$, + $0.05 < p \leq 0.1$

Next, the items of the characteristics of customer value were entered into factor analysis, which resulted in three factors with an eigenvalue over 1. The factors were labeled as follows: 1) service process–related elements (including the qualitative characteristics of an end product/service, research and development (R&D) functions, the characteristics associated with the level of service, understanding the customer's business environment and the competition), 2) product-related elements (including the production characteristics of an end product/service, the characteristics of deliveries, the characteristics of the customer relationship, the brand), and 3) cost-related elements (including additional innovations for an existing product/service, the price of the end product/service, the price of other services, cooperation networks). The reliability of factors was ensured by calculating Cronbach's alpha values (over 0.6 in all factors).

Next, regression analyses were performed to examine the relationship between the factors and different dimensions of company performance. As shown in Table 6, the service process–related element is significantly and positively related to renewal and sustainable performance. The product-related element is significantly and positively related to financial performance, operational performance, and sales performance. The cost-related element is not significantly related to any of the performance dimensions.

Table 6. Results of regression analyses

Dependent variable	Financial performance		Operational performance		Renewal		Sales performance		Sustainable performance	
	Beta	t	Beta	t	Beta	t	Beta	t	Beta	t
Independent variables										
Service process	-,226	-,889	,084	,381	,734***	4,452	-,095	-,388	,649**	3,514
Product	,473*	2,213	,664**	3,661	,219	1,134	,547*	2,695	,337	1,617
Cost	-,311	-1,467	,312	1,780	,265	1,654	-,170	-,809	,101	,527
F	4,900*		13,404**		19,824**		7,265*		12,347*	
R	,473		,664		,734		,547		,649	
R ²	,224		,441		,538		,299		,421	

Sign. *** ≤ 0.001 , ** $0.001 < p \leq 0.01$, * $0.01 < p \leq 0.05$

4.2. Results of the interviews

Based on the results of the survey, semi-structured interviews were made. The results considering the service experience in digital business were analyzed based on the following distinction: product related, service process related, and cost related.

The results of the interviews indicated that digital resources are in use in all of the companies and in all of the dimensions: the market offering, the processes, and the business model. All in all, digital end products or services are not so common in the interviewed industrial companies. Digital resources are more in use in processes such as research and development and in sharing information between different operators. In addition, quite a few digital resources are used in making purchases.

In the interviews, it was pointed out that product quality, support activities (service related), relationship, and understanding are the most relevant elements for customer value creation. Product quality can be seen as something extra if it is really good, for example, if it is ensured by quality certificates. Still, in most cases, the quality of the market offering is seen as a given, as competitors can provide the exact same thing. That is why something extra is needed to win customers. Still, even with quality, some kind of dissociation can be made, for example, with certificates. Further, the interviewees indicated that sustainability issues are becoming increasingly important and that digital technologies are seen as a tool for increasing, for example, environmental friendliness.

The interviewees were unanimous in saying that to create value through the digital environment, companies need to offer comprehensive product and service ranges. Just one market offering is not enough; the offering has to be configurable and have different features, such as options between big and small, fast and slow, and added features. Also, the services provided with the product need to be comprehensive, including, for example, maintenance, support, and delivery services. However, based on the interviewees' perceptions, companies themselves need to focus on their core businesses, while other operations need to be outsourced and performed by subcontractors. This brings networking skills into a key role. Also, digital resources in these

interactions are important. Some of these are already used, but in the future, more is required, and it is acknowledged that more will be used.

Understanding the customer is the basis for all transactions and is the only way to really create customer value, as by understanding the customer, one is able to fulfil the customer's requirements and desires. This relationship with customers can be supported by digital tools. Even the biggest companies think they need more developed systems and resources to use. Especially in networks and with subcontractors, more digital resources are needed to share information more quickly. Although digitality is seen as a way to increase customer value, human interaction cannot be forgotten. Even though digital resources are smoothening the interaction, relationships still have to be built and maintained. The initial purchasing decision is based on actual face-to-face meetings.

Price in this research study was seen as a compulsory thing, but competing with that was not seen as a clever strategy. The prices of services was an interesting issue since customers are not willing to pay anything for them. Price competition in some industries is still quite common, which requires that the quality of the offering be similar. Still, because competition is fierce in many industries, similar products with similar quality can be found, so it cannot be the only thing creating value. The importance of augmented offerings, such as services and maintenance, is increasing.

4.3. Summary of the results

As a summary of the explored characteristics of customer value contributing to value creation in terms of high company performance, the results of this study reveal the following. Companies with digitality integrated in the company strategy are investing more in the characteristics of customer value and value creation, especially service-related ones. This can be due to the fact that when digitality is a part of the company's strategy, it is likely to be connected to an existing business model in terms of developing and intensifying services and solutions. Thus, it assists in creating and generating value to customers through digitality.

It was also found that companies with higher appreciation on cost-related elements in digital solutions and services performed worse in terms of performance dimensions. In better-performing companies, value creation through digitality is connected to service process- and product-related elements. The effects of the elements of customer value on different performance dimensions were as follows:

- The product-related elements of customer value in digital business affect financial, operational, and sales performance.
- The service process-related elements of customer value in digital business affect renewal and sustainable performance.
- The cost-related elements of customer value in digital business (meaning lower prices due to the decrease in manufacturing costs and developments aiming to lower manufacturing costs) do not affect any of the performance dimensions.

Also highlighted in the interviews was that price was seen as a compulsory thing, but competing with that was not seen as a clever strategy.

The higher performance of companies that place emphasis on service process–related elements indicates that digitality is more valuable in improving service processes than in cutting costs. Also, new digital innovations and solutions can support customer value and value creation if they are linked to service-related production. One main reason for that might be that the internal productivity and effectiveness inside the Finnish companies are at a high level and that new digital innovation and solutions cannot generate much more value by lowering costs. Instead, these digital solutions and innovations should be linked to service-related production to generate customer value.

5. Conclusions

This study explored the characteristics of customer value in digital business that contribute to value creation in terms of high company performance. Previous research concluded that because the global economy is increasingly driven by digital businesses, the need exists for a theory that elucidates what the actual value-creating elements are. This study put the results of these previous studies forward by concentrating on digital industrial services in the b2b context. As a main contribution, the study has clarified the characteristics of customer value that contribute to value creation and performance. This study suggests that value creation through service process– and product-related elements constitute higher company performance, whereas cost-related elements do not. Also, when it comes to the role of digitality in value creation, the study suggests that digitality needs to be implemented in a company strategy as well as in an existing business model to generate benefits.

Some potential limitations exist concerning the data collected. However, due to the nature of the research subject, combining both quantitative and qualitative methods is an appropriate research strategy for gaining a deeper understanding of customer value creation in digital business. This study showed that more in-depth action research and case studies are needed to validate the results in terms of suitability, usefulness, and acceptability. Although the results supported many of the propositions in prior literature, they also generated a number of open questions for further research. First, it might be interesting to do comparison studies in other industries to investigate whether a relationship exists between the cost-related elements of value creation and company performance in these industries. Second, further studies should focus on investigating how value creation can be measured to better support its improvement in terms of high company performance.

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DEVELOPING A SCALE TO MEASURE EMOTIONAL RESPONSES TO BUYING COMPLEX SERVICES: A CASE OF OCCUPATIONAL DISABILITY INSURANCE

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Consumers have difficulties in purchasing complex services, such as occupational disability insurance (ODI), and experience strong negative emotions. However, thus far, research has mainly focused on the cognitive responses to the complexity and has neglected the emotional responses, such as consumers' negative emotional responses (NERs), to buying complex services. To fill this research gap, this article develops and validates a scale to measure NER in three studies. Emotional resignation and the fear of post-purchase dissonance have been identified as two negative emotions. By revealing two determinants and one consequence of NERs, their theoretical and practical relevance are emphasized.

1. Introduction

Although research on consumer behaviour has been conducted for more than 50 years, buying processes have not become easier for consumers. Instead, consumers are often emotionally overwhelmed, particularly in complex buying situations, and experience negative emotions, such as frustration. When shopping for complex services, such as occupational disability insurance (ODI).

Complex buying situations pose challenges for different stakeholders, including consumers, marketers, and consumer protection organizations, because complexity has negative and grave influences on consumer behaviour as follows:

- Prior research found that strong negative emotions (such as frustration) that result from conflicts and making trade-offs in complex buying situations increase the likelihood of consumers postponing or even cancelling the purchase (e.g., Luce, 1998).
- Furthermore, the decision making literature suggests that decision makers not only tend to postpone the decision but choose a default option in decisions that involve conflict (Tversky; Shafir 1992).

Therefore, firms must take actions to decrease complexity to attract new customers and prevent the negative consumer consequences of complex buying situations.

This study addresses the following two important research gaps:

First, thus far, research on product complexity, choice complexity and choice overload has mainly focused on the cognitive responses to complexity, such as perceived choice complexity, and has neglected emotional responses. This is an important oversight because decision making theories suggest that both cognitions and emotions influence behaviour (e.g., Loewenstein et al., 2001). Second, only a few authors have investigated complex services, such as mutual funds, in their studies (e.g., Townsend; Kahn, 2014).

Beyond the notion that consumers' NER to buying complex services is a potentially important construct, and despite calls for research into consumers' perceived complexity of services (e.g., Patterson; Cicic, 1995), the nature and dimensionality of this construct remain opaque. Therefore, the main aim of this study is to develop and validate a scale to measure NER. Furthermore, we also present two determinants and one consequence of NER and thereby underline the managerial relevance of NER for services.

2. Background

Prior research on product, task and choice complexity is quite diverse and contains studies from the past 40 years. Therefore, we only briefly highlight some of the major findings and deficiencies of previous research.

Studies on product complexity fall broadly into two different categories. First, the product characteristics perspective defines product complexity based on product characteristics, such as a high number of attributes that contribute to complexity (e.g., Park et al., 2008; Park, 1976). Second, the consumer perspective addresses consumers' problems when evaluating and using complex products. Holak and Lehman (1990), for example, found that perceived complexity decreases perceived relative advantage and communicability of a complex and new product and increases perceived risk.

Research on task and choice complexity has mainly focused on cognitive responses to complexity, such as "perceived choice complexity", and judgemental strategies that consumers apply when choosing from a set of alternatives (e.g., Townsend; Kahn, 2014; Ursic; Helgeson, 1990). This prior research has identified the determinants of complexity, including goal clarity, number of available alternatives and amount information, (high) brand differences or conflicting information on alternatives (e.g., Liu; Li 2012). However, a large share of studies on choice complexity has used low complexity products, such as groceries, as stimuli in their experiments (e.g., Townsend and Kahn 2014; Swait; Adamowicz 2001). Only a few authors have investigated more complex products and services, such as mobile phones or mutual funds, in their experiments (e.g., Townsend; Kahn 2014; Fasolo et al. 2009).

Furthermore, research has largely ignored the role of emotions in complex buying situations. Little empirical evidence exists to support that the characteristics of the choice task influence emotions; for example, it seems that choice overload (which results from a high number of alternatives) increases negative emotions, such as regret or disappointment, after the choice has been made (Schwartz et al. 2002). In research on information overload, which is conceptually similar to choice overload,

some evidence exists that information overload increases stress and confusion (Epler; Mengis 2004).

However, emotions are highly relevant in decision making contexts due to their influence on behaviour. In the psychological decision making literature, emotions gained more interest since the beginning of the 21st century (e.g., Loewenstein; Lerner 2003). Modern theories, such as the risk as feelings hypothesis proposed by Loewenstein et al. (2001), describe that emotions and cognitions interact and that both influence decision making, which emphasizes the necessity of investigating emotions in complex buying situations.

However, in service research, there is no scale that reliably measures negative emotional responses towards complexity. This research gap is addressed in this study with the development of a scale to measure NER that relates to task-induced emotions, i.e., emotions that arise directly from a decision task in contrast to an ambient affect. Similar to task-induced affect, such task-induced negative emotions are likely to have a strong influence on consumer decision making (e.g., Shiv; Fedorikhin 1999; Luce 1998).

In summary, prior complexity research has not yet identified and examined NER to complex services empirically. To fill this important research gap, the most important contributions of this study are 1) to identify qualitatively and quantitatively emotions that consumers experience in complex buying situations and 2) develop a scale to measure these emotions.

3. Scale Development

To the best of our knowledge, no study on product complexity or choice complexity has yet measured negative emotions as consequences of complexity with the exception of one study by Iyengar and Lepper, (2000) which measured the negative emotion “frustration” with a single item.

The following sections describe the detailed scale development procedure that examines the reliability and validity of the NER scale.

In summary, three studies were conducted, starting with a qualitative study in which respondents described complex buying situations that they have experienced. The product and service context was open-ended in this study. In studies 2 and 3, laptops and ODI, respectively, were chosen as the research contexts. According to Erasmus et al. (2014), buying computer and insurance is of very high complexity. By investigating these different buying contexts during the scale development, generalizability of the results is assured.

3.1. Study 1

In study 1, we used an online survey with open-ended questions. All respondents were asked to name products or services that they experienced as highly difficult to purchase and describe a specific highly complex buying situation that they have experienced in detail, with a particular focus on their emotions during that buying situa-

tion. For example, several respondents chose to describe the purchases of health insurance or making travel arrangements.

The sample of the online survey consisted of 316 respondents (28% male, 72% female), mainly from one medium sized German university. The age ranged from 18 to 70 years (Mean=27.820, SD=9.759); 185 respondents had a general qualification for university entrance (59%), and 113 respondents had a completed degree at the university (36%). Thus, female, young and higher educated respondents were overrepresented, which can be disregarded because the explorative nature of this study does not require representativeness.

The text material that was analysed comprised a total of 18.446 words on 58 pages (Times new Roman, 12 pt, line pitch: 1.5).

Because study 1 was mainly designed to generate an initial item pool for the scale development, the major interest was placed on the descriptions of the emotions. From these descriptions, adjectives were extracted in the first step. Afterwards, several nouns and descriptive sentences were transformed with corresponding adjectives.

Overall, the qualitative study 1 provided support for the notion that consumers experience mostly negative emotions, such as fear, insecurity and feeling overstrained, during complex buying situations because the frequencies of positive emotions were much lower compared to the frequencies of negative emotions.

To obtain a list of frequencies, a software was used. For the scale development, only negatively connotated adjectives were relevant. The most frequently stated 23 adjectives were reviewed in detail by the authors and by two PhD students to assess content validity. In this step, the following three items were excluded from the pool: "Doubtful" and "sceptical" seem to relate to cognitions rather than to emotions, and "nervous" is considered an ambivalently valenced emotion because it can be experienced by consumers as positive or negative. Thus, 20 items remained as shown in the following table.

Table 1. Initial item pool

Initial item pool			
1. insecure	6. confused	11. agitated	16. fear of a bad buy
2. overstrained	7. irresolute	12. listless	17. fear of having a
3. helpless	8. being put under	13. embattled	fast one pulled
4. stressed	pressure	14. irritated	18. angry
5. joyless	9. unhappy	15. frustrated	19. impatient
	10. being torn		20. disappointed

3.2. Study 2

For item purification, study 2 was conducted online. Participants were asked to imagine buying a laptop. For a better simulation, they were asked to imagine searching for information, evaluating alternatives and finally purchasing the product. Afterwards, participants were asked to answer the 20 initial items of the NER scale. The introduction phrase to the scale items was "During the purchase situation, I felt/ experienced ... (adjective or noun)", and a 7-point Likert-Scale with the endpoints "I strongly agree" and "I strongly disagree" was used. Whether the emotion was described with a noun or an adjective was language and grammar dependent. To avoid a potential order bias, the items were randomly rotated.

The survey was published at different German universities and on different social networks, such as Facebook. A total number of 236 subjects participated in the survey, which meets the suggestion of Tinsley and Tinsley (1987) of 5 to 10 participants per item. The survey had 429 impressions in the online survey tool; therefore, the sample corresponds to a response rate of 55%. A total of 96 participants (40.7%) were female, and 140 participants (59.3%) were male. Most of the participants (29.2%) were between 20 and 24 years old (Mean=32.890, SD=13.910), and 43.2% of the participants had a general qualification for university entrance.

3.2.1. Exploratory factor analysis

Before conducting the exploratory factor analysis (EFA), the inter-item correlation matrix of the items was evaluated to reveal redundant items and multicollinearity (e.g., Field, 2014; Bearden; Netemeyer, 1999). Reviewing the inter-item correlation matrix revealed a high redundancy between the items “being put under pressure” and “embattled” ($r=.746$) and similar correlations between these two items and the other items. In consequence, the item “being put under pressure” was excluded from the item pool because its formulation is more distinct from the other items than the formulation of the item “embattled”. Thus, 19 items remained. Afterwards, because of multicollinearity issues, the items “overstrained” and “insecure”, which had the highest correlations with the other items, were also deleted.

Seventeen items remained for the EFA. The sampling adequacy was verified with the Kaiser-Meyer-Olkin measure (KMO=.934). Furthermore, Bartlett’s test of sphericity was significant ($p=.000$), which means that the correlation matrix was significantly different from an identity matrix, and consequently, performing an EFA is appropriate (e.g., Field, 2014).

An EFA with the oblique rotation Promax was conducted because it was assumed based on Ortony et al.’s (1990) classification of emotions, which states that at least two moderately to highly correlated factors exist (Rennie 1997), one negative well-being emotion and one negative prospect emotion. These types of emotions are negatively valenced reactions to events, i.e., to the buying situation, that relate to the consequences to the consumer. The choice of the oblique rotation was supported by the EFA-results, which are described in the following sections.

To determine the number of factors to be extracted, the Kaiser-criterion was used. Kaiser’s criterion suggests extracting factors with an Eigenvalue greater than 1 because those factors contain more information than the average individual item (DeVellis 2012; Kaiser 1960). According to this criterion, two factors were extracted with Eigenvalues of 8.851 and 1.463. The factor correlation matrix supported the choice of an oblique rotation because it showed that the two factors are highly correlated ($r=.719$).

When conducting an oblique rotation, a pattern matrix and a structure matrix are produced. The pattern matrix contains regression coefficients for each item on each factor in the data, which describe an item’s unique contribution to a factor that, therefore, is used to interpret the results of an oblique rotation (e.g., Field 2014, S. 702).

Table 2. Pattern matrix of the EFA

	Factor	
	1	2

1. unhappy	.922	
2. frustrated	.780	
3. angry***	.763	
4. disappointed	.726	
5. joyless	.720	
6. listless	.654	
7. embattled***	.611	
8. agitated****	.553	
9. irritated**	.532	.318
10. stressed**	.527	.314
11. impatient*	.319	
12. irresolute		.907
13. being torn		.895
14. fear of a bad buy		.794
15. fear of having a fast one pulled		.694
16. confused**	.356	.505
17. helpless*	.404	.410

Notes: Extraction method: Principal Axis Factoring; Rotation method: Promax with Kaiser-Normalization; * removed due to low factor loadings; ** removed due to cross-loadings; *** removed due to low communalities after extraction; **** removed due to too high correlation with both factors (based on structure matrix)

In the following steps of the EFA, several items were removed from the item pool. First, based on the regression coefficients shown in the pattern matrix, the following five items were removed: The items “impatient” and “helpless” did not load high on any of the two factors, and the items “stressed”, “irritated” and “confused” were removed due to cross-loadings. Thus, 12 items remained in the item pool. Second, the communalities after extraction were evaluated. Items should have communalities greater than the cutoff-level of .50 to be included in the scale (Hair et al., 2013). Because of low communalities, two additional items (“angry” and “embattled”) were removed from the scale. Third, the structure matrix was evaluated, which revealed that the item “agitated” correlates highly with both factors (difference between correlations =.09), whereas the difference between the correlations of the two factors for the remaining items was at least .16. Therefore, the item “agitated” was also removed. Finally, Factor 1 comprises five items, and Factor 2 comprises four items (see Table 2).

3.2.2. Interpretation of the factors

To interpret the two factors, we referred to Ortony et al. (1990) and their structure of emotions and Festinger’s (1957) theory of cognitive dissonance. The two factors comprise the following two categories of negative emotions that arise during complex buying situations: negative well-being emotions and negative prospect emotions. Following Ortony et al. (1990), prospect emotions (such as the positively valenced emotion hope and the negatively valenced emotion fear) are reactions to the prospect of an event, while well-being emotions capture whether the consumer appraises the buying situation as “desirable” (with positively valenced emotions, such as joy and happiness) or as “undesirable” (with negatively valenced emotions, such as distress and unhappiness).

Factor 1: Emotional resignation

Applying the classification of Ortony et al. (1990), this factor is a negatively valenced well-being emotion for which the prospect of the purchase decision is irrelevant. Research distinguishes affect on an activation-deactivation basis. The items in Factor 1 are associated with deactivation, i.e., with demotivation during the buying process. In

the literature, some evidence can be found that these emotions are associated with resignation (van Steenburg et al., 2013; Hirschman; Stern, 1999). In the context of complex buying situations, resignation means to give up during the purchase situation and unresistingly accept the complexity of the buying situation as inescapable.

However, to date, there seems to have been little consumer research on resignation during the buying process. Mick and Fournier (1998) alluded to resignation and associated it with consumers' behavioural avoidance strategies. Such avoidance strategies include postponing or even aborting a purchase, and, in this context, Luce (1998) found that negative affect increases the likelihood of consumers applying those strategies. However, Factor 1 reflects the emotional and non-behavioural component of resignation and is, therefore, entitled "emotional resignation".

Factor 2: Fear of post-purchase dissonance

Compared to the items of Factor 1, the items of Factor 2 are more closely related to the anticipated outcome of the purchase decision. Ortony et al. (1990) defines prospect emotions that relate to the prospect of making a good or a bad purchase, for which hope and fear are prominent examples. Factor 2 classified as a prospect emotion. For complex products, the "goodness" or "badness" of the decision seems to be assessable mostly after having made the purchase because product quality cannot easily be judged during the purchase process (e.g., Kempf; Smith, 1998; Settle, 1972). Factor 2 is entitled "fear of post-purchase dissonance". The classification as a prospect emotion is greatly reflected by this title because it includes the specific prospect emotion fear and the relevant prospect of the purchase decision, i.e., post-purchase dissonance (Ortony et al., 1990; Festinger, 1957).

According to Festinger (1957, 2f.), cognitive dissonance describes a state of inconsistency between cognitions, and cognitions describe "any knowledge, opinion, or belief about the environment, about oneself, or about one's behaviour". In a buying situation, cognitive dissonance can arise after making a purchase decision and is, therefore, often termed post-purchase dissonance. It arises when expectations, e.g., about product performance, are disconfirmed (Anderson, 1973).

Both NER factors are assumed to be highly correlated because they both comprise negatively valenced emotions that occur during the same situation and might even occur simultaneously. As described above, the factor correlation matrix supports this assumption.

3.2.3. Further analysis

After having defined the two NER factors, a reliability analysis was conducted. Since Cronbach's alpha is affected by the number of items in a scale, inter-item correlations and average inter-item correlations were examined (e.g., Netemeyer et al., 2003). For emotional resignation 1 (5 items), Cronbach's alpha was .865, and Cronbach's alpha for the standardized items was .866. Corrected item-total correlations ranged from .642 to .754. The average inter-item correlation was .563, and the inter-item correlations ranged from .432 ("disappointed"- "listless") to .688 ("disappointed"- "frustrated"). For fear of post-purchase dissonance (4 items), Cronbach's alpha was .865, and Cronbach's alpha for the standardized items was .864. The corrected item-total correlations ranged from .642 to .763. The average inter-item correlation was .615, and the inter-item correlations ranged from .490 ("irresolute" – "fear of having a

fast one pulled”) to .729 (“irresolute” – “being torn”). For both NER factors 2, Cronbach’s alpha could not be improved by a further reduction of items.

In summary, Cronbach’s alpha is sufficiently high for both factors because it exceeds .70, and the average inter-item correlations were also high enough because they exceeded .30 (e.g., Netemeyer et al., 2003; Robinson et al., 1991).

3.3. Study 3

To apply the scale to a service-context, participants of study 3 were asked to imagine buying an ODI. In addition to conducting a CFA, this study further focuses on the analysis of a nomological network that includes two determinants (perceived service complexity and pre-search uncertainty) and the consequences (consumers’ frequency of using product tests as an information source during the buying situation) of NER.

Similar to study 2, subjects were asked to imagine searching for information, evaluating alternatives and finally purchasing the service. Subjective service-class knowledge was measured using five items from Flynn and Goldsmith (1999), perceived service complexity was measured with four items by Burnham et al. (2003), and pre-search uncertainty was measured with six items by Urbany et al. (1989). Afterwards, emotional resignation and fear of post-purchase dissonance were measured with a total of nine items. As before, the items were rotated randomly to avoid a potential order bias. Throughout the survey, all constructs were consistently measured with 7-point scales. Finally, demographical data (age, gender, education) were gathered.

Similar to study 2, the survey was published at German universities and on social networks, such as Facebook. In summary, 161 persons participated in the study. Since the survey had 466 impressions in the online survey tool, the total number of subjects corresponds to a response rate of 34.54%. Of these participants, 75 (46.6%) were male, and 86 (53.4%) were female. The age category of 20-24 years formed the largest age group (26.7%) (Mean=35.056, SD=13.858), and most participants had a general qualification university entrance (39.1%) or a completed degree (31.1%).

3.3.1. Validation of measurement properties

During the CFA, several goodness-of-fit indices were evaluated to assess the model fit.

The initial model comprised the two NER factors (five items for emotional resignation and four items for fear of post-purchase dissonance). For this model, the standardized regression weights for emotional resignation ranged from .626 (“disappointed”) to .850 (“joyless”) and from .738 (“being torn”) to .836 (“irresolute”) for fear of post-purchase dissonance and are, therefore, sufficiently high. Similar to study 2, both factors correlated highly with each other ($r=.810$). The initial model did not fit the data well (Chi-square=134.787, $p=.000$ with $df=43$, chi-square/ $df=3.135$, AGFI=.780, IFI=.920, TLI=.896, CFI=.919, RMSEA=.116, and PCLOSE=.000).

In a three-step approach, the model fit was improved by identifying localized areas of strain by an investigation of modification indices and standardized residuals (e.g., Brown, 2015).

First, the modification indices show that the error terms of “fear of a bad buy” and “fear of having a fast one pulled” (M.I.=41.273) should be covaried to improve the model fit. These items have similar wording and clearly refer to the same emotion, i.e., fear. Second, the modification indices revealed that the error terms of “listless” and “joyless” were covaried due to similar wording (M.I.=6.068). Third, the standardized residual covariances were investigated, but no problems with specific items were found (Brown, 2015). The standardized residual covariances ranged from -1.084 (“being torn” – “disappointed”) to .757 (“being torn” – “fear of having a fast one pulled”). In summary, those two modification increased the model fit greatly, resulting in Chi-square=41.623, $p=.014$, with $df=24$, $chi-square/df=1.734$, $AGFI=.903$, $IFI=.981$, $TLI=.971$, $CFI=.980$, and $RMSEA=.068$.

3.3.2. Construct validity

In the next steps, the construct validity was evaluated by examining the convergent, discriminant, and nomological validity.

Convergent validity

Convergent validity can be assessed by evaluating factor loadings, average variance extracted (AVE), and reliability (Hair et al., 2013). The factor loadings (standardized regression weights) of emotional resignation ranged from .627 (“disappointed”) to .843 (“unhappy”), and, for fear of post-purchase dissonance, the factor loadings ranged from .665 (“fear of having a fast one pulled”) to .890 (“irresolute”), which are all higher than the suggested threshold of .6 (Bagozzi and Youjae Yi, 1988). Thus, convergent validity is supported.

AVE is greater than .5 (emotional resignation, $AVE=.615$; fear of post-purchase dissonance, $AVE=.554$), which further supports validity.

To assess the reliability of the scales, Cronbach’s alpha, the average inter-item correlations and the composite reliability were calculated. For emotional resignation, Cronbach’s alpha was .890, and Cronbach’s alpha for the standardized items was .889. The average inter-item correlations were .615. Emotional resignation had a construct reliability of .888. Cronbach’s alpha and Cronbach’s alpha for the standardized items were .861 for fear of post-purchase dissonance. The average inter-item correlation was .607, and fear of post-purchase dissonance had a construct reliability of .831. These findings support the convergent validity of both scales.

Discriminant validity

There is support for discriminant validity between emotional resignation and fear of post-purchase dissonance. As assumed and previously indicated, the two factors correlate highly ($r=.85$ in study 3) with each other because they are both negative emotional responses to an event, and they are both emotional consequences for consumers resulting from complexity (Ortony et al., 1990).

For the ODI-dataset, the model fit indices were calculated for a similar one-factor solution to assess the discriminant validity further because the factor correlation was especially high (Hair et al., 2013). A comparison of the model fit indices of the two-factor model and the one-factor model reveals a better model fit for the two-factor model. The chi-square difference between the two models is 32.153 ($df=1$, p -value for nested comparison $<.001$), which provides strong support for the discriminant va-

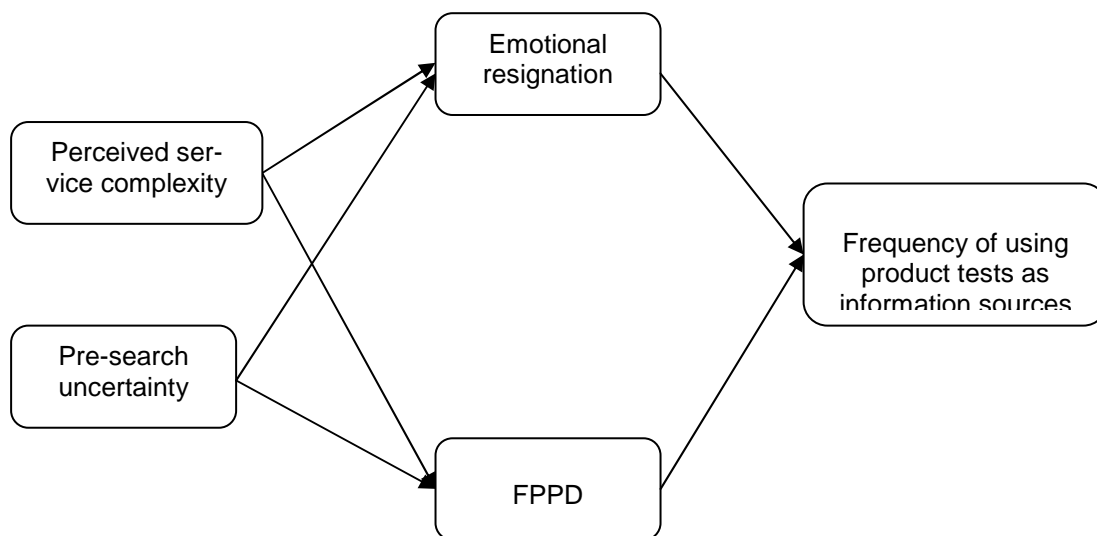
lidity of the two-factor solution. Furthermore, all goodness-of-fit indices are better in the two-factor solution.

To distinguish the two factors from other constructs that could be relevant in complex buying situations, a correlation analysis was conducted between the two NER factors and subjective service-class knowledge. Subjective service-class knowledge is an important cognitive marketing construct that is highly relevant during buying situations. It can be defined as “a consumer’s perception of the amount of information [about the service class] they have stored in memory” (Flynn; Goldsmith, 1999, 59). Because decision making theories suggest that cognitions and emotions are correlated, it is assumed that this construct correlates moderately with both NER factors (e.g., Loewenstein et al., 2001).

Supporting this assumption, the correlation analysis reveals that both factors correlate moderately with service class knowledge (emotional resignation: $r=.405$, $p=.001$; $r=.456$, fear of post-purchase dissonance: $p=.001$). Thus, the discriminant validity between NER and those constructs is given.

Nomological validity

To evaluate the nomological validity of the two NER subscales, a nomological network is proposed that includes perceived service complexity and pre-search uncertainty as determinants of NER and consumers’ frequency of using product tests as information sources during the buying process as one consequence of NER. This nomological network is described in Figure 1.



Notes: FPPD: Fear of post-purchase dissonance

Fig. 1. Study 3 – Nomological Network

In the following sections, the hypotheses that describe this nomological network are developed first, and, afterwards, the results of the nomological validity testing are presented.

Hypotheses development

High levels of service complexity and pre-search uncertainty increase the cognitive demands necessary to complete the task, and, thereby, they increase the likelihood that these demands exceed the consumer's available resources. Situations that place high cognitive demands on the consumers (e.g., complex buying situations) and in which consumers have low levels of cognitive resources available might be interpreted as highly "undesirable", which influences the intensity of well-being emotions according to Ortony et al. (1990); therefore, emotional resignation is increased. Thus, we propose the following hypotheses:

H_1: Perceived service complexity increases emotional resignation.

H_2: Pre-search uncertainty increases emotional resignation.

According to Ortony et al.'s (1990) structure of emotions, the higher the likelihood of a negative event to occur, i.e., purchasing a service that does not fulfil the consumer's requirements, the greater the intensity of prospect emotions, such as fear. Consumers with high pre-search uncertainty are more likely to buy the "wrong" product and, therefore, experience comparably high levels of fear of post-purchase dissonance. Furthermore, since complex products and services are difficult to evaluate (e.g., Day; Deutscher 1982), the likelihood of buying the "wrong" product seems to increase with service complexity. Therefore, the following influences of service complexity, pre-search uncertainty and product class knowledge on fear of post-purchase dissonance are assumed:

H_3: Perceived service complexity increases fear of post-purchase dissonance.

H_4: Pre-search uncertainty increases fear of post-purchase dissonance.

As previously described, emotional resignation is a negative well-being emotion. Consumers who experience emotional resignation are less motivated during buying situations. Due to their decreased motivation, they do not conduct an extended information search, which should be reflected in a decreased frequency of using information sources during their buying process. Thus, emotional resignation should decrease the frequency of using high expertise information sources, such as product tests, during the purchase of complex services, such as ODI. Therefore, the following hypothesis is proposed:

H_5: Emotional resignation decreases the frequency of using product tests as information sources during the purchase of services.

As previously described, fear of post-purchase dissonance is a negative prospect emotion that arises because consumers anticipate buying a "wrong" service. This anticipation should motivate them to take steps to increase decision accuracy, i.e., the likelihood that they select a service that truly fulfils their requirements. Decision accuracy is increased by information from high expertise information sources, such as product tests that provide consumers with aggregated knowledge. Therefore, consumers who perceive fear of post-purchase dissonance should be highly motivated to seek information from such high expertise information sources. Thus, the following hypothesis is proposed:

H_6: Fear of post-purchase dissonance increases the frequency of using product tests as information sources during the purchase of services.

Results of nomological validity testing

The nomological network was analysed in AMOS. The model fits the data quite well (Chi-square=255.168 ($p=.000$), $df=161$, AGFI=.826, IFI=.958, TLI=.950, CFI=.957, RMSEA=.060, and PCLOSE=.111).

Supporting H_1 and H_3, service complexity has a significant positive influence on emotional resignation ($\gamma=.299$, $p=.002$) and fear of post-purchase dissonance ($\gamma=.458$, $p=.000$). Consistent with H_2 and H_4, pre-search uncertainty has a significant and positive influence on emotional resignation ($\gamma=.361$, $p=.000$) and fear of post-purchase dissonance ($\gamma=.417$, $p=.000$). Supporting H_5 and H_6, emotional resignation and fear of post-purchase dissonance have a significant negative influence on the usage frequency of product tests (emotional resignation: $\gamma=-.596$, $p=.007$; fear of post-purchase dissonance: $\gamma=.759$, $p=.000$).

Overall, the results support the nomological validity of the emotional resignation and fear of post-purchase dissonance subscales. Table 3 summarizes the model fit indices and the standardized path coefficients of the model.

Table 3. Results of the nomological network analysis

Model	SPC	p	R ²
Hypothesized paths			
Emotional Resignation			
H_1: Perceived service complexity → Emotional Resignation	.299	.002	.28
H_2: Pre-search uncertainty → Emotional Resignation	.361	.000	
H_5: Emotional Resignation → Information source: Product tests	-.596	.007	.16
Fear of post-purchase dissonance			
H_3: Perceived service complexity → Fear of post-purchase dissonance	.458	.000	.48
H_4: Pre-search uncertainty → Fear of post-purchase dissonance	.417	.000	
H_6: Fear of post-purchase dissonance → Information source: Product tests	.759	.000	.16

Notes: SPC: Standardized path coefficients

4. Summary and discussion

A reliable and valid measure of NER was developed based on a qualitative study and two quantitative studies with different product/service contexts.

In studies 1 and 2, two NER factors were identified by evaluating an initial item pool with EFA as follows: Emotional resignation was measured with 5 items, and fear of post-purchase dissonance was measured with 4 items. The scale was further validated with a CFA, correlation analysis and structural equation modelling in study 3. The first attempt to establish the nomological validity was conducted by investigating the influence of service complexity and pre-search uncertainty on NER and the influ-

ence of NER on the frequency of using product tests as information sources in a structural equation model. The results revealed that service complexity and pre-search uncertainty increase emotional resignation and fear of post-purchase dissonance and that emotional resignation significantly decreases whereas fear of post-purchase dissonance increases the frequency of product tests as information sources.

4.1. Relevance for theory

From a broader perspective, this study makes the following two theoretical contributions:

First, it provides the first context-specific measure of negative emotions in complex buying situations (NER) that was developed in a structured scale development approach. The studies provide support for the notion that negative emotions prevail during the purchases of complex products or services.

Second, two NER factors were identified, emotional resignation and fear of post-purchase dissonance. Their distinction was supported particularly by theory (Ortony et al. 1990) and providing quantitative evidence that these factors have different determinants and consequences, although they are highly correlated.

The factors emotional resignation and fear of post-purchase dissonance contribute to theory in the following four ways:

First, these factors provide empirical support for Ortony et al.'s (1990) classification of emotions because, conceptually, emotional resignation is a negative well-being emotion, whereas fear of post-purchase dissonance is a negative prospect emotion.

Second, to date, the concept of resignation has been investigated in the consumer buying process only as a behavioural consequence, i.e., as an avoidance strategy (e.g., Luce 1998; Mick; Fournier 1998), and it has not yet been conceptualized in detail. This scale development process provides evidence for the existence of emotional resignation that is reflected by emotions, such as frustration and listlessness. Study 3 provided empirical evidence that emotional resignation decreases the frequency of using product tests as information sources during the buying process of services. Consumers who experience emotional resignation are less motivated to engage in an extensive information search, which would be associated with high levels of cognitive effort and high costs for information search. Future research should investigate whether emotional resignation produces behaviour that leads to a decision in a short period of time with low cognitive effort, such as relying on a recommendation of a high expertise insurance agent given in a sales conversation.

Third, fear of post-purchase dissonance contributes to theory by linking a specific negative emotion, i.e., fear, with anticipated post-purchase dissonance. In terms of Ortony et al. (1990), fear of post-purchase dissonance belongs to the group of prospect emotions. It was found that fear of post-purchase dissonance significantly increases the frequency of using product tests as information sources. Product tests are information sources that might be used if consumers put additional effort in increasing decision accuracy.

4.2. Relevance for practice

The findings of this chapter emphasize the role of NER in buying complex services, which is not only relevant for theory but is also relevant for practice. For consumer protection organizations, the relevance of NER becomes particularly clear through its significant influence on the frequency of using product tests as information sources. Product tests provide consumers with aggregated knowledge that should support them in decision making. However, in a state of emotional resignation, the information in this product test is not able to reach the customers, and consumer protection organizations are not able to reach their goal of supporting consumers in complex buying processes. In contrast, fear of post-purchase dissonance increases the frequency of using product tests, and therefore, it highlights the relevance of this information source. Therefore, to reach consumers, consumer protection organizations should especially take actions to decrease consumers' emotional resignation. Marketers and consumer protection organizations should provide consumers with high quality and aggregated information to decrease perceived service complexity and pre-purchase uncertainty because both constructs have been identified as determinants of NER. However, future research must investigate which characteristics of information and information presentation decrease NER.

In summary, marketers should be more sensitive to NER. Further research on NER should investigate its influence on using other information sources during the purchase of complex services. It might support marketers in developing communication strategies and could provide support for sales training. For example, identifying the antecedents and consequences of NER could help marketers develop guidelines for sales efforts and advertising that aim to reduce these negative emotions.

4.3. Limitations and future research

As with any empirical study, this scale development process has some limitations. In the following section, the limitations and directions for future research are summarized.

First, the scale has been developed in the context of purchasing laptops and ODI. Thus, further validations in other contexts would provide further evidence for the generalizability of the results and show that the scale is broadly applicable. Notably, the correlation between the two factors was lower for laptops (products) than for ODI (services). Thus, whether these factors correlate particularly high for services might be investigated further by future research. Service characteristics, particularly the integration of the external factor (e.g., Bruhn; Georgi 2006), might influence the correlation between emotional resignation and fear of post-purchase dissonance. When the consumer is personally integrated in the production of the service, well-being emotions (e.g., emotional resignation) and prospect emotions (e.g., fear of post-purchase dissonance) are likely to correlate highly because the consumers have a higher influence on the prospect of the event through their influence on the quality of the purchased service during service production. Thereby, negative well-being emotions might have a negative influence on the quality of the produced service, and consumers' fear of post-purchase dissonance might increase because they are aware of that relationship.

Second, future research should conduct quantitative studies to identify additional antecedents (e.g., the number of alternatives in an assortment) and consequences (e.g., usage frequency of other information sources and the application of avoidance strategies) of NER. Third, the possible moderating role of consumer characteristics, such as pre-search uncertainty, should be further investigated because the results of study 3 support the notion that they influence the intensity of NER.

Finally, marketers would benefit from experiments that investigate NER in the context of sales conversations, particularly in the context of buying services.

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DIGITAL MARKETING INNOVATIONS AND THEIR ROLE IN SERVICE ECOSYSTEMS, THE EXCHANGE OF VALUE AND SOCIAL IMPACT

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This paper presents a discussion of results from an ongoing project, specifically providing an in-depth case study of a digital marketing innovator playing an important role for online brand engagement within its service ecosystem and how they are helping to facilitate the exchange of value and have a positive social impact. In particular, examples of focal company's digital marketing innovations are examined to understand: what roles various actors are playing, how the ecosystem is structured and what precisely is being exchanged. This manuscript offers a different perspective of digital marketing innovations from a traditional brand-centric view, to stimulate businesses and service providers to think out of the box and include the evaluation of the social impact of their technological innovations.

Key words: service ecosystem, digital communication, innovation, sustainability.

1. Introduction

Marketing innovations are important to the value exchange within service ecosystems and this paper explains some of the ways this can occur. The digital world we currently live and conduct business within has fundamentally changed the way people interact, including stories consumers share and the ways brands engage those consumers (Blazevic et al., 2013). This network of consumers, brand firms, retailers and related organizations serving each other can be thought of as a service ecosystem (Iansiti; Levien, 2004).

Although the Internet provides a platform that theoretically can help this ecosystem operate, to a brand the dynamic digital environment with constant interaction between consumers can appear quiet chaotic (Edelman, 2010). Consumers interact via numerous social media applications, using both text and image-based narratives creating communities, where traditional marketing is insufficient and as such, companies are trying to rethink their marketing strategies in the digital domain focusing more on relationship-based interactions with their customers (Thiago; Verissimo, 2014). Despite increased attention on, and investments in social media, brand building has become challenging demanding significant effort and frequently resulting in very little payoff (Holt, 2016). There is a need for service innovators that can make

sense of this chaos and alter the way companies think about their roles in the ecosystem (Akaka; Vargo; Lusch, 2012; Akaka; Vargo, 2014).

Companies and their brands are part of consumers' stories online and innovative technologies using big data analytics can facilitate these conversations/brand narratives through interpretations of what is being shared (King; Racherla; Bush, 2014). To remain relevant on the Internet brands should target crowd-cultures, shifting from trend followers to innovative ideologists being inspired by customers' cultural flashpoints (Holt, 2016, 48). Flashpoints refer to shifts in direction of microcosms within the ecosystem that erupt via social interactions. Innovations can help firms not only engage in the conversations and sell more products in relevant ways but also capture novel ideologies and receive consumer insights to improve products and services.

Within the service ecosystem firms produce outputs and inputs from services which become part of customers' value creating activity (Lusch; Vargo; Tanniru, 2010). One emergent narrative among customers focuses on a concern and value for society at large. In their strive toward continuous improvement, companies can possibly identify ways that can contribute positively to society, so enabling multiple actors to provide and receive greater value as a result of their innovations. It is well known that "value is always uniquely and phenomenologically determined by the beneficiary" (Vargo; Lusch, 2008, 7), but understanding what is valued and helping to create value for this new dynamic consumer world is challenging. A missing link today is answers to questions like how can firms make sense out of the complexity of conversations online, how can firms optimize new technologies addressing them to the right goals, and how can firms provide core values to those that interact and the society in general?

2. Literature

A service ecosystem is comprised of a network of organizations exchanging service for service, as they each help to create value for themselves and other network members using processes that have been referred to as integrated value chain management (Flint; Mentzer, 2006). However, if we look more closely at this service ecosystem, we notice that it is not limited to organizations: consumers are also part of it; both business customers and consumers are always co-creators of value in supply chains and networks (Vargo; Lusch, 2008, 7). Consumers are key actors in this ecosystem as they influence and exchange value with some of these organizations such as brand manufacturers (and their brands) and retailers. They also interact with each other exchanging and creating social value in part through the communication about the brands they use and retailers from which they acquire products. Service dominant logic (Vargo; Lusch, 2004. Vargo; Akaka, 2012) would argue that in actuality this service ecosystem is nothing more than a network of service integrating actors exchanging and leveraging operant and operand resources. In this paper, an important aspect of ecosystems we wish to highlight is this network of actors and specifically, customer networks. This is shown in Figure 1, which serves as a framework for guiding our thinking and the literature review.

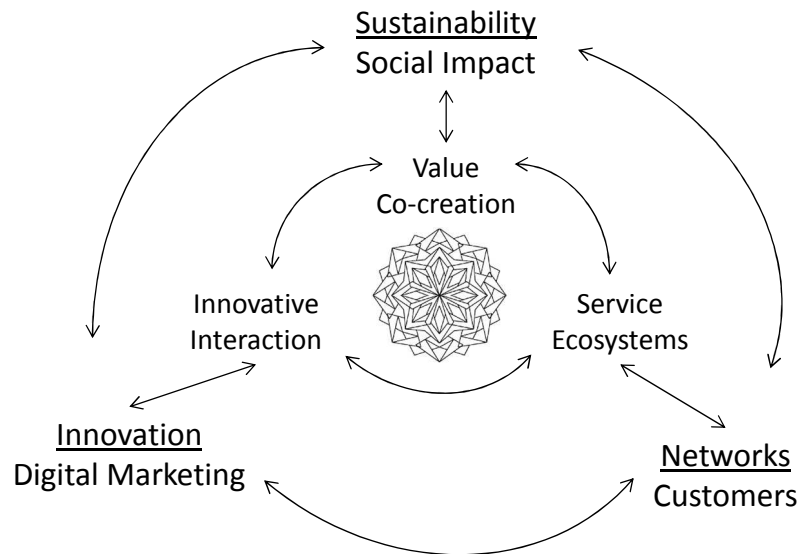


Figure 1. Framework of theoretical connections between service ecosystems, digital innovation and social impact

In order for organizations to effectively make healthy contributions to their ecosystem, including customers, they must adopt an orientation that values sharing knowledge, collaborating and integrating with other network members co-creating value; this is known as a supply chain orientation (Stank; Davis; Fugate, 2005. Hult; Ketchen; Adams, 2008). Moving counterclockwise from ecosystems and networks in Figure 1, we consider value co-creation first. Service Dominant Logic (SD Logic) highlights that each entity within ecosystems is part producer and part consumer of services and value, and as such they are always a form of co-producer. Flint and Mentzer (2006) break this down into concepts such as co-design, co-production, knowledge co-creation, and co-creation of value propositions. One powerful concept drawing a great deal of attention currently in practice and research is the co-creation of sustainability.

Sustainability can refer to the long-term health of the ecosystem, which includes economic health of the system as well as individual actors, environmental health, and social health, including all actors driving and impacted by decisions made by members of the networks. When an organization shows concern for sustainability it is thought to have a sustainability orientation. A sustainability orientation refers to the extent to which an organization embraces all aspects of the triple bottom line of sustainability, namely economic, environmental and social impact of the organization (Beske, 2012. Beske; Land; Seuring, 2014). That said, much sustainability research tends to focus more on environmental aspects and somewhat ignore social aspects. Here in our paper we wish to highlight the social impact actors within an ecosystem can and do have.

When firms embrace both a sustainability orientation and a supply chain orientation, they are considered to be high in sustainable supply chain orientation (SSCO) (Signori; Flint; Golicic 2015). It is argued that such an organizational orientation is likely one of the best for the overall health of a service ecosystem. However, early research suggests that most organizations are on a variety of journeys toward such an ideal and not many have achieved it yet (Signori; Flint; Golicic, 2015), maybe this is due to them not fully understanding the dynamics of an ecosystem.

Social actors constantly interact and exchange service for service in their ecosystems. They exist in a dynamic symbolic series of interactions constantly determining what they value, and changing what they value (Flint, 2006). Within this chaotic ecosystem there exist actors who play specific and specialized roles (Fyrberg; Jürjado, 2009). For example, some actors provide a platform that enables the ecosystem to function. The Internet would be such a platform, although no single entity controls or provides the Internet. Rather a sub-network of organizations provides the hardware and software that serve as the portal to, and infrastructure for, organizations and consumers to access the Internet. But these organizations merely provide the infrastructure, like a pipeline network provides the infrastructure for water flow throughout a metropolitan district. With the Internet, the piping system connecting actors together has exponentially more routes and connections than a water pipeline and is constantly changing. In this scenario, innovation has to be conceptualized as the "recombination of a set of practices, processes and symbols to serve a human purpose, and this recombination occurs through both value proposition and value determination phases" (Akaka; Vargo, 2014, 381). Firms must continue to learn and improve how they serve others in a value network (Lusch; Vargo; Tanniru, 2014, 21). This need has created an opportunity for another type of technical service actor that has emerged to help make sense of the information flowing through the service ecosystem's network. Such an actor would offer a powerful innovation to help the ecosystem thrive, specifically a digital marketing innovation (see Figure 1).

When consumers interact with each other they often create brand communities wherein lies collective value that requires innovative methods for uncovering insights (Schau; Munix; Arnould, 2009, 40). We can envision the customer actors, the services they consume offered by organizations (e.g., brands, retailers) and the services being exchanged among themselves as in constant motion much like the crystals in a kaleidoscope (the image at the centre of Figure 1). If you look through a kaleidoscope from the wrong end (backwards) the crystals appear as a jumbled chaotic mess. When you spin the tool, they simply continue to appear chaotic. Look through the correct end, and patterns emerge, even as the tool turns. The digital marketing innovation that is needed is like the kaleidoscope tool, helping to make sense of the interaction chaos. But what would this look like? We must better understand what these specialized actors are doing, if they are emerging. Specifically, a research priority is to better understand the processes of resource integration these specialized innovative actors adopt and think about the resources required for them to contribute positively to society (Luca; Hibbert; McDonald, 2016, 210).

3. Objectives and Methodology

3.1. Objectives

According to SD Logic all actors are service integrators; service is always exchanged for service. Service ecosystems may require platforms that enable the network to thrive and/or facilitate these service exchange flows. Thus, research questions (RQs) that arise include:

- RQ₁: What roles are various actors playing within service ecosystems? What might a structure of the ecosystem look like?

- RQ₂: What precisely is being exchanged?
- RQ₃: How are service providers facilitating (or harming) this exchange? How is society benefiting (or being harmed) by this exchange?

This paper will provide a start to answering to these questions.

3.2. Methodology

The study represents an in-depth case study of a technical service innovator that involved numerous meetings with the firm over a period of three years. The case study resembles ethnographic work data collection in that it relied on participant observations, in-depth interviews and casual conversations with the business owner and key managers, observation of operations, and review of documents and business tools used by the organization. These procedures are consistent with well established case study approaches in management (Eisenhardt 1989; Yin 1994). We interpreted field notes and interviews to create a model of how such a firm is helping to, and can further assist in helping to, create value for consumers, brands, themselves and society.

Specifically, we adopted an approach from grounded theory (Strauss and Corbin 1990) known as constant comparison where we tacked back and forth between field notes, data and the literature to understand the role this tech service innovator was playing in its service ecosystem, as well as the processes taking place as value was being exchanged between them and other actors in the system. We also recognized that as researchers become immersed in an ethnographic case study, they often connect with organizational participants in ways that allow them to see subjectively and emotionally deeper into the organizational members and their intent for the organization (Kisflavi 2006). Thus, the extended time period over which the case organization was engaged allowed for a variety of examples to be discovered and analysed.

4. Results

This paper presents a discussion of results from an ongoing project, specifically providing an in-depth case study of a digital marketing innovator playing an important role for online brand engagement within its service ecosystem and how they are helping to facilitate the exchange of value and have a positive social impact. In particular, examples of the focal company's digital marketing innovations are examined to understand: what roles various actors are playing, how the ecosystem is structured and what precisely is being exchanged.

Maxfone is a small Italian ICT (Information & Communication Technology) company that since 2008 has specialized in 3.0 digital communication services and technologies for companies. Their principles are based on cooperation and knowledge with customers with whom they created solid and positive relationships. Every innovation emerged both from advanced technical knowledge of their own and market driven insight from observing customer problems. In many cases innovative solutions are co-created with customers. Maxfone's mission is to shape communication

with new perspectives that help to realize the full potential of the web with a futuristic view of Internet applications and flexible, dynamic up-to-the-minute services.

In this paper we analyze this case firm as a technical service innovator who clarifies complex data for their clients. They are part of an active service ecosystem. Their innovation approach relies on partnerships with universities, local associations, and professional networks, with which they have frequent connections. Thanks to the style of open exchange of knowledge and co-creation of value, their relationships are positive and long term. The top manager of this company believes in networking and is also playing an important role in a local industrial association. If we look back to our theoretical framework in Figure 1, we recognize that in this case study the service ecosystem includes a network between companies, a university, associations and business customers as first tier relationships, and that social media help the direct connection with consumers and other audiences including them in the same network.

Maxfone is playing an important role in its networks, offering the most innovative technologies, services and methods to efficiently increase companies' brand reputation on the web and social media. For them, "digitalization is the new communication frontier: for this reason it is important and necessary to structure and plan this process in order to succeed in the best way." They also realized that the technological solution is important but it is not enough because it needs to be oriented to creating mutual benefits for all parties involved, consumers included.

The situation that gave rise to Maxfone was one where brands were aware that thousands of consumers were telling stories to each other that involved and sometimes were about their brands, but these narratives came in many forms and were constantly emerging and morphing. It was nearly impossible to see what was being said clearly, to generate insights, to use the insights or to relevantly tap into the conversations. A digital marketing innovation was needed, both to make sense of big data, and to enhance the online innovative interaction skills of companies. Maxfone then developed proprietary algorithms (with a strategic tool called SocialMeter Analysis, recently exported to Austin, Texas, through a subsidiary named Instant Media Analyzer) that enables them to not only make sense of the narratives but also enable brands to speak directly to consumers in relevant ways. Maxfone monitors (with live streaming) text messages, Tweets, blogs, Facebook and similar posts, Instagram images, and other social media applications where posts and conversations are occurring. These data are mined at Maxfone and screened to generate a live stream of data focused on a client brand and its parent firm. This stream then enables Maxfone clients and Maxfone on behalf of its clients to engage consumers in relevant and empathetic ways as they post about events and interactions with the brand. SocialMeter Analysis not only pulls together relevant conversations but also, with ad-hoc observatories, helps clients make sense of the conversations by developing insights to perceptions, emotions and behaviours. Then Maxfone moved beyond text to simply capture images where client brands were appearing. Over time, Maxfone was able to generate insights to the behaviours associated with the images in real time (with a service called Photostream by SocialMeter Analysis). The real time analytics aspect is revolutionary and critical if brands are to tap into the conversations, events and behaviours appropriately; timing is critical for relevant participation. The hypertextual analytics tool is patented in part because it not only helps to make sense of complex streaming data in real time but also removes unnecessary and even potentially damaging data such as erotic or personal identifying/privacy threatening images. To further refine their tool, Maxfone promoted or supported events to raise awareness of what it was doing and encourage consumer activity across a variety of media, creat-

ing an even more intense data environment helping to take the analytic tool to another level.

Reading this case study through our theoretical lenses in Figure 1, the role of this technological service provider of innovative digital marketing solutions for interaction become clear. Maxfone demonstrated that brands could jump into conversations in real time in relevant and not overt marketing ways. As a result, client brands have realized a number of benefits. First, they have realized significantly higher rankings in social media metrics. Additionally, Maxfone was able to help companies to deliver a more insightful social media experience and service to consumers. This also led to development of real time customer profiling and a more effective move of traditional social events into the digital space, significantly expanding the events' impacts. For example, during one event consumers from across the globe participated in conversations digitally claiming "We're here, guys! We're part of you!" Additionally, when live feed text and image content is fed to client websites, consumers remain on site significantly longer, especially if the application might display one of their own posts soon. In some cases, the average dwell time on a site went from two minutes to twenty, or two seconds to two minutes. Finally, brands have been able to develop new product improvement ideas through these engagements. The benefit to consumers is that they begin to feel that the brand and firm are listening to them, which in turn builds trust and helps to strengthen real inter-personal relationships.

In addition, Maxfone decided to create a service for citizens not driven by a commercial goal, one where they developed an application to help Maxfone play a role of social observer, looking beyond what consumers were saying directly to understand a variety of needs. For example, during a natural flooding disaster, they were able to tap into, stimulate and use conversations in the digital space about those in need of assistance and became a key enabler for critical aide getting it efficiently to the most appropriate places. This service had a significant social impact and it is part of the sustainability philosophy of this company.

As an overview, we offer six very brief case examples of the role this technical service innovator has played in its ecosystems (see Tab. 1).

The first case, Banco Alimentare Veneto, involves a non-profit organization that collects food and repurposes it for those in need. By sharing consumer stories about what they had to share as well as those being served/helped and making sense of the conversations, clarity turned into action, stimulating significantly higher participation. Specifically, on the 28th of November 2015, Banco Alimentare Veneto launched the charity event (and hashtag) #colletta15, aimed at promoting the collection of food for those in need. When buying food in grocery stores, customers were invited to make small donations of food products that were then repurposed by Banco Alimentare and, while doing so, take pictures of these moments and share them with the official hashtag. What Maxfone did was exploit the potential of digital emulation to enhance the reach and success of the charity event. By means of the Photostream service, Maxfone collected and monitored the narratives and visual stories shared by the benefactors of Banco Alimentare. These stories came from all over the Veneto region, and were then promoted and posted on the Banco Alimentare Veneto, Maxfone and Photostream websites, as well as on their Facebook, Twitter and Instagram pages. The resulting online popularity led to a chain reaction and to a shared will of emulating the beneficial actions that boosted both public awareness and the amount of collected goods.

Table 1: Case examples descriptors: network structures, values and social impact

Case examples	Profit/Non-profit	Extent of impact	Network structure	Value being exchanged	Social impact
1) Banco Alimentare Veneto, #colletta15	Non-profit	Regional	Association, citizens, firms, tech service provider	Food, time and place utility	Real time food needs update, community connectivity
2) #Alluvioni	Non-profit	Local (relief area)/National	Association, citizens, public services personnel, tech service provider	Facilitating real time emergency response (flood relief),	Community wide, perception of safety
3) Mila	Profit	National	Firm/brand, consumers, tech service provider	Insights to consumer behaviour, product innovation, brand awareness	Strengthen firm's sustainability orientation, more suitable products for consumers, support of local businesses
4) Zonin1821	Profit	International	Firm/brand, customers, consumers, influencers (chefs), employees, tech service provider	Interaction facilitation, brand narratives, consumers engagement	Dissemination of wine culture
5) Consorzio di Soave	Profit	Local/regional	Firm/brand, customers, consumers, tech service provider	Sharing of culture, style and values, event engagement, region awareness, origin protection, terroir reputation	Community engagement
6) Zuegg and Romeo&Juliet Marathon	Profit and Non-profit	Local/national	Firm/brand, consumers, local municipality, event organizers and sponsors, tech service provider	Event engagement, healthy fruit culture exchange, brand awareness	Support local community events

The second case #Alluvioni is used during natural flooding disasters: Maxfone was able to tap into, stimulate and use conversations in the digital space about those in need of assistance and become a key enabler for critical aid getting efficiently to the most appropriate places. Social networks are increasingly imposing themselves as the first and most efficient means of communication when it comes to natural disasters and acts of terrorism. This process began back in 2009, when Twitter changed its prompt from “what are you doing” to “what’s happening”. Rather than looking inwards, users started looking outwards, thanks to a prompt that encouraged them to describe what they saw around them. These tools have then been improved and re-

fined, to such an extent that, at present, Facebook and Twitter are the first tools to which people turn not only to discuss bad things happening, but also to seek aid and assistance. The situation, however, is still one where first intervention and security services are incapable of isolating irrelevant data (noise) and exploit the benefits of real-time interaction, through social media, with those in need of assistance. This is why services like Maxfone's SocialMeter Analysis and Photostream seem to be bound to represent the new frontiers of an on-line-prompted first intervention. This service has already been tested during a recent flooding in Texas, which proved that narratives and pictures shared by the people can help critical aid and that real-time interaction is a key factor in those cases where prompt intervention can save lives.

The third case, Mila, is a consortium of 2700 small dairy farmers in northern Italy (south Tyrol) and uses the Photostream to generate insights to consumer behaviour and preferences, to innovate products, and stimulate brand awareness. The partnership between Maxfone and Mila began in March 2016 and involves both the activation of the Photostream and management of Mila's social network official accounts (Facebook, Twitter and Instagram). By means of the Photostream, Mila is now able to collect in one place (and screen on its website) the visual content spontaneously shared by its customers. Such tool allows Mila to observe and investigate the way in which customers use products and find out e.g. the most common food pairings with cheese, what people dunk in their milk, where they eat their yogurt and the most appreciated flavours. This information is then used by Mila to meet the needs of its customers when it comes to launching new products, partnerships or innovate them. Furthermore, new communication strategies applied by Maxfone to the Mila social network pages have revealed a previously ignored demand for Mila products that comes from far outside south Tyrol, and that extends to Italy's central regions. On a daily basis, customers would ask information on where to buy the Mila products in their city. This is what pushed Mila to start working on a search engine that, within a few months, will be embedded on the Mila website, allowing visitors to find the nearest seller and the products available, even far away from south Tyrol.

Zonin1821, the fourth case example, is a large Italian multi-brand wine producer with heritage that goes back seven generations through nearly 200 years. They want to be close to their clients and, by promoting high-quality Italian wine, they are endeavouring to celebrate their country's culture. They use social media as a unique and effective way "to stay in tune with the world". Zonin1821 first activated the Photostream for the 2015 edition of Vinitaly, Italy's most important wine fair, held in the city of Verona once a year. Given the unexpected success met by the tool in terms of engagement, the brand then decided to embed it into its website, as part of a bigger project aimed at renewing the brand and making it more appealing. The Photostream now serves a call to action function for the thousands of users that access the website every day, and who are invited to share their Prosecco moments with Zonin. This tool is increasing the user's residence time on the website as well as the amount of data shared on social network and related to Zonin, as well as the brand's popularity among younger generations.

The fifth example is Consorzio di Soave, a consortium of wine producers and grape growers that is instrumental to the economic health of the entire community. Consorzio di Soave bought the Photostream for the 2016 edition of Vinitaly with the aim of collecting, through the hashtag #soavewine, the visual stories shared by visitors. During the fair, the Photostream was displayed on a wide screen that stood out from every corner of the hall. The power of this call to action worked so well that Con-

sorzio di Soave ended up being the most active (and talked about) consortia/brand of that year's Vinitaly.

The last case is related to the Romeo&Juliet Half Marathon and Zuegg. On 2015 Valentine's Day, the city of Verona hosted the Romeo&Juliet half marathon, an event partially sponsored by Zuegg. The Photostream was activated, displayed on a large screen in Piazza Bra, Verona's most important square (the square where the Arena is located) and runners were invited to share their moments with the hashtags #fruit-lovers and #Zuegg. The success achieved by the Photostream made runners feel more connected with the brand Zuegg, which, rather than being just one of the many sponsors, became the protagonist of the runners' pictures, thus increasing its levels of engagement and popularity.

These six vignettes demonstrate only a few ways in which a firm such as a service provider can innovatively achieve numerous ecosystem social benefits. Their platform is able to make sense of a highly chaotic and dynamic text and image intensive amalgamation of narratives by helping clients, be they large brands, non-profits, small local businesses or social aid workers find relevant and meaningful stories in which they could participate. However, in this case, insights were generated to consumers' perceptions, emotions, and behaviours helping clients be more sensitive, empathetic and knowledgeable which when used wisely, helped clients play more meaningful roles within their ecosystems. This case study offers a different perspective of digital marketing innovations from a traditional brand-centric view, to stimulate businesses and service providers to think out of the box and include the evaluation of the social impact of their technological innovations.

5. Discussion

We stated several research questions for this project. The first was to determine the roles various actors were playing and provide a depiction of the ecosystem structure (RQ₁).

We provide Figure 2 in partial answer to this question, which pulls together all that we have discussed. Not all actors are equal as a basic value network may be depicted; actors play different roles. The ecosystem literature calls out those actors who provide platforms that assist the entire ecosystem as one such special role, such as the Internet. Sometimes these are considered keystones to the ecosystem. However, as we discovered, some actors are assisting value exchange within the system by helping to make sense of dynamic and complex information flowing (online conversations and User-Generated Content) between other actors on this keystone platform. This means that at times the introduction of one actor may necessitate the emergence of others. The digital innovator described here played an important role through personal relationships with top managers enabling the creation of connections between many actors, helping to create additional value exchanging networks within the ecosystem. Thus, firms like this are not only big data sense makers but also relationship facilitators. We also discovered that universities and similar knowledge centres provide a unique role as participant observers within the system but also examiners of it, helping to guide other actors. Actors such as these can exist on a different plane (level), which is a more generic network of supporting actors that can assist specific project focused networks.

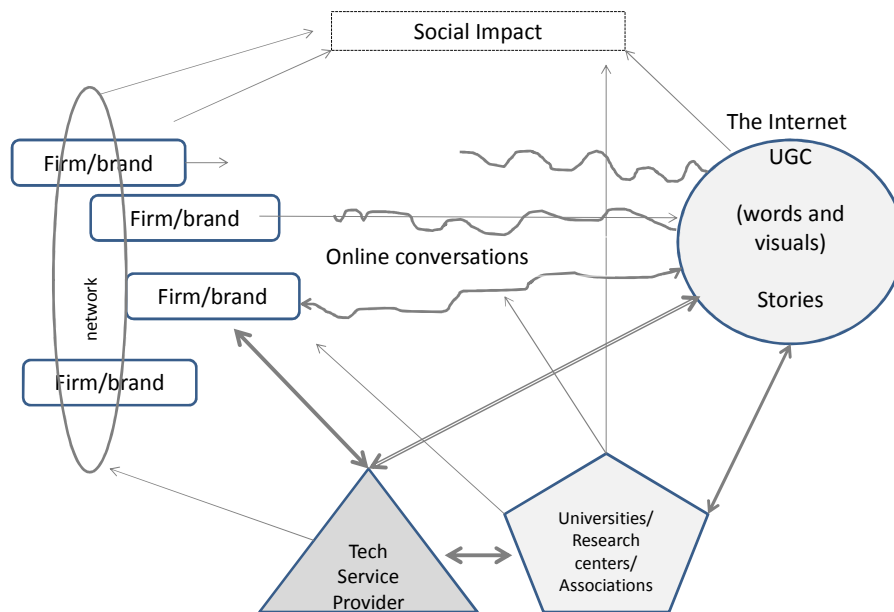


Figure 2. The structure of a service ecosystem in the digital era

The second research question was to describe what was being exchanged in a deeper way than simply stating generically that “value” is being exchanged (RQ₂). We discovered that beyond traditional exchanges such as products, services and currency, consumers exchange stories and when they do, indirectly they offer insights to other actors. These insights to perceptions, emotions and behaviours, enable actors to more deeply penetrate the local micro-cultures and even potentially see flashpoints of change, be they behaviours, attitudes or even ideologies. To be specific, “information” is being exchanged between consumers and due to the public aspect of their digital interactions, they share information about their behaviours and opinions both consciously and unconsciously. For example, they sometimes provide insights to the social issues they care about. By extension brands have an opportunity to create greater value in the form of social services to the broader ecosystem.

To the third research question, our insights to the case firm’s experiences suggest that when brands merely use consumer information to find ways to sell more products for financial gain, they wind up potentially hurting the ecosystem in a way (RQ₃). Capitalism may argue that each actor should serve its own needs and as such the system will thrive. However, society has needs that are not served by this model. There is an opportunity due to being allowed a privileged access to conversations as well as superior resources to do more than simply advance commerce. There is clearly potential for technical innovators to simply use these insights to narratives, some even private, to generate profit for clients. But there is potential to go much further, respect consumers’ privacy and serve the greater good of society.

We discuss a few ideas next, such as ‘local microcosms’ and the importance of time. Within an ecosystem there are planes of smaller networks that can be referred to as societal microcosms. These may be digital microcosms spread out geographically or physically local social networks that also interact digitally. By gaining insights to local microcosms, firms can assist local communities in ways they might not have been able to before these advances in technology.

Some issues are time sensitive. They may be crisis situations or fleeting opportunities. Technology innovators making sense of digital narratives must generate insights in time to react and help others react.

By assisting local initiatives, larger social causes and reacting in real time, technical innovators, as well as brand manufacturers, can accelerate their social sustainability initiatives.

6. Conclusion

6.1. Theoretical implications

Theoretically this project brings together service ecosystem and sustainability research. In particular, we focus on the specific role certain digital innovation actors can play to assist their ecosystems by facilitating value exchange in new ways, some of which can involve social sustainability benefits.

Our work highlights a few points. First, it is clear that service ecosystems in the current digital era need more than platforms to facilitate information exchange. They need also actors who make sense of the resulting information flow and more, facilitate productive value exchanges. Second, there are members of service ecosystems who are sometimes forgotten (e.g., universities and agencies, even consumers) and sometimes providing value (sharing) unconsciously; not all value exchanges are depicted in social network maps. Third, by focusing on the digital aspects of a contemporary service ecosystem we discovered has a hyperdynamic nature. The rapid pace of constant change within a digital ecosystem cannot be overstated. As such, actors must be highly adaptive. Finally, geolocalization has clearly emerged within the digital era expanding the notion of microcosms beyond geographically centralized. Making sense of the many local microcosms forming and operating requires digital innovator actors.

In the digital era, service ecosystems can potentially have many more actors than in years past. Activity is intense, fast-paced, and involving a far higher percentage of a network simply due to advanced and changing connectivity options. We have discovered that some innovators can actually influence the number of actors engaging and the quality level of their interactions.

6.2. Managerial Implications

Managerially this project is helping brands adopt a different perspective. Brand firms traditionally have sought to gain access to consumers' narratives in order to find more effective ways to sell to those consumers. However, if brands see access to consumers' narratives as a privilege and find ways to become part of consumers' conversations in relevant ways, brands will begin to learn about issues that are important to those consumers. They will discover that brands are actually a small part of their larger lives and much of what consumers care about are ways to contribute to a healthy society. Armed with this knowledge, brands can find ways to serve society directly or by directing funds to social causes, be they local or not. When brands recognize that they are part of the ecosystem and have tools that give them privileged insights, product sales will be a natural outcome of serving society rather than the primary goal.

Our insights and depiction of a service ecosystem may help organizations restructure their own networks and even inspire managers to arrive at a common social goal for the ecosystem or some microcosm of it. As a result, firms can become part of a system measuring their impact at the societal level as well as the corporate level. In particular, digital innovators who help make sense of seemingly chaotic data could realize greater power by activating people (managers and consumers alike) to move toward social causes.

Finally, this project helps to address one of the Marketing Science Institute's 2016-2018 priorities (no. 4) which states that we need "new data, new methods, and new skills – how to bring it all together?" The kind of digital innovator we provided insights to helps by integrating big data analysis with real time managerial decision making, identifying the trade-offs between managerial judgment and insights from consumers and customers. They are the kind of actor that can assist in the comparison and contrast that must take place between big data-driven insights and managerial heuristic-driven insights.

In this paper, we have tried to move the conversation along regarding contemporary service ecosystems emphasizing the need for a specific kind of actor and by showcasing an example of one that has emerged.

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DIGITAL SERVICE INNOVATION AND SMART TECHNOLOGIES: DEVELOPING DIGITAL STRATEGIES BASED ON INDUSTRY 4.0 AND PRODUCT SERVICE SYSTEMS FOR THE RENEWAL ENERGY SECTOR

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Digital service innovation and smart objects are currently transforming many industries. Smart technologies related to Internet-of-Things (IoT) and trends such as Industry 4.0 provide new technological platforms, which offer many business opportunities for small businesses. In this paper, we present the case of a small software-oriented company, which intends to take advantage of disruptive technologies by reorientation and creating new service-based offerings for intelligent energy management. Suppliers can move into strong competitive positions through digital service innovations by integrating products, services and smart technologies to offer novel value propositions to their customers. Based on conceptual research the paper explores options for service innovations for energy management and smart metering in the renewal energy sector.

1. Motivation

Digital service innovation and smart technologies are an interesting field of research. Definitions and conceptualizations of service innovations differ and there are diverging views and perspectives as well as categories (Gallouj and Weinstein, 1997; Witell et al., 2016; Snyder et al., 2016). Subsequently, we look at emerging service ecosystems (Lusch et al., 2016) fuelled by interconnecting service systems and digital technologies. In the remainder, we take focus specifically on the energy sector. We look through a service lens on energy management to explore service innovations (Gallouj and Weinstein, 1997). In particular, we shed light on business opportunities for small and medium-sized enterprises (SMEs) and their active role in transforming this sector through service innovations (Gebauer et al., 2013). From a collaborative perspective, service innovations rely on strategic (organizational) networks (Sydow, 1992, 60-74) and service systems (Spohrer and Maglio, 2010; Spohrer et al., 2007; Chandler and Lusch, 2015, Vargo and Lusch, 2016).

Currently, the energy sector is subject of digital transformations (Andal-Ancion et al., 2003, 37) in direction of loosely coupled network entities and resources (Sydow, 1992, 301). Service ecosystems ground on Service-Dominant (S-D) logic and are based on connected distinct service systems to achieve new levels of resource density through service exchange and mutual value cocreation (Chandler and Lusch,

2015, Vargo and Lusch, 2016). Aim is to mobilize resources in order to configure novel value propositions. S-D logic can make a strong contribution to provide required business context for Internet of Things and Industry 4.0 technology-driven application scenario. Manufacturing and product-oriented companies can benefit from digital technologies to improve their business performance and to achieve new insights in customer preferences and needs (Yu et al.; 2016, 91) through possibilities to interact and collaborate with customers on solutions to specific customer problems (Weill and Woerner, 2015). Barriers to adopt digital technologies ground typically in lack of strategy and entrepreneurial vision (Wortmann and Flüchter, 2015, 224; Kane et al., 2015). The latter can be stimulated through viewing current business models through a service lens (Böhmman et al., 2013). Following, digital technologies (Deloitte, 2016) is used as umbrella concept, whereby smart technologies underscore connectivity and data gathering (e. g. smart metering) as subset. This serves well to underline, that our research prioritizes IoT enabling technology perspectives, which subsumes approaches such as Industry 4.0 (Bauernhansl, 2014) and smart objects / metering (Bassi et al., 2013).

Hereafter, product-service systems (PSS) constitute our research avenue. We aim at conceptualizing a working service architecture and strategy for a technology-oriented company in Germany. This industrial use case frames and guides our explorative research. Primary focus on an explorative case, leads us to prioritize in the remainder working architectures and practical solution designs. Synthesized solution design draws on systems and industrial engineering concepts (Spohrer et al., 2007; Böhmman et al., 2014). We look at energy management in the context of complex interacting service systems (Spohrer and Maglio, 2010) and service innovations (Böhmman et al., 2014). Service systems interact with actors to configure and connect resources to define value propositions to engage in service (Chandler and Lusch, 2015, 8). Service platforms facilitate access to resources and support interaction as prerequisite of mutual value cocreation (Yu et al., 2016; Voss and Hsuan, 2009; Eloranta and Turunen, 2016; Lookegaard et al., 2016). IoT are highlighted as driver of evolution and organization of digital ecosystem and related structures and mechanisms (Weill and Woerner, 2015).

The remainder of this paper is organized as follows. First, we describe objectives and research methodology. Next section reviews existing literature and presents in condensed way the available theoretical background and concepts selected and applied to our industrial use case. Then, we present technological trends and pivotal technologies to offer digital-enabled services for energy management. Finally, we use yielded results to conceptualize a solution design for given industrial case addressing service innovations for energy management. Last section concludes the paper.

2. Objectives and Methodology

This is a conceptual paper, which documents and presents research in progress. Subsequent sections aim at conceptualizing a solution design in explorative way. Results are show cased and tested using an industrial use case with focus on energy management. Smart technologies drive radical change and innovations (Gallouj and Weinstein, 1997, 547) in the energy sector. Industrial case highlights how companies can benefit adopting service strategies and S-D logic principles to improve their competitive position (Gebauer et al., 2013). Presented industrial case, namely “energy

management”, is analysed to conceptualize platform-based service strategies (Eloranta and Turunen, 2016). Companies can improve business performance using a service lens to adopt S-D logic to move from product offerings to solutions (Gebauer et al., 2013). Through the lens of S-D logic, all economic actors are resource integrators, and all economic activities are based on service exchange and interactions to mutually cocreate value (Vargo and Lusch, 2004). S-D logic offers strategic opportunities for energy management services to extent company’s total offerings.

Product-oriented companies are increasingly integrating services to extend their overall offering, e. g. basic services for the installed base (Gebauer et al., 2013, Aurich et al., 2009). From a PSS perspective, companies strive for “[...] *selling performance instead of selling goods*” (Spring and Araujo, 2009, 453). Viewing the business through a service lens suggests seeing company’s strategy and operations from a relational view (Chandler and Lusch, 2015, 10). From this perspective, integrating resources from a service ecosystem results in competitive advantage (Spring and Araujo, 2013, 61). Hence, service strategies aim at building complex service networks based on interconnected service systems. In the remainder, we look at technological foundations of service ecosystems. In this context, Internet of Things (IoT) and Industry 4.0 concepts are promising avenues of research. This strives for an architectural solution design highlighting how companies can take advantage of smart technologies. As result, a conceptualization and solutions design is presented, which yields from action design oriented (Böhmman et al., 2014) research. We concretize service-led strategies on basis of an information system architecture, namely a software-based service platform. Thus, this conceptual research activity provides concepts resulting from our literature review and offers best practices for follow up activities. The industrial use case analyses underlying IT structures and systems (architectural paradigms) and strategies. In this way, our explorative research allows evaluating theoretical concepts, mainly drawing from S-D logic (Vargo and Lusch, 2004), PSS and the tripartite framework of service innovation suggested by Lusch and Nambisan (2015). Finally, conclusions are drawn concerning how SMEs can apply S-D logic elements and principles to be concretized in service architectures and to integrate them into their individual business strategies. This supports companies to transform their current business models taking a service lens (Böhmman et al., 2013). Innovative service offerings and value propositions are used to drive transitions from product- to service-based strategies (Spring and Araujo, 2009, 453).

3. Energy Management and Service Innovation

Many companies today struggle with energy management (Ransbotham, 2015). Thus, energy management offers an attractive field to innovate with service concepts (Weinschenk, 2015). Today, we recognize service innovations (Gallouj and Weinstein, 1997; Witell et al., 2016; Snyder et al., 2016) require various categories based on underlying perspectives and views. Lusch and Nambisan (2015) conceptualize service innovation through a tripartite framework. Smart technologies (Deloitte, 2016) allow unprecedented ways to interact with customers and suggest to connect resources from various platforms to complex interacting service systems to enhance the total offering (Pan and Nguyen, 2015, Gebauer et al., 2013). Smart technologies offer new ways for manufacturing and product-oriented companies to achieve “alternative product-uses” (Pan and Nguyen, 2015, 179) and offer “value-in-use” (Vargo

and Lusch, 2004). Service innovations occur if smart technologies are combined with existing products and practices of companies to fulfil a new purpose and to establish new practices. Maglio and Spohrer (2008) discuss service innovation and value co-creation in the context of service systems. This emphasises that the scope of service innovation is broadened beyond the company' border (Vargo et al., 2015, 67). Service innovations can be result of various modes and models (Gallouj and Weinstein, 1997, 547). An example is the combination of service components with physical products enhancing the total offering towards solutions (Gebauer et al., 2013). However, this requires the ability to act as resource integrator. Service platforms offer mechanism to interact with customers and to provide means to mobilize, manage and integrate resources. Service systems (Maglio and Spohrer, 2008) and S-D logic (Vargo and Lusch, 2004, Vargo and Lusch, 2016) explain related mechanism and principles, which are the origin of developing new value propositions and innovative service offerings making use of service ecosystems. Proposed solution design integrates various concepts. Foremost, it uses service (from basic product-centric to value-in-use, offering solutions) (Gebauer et al., 2012; Gebauer et al.; 2013, Spring and Araujo, 2009), strategic networks (Sydow, 1992, 60), service ecosystem (actor-to-actor network) (Lusch and Nambisan, 2015; Lusch et al.; 2016), service systems (Chandler and Lusch, 2015) and information systems (Spohrer and Maglio, 2010; Böhmman et al., 2014). Selected concepts are foundations and prerequisites to develop and deploy new innovative service offerings. We focus on energy management and renewable energy market. From this perspective, energy management represents a service system, which mobilizes and configures resources from various connected service platforms and systems (Spohrer and Maglio, 2010) to engage customers in service (Goda and Kijima, 2015; Chandler and Lusch, 2015).

3.1. Smart energy and smart grids

Smart energy and smart grids are an interesting field of research (Bassi et al., 2013, 8). Digital technologies offer opportunities to develop systems of engagement (Moore, 2011) to interact with and actively involve customers in value creation (value co-creation). The energy sector is under influence of digital transformation and disruptive technologies such as smart metering, revolutionizes the way energy will be produced, distributed and consumed. Thus energy production, and especially renewable energy, is an interesting emerging market. Smart metering is a prerequisite enabling intelligent monitoring, control and communication in grid applications (Bassi et al., 2013, 8). Recent market studies estimate a significant potential for service innovations in the field of smart energy and smart grids (Weinschenk, 2015). From a PSS perspective (Aurich et al., 2009), manufacturers of energy plants can benefit from extending their product-based offering with service components (Gebauer et al., 2013). Hence IoT platforms are an integral element in developing service innovations for smart metering and energy management (Bassi et al., 2013, 8).

3.2. Product-Service-Systems and Servitization

Product service systems (PSS) are linked to services offered along the various stages of the product's life cycle (Mont, 2002) and product-centric service offerings, as well as services oriented towards concepts of the product use (both use and result oriented) (Mont, 2002; Aurich et al., 2009; Cook et al., 2006). PSS aim at improving

resource productivity (Cook et al., 2006). PSS keeps the product offering in focus and intends to extend the total offerings through service components. Typically, companies are motivated by financial benefits (e. g. additional revenue streams) to follow service-based strategies implementing concepts such as PSS or servitization (Mathieu, 2001; Kowalkowski et al., 2015; Eloranta and Turunen, 2016). PSS start typically with product-related service offerings for the installed base (Oliva and Kallenberg, 2003). Servitization initiatives are often driven by business needs to differentiate a company's offerings from those of competitors. Major driver are revenue shrinks through commoditization effects (Mattysens and Vandenbempt, 2008) or innovations (Mathieu, 2001; Wallin et al., 2015). PSS offer product-related services, which if extended support the use of products and can be either (1) product-, (2) use- or (3) result-oriented (Cook et al., 2006; Tukker and Tischner, 2006).

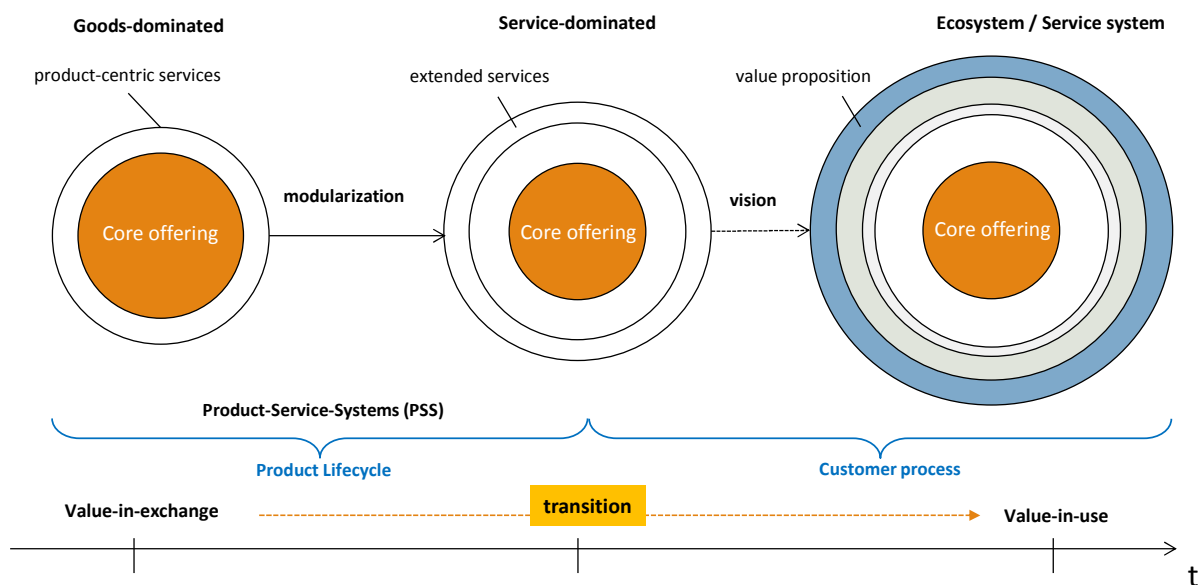


Figure 1: Transition from G-D logic based value-in-exchange to S-D logic based Service Ecosystems and value-in-context

In their core, service strategies extend the companies' total offering by moving from products to solutions (Gebauer et al., 2013) (see Figure 1). PSS approaches service transitions from the direction of systematic development and design approaches to product-oriented value bundles (Becker et al., 2010) and/ or solutions (as combination of product and service components). In PSS a goods-dominant perspective dominates. PSS base on various service types decomposed in combined product and service designs (Becker et al., 2010, 45-49). Successful implementation of service strategies however require support through organizational and institutional arrangements (Gebauer et al., 2005; Vargo et al., 2015, 67). Thus, mere focus on products brings up potential risks if companies decide for service transitions merely focusing on technological aspects and challenges, such as IoT.

Hence, service orientation and service systems are a prerequisite for companies to achieve competitive advantage (Spohrer and Maglio, 2010; Lusch et al., 2007). From a S-D logic perspective, companies are not delivering value, they only offer a value proposition as an invitation to engage with the company (and potentially other actors) for the cocreation of value (Lusch and Nambisan, 2015).

4. Internet of Things and Industry 4.0

Internet of Things (IoT) (Yu et al., 2016, 86-87) and Industrie 4.0 (Bauernhansl, 2014) are related concepts. The future of the Internet will consist of heterogeneously connected “things” or objects equipped with tags, sensors, RFID (Radio Frequency Identification), mobile phones, actuators, etc., (Yu et al., 2016; Li et al., 2015) that will allow to coalesce the physical and the virtual world. Both concepts provide mechanism for connecting all kind of objects through the Internet as communication infrastructure. Connectivity of objects emerges as standard feature to facilitate communication with the service system and to provide the ability to servitization (Porter and Heppelmann, 2014; Kagermann et al., 2011, 80-81; Gandhi and Gervet, 2016). IoT is an umbrella term for interconnected technologies, devices, objects and services, seen as a “mega-market” (Bassi et al., 2013, 13). Various studies identify IoT as one of the top strategic technology trends (Deloitte, 2016; O’Doherty, 2016).

4.1. IoT technology stack and architectural paradigms

Figure 2 depicts an architecture or technology stack with enabling technologies for IoT. Objects must identifiable uniquely in the virtual representations (Li et al., 2015). As shown, the IoT concept integrates various enabling technologies (Atzori et al., 2010; Bandyopadhyay and Sen, 2011, 53; Tsai et al., 2014, 2203). “*Within an IoT, all things are able to exchange data and if needed, process data according to predefined schemes*” (Li et al., 2015). Currently, it lacks standardization integrating enabling technologies into a comprehensive framework (Tsai et al., 2014, 2211). Further open issues and challenges are related to network and communication designs and security and privacy issues (Tsai et al., 2014, 2211; Kranenburg and Bassi, 2012). Low-power wireless communication technology (such as LoRA) is favoured to implement service systems (Kim and Jung, 2016).

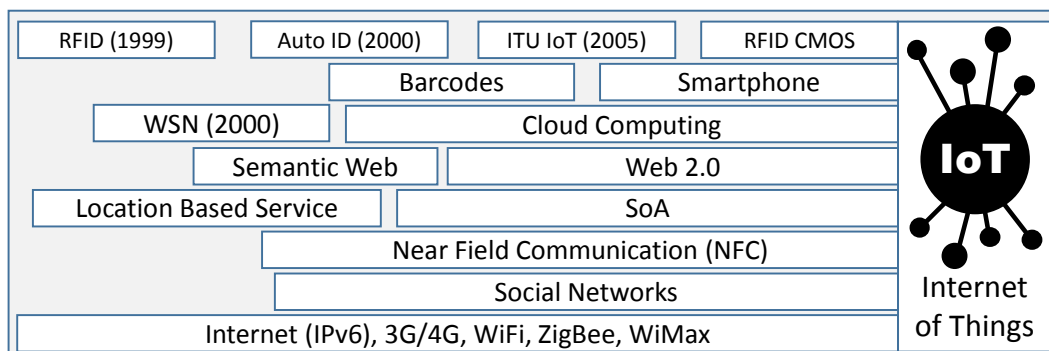


Figure 2: Enabling Technologies for IoT adapted from (Li et al., 2015)

This creates a link to RAMI 4.0 reference architecture, which introduces an administrative layer. This layer manages the interface and data exchange with the virtual environment. Classification systems such as eCI@ss (Weiß et al., 2011) play an important role to represent in formal way physical objects so that ICT applications can process respective data. This creates an important link to business transactions and related business processes, e. g. maintenance processes or e-procurement or purchasing (Weiß et al., 2011).

IoT and its technical concepts have drawn significant attention by researcher and practitioners, respectively (Ransbotham, 2015; Wortmann and Flüchter, 2015; Atzori

et al., 2010, O'Doherty, 2016). While IoT refers to the general ability of objects to connect and to communicate with each other, Industry 4.0 expresses a specific focus on manufacturing industry (Bauernhansl, 2014). Connecting various smart objects into a network of things encourages new possibilities and opportunities for not only manufacturers and production companies, but effectively affects all industries, to respond to customer needs and preferences, faster and more personalized. Smart objects are small computers with communication ability, which replace previously physically represented features with software-based functionalities (e. g. through appliances) (Kim and Jung, 2016). IoT requires enhanced capabilities concerning data management and analytics to achieve required computational intelligence (Tsai et al., 2014, 211). Data analytics and big data are a key competence and key source of competitive advantage (Porter and Heppelmann, 2015). In this way, companies can generate valuable insights concerning customer behaviour and preferences, e. g. by extracting use patterns and reveal performance shortages. With regard to smart metering, collecting and analysing sensor data requires adequate architectures and new paradigms how the amounts of raw data (mainly flat, unstructured sensor data) and is managed and analysed efficiently as continuously delivered through various channels and data streams.

4.2. RAMI4.0 and Industrie 4.0

Industry 4.0 (Bauernhansl, 2014, 5) is an umbrella term characterising digitisation and integration of the whole industrial value chain. Various technologies are combined such as information and communication technology (ICT) with automation technology to form the IoT. Digital services facilitate increasingly higher degrees of networking in and between production facilities, from the suppliers to the customers (Bitkom et al., 2015).

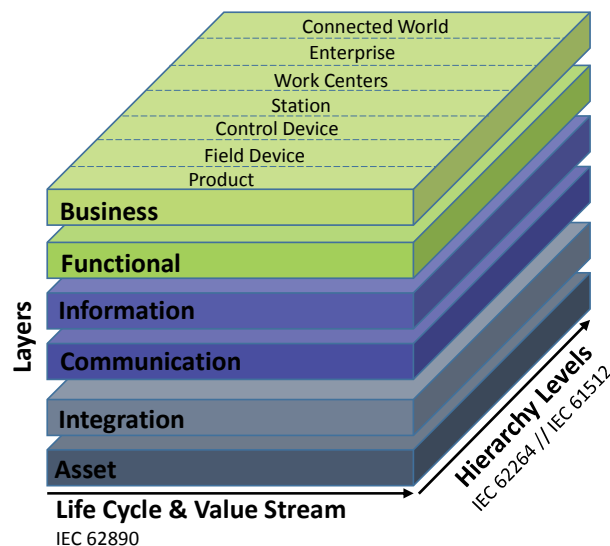


Figure 3: Reference architecture model for the Industrie 4.0 approach in Germany (RAMI4.0) adapted from (VDI, 2015, 7).

RAMI originates from a joint standardization endeavour and partnership of industry stakeholders and research institutions in Germany. RAMI provides a structure to allocate and position relevant standards in an architectural design. Available international standards (from various domains such as communication, QoS (Quality of Service), semantics and identification) have been included (if useful and of importance)

by reference in the different hierarchy levels of the RAMI model. Hierarchy levels represent the spotted functionalities within smart factories or facilities. The various functionalities of Industry 4.0 in RAMI are classified by means of various dimensions and concepts such as “Product” or “Connected World” (see Figure 3). They represent distinct perspectives and abstraction levels relevant for solution designs. In addition, abstraction levels for analysis and design of smart factory solution include micro (device), meso (production facility or modules) and macro (enterprise or industry) perspectives. Those “subdomains” conceptualize requirements for an appropriate solution design. RAMI represents shared knowledge or various industry working groups and in this way transports knowledge, best practices and guidance concerning interoperable design of Industry 4.0 system elements. Interconnectivity of system elements and the ability to interact dynamically with various system elements and components is a pivotal element of RAMI (BMW/ZVEI, 2016). In summary, RAMI contributes to standardize interfaces for service modules. Service modules are service building blocks, which can be aggregated and combined dependent on a given business or application context (Lokkegard et al., 2016, 240; Voss and Hsuan, 2009; Eloranta and Turunen, 2016). An important link to previously discussed service ecosystems and service systems.

5. Industrial Use Case: Smart Energy and IoT

In the remainder, presented industrial use case refers to energy management. Solutions and innovative service offerings for renewable energy production and distribution networks are targeted. Hence, ingredients for the solution design are elicited and options for appropriate service strategies are evaluated. Industrial use case illustrates how a software-oriented company can achieve competitive advantage through following a service-led growth strategy based on integrating innovative service offerings (such as energy management) to increase resource efficiency and productivity of its customers. Energy management requires IoT enabled service innovations and strategies (Wortmann and Flüchter, 2015; O’Doherty, 2016), which in turn draw on integrated solution designs (Yu et al., 2016). Concepts selected contribute to build an architecture for IoT based service platforms (Wortmann and Flüchter, 2015) as foundational pillar of energy management and related solution designs.

Subsequently, we conceptualize a solution design drawing from yielded results of our conducted research. For the conceptual design, we draw on previous introduced concept of product service system (PSS), which provides a systematic, engineering oriented perspective how value propositions are developed and rolled out to the market. Elaborated conceptual design draws on the tripartite conceptualization suggested by Lusch and Nambisan (2015), mainly service platform and service ecosystem, and on service systems (Spohrer and Maglio, 2010; Spohrer et al., 2007). The hands-on industrial use case addresses energy management and related solutions for energy providers and product manufacturers.

5.1. Domain Energy Management

As stated previously, the energy market and energy supply systems (especially in Germany) are undergoing radical change and face a fundamental transition of struc-

tures, systems and policy. Subsequently, we describe the case of a software oriented SME, located in Germany, which intends to set up a service ecosystem in the field of smart energy. The aim is to develop appropriate business models and IoT related strategies (Wortmann and Flüchter, 2015) on basis of results yielding from our research. Service platforms conceptualize service architectures and service processes (Voss and Hsuan, 2009, 549). We make use of the tripartite framework of service innovation as suggested by Lusch and Nambisan (2015), service platforms, service ecosystems and value co-creation (Vargo and Akaka, 2012; Vargo et al., 2015) as solution design for smart metering and energy management. IoT inspires new service-led business models (Kranenburg and Bassi, 2012; Zolnowski, 2015; Böhmman et al., 2013). Service innovations draw on opportunities to connect and interact with smart objects and complex service systems (Wortmann and Flüchter, 2015, 224). Energy management requires connecting all kind of smart objects to a dynamic integrated network of things, which generates valuable real-time information concerning status and usage of objects and systems. This suggests new innovative service offerings such as monitoring and predicting energy consumption of objects and systems.

5.2. Building an Service Ecosystem for Energy Management

Energy management (Weinschenk, 2015) grounds on an efficient network of smart meters and sensors. From a service perspective, interaction with and engagement of customers is a prerequisite to gain required insights concerning customer processes. Data can be gathered and analysed to understand customer problems and related value-generating processes. Smart meters enable customers to take control over their energy consumption. Based on PSS the product lifecycle and usage phase is supported through service components (e. g. such as self-services for managing bills), which support customers determining maximum value with purchased facilities or energy management systems. Service ecosystems provide an organizing structure for the dynamic behaviour of the system itself and its resource integrating actors (Lusch and Nambisan, 2015; Vargo and Akaka, 2012; Vargo et al., 2015, Goda and Kijima, 2015, 86) with focus on service innovation.

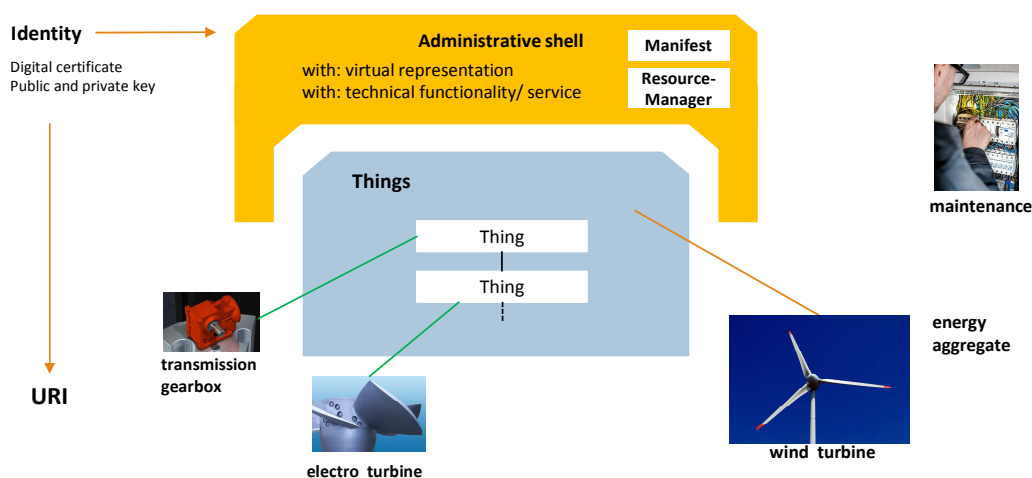


Figure 4: Smart object described as Industrie 4.0 component (RAMI 4.0)

From a service perspective, service ecosystem typically consists of various service systems “[...] *connected by network to engage in value cocreation process* [...]” (Goda and Kijima, 2015, 86). Actors in the network are large capital good suppliers and manufacturing companies. Energy providers have previously controlled the energy market in Germany and thus act as focal actor-to-actor networks. Connectivity is an important future capability to offer PSS. IoT platform providers have to build service ecosystems and development communities to offer support to their “product” customers (Wortmann and Flüchter, 2015, 224). RAMI architectural design reflects required self-organizing capabilities such as identification of system components or devices realizing the ability of things to find each other autonomously in networked industrial settings (see Figure 4). Furthermore, IoT platforms provide mechanisms and logics to enable complex systems of systems constellations (Blair et al., 2016; Eloranta and Turunen, 2016).

Sensors and actuators are a pivotal element to sense the environment of smart objects and to record data concerning respective system variables. Collecting and analysing data is an important capability to develop services in the context of IoT (Kim and Jung, 2016). To facilitate high quality interactions amongst actors and seamless access to operant resources (competences, knowledge) are subject of value cocreation mechanism. Value cocreation and opportunities to collaborate and link to other systems results in higher resource density and hence novel value propositions and service innovations.

5.3. Platform Architecture and Service System

Service platforms enhance resource density by facilitating service exchange and value cocreation (Lusch and Nambisan, 2015). This is realized through support of searching for appropriate resources in a given value creation context) as well as bundling resources in a location (or transporting resources to a location) (Voss and Hsuan, 2009; Lokkegard et al., 2016). Service platforms help actors to search, select, match and combine resources within and across service platforms (Lusch and Nambisan, 2015). Service platforms are based on three logics, namely connecting, sharing and integrating (Eloranta and Turunen, 2016, 183). Middleware technologies are a constituent element connecting all kind of objects and things and other systems (Blair et al., 2016, 88).

From S-D logic perspective, IoT is an enabler of resource integration (Lusch and Nambisan, 2015; Vargo and Lusch, 2016) and offers new opportunities to aggregate and combine resources to generate new service innovations and improve existing offerings. IoT allows gathering of customer-centric information, which in turn leads to innovative service offerings (Li et al., 2015). Service platforms provide the environment for interaction and resource integration activities (Eloranta and Turunen, 2016, 183) through implementing corresponding mechanisms and logics. Thus, from a strategic perspective, many value propositions ground on provision of service platforms, which ease access to resources and support to collaborate with other actors and in this way offer opportunities for resource integration. Connecting various systems to a system of systems constitutes a major future research challenge (Blair et al., 2016, 90; Spohrer and Maglio, 2010). Various architectures and proposals of IoT platforms and applications exist offering varying set of functionalities based on underlying strategy and purpose (Wortmann and Flüchter, 2015, 223; Bandyopadhyay and Sen, 2011; Abreu et al., 2016). Often contributions are focusing on mere IoT aspects not

sufficiently prioritizing coordination and integration of people, systems and things (Wortmann and Flüchter, 2015, 223). In the remainder, we thrive for a more comprehensive view of service platforms embracing more abstract service concepts, e. g. service systems in context of service ecosystems and value cocreation as proposed by (Lusch and Nambisan, 2015; Vargo and Akaka, 2012; Vargo et al., 2015, Chandler and Lusch, 2015). Figure 5 shows a generic architectural design based on SOA design paradigms (Li et al., 2015). The architecture grounds on four constituent sub-systems or layers, namely sensing, network, service and interface layer.

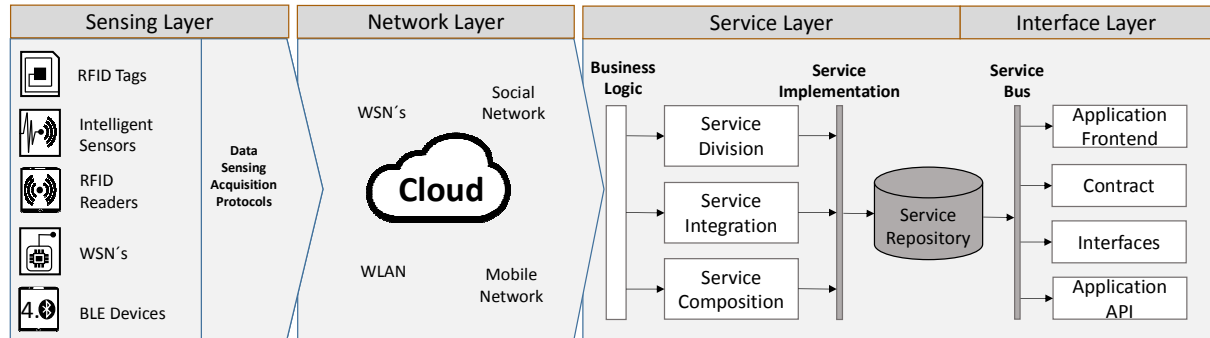


Figure 5: Service-oriented architecture for IoT, (adapted from Li et al., 2015)

Further details concerning IoT technology stack can be found in (Atzori et al., 2010, 2792; Wortmann and Flüchter, 2015; Porter and Heppelmann, 2015; Tsai et al., 2014, 2203; Bandyopadhyay and Sen, 2011, 52). Further interesting perspectives to be added to a comprehensive framework and architecture are computational intelligence, data management, cloud computing and social network (Tsai et al., 2014, 2211). Important to mention, security issues are crucial for a solution design and needs to be adequately reflected by solution designs.

5.4. Solution Design for Service Platform Architecture

In presented case, core of the service offering combines a software-based service platform (Wortmann and Flüchter, 2015; Atzori et al., 2010, 2791), modularity (Voss and Hsuan, 2009, 555) and a service ecosystem (Lusch and Nambisan, 2015). Latter builds on deployed standards (such as data representations, semantic technologies as well as network and communication protocols) for connecting devices. An overview of enabling technologies offers Atzori et al. (2010, 2790) or Wortmann and Flüchter (2015), the latter with focus on IoT software platforms. The service platform provides access to various energy management services and related resources (operand and operant). Service platforms are critical to make this happen (Lusch and Nambisan, 2015). The lowest layer in Figure 6 corresponds to the sensing layer of the IoT architecture (Figure 5). On the upper layers, applications and omnichannel capabilities are required to interact with actors on various channels (physical and digital) (Weill and Woerner, 2015).

Service platforms have to reflect rules and policies governing the interactions and service exchange (Lusch and Nambisan, 2015). Protocols are normative and provide guidance to actors / customers how they can make use of available resources and value offerings (Lusch and Nambisan, 2015). Classification systems such as eCI@ss (Weiß et al., 2011) are an important element of solution designs as they are essential

to codify and implement the acceptable (or desired) behaviours and guide the interactions between actors and resources for service exchange (Lusch and Nambisan, 2015). Service platforms have to establish mechanisms and logics of leveraging complexity (Eloranta and Turunen, 2016, 183), which verify and validate both structured and unstructured interactions between actors and resources through the service platform (Lusch and Nambisan, 2015). Proposed logics include connecting actors, sharing resources and integrating systems (Eloranta and Turunen, 2016, 183). Innovation occurs as actors seek better density and improved ways for value co-creation (Lusch and Nambisan, 2015).

Technology stack combines typically the following components (Wortmann and Flüchter, 2015, 223): (1) connectivity component to connect the product with the cloud by utilizing network protocols, (2) product cloud (broken down into the components product data database, application platform, rules/analytics engine and smart product applications), (3) product (both software (OS and apps) and hardware (sensors, processors, antenna/connectivity port), enabling IoT connectivity). Further system elements proposed are components for identity and security (system access and authentication), gateway to connect and gather information/ data from external sources and the ability to integrate smart objects' data with backend and legacy systems (system of records) (Moore, 2011) such as ERP, CRM and PLM (Wortmann and Flüchter, 2015, 223).

Sensor add connectivity to resources and make them available and accessible within and among service systems (Blair et al., 2016; Eloranta and Turunen, 2016). In consequence, data streams gathered from the various connected network entities have to be managed and analysed efficiently. Data analytics becomes an important capability to support energy management through intelligent service systems constituting on connected smart objects (Tsai et al., 2014, 2207; Kim and Jung, 2016).

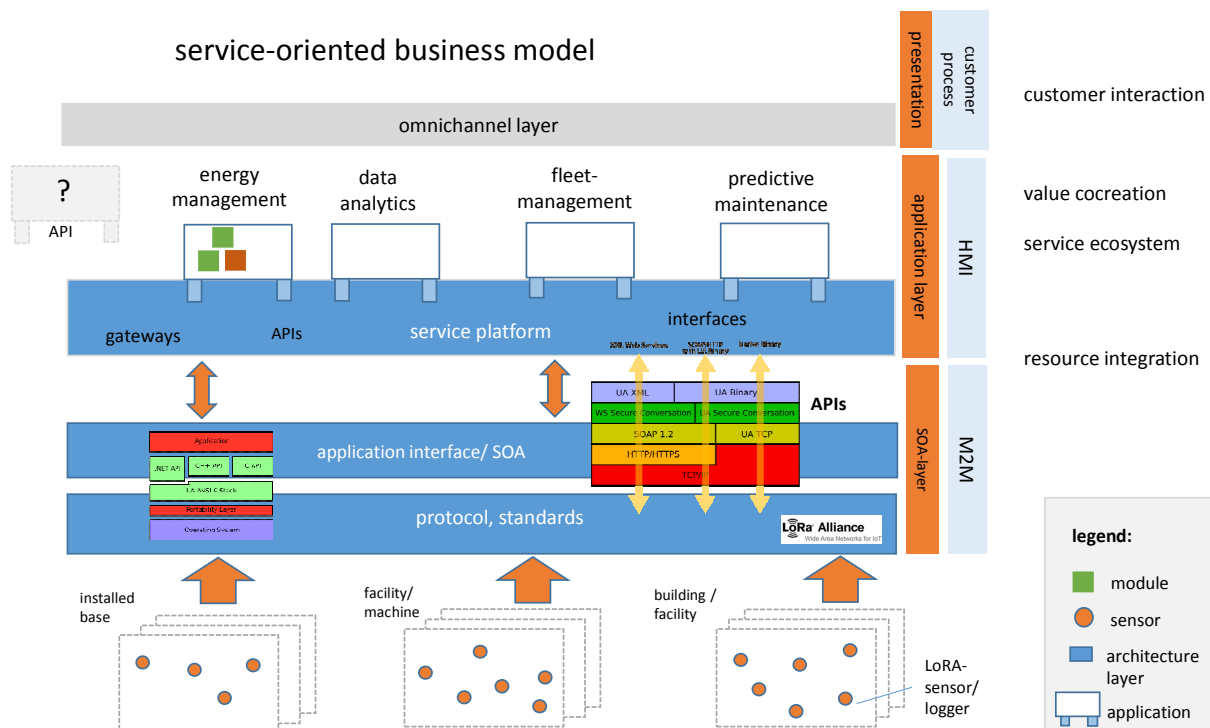


Figure 6: High-level architecture of the service platform build on four layers

6. Summary and Outlook

Energy management offers a wide market and is applicable across many industries. The paper has highlighted respective capabilities to connect smart objects through digital infrastructures (e. g. IoT) enabling new digital service offerings and innovations. The renewal energy sector (e. g. wind turbines) is a dynamic market driven by current developments of smart technologies. PSS-based models (Aurich et al., 2009) combined with modular service architectures (Voss and Hsuan, 2009) and systemic view, namely service systems (Spohrer and Maglio, 2010), are of strategic interest as they support configurations of resources to achieve complex service offerings and service innovations.

The paper has highlighted service-led strategies, underlying architectural designs and enabling technologies. Current developments related to the integration of products and services, e. g. the interlinkage of industry and services (Industry 4.0) and the emergence of smart service technologies (systems of service systems) offers new opportunities by integrating innovative services, such as integrating resources of energy management service systems as service component to their product offerings. From a PSS perspective, integrating energy management services enables companies to increase the lifetime value of their products (Aurich et al., 2013). Especially for manufacturers and providers selling capital goods, service ecosystems offer attractive strategic options to move from selling products to offerings solutions (Gebauer et al., 2013). This necessitates to build new capabilities such as integrating and configuring resources from various service systems (service exchange). By using service-led strategies companies can make the leap to strategic use of IoT technologies as a “[...] *core element of value creation and source of competitive advantage*” (Wortmann and Flüchter, 2015, 224). The trend towards a more service-oriented industry is clearly visible (Greer et al., 2016, Gebauer et al., 2013). In order to secure their competitiveness, companies have to adapt their product / service portfolio accordingly. Further research should concretize strategy formulations and explore the interdependencies between IoT-based service innovation and IoT infrastructures.

Digital service ecosystems are supposed to evolve which will draw on the principles of service logic and service systems (Maglio and Spohrer, 2008). The Service Dominant Logic (S-D logic) approach can explicate influencing factors and shed light on the interplay of system elements (Vargo and Lusch, 2004; Akaka and Vargo, 2014). Besides various technical open issues and challenges existing, we still miss, foremost, overarching frameworks and standardization (Tsai et al., 2014, 2211) to achieve systems of systems (Blair et al., 2016, 90). Combining service science and IoT research creates synergies to implement required logics and mechanisms (Eloranta and Turunen, 2016). Next step foresees to follow an action design oriented approach to prototype and evaluate the solution design in a comprehensive service platform offering variety of industrial services oriented towards the needs of given industrial use case.

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DIGITALIZATION AND BIG DATA SUPPORTING RESPONSIBLE SERVICE BUSINESS CO-EVOLUTION

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Digitalization is rapidly increasing and enterprises must find new ways to innovate for business advantage. This article introduces a strategic concept, responsible service business management, for utilizing responsibility as a business and innovation driver to facilitate the transition of industrial business towards the new service economy. Responsibility is creating significant impact and opportunities where business, technology, and innovation intersect. Big data, which is resulting from digitization, can be considered as a major opportunity to support responsible business co-evolution. The case business area in this article is circular economy.

1. Introduction

The management of responsibility in value network and the entire society is becoming an important business driver. Most companies do not have a strategy or analysis on aligning the business to responsibility. Being green to achieve mitigation, clean to reach up to optimization and smart to manage the transformation is the integrated, evolutionary approach. Responsibility is an opportunity integrator on the path. Integrating novelty with technology brings new opportunities for more responsible business models. The transformation towards responsible business takes a long time and that is why it is important to fully understand the strategic concept, identify the key issues and harness the associated opportunities. Most of the companies, which are moving towards service business, need new concepts to manage life cycle business on the responsible way. From initial compliance or carbon footprint thinking, steps can be taken which can concurrently be used to optimize enterprise-wide business processes and perhaps even begin creating strategic differentiation and offering enhancement. Knowledge is scattered and distributed in business networks. Competence areas have become more complicated and single human capacity cannot cope with all the needed competence to create new opportunities for businesses.

This article intends to demonstrate that responsible service business is not only the goal but also the means. It introduces a strategic concept, responsible service business management, for utilizing responsibility as a business and innovation driver to facilitate the transition of industrial business towards the new service economy. Responsibility is creating significant impact and opportunities where business, technology, and innovation intersect. The case business area in this article is circular economy.

2. Digitalization and big data

Digitalization is a current megatrend, implying that digital technologies are integrated into our ordinary life. The utilization of advanced digital technologies empowers the connection of various services and automating several processes supporting them. Despite the fact that digitization itself is a vital technological (r)evolution, it empowers much more fundamental change: datafication (Ylijoki; Porras, 2016). An expanding number of peripherals, devices, and sensors are continuously connected to the Internet. They deliver wide assortments of digital data. This data generation phenomenon is known as datafication (Mayer-Schönberger; Cukier, 2013). Datafication can be defined as a "sense-making process", which accentuates the value generation viewpoint (Lycett, 2013). Datafication and digitization make it conceivable to catch distinctive activities, situations, or even series of events as data. An obscure term "big data" depicts the data resulting from datafication (Ylijoki; Porras, 2016).

Digitalization and industrial internet can then be used when increasing the efficiency of processes. Industrial internet enables functional optimization of entire value network and increasing use of material side flows (material and energy efficiency). It is possible to anticipate beforehand the disturbance situation of value network and their repair operations. Collected data from whole the value network can be used for its functional development or forecasting purposes. New entrepreneurship and new digital services can be created through digitalization activities. Industry 4.0 standard architecture can be applied to a common framework when starting a business on circular economy.

Big data, which is resulting from digitization, can be considered as a major opportunity, see for example (Davenport, 2014; Manyika et al., 2011; Schmarzo, 2013). Datafication and big data are disruptive technological phenomenon that have widespread implications for the society and industries. The public sector, privately owned businesses, technology vendors, consumers, and policy makers, among others, have interests in the field. In addition, as the quantity of stakeholders parties involved expand, the basic comprehension of the phrasing and concepts turns out to be increasingly important (Ylijoki; Porras, 2016). Big data might be characterized as far as volume or scale (Zikopoulos; Eaton; DeRoos; Deutsch; Lapis, 2012), examination strategies (Chen; Chiang; Storey, 2012), or effect on organizations (McAfee; Brynjolfsson; Davenport; Patil; Barton, 2012). The ascent of mobile and digital networking has made the world turn out to be more associated, arranged, and traceable and has lead the accessibility of such huge scale sets of data (Rainie; Wellman, 2012). Big Data is a freely characterized term used to depict data sets so vast and critical that they get to be ungainly to work with utilizing standard statistical software (Snijders; Matzat; Reips, 2012).

Given the data assessing capacities that are set up with regards to checking physical resources, chances of success are greater from an industrial perspective (Shah, 2016). Big data is likewise characterized as a key empowering influence that can be utilized to generate value in privately owned businesses and public organizations (Ylijoki; Porras, 2016). The revolution of big data is in its initial days, and the vast majority of the potential for the creation of value is still unclaimed. However, it has set the industry on a way of quick change and new revelations; stakeholders that are focused on innovation will probably be the first to reap the rewards (Groves; Kayyali, Knott; Van Kuiken, 2013). Examples of the benefits related to digitalization and big

data incorporate creating opportunities for new business, enabling innovation related activities, and supporting managerial decision making (Lee; Kao; Yang, 2014).

The amount of scattered and structured data around us is increasing dramatically. It is a great business opportunity to benefit that data for business purposes. Data-driven service operations aim to harness insights from the data for planning and optimization. Recent research provides cases of the big data analytics to smart service related innovation (Opresnik; Taisch, 2015/7). Utilization of big data can encourage a commonly beneficial relationship amid a firm, its clients, and perhaps society in smart service systems (van Riel; Kandampully; Kumar, 2013). A smart service system is "a service system capable of learning, dynamic adaptation, and decision making based upon data received, transmitted, and/or processed to improve its response to a future situation" (Medina-Borja, 2015). Smart service systems are a sort of human-centered service systems, implying that knowledge, capabilities, and value are all controlled by the people in the system (Maglio; Kwan; Spohrer, 2015). A key issue in innovating smart service systems lies in taking the benefit of analytics of big data to create human value (Maglio; Lim, 2016).

3. Responsible service business and circular economy co-evolution

Sustainability is no longer a question of if, but of when, and to what extent it will affect a specific business sector. It is no longer a negative reactionary tactic to moderate environmental climate change, but a positive proactive strategy to accelerate long-term business climate prosperity. It is not just about risk, reductions, and recycling, but an industry-changing paradigm integrating innovation, differentiation, and transformation. Antonio Tajani, EU Commission Vice President on Industry & Entrepreneurship stated, "there will be no sustainability without competitiveness, and there will be no long-lasting competitiveness without sustainability. And there will be neither of them without a quantum leap in innovation." (Eppinger; Hopkins, 2010) have discovered that the link between sustainability and innovation is commonly mentioned, but not commonly made.

Sustainable growth and responsible business management are not possible to achieve by the way of a linear economy but by circular economy (MacArthur, 2013). Circular economy with interrelated bio and mechanical cycle consists of huge amount of data. The data of waste from one partner means material for the other partner. Understanding the value proposition in growing value networks is essential. Management and analysis of data coming from various sources is routed through the data-to-service process in business co-evolution of circular economy, Figure 1. Creation and optimization of new operational functions and responsible business co-evolution requires democratic innovation and decision culture.

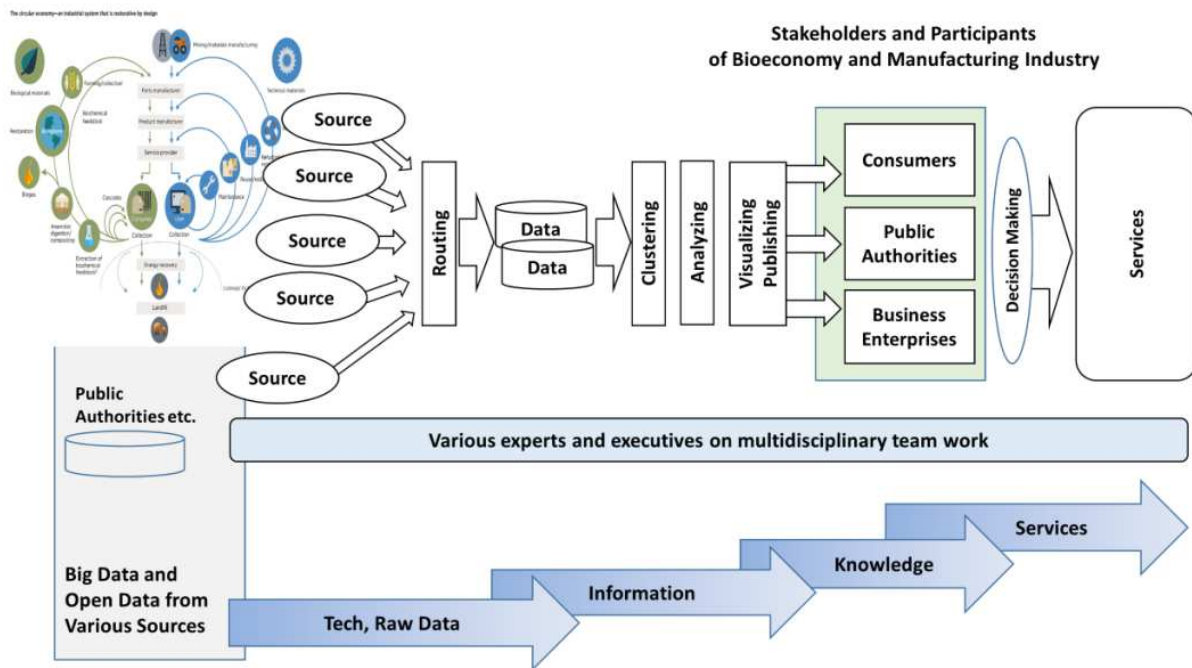


Fig. 1: From data to services process in business co-evolution of circular economy (Salminen; Ruohomaa; Pöykkö, 2016).

A circular economy is restorative and regenerative by design and aims to keep products, components, and materials at their highest utility and value at all times. The concept distinguishes between technical and biological cycles. As envisioned by the originators, a circular economy is a continuous positive development cycle that preserves and enhances natural capital, optimizes resource yields, and minimizes system risks by managing finite stocks and renewable flows. It works effectively at every scale. There is a world of opportunity to re-think and re-design the way we make stuff (European Commission, 2016). "Re-Thinking Progress explores how through a change in perspective we can re-design the way our economy works - designing products that can be 'made to be made again' and powering the system with renewable energy. It questions whether with creativity and innovation we can build a restorative economy" (EU environment, 2016).

Circular economy and industrial internet are rather new topics and there are few experiences on driving of benefit out of them both in enterprises and universities. That is why co-operation serves to develop on the collaborative way. Digitalization is rapidly increasing and enterprises must find new ways to innovate for business advantage. Through digital transformation with increasing intelligence and automation enterprises can capitalize on new opportunities and optimize existing operations to achieve significant business improvement. The collection of the enormous amount of scattered data, clustering it for analysis, visualizing it for decision making and using the selected data in new service development and execution is most important in the concept of responsible business leadership.

Most of the innovations are created at customer interface and co-operative development on the common platform, research and learning environment is an essential basis in succeeding on business co-evolution. Good co-operation requires management engagement, trust building, information, and experience delivering. It happens

on various levels of operation; e.g. forecasting and roadmap-projects, applied research and development projects, on bachelor and masters' thesis works or creation of research and learning environment for experimentation and piloting. It is ought to be continuous at various organization levels. Co-operation and learning together on research and learning environment supplied by a university is basis for innovations and continuous development. Lean and digitalized value networks build developing of superior competitive power through principals of circular economy. It is important to succeed in benefiting multidisciplinary competence and open information sharing.

There is a new logic behind open innovation, which embraces external ideas and knowledge in conjunction with internal R&D (Chesbrough, 2003). This offers a novel way of creating value. Miller and Langdon (1999) introduce how to manage disruptive innovation by managing platform, product and process innovation in continuous cycles. Nidumolu, Prahalad and Rangaswami (2009) explain widely why sustainability is now the key driver of innovation. Salminen (2008) has discovered that when new value for the customer is created in the form of a product or service offering and it results in sustainable innovation, it is essential to know whether there is also a transition into a new business model of circular economy. At the same time, the business innovation must be built on the essential business structures (operational systems, contracts, network structures, competence, etc.). Tammela and Salminen (2008) introduce the interoperability concept through which common innovation of sustainable products and services can be accelerated by an open semantic infrastructure. The open innovation process requires the definition of interoperability in order to achieve a critical level of network dynamics to create new products and services. Skyttner (2005) introduces new systems theory with self-organization and evolution. Gharajedaghi (2011) argues that system thinking is the art of simplifying complexity. It is about seeing through chaos, managing interdependency, and understanding the choice. Concepts are important to explain chaos. Sanchez (2004) have proposed an open systems model of firms. Improving organizational competence also requires increasing managers' own cognitive flexibilities to imagine new strategic logics for creating and realizing new kinds of value-creating product offers and new ways of managing processes for creating and realizing new and existing product offers.

Succeeding on circular economy co-innovation requires data-to-service management process and creation of adaptive multidisciplinary co-operation model for solution development. Same operation model and framework suit for the re-use chain planning and execution as for normal supply chain management .It is obvious that supply chain and re-use chain will unite into circular value chain (Figure 2), when component and material re-use is taken into account until from product planning phase.

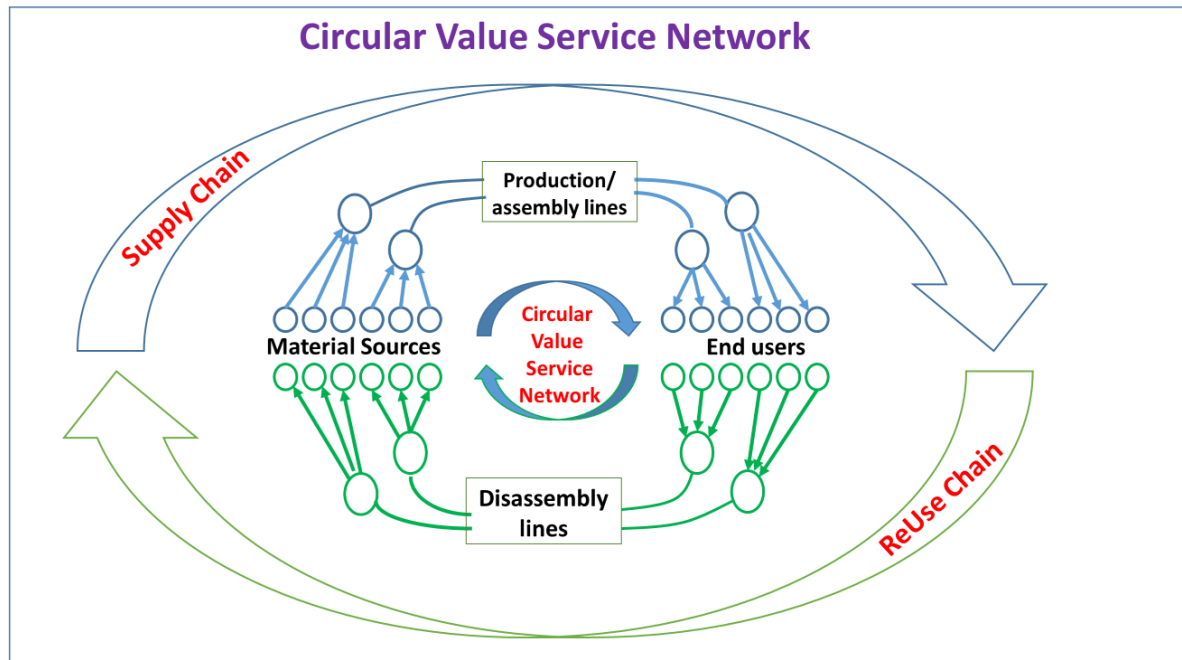


Fig. 2: Integrated Planning of Supply Chain and Re-Use Chain towards Circular Value Service Network

Enabling forces for the development of circular value service network are

- * Life cycle planning and calculation, which create economic base for effective operation
- * Utilization of efficient and modern digitalization in all phases of operation
- * Formalization of value chains and networks, which creates efficiency by streamlining network operations, new innovativeness and entrepreneurship
- * Legislation, which directs and control operations by restrictions and laws or by incentives connected on taxation.
- * Business opportunity for many companies in inter-professional co-operation
- * Created value for whole society in responsible way

Figure 3 describes the conceptual model of adaptive development towards circular economy by benefiting responsible service business, proper digitalization, and data analysis/management. The objective of circular economy is efficiency on the use of material and energy. The purpose of digitalization is to increase effectiveness of planning and optimization. The objective of the responsible service business is to apply responsibility as a business and innovation driver. The trend in succeeding on circular economy is that these functions will be continuously increasingly overlapping. The increasing digitalization and management on data-to-service-process are key enablers in business co-evolution.

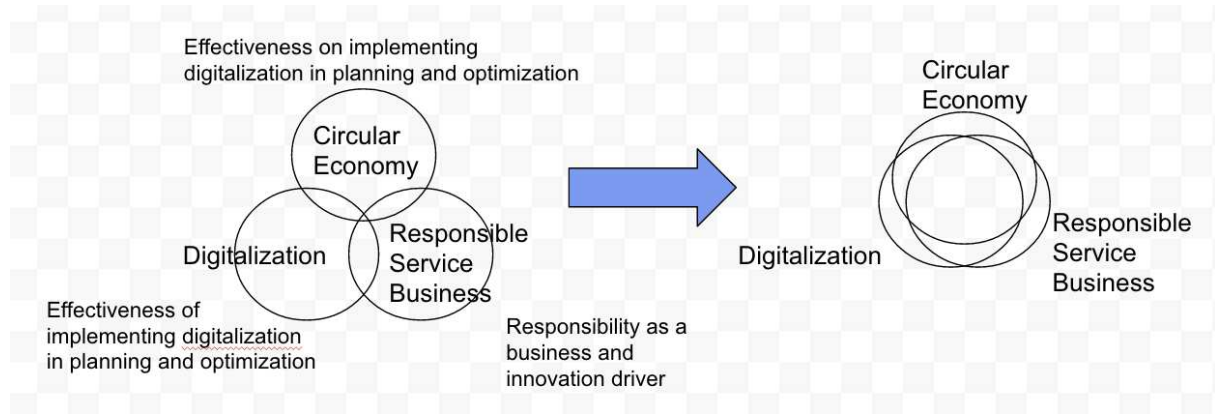


Fig. 3: Proper implementation leading on more intensive overlapping

4. Discussion and managerial conclusions

Manufacturing industries have started to adopt the circular economy framework with a regenerative model of manufacturing. In this model, products, components and material are re-used multiple times by circular value chain. Combining the principles of circular economy to value network thinking and digitalization of functionality of whole the network give an opportunity for remarkable competitive advantage in business. In order to sustain competitive advantage, manufacturing companies are expanding their product offering to also provide lifecycle services. By doing so, these leaders are expanding their value proposition multidimensional by concurrently creating strong potential through developing more sustainable customer-engaging products, co-innovating sustainable services together with their partners, and collaborating to create integrated new sustainable business technologies. Companies today are facing increasing complexity to execute profitably on continuous sustainable business transition.

Resource and energy efficiency is possible to achieve by eliminating waste through the superior design of materials, products, systems and business models, improving the reuse of products and by recycling of materials. Recognition of actual customer needs combined with life cycle calculation creates opportunities for life cycle services, but it gives also economic fundamentals and reason to observe also the value of disposed products and re-use opportunity. That requires combining of various theories but the main challenge is in the utilization of transdisciplinary knowledge and implementation work. The use of new technologies; digitalization, big data, and social networks with increasing intelligence and automation enterprises can capitalize on new opportunities on and optimize existing operations to achieve significant business improvement on circular economy.

Managers inspired by driving a major data transition can begin with two straightforward strategies. To begin with, they can get in the propensity for asking "What do the data say?" when confronted with an essential choice and catching up with additional specific inquiries, for example, "Where did the data come from?," "What kinds of analyses were conducted?," and "How confident are we in the results?" Second, they can permit themselves to be overruled by the data when

applying data discredits a hunch (McAfee; Brynjolfsson; Davenport; Patil; Barton, 2012). To get advantage from big data requires alterations and upgrades of technological infrastructure, organizational processes, business applications and in addition an incremental change in the business model of the firm. This includes also new techniques to derive knowledge from data. Firms going for a better utilization of accumulated data ought to see this additionally as a cultural challenge. To overcome this cultural challenge organization should concentrate on preparing employees to efficiently manage data appropriately and consolidate them into decision-making process. As opposed to considering data essentially as an input variable, its worth as an organization's "resource" should be understood and internalized. To amplify this resource, data governance should focus on ensuring high data quality as a premise for any big data activity (Buhl; Röglinger, Moser; Heidemann; Others, 2013).

According to the experiences of conceptual development work, successful activity in circular economy is dependent on systematic long-term development on industry. An essential topic is preparing of up to date legislation, which enables and controls the operation and creates a business environment to apply new offering. European community is preparing new legislation and directives, which are speeding up the development of circular economy. Industry 4.0 as an industrial standard architecture has a remarkable role in preparing new functionalities on distributed value networks. The standard offers technical background and rules for implementation for digitalized circular economy.

The co-operation between government, enterprise and universities is essential to succeed in co-evolution when building up cumulative competence while creating solutions for circular economy by benefiting digitalization in it. It is also essential to have a common vision to direct the local operation and funding. Otherwise, the activities can splinter into small pieces and do not form parts of the whole vision. The important role of universities is to support enterprises by applied research and creation of research and learning environments for continuous piloting of new technologies and preparation of new business models on circular economy. Digitalization changes everything and is a great opportunity to find out a competitive advantage in business. Universities of applied science have a good opportunity and central role in supporting the growth of business in the area of circular economy.

Smart services research unit at Häme University of Applied Sciences supports industry, commerce and the society in digitalization and service development needs. The task of the research unit is to create and execute, together with co-operation network, well-addressed R&D activities for the region and its' enterprises. The focus is on developing knowledge that can be applied in diverse industries. Responsible business management and circular economy are key focus areas of the research strategy on Smart services research unit. The Smart Services research unit supports the utilization of digital technologies and service business development across sectors: similar solutions can be adapted in various lines of business. A specific geographic focus is on the growth path of Finland, Helsinki-Hämeenlinna-Tampere, which is a versatile area of industry. To be successful on new challenges of circular economy, enterprise-university partnership has to be tight and the main objective is common learning. Long-term co-operation creates a background for new co-innovation and business co-evolution. For research unit to be capable of collaborating with industrial companies, it is important to know the overall capability of research and development unit. The experts making applied research with customers have to have content and process knowledge of customer site, they have to be

capable of working in teams on distributed way with other experts in value network and have to certain collaborative skills to work together. It is essential to categorize the competence and capability on three layers: content management capability, organization capability and human competence and capability (Salminen; Kantola; Vanharanta, 2015).

Responsibility business leadership needs democratic innovation culture and co-innovation and co-evolution processes. This article introduces a concept of responsible service business. It gives a concept how to analyze co-evolution over the life cycle of business transition on circular economy. Digitalization is rapidly increasing and enterprises must find new ways to innovate for business advantage. Through digital transformation, the use of new technologies like cloud, mobile, big data, and social networks with increasing intelligence and automation enterprises can capitalize on new opportunities and optimize existing operations to achieve significant business improvement. Through digital transformation, the use of new technologies with increasing intelligence and automation enterprises can capitalize on new opportunities and optimize existing operations to achieve significant business improvement on circular economy. There is a great challenge on usability of digital systems and services and even data. The process of data (life cycle and big data) transferred on information and tacit knowledge and finally as life cycle care and services have to be managed to change it as a business opportunity or completely new entrepreneurship and business. It is tuff for a human being and his mindset, capability of organizations and team structures to manage scattered topics during business co-evolution.

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DO YOU SEE WHAT I SEE? WEB APPLICATION AS A METHOD FOR CREATING A SHARED CONTEXT IN EMPLOYEE-DRIVEN INNOVATION

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The paper presents action research on the role of information technology that is used in capturing employees' starting points and motivational factors in employee-driven innovation in health care. The empirical study investigates a web application used as a method for supporting employees' collaborative knowledge sharing in front-end of innovation in two study cases. Particularly, the research findings focus on how the web application enables employees to create a shared context for their innovation.

1. Introduction

Over the recent years, we have witnessed a hike of interest in employee driven innovation (EDI) (Høyrup, 2010, Kesting; Ulhøi, 2010). The EDI is expected to accelerate the productivity and quality of services. The role of employees as innovators has been a subject of studies in service innovation and management research but also in the service design research. Despite increasing studies about the EDI, we still lack understanding on how to engage employees to participate more actively in collaborative development and how solutions of the recent information technology (IT) could have a meaningful role in supporting employee driven innovation especially in the front-end of innovation process (FEI).

Private organisations are increasingly finding new means and methods for enhancing EDI but innovators should be more aware of advances in IT products and systems in the FEI (Gordon et al., 2008). In the public sector, organisational renewal and innovation are still often initiated by policy-makers and management rather than bottom-up activities initiated by actors on the lower organisational levels (Windrum; Koch, 2008, Borins, 2008). Renewal of public sector has rested on structural reorganising and policy implementation, and employees have typically been adopters of changes (Saari; Lehtonen; Toivonen, 2015). Particularly staff in the lower ranks perceives that it is not suitable to enact innovative role at the workplace. However, rising demands and expectations directed to the public sector, the wicked problems the public sector is currently facing, and the global competition have forced the public sector to seek new ways to turn innovation into a permanent and systematic activity. The public innovation should be further enhanced by bringing together different kinds of actors to recognise and to identify problems and challenges in ways that capture the complexity, and to develop new strategies for dealing with the complexity (Sørensen; Torfing, 2012).

Recent service innovation research (Fuglsang, 2010) has been interested in attempts to imply a more intrinsic understanding of innovation in the public sector and to capture better how innovation activities could become socially sustained. According to Fuglsang (2010) innovation is seen as an emergent phenomenon which is constituted by a practice in order to achieve an impact. Innovations emerge out of practices and are continuously constituted in an evolving practice where problems are uncovered and responded to. Empirical research especially in services knowledge (Gallouj; Weinstein, 1997) indicates that innovation is not always a planned and intentional activity in relation to an understood problem. Even the small intrinsic and interactive adjustments can lead to new practices and routines, “ad hoc innovations” if all the available knowledge and experience are harnessed and put to work to create new solutions (Fuglsang, 2010).

Both in private and public sector, employees are increasingly been involved in problem solving activities, such as opportunity identification, opportunity screening and idea generation (Koen et al., 2002, Smith; Reinertsen, 1991). New technology offers a wide range of opportunities to involve employees in identifying problems and opportunities but it can also be exploited as a mediator for collecting, sharing and processing data during the process. By capturing, transmitting and combining employees’ different aspects the technical tools will inevitably affect also in the relationship the employees have to their work. At its best, the technical tools can have an important role to engage employees in their profession and in collaborative development in organisation.

The previous result findings of this research indicated that concrete ‘doing’ from real needs motivates employees to participate in and get excited about the collaborative development process within their organisation (Lahtinen et al. 2014). The web application used in the empirical study of this research has been developed in the previous study project where it was designed for supporting employees in their collaborative service design project which based on the real needs the employees collected in their everyday work. The results of the study revealed that employees are committed to the collaborative development if they feel process open and transparent. Hence, employees are willing to use the technology and digital tools in the process if they experience them supporting and strengthening the transparency of the collaboration. In addition, the results revealed that the technical solutions are approved well by the personnel if they enable simple and practical opportunities for whole organisation to renew practices, processes, and conditions to provide better services. (Lahtinen et al., 2014)

Due to the promising previous study results (Lahtinen et al., 2014, 2015) researchers are now investigating more carefully the role of IT when it is used in capturing employees’ starting points and motivational factors in EDI. The purpose of the study is to shed some light on a web application which is used as a method of supporting employees’ collaborative knowledge sharing in FEI and to analyse how the web application functions as a method supporting employees to create a shared context in collaborative development process.

The research is part of the project “Entrepreneurial renewal and design thinking in the organisational development” funded by the Finnish Technology Agency for Innovation. The aim of the project is to help organizations to identify and utilize their workers’ tacit knowledge and vocational know-how, and to incorporate their ideas to develop new services and work practices.

The structure of the research paper is as follows. The first, the paper describes the key concepts used in the research – the concepts of employee driven innovation (EDI), front-end of innovation (FEI) and boundary object – and proposes a way of conceiving IT systematically used in EDI. Then the research proceeds into describing the empirical study cases and the methodical approach. From there on, the research continues to the study results and the discussion of them in the light of theory.

2. Literature and key concepts

In order to develop work practices and service processes, the tacit knowledge and skills of workers should be incorporated into the innovation process. Incorporating the employees - the experts of their own work - into innovation activities can be seen as co-creation aimed towards employee-driven innovation (EDI). By definition, EDI is a new idea created by employees that results in a new, shared, and sustainable practice (Kristiansen; Bloch-Poulsen, 2010, Hoeve; Niewenhuis, 2006, Feldman; Pentland, 2003). Most commonly, innovation refers to commercialized invention like a new technology, product or process. Here, the concept is wider. By innovation, the researchers of this study understand both radical and incremental renewal of the products and services, processes, and work practices alike (Wolff; Pett, 2006).

Innovation is a multidimensional process that covers various aspects of newness. It may refer to the development process with an outcome of new goods, services, marketing methods, or even organisational practices. Here, we do not approach innovations as commercial. Instead, we refer to process innovations that are new ways of acting to diminish the cost or to increase the quality of health care services. This includes but is not limited to organisational innovations that are changes in the workplace practices to improve administrative efficiency.

The innovation process can be divided into three stages: front-end innovation, new product and process development, and commercialization (Koen et al., 2001). The early phase of the development process is called fuzzy front-end (FFE) (Smith; Reinertsen, 1991) or front-end of innovation (FEI) (Koen et al., 2001). A characteristic to this phase is that there is no clear objective, no schedule, or no budget, and hence no plan to follow. The nature of work is experimental and unstructured. Despite the fuzziness of this phase, some common elements of the FEI have been identified. According to Koen et al. (2001), FEI - as they call it - consists of five elements, which are idea genesis, opportunity identification, opportunity analysis, idea selection, and concept and technology development. Idea genesis can precede opportunity recognition or vice versa. What comes out from the FEI is not certain, since not every idea - and not even every novel and useful idea - gets implemented and utilized in a profitable way (Amabile et al., 1996, Fillis; Rentschler, 2010). Hence, only some creative ideas turn into innovations. Therefore, uncertainty is characteristic for of the FEI of employee-driven entrepreneurial renewal (Smith; Reinertsen, 1991). The end product of the renewal process is still unknown at this stage and the uncertainty of the process is quite similar to a business start-up process (Phan et al., 2009) even though the amount of risks and employees' role as a risk bearer is different (da Costa; Brettel, 2011).

The FEI is a divergent process that requires letting out of too much analysing and solving complex problems. It consists of many human touch points and interactions and creative activities that do not typically lead efficiency or predictable processes. IT is usually employed for removing redundancy, reducing human error and touch points, and for improving the efficiency of decision making. Although the mostly recognised value of IT is in people management and execution, the IT can be effective in supporting many FEI activities, such as collaboration and intelligence gathering. (Gordon et al. 2008, 51)

In participatory design, technology is seen as a mediator interweaving meaningful connections within a wider socio-material system between people, objects, and processes (Suchman, 2002, Björgvinsson; Ehn; Hillgren, 2010). Recently, particular attention in participatory design has been paid to the application of participatory tools and techniques specifically in the front-end of the design process. Co-creation has been found to be even more relevant at the early front-end of the design development process, where probes and generative toolkits operate well (Sanders; Simons, 2009).

The concept of a boundary object, developed by Star, describes objects that are shared and shareable across different problem solving contexts. In Star's and Griesemer's (1989) study of heterogeneous problem solving, they observed that in spite of differences between scientists in various disciplines, they nevertheless are often successfully cooperating. They describe boundary objects as objects that work there between the differences to establish a shared context that "sits in the middle" (Star; Griesemer, 1989, 47).

The web application used in the empirical study of this research collects employees' initiatives and ideas for better services. The tool makes employees' observations and ideas visible on a computer screen and opens them for discussion in the working community. The collection of the issues on the screen is a starting point for the innovators to plan the service design process which continues from the context inquiry towards more co-design centered phases. The web application is a key method in the empirical study of this research and it is described in the following chapter.

3. Empirical study method

The study is based on two action research cases realized in Tampere University Hospital which one of the biggest hospital districts in Finland (Lahtinen et al., 2014, Lahtinen et al., 2015). In the study cases, the web-based application called Idea Window is introduced to the employees as an inquiry tool in the service design process. Employees are asked to document and to work on their thoughts, ideas and perceptions on the given topic during three weeks experiment. The topic "In what ways can we serve our patients better?" is given to the employees for viewing their everyday working environment, situations and processes from the customer and service perspective and to enter their insights to the web application. Employees can leave their views and comments anonymously to the application any time in their coffee room, where they can also browse, comment, and vote for the items on the screen.

As mediating employees' different insights the web application serves as bridges "between several intersecting social worlds and satisfy the information requirements of each of them" (Star; Griesemer, 1989, 393) and thus can be considered as a boundary object (Star; Griesemer, 1989; Carlile, 2002). The tool captures the knowledge which is characteristically situated and tacit (Suchman, 1987, Cook; Brown, 1999). According to Cook and Brown (1999) knowledge and knowing cannot be separated from an individual's engagement in the "practicing" of their practice. "For knowledge to be useful and effective in solving the problems, individuals must be able to localize knowledge around particular problems, as well as draw from and alter (i.e., trial and error, and learning) the knowledge embedded within their practice. Individuals also must be invested in their knowledge as they try to meet the challenging requirements (what is "at stake") in their practice." (Carlile, 2002, 446)

The researchers in the project are facilitators helping the employees in the co-operating organisation to capture the primary needs for service development from their perspective and to communicate and externalise their ideas in a way that others can understand and so enable discourse and debate. The instrument called Idea Window is created for that purpose and it is a fundamental part of the researchers' function in the organisation. The dialogue in the co-operating organisation is mainly facilitated through the modifiable web based application. The researchers' role is to modify the instrument for the process and to instruct and guide employees in the use of the tool. The researchers participate in EDI process as designers and facilitators and combine action, research, and participation. Thus, the approach of the study can be characterized as critical, pragmatic action research (Greenwood; Levin, 2007, Reason; McArdle, 2008, Greenwood; Levin, 1998).

The two study cases share the same public health care context. In the first study case, employees observe their everyday practices and situations from customer perspective by using the web application Idea Window which they have co-designed together with the researchers for their observations, ideation, and knowledge sharing for early phases of the collaborative process in EDI. In the second study case, the same digital tool is used among of other employees within the organisation but this time, the employees don't have any role in designing the tool – the second case is primarily focused on investigating the effect the ready-made tool has in the process.

The research data consists of two kinds of material: The first part of the data consists of employees' ideas and comments collected by the web application and is related to patients' service experience, inevitably referring also to the work conditions and situations the employees find critical in customer oriented service development. The second part of the research data consists of interviews of the employees. In the interviews, the attendees are asked to literally reflect their experiences about the project and the tool used, and to generally describe their thoughts about developing and creating new ideas in their work community.

All the material is transcribed, read and coded carefully according to emerging topics. After this, the topics are categorized under different themes. In the analysis, attention is paid especially on how the health care workers experience the type of co-developing method used in the project and what kind of preconditions they consider important for IT used in EDI.

4. Research findings

4.1. Idea and proposal material

In the study cases, employees produced altogether **160** ideas and proposals on the web application. In the first study case, during a 3 week experiment realised in May 2014, personnel produced 117 issues of which 75 issues were ideas and comments regarding patients' service experiences, 38 issues included proposals for improving services for example by renewing work practices and service facilities, and 4 issues proposed experiments for testing better services. In the second study case, during a 7 week experiment realised at the hospital ward in May and June 2015, personnel produced 43 issues with the Idea Window application, from which 27 issues were about the ideas, 9 of the issues proposed a new solution and 7 issues described an experiment to test a new idea.

64 percent of all the issues include employees' ideas for new ways to organise and arrange services within the organisation. These issues typically handle the existing facilities, infrastructure, and capabilities related to services and suggest alternative ways to develop better services. 36 percent of the issues describe proposals for testing and experimenting new solutions in practice.

The ideas on the web application can be categorized into four groups. The first category consists of ideas and proposals related to the technology and the tools which employees considered as critically affecting their work and thus also on the service experience of customers. The second category concerns the ideas and proposals of reorganising places and equipment that have an impact on the experienced service quality. The third category handles working practices and processes and their connection to the services. The fourth category includes ideas and proposals for improving customer service situations.

Content of the issues presented and stored in the application indicates that employees attach importance to a variety of areas in work and they seem to find easily various issues for collaborative development. It is noteworthy that the web application employees used is not enabling mobile communicating and still they succeed to use it during the working hours and by the work and they consider it even as a permanent solution for their work. The employees in the case are willing to try new kinds of methods in joint innovation but how they really appreciate them if they can concretely see the purpose and the role of them in the process. Employees' perspective and expectations of the use of IT in EDI are presented in the next chapter.

4.2. Interview material

The interview data collected at the Tampere University Hospital consists of nine interviews with healthcare professionals. According to the interview data, the employees see the web application as a tool for making communication more open between different professionals and for enabling continuous collaboration at work. The employees appreciate the way the web application tool presents their ideas on a continuously open dashboard available for any worker for any time and even any-

mously. The tool also makes different employees' ideas and insights visible and provides employees with a new means to participate in the process.

"[...]And the best thing is that it's anonymous. So anyone had the opportunity to put their thoughts there and when you received a message from a patient it was brought there directly, and it's not just forgotten, we discuss it, it's written down."

"[...]When problems are visible to everyone there will be more suggestions for improvement and people more responsively tell about their thoughts when you have the possibility to anonymously propose ideas."

"[...]That's would be the way I like, well I understand it, how it should be used. You should use it more for getting the idea there: someone produces an idea and others comment on it. That's what could be used in work community all the time either it relates to patient care or anything else. That's kind of a good bus [for communication]...you can even see the replies there."

But when describing their experiences about various development projects respondents express strong frustration in the kind of developing in which the meaning is not clear for them. In these projects, it is difficult to find incentives for participating in development activities. If the connection to practices is seen weak not much value is given to the project, rather it is experienced as useless extra work. Respondents also highlighted the importance of information sharing and coordination in the collaboration process. The technology itself can't maintain and support the collaboration if the objective and the different stages of the process are not clear to them. Some of the respondents even might have needed some management and guidance for ideation during the process.

"If it [developmental project] requires a lot of extra thinking or if it has not been presented clearly to us or if the point and benefits have not been marketed well to us -- then you react to it in a more aloof manner."

"I felt that the issue wasn't discussed during the department hours. Ideation was not managed in any way. [...]Use [of the tool] was not motivated."

"Well, yes, certainly I might have needed some more [guidance] to some extent, it would have increased [my] motivation to become familiar with it and use it. But it is depending on my own activity. I should have searched for the information when it came out."

"I think we were motivated [to start]. We had info, and then it was discussed after that, when the people came back from vacation or they didn't know anything about it and wondered the thing in our coffee room. [...]Then there we were talking about the purpose of all this and we saw that it is possible to write down here."

The interview data indicates that health care professionals are motivated to participate and to ideate if the participatory processes are based on meaningful and practical frames which matter to employees and fit with their context and everyday practices. Developing is experienced important and meaningful if it is connected to the everyday practices in one's own work and if the improvements are visible or highly probable. To get motivated clarifying the link to practice seems evitable. From this

point of view developing is not successful if it is “too far from the practices. That you think too scientifically without facing the patient.”

Related to the experiences of meaningful development, respondents find important the kind of developmental actions that are realized on grass-root level and in close co-operation with those who do the work in practice. Challenges for motivation seem to occur if the ideas for developing come from outside or top-down, without concretely understanding the grass-root level reality.

“When employees can themselves think about suggestions for how to correct things, these [ideas] are tested more bravely.”

“The best ideas come from those who physically work in the center of where things happen [...] I find it extremely important that actions are developed in co-operation with those who concretely do the work, perhaps together with those who’ve got the tools.”

“[...] When the suggestions to change come from ourselves and not from what the administration says they are certainly much easier to accept.”

Collaborative ideation with a technical communication tool is received well by most of the respondents. They feel that the tool makes development more transparent and concrete and provides personnel with a lens to look at the work site and its practices from more developmental aspect. Not only is the tool appraised as a one-way channel to express and share ones’ thoughts but it is also experienced as a facilitator for interaction among employees and between employees and management. When commenting on the interaction between employees and managers, the employees highlighted the role of the managers to take forward the views of employees and to guide the further development.

“Well, maybe this idea box enables to process the ideas a little bit further. I feel that sometimes when we have a development day people have such a terrible need to talk about, and if there is a need to get something done, nothing really happens. People are just talking over and over again about the starting point or about the things which are not okay whereas we should see the situation and the way how we can proceed. This idea window could be used in processing and thinking issues a bit further and to consider the things that relate to the issue. Indeed, like brainstorming where ideas are taken a little bit further even before they are discussed face to face or in groups. Then it is time for taking next steps toward the solutions, like what we can do next and think about the impacts.”

“I think managers should deal with that which of these [ideas] are such that what we need to [focus] on somehow. Which of these are relevant to these matters and to which we need to take a stand and to bring, for example, to [our] department meeting. And [managers] think about the way that how these are being taken forward together with the staff.”

As in hierarchic hospital organisations major changes are very slow to realize, the project is aiming at bringing attention to the small acts and achievements in everyday work. Identifying new opportunities in the working environment and community is facilitated with the web application.

“It is easier to bring up ideas/problems/solutions via Idea Window. If the solution is the kind that it doesn't require organizational or structural changes it is easier to take forward. But if some bigger changes are needed it hardly happens.”

Respondents report that the Idea Window produces small, concrete improvements in everyday work that can be realized already during the project. The previous chapter presented the issues the employees collected by the web application, like everyday problems with technology or equipment in work, or suggestions to improve or reorganise places, and simple solutions to solve them. These examples show how employees themselves can take many practical solutions that are relevant for the development of services and gradually can get engaged in also more complicated service development.

4.3. IT in EDI

In health care, rational way of thinking and operating is prevalent and professional competence is fundamentally based on strong knowledge of substance and professional skills. Developmental operations are typically realised in particular actions along with other work tasks and they reach rarely all in the organisation. In addition, objectives and teams of development have been pre-set quite often at the higher levels in the organisation when the employees don't have possibilities to influence on them.

The result findings indicate that predefined targets and plans for development without employees' possibilities to orientate or find their own starting points to the subject of development encounter resistance among employees. Thus, the implementation of projects and involving employees in collaboration can be difficult or not possible at all. Development projects in health care, often specific in nature, consist of predefined problems, teams, and time schedules which do not encourage employees to actively participate in the development. However, workers' tacit knowledge and professional skills involved in development could improve the productivity of the organisation but also increase the awareness of customer value within the organisation (Virtanen; Stenvall, 2014). Although the front-line service workers may have a better understanding of user needs based on their daily interaction, their creative potential is too rarely utilised (Hasu; Saari; Mattelmäki, 2011).

If knowledge of the personnel want to be captured, for example for context inquiring in the early phase of the innovation process, it is probable that collection of the issues it generates is quite heterogeneous. IT and its functionalities, like visualisation and data processing, can help in presenting the captured material as an organised entity to be observed and viewed from all the different dimensions and aspects that relate to the problem. IT solutions can enable viewing the challenge or the problem in the eyes of employees and open it for comments and discussion in the working community.

According to this research the material got from the employees in FEI is a good starting point for management to find the motivational factors and ideas for further steps in the process with personnel. Research findings show quite clearly that employees highlight the managers' role in coordinating and guiding the personnel in the innovation process and they even expect to get some help from management to orientate

towards further development and be prepared for upcoming phases. But the employees are ready and open for participatory methods if they see the point and meaning of the development also from their own perspective and can connect the development especially to their own work context. From the perspective of managers, heterogeneous collection of ideas and solutions captured by employees may appear chaotic and unpredictable. According to Saari, Lehtonen and Toivonen (2015, 328) there are several alternatives to solving this problem. "First, managers may join and empower employee-driven efforts by allocating new resources and formalising them. Second, managers may take initiative in innovation and invite employees to participate in top-down innovative processes (Høystrup, 2012). Managing EDI is not only a question of the flow of communication and coordination between bottom-up and top-down innovation processes. Managers have to perceive employees' initiatives as future opportunities for the entire organisation. An attempted innovation from the manager level may also fail if the employees do not recognise it as relevant at the front-line level (Brandi; Hasse, 2012)."

To improve the innovation process at the front end, it is essential that innovation managers understand how they can create opportunities for different people within the organisation to interact and to exchange ideas and knowledge. The IT tools that have a fast learning curve and are easily adopted by personnel can be a necessary support in facilitating employees' participation but also in storing the information that is maybe not immediately useful but it can be retrieved when eventually needed. According to Gordon (Gordon et al., 2008) this is one of the roles of knowledge management in innovation that can be supported by IT. Knowledge management is a way of extending collaboration also to those who will not be available for or have no interest in working on the innovator's problem. It provides a way to mine the expertise of these people and use this expertise without their immediate participation. (Gordon et al., 2008)

But rethinking and reorganising innovation to be more employee-driven implies also a need for democratization and decentralization in policy and decision making on the whole organisation level (Ramaswamy; Gouillart, 2010), as well as identifying and launching new ideas and experiments right on the grassroots level. Entrepreneurial activity of the workers will inevitably develop long-term profitability, productivity, performance, customer orientation, learning, innovation, and job satisfaction (Antoncic; Hisrich, 2003, Zahra, 1999, Zahra; Covin, 1995). An entrepreneurial approach supported by the working culture benefit not only the individual workers but also the organization as a whole. It means that the whole organisation should be tuned into the opportunity design mode. Sarasvathy (2008) introduces methods and processes of opportunity design this way: "The pragmatist effectuator will look carefully at the actual world and figure out courses of action, however local and contingent, that are both doable and worth doing. Then, through interactions with others, effectuators will redefine the designs of their solutions" (Sarasvathy, 2008, 186).

In health care, innovative tools and methods are quite seldom utilized in development processes and innovation. That applies also to use of the IT in EDI in health care. According to Gordon (2008) there are many activities where the information technology can help to increase innovators' productivity even before the innovations become formal projects. The IT tools and systems can have a role in collaboration, knowledge sharing, competitive intelligence, and they can help personnel in many other ways to generate ideas. (Gordon et al., 2008)

5. Conclusions

In the study, the experiment realized in two study cases in the hospital revealed that IT, such as a web application used in the case, can encourage and stimulate employees in their developmental purposes and can help an organization to get beyond the assumptions that block effective and new solutions. Tools meant for collegiate use provides employees a lens to consider their work site and practices from the more developmental aspect. If the tool is easy to use and it matches well with employees' working context it can bring out and trigger variable reforming aspects and efforts of the working community. The data the IT tool captures and shares can open a view to reflecting various practices, processes, attitudes, meanings, and conditions related to work from multiple points of view. Employees' reflective process combined with management's coordination and facilitation can create a very good base for renewing organization to be more flexible and agile in its developmental operations.

IT in EDI can be helpful in enquiring knowledge and experiences on new opportunities and ideas in participatory ways. It can be useful in gathering broader and deeper information from a multi-professional aspect and thus providing a good starting point for EDI even such hectic and very much routine-based working environment as hospitals. Interactive IT can enable employees to build on each other's thoughts and help them to see the connections between different ideas, observations, and experiences, while simultaneously capturing the collective thinking of the group.

In the research paper, we focus on presenting and analysing the project results as possibilities the IT can provide in EDI. Especially the research investigates the role and the impact IT could have in finding starting points and motivational factors to foster employees' engagement in innovation and organisation development operations. The research combines employee-driven innovation, front-end of innovation and boundary object and investigates the web-based IT solution in practice in the early phase of EDI in health care. Consequently, we discuss the insights for preconditions to implement IT in EDI, especially in front-end of innovation process when employees are involved in the process by capturing their knowledge, experiences and ideas to make outlines of the problem from their own perspective.

The research results indicate that IT solutions can have an important function in employee-driven co-creation and innovation but the most valued feature in the IT solutions would be its' capability to keep the process continuously open, communicative and transparent to different directions, between professions, working teams, and departments but also to top-down and bottom-up directions. The empirical study also shows that employees expect that IT tools fit with their context and they provide with better ways them to participate in and monitor the collaborative processes. In addition, technical tools should be implemented within meaningful and practical frames which matter to them, and thus they can function like a platform for capturing and sharing knowledge in multidisciplinary collaborations and networks. IT tools and systems can collect, combine and carry the insights along the innovation process and have an important role in the emergence of a shared context in EDI. Simultaneously, IT solutions can bring up an attention to the employees' expertise and capabilities as a source of renewal and change, and provide employees with platform also for evaluating ideas and enabling faster reacting and implementation.

The research findings of this study are in line with many investigations on the role and impact of the information technology in front-end of innovation (Gordon et al., 2008) and in participatory design (Suchman, 2002, Björgvinsson; Ehn; Hillgren, 2010). According to researchers like Gordon (2008) or Gallouj and Weinstein (1997)

or Fuglsang (2010) innovation is rarely a solitary process. It usually occurs when people tackle problems whose solutions are neither obvious nor simple. The ability to identify and work with others having the complementary skills and knowledge are critical to solving these kinds of problems. At this point the technology, more and more ubiquitous in today's corporate environment, can provide a channel and a platform even for small intrinsic and interactive adjustments, "ad hoc innovations" (Fuglsang, 2010) that emerge from employees' knowledge and experience accumulated over time. At its best, participatory IT tools and systems can connect the whole organisation to the collaborative development which is not separated from individual's engagement in his practice and localized knowledge. With guidance and support, it can work for connecting the whole organisation to a shared context that "sits in the middle" (Star; Griesemer, 1989, p. 47).

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ECONOMIC IMPACT OF HEALTHCARE SYSTEMS: AN INTER-COUNTRY INPUT-OUTPUT APPROACH

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The process of globalisation in the sector of health services offers multiple facets. In this paper we study the economic impact of National Health Service expenditures on the whole economy from a global and international perspective. By means of the OECD Input-Output Tables and the Inter-Countries Input-Output database, we will analyse the existence of a gap between total and domestic output multipliers obtained from the Leontief inverse. Although there are marked differences among countries, in average terms, for the 62 countries included in the OECD IOT, we observed the stagnation of domestic output multipliers in the health sector, while total multipliers increased between 1995 and 2011. The initial hypothesis links the observed gap with the process of globalisation and the intensification of imported inputs in the health service sector. This hypothesis will be confirmed with a difference in differences model designed for this purpose.

1. Introduction

The health sector has traditionally been closed and nationally focused, but this is beginning to change. Examples of the globalisation of health include:

- The increasing mobility of health professionals across borders; for example, the United Kingdom now actively recruits nurses from other countries (Glinos, 2015) (Shaffer, Bakhshi, Dutka, & Phillips, 2016) (Maier & Aiken, 2016) (Marchal & Kegels, 2003).
- The increasing mobility of health consumers (people); for example, patients travelling abroad to access medical care (Hazarika, 2010) (Hopkins, Labonté, Runnels, & Packer, 2010) (Whittaker, Manderson, & Cartwright, 2010).
- The increasing number of foreign private companies that offer health services and international health insurance schemes (Smith, Chanda, & Tangcharoensathien, 2009) (Pachanee, 2006) (Herman, 2009).
- The use of new technologies, such as the Internet, to provide health services across borders and to remote regions within countries (Abbott & Coenen, 2008) (Haux, 2006).
- The higher disease burden in poor countries that requires a more nuanced analysis of global health (in which health risks in both poor and rich countries are seen as having inherently global causes and consequences) (Labonté, Mohindra, & Schrecker, 2011).
- The growing trade, marketing and investment have important implications for public health, as well as the health effects of global trade agreements (Bettcher, Yach, & Guindon, 2000).

- Environmental impacts and climate change impacts on health (McMichael, 2013).

Globalisation affects the institutional, economic, social-cultural and ecological determinants of population health, but the globalisation process mainly operates at the contextual level, while influencing health through its more distal and proximal determinants (Huynen, Martens, & Hilderink, 2005).

A measure of the globalisation of a health system should include its degree of openness to foreign goods, services, ideas and policies, and people. But, the openness of healthcare systems is a relevant factor that sometimes limits the domestic economic impact of an eventual increase of expenses in national healthcare systems. The recent widespread use of generic medicines has created new channels of trade at an international level (Rana & Roy, 2015).

If there is an increase in final demand for a particular product or service (e.g., healthcare services), we can assume that there will be an increase in the output of that production branch, as producers react to meet the increased demand; this is the direct effect. As these producers increase their output, there will also be an increase in demand on their suppliers, and so on down the supply chain; this is the indirect effect. As a result of the direct and indirect effects, the level of household income throughout the economy will increase as a result of increased employment. A proportion of this increased income will be re-spent on final goods and services; this is the induced effect.

As a consequence of globalisation, world trade and production are increasingly structured around “global value chains” (GVCs). A value chain identifies the full range of activities that firms undertake to bring a product or a service from its conception to its end, which is its use by final consumers. Today, more than half of world manufactured imports are intermediate goods (primary goods, parts and components, and semi-finished products), and more than seventy percent of world services imports are intermediate services. Inter-country input-output tables and a full matrix of bilateral trade flows have been used by OECD to derive data on the value added by each country in the value chain, thus giving a better picture of trade flows related to activities of firms in GVCs.

The most recent published studies reveal that on average more than half of the value of exports is made up of products traded in the context of global value chains. While most studies on GVCs have focused on Asia, Europe shows a comparable if not higher level of participation in GVCs (De Backer & Miroudot, 2013).

An important implication of the new GVC paradigm is that one should look beyond industries to understand trade and production patterns. The GVC literature insists on business functions, which are the activities along the supply chain, such as R&D, procurement, operations, marketing, customer services, etc. Countries tend to specialise in specific business functions involving specific tasks rather than specific industries.

In this scenario dominated by strategies based on global value chains, it is still interesting to know the impact of this process on traditional impact analysis. The research question we pose in this paper attempts to understand how the process of globalisation affects domestic effects (direct and indirect) of the final demand for health services.

The objective of this work is to analyse the economic impact of National Health Service expenditures on the whole economy from a global and international perspective.

To analyse the impact of globalisation on the openness to foreign goods of health-care services, we will use the latest set of OECD harmonised national Input-Output Tables. This database presents matrices of inter-industrial flows of goods and services (produced domestically as well as imported) in current prices (USD million) for all OECD countries, covering the years 1995 to 2011. Additionally, we will utilise the OECD's Inter-Country Input-Output Tables. In those tables the diagonal blocks represent domestic transaction flows of intermediate goods and services across industries, while the off-diagonal blocks represent the inter-country flows of intermediates, via exports and imports.

We will focus our analysis on the industry (C85) "Health and Social Works" and try to uncover its direct and indirect impacts on production for the various countries and time-periods.

The main hypothesis of this work is that globalisation and the change in the structure of imports in the health sector increases international differences in the impact of the sector in national economies.

A pilot study was carried out with seven countries— France, Germany, the Netherlands, Spain, Switzerland, the United Kingdom, and the United States. Preliminary results show that the total direct plus indirect effects of an increase in the health sector final demand are greater in 2011 than in 1995. The increment for the whole period was around 4%, except in the United Kingdom where the increment was 20%.

The situation regarding domestic effects is a lot more unequal; the variation is clearly positive in only one country, the United Kingdom; four countries reduced the effects of the health sector, and two countries maintained a similar impact in both years.

An increase in health sector expenditure has an impact on the domestic economy of about 20% less than on the total economy. This trend is increasing because the sector imports are growing faster than their output.

To measure these international differences, we will assess the divergence of output multipliers— domestic and total.

The following section will be a reminder of the input-output model and the different effects that can be studied by means of it. The next section presents some methodological issues related to the process of homogenisation to obtain comparable input-output tables for many countries that work with dissimilar rules in origin. Three alternative inter-country IOT initiatives will be also presented in this section. And, finally, we will include in this section a brief presentation of the econometric model known as Difference in Differences model, which will be used to verify the main hypothesis of this work.

The results section will follow an orderly presentation in accordance with the objective of verifying the initial hypothesis of this work. First the values of the different output multipliers in 1995 and 2011 for the 62 countries included in the study will be presented. Once the existence of a gap between total and domestic multipliers has been confirmed, the association between that gap and some indicators concerning the share of imports in domestic and imported intermediate inputs in economies will be

exhibited. The results of the Difference in Differences model and a detailed analysis of the main health sector supplier industries will terminate this section.

The concluding section will close the arguments and reach a decision on the veracity of the initial hypothesis. Some limitations of the analysis will be also pointed out, as well as some ways forward for future research. Finally, this section will finish by emphasising the implications of the results achieved in this work for economic policy.

2. The Rationale of the Input-Output Model

Economic impact terminology arises from the methods used to estimate impacts. The most widely accepted approaches are based on input-output models. The input-output analysis tells us that there are industrial interrelationships and interdependencies in the economic system as a whole. The inputs of one industry are the outputs of another industry and vice versa, so that ultimately their mutual relationships lead to equilibrium between supply and demand in the economy as a whole.

Thus, an input-output model is a representation of the flows of economic activity within a country. The model captures what each business or sector must purchase from every other sector in order to produce a dollar's worth of goods or services. Using such a model, flows of economic activity associated with any change in spending may be traced either forwards (spending generating income which induces further spending) or backwards (purchases of goods and services leads businesses to purchase additional inputs). By tracing these linkages between sectors, input-output models can estimate secondary effects of final demand spending, usually presented in the form of multipliers.

A key output from the Input-Output analysis is the construction of multipliers which help to analyse direct relationships within the economy.

The Leontief Inverse provides the central tool for multiplier analysis, which studies the effect of changes in final demand on output and related aspects of the economy. These effects have three different economic drivers:

- **Direct:** This is the immediate effect caused directly by the change in final demand; e.g., if there is an increase in final demand for a particular product, we can assume that there will be an increase in the output of that product, as producers react to meet the increased demand.
- **Indirect:** This is the subsequent effect caused by the consequent changes in intermediate demand; i.e., as producers increase their output, there will also be an increase in demand on their suppliers and so on down the supply chain.
- **Induced:** This is the effect attributable to the ensuing change in compensation of employees and other incomes, which may cause further spending and hence further changes in final demand; e.g., as a result of the direct and indirect effects, the level of household income throughout the economy will increase as a result of increased employment. A proportion of this increased income will be re-spent on final goods and services: this is the induced effect.

The use of IOT allows distinguishing among various multipliers and effects:

- Output/Production Multipliers

The output multiplier for an industry is expressed as the ratio of direct and indirect output changes to the direct output change due to a unit increase in final demand. Thus, multiplying a change in final demand (direct impact) for an individual industry's output by that industry's output multiplier will generate an estimate of direct + indirect impacts upon output throughout the national economy.

- Employment Multipliers

The employment multiplier is the ratio of direct plus indirect employment changes to the direct employment change.

- Employment Effects

Employment effects show the direct plus indirect employment change to the direct output change due to a unit increase in final demand.

- Income Multipliers

These measure the change in income (compensation of employees) which occurs throughout the economy as a result of a change in final demand. They show the ratio of direct plus indirect income changes to the direct income change.

- Income Effects

These show the direct plus indirect income change to the direct output change due to a unit increase in final demand.

- GVA Multipliers

The GVA multiplier is expressed as the ratio of the direct and indirect GVA changes to the direct GVA change, due to a unit increase in final demand. In other words, if you have the change in GVA for the industry, the GVA multiplier can be used to calculate the change in GVA for the economy as a whole.

- GVA Effects

The GVA effect is expressed as the direct and indirect GVA changes to the direct output change, due to a unit increase in final demand. In other words, if you have the change in output (or turnover) for the industry the GVA effect can be used to calculate the change in GVA for the economy as a whole.

Input-output models, when applied correctly, can be powerful tools for estimating the economy-wide effects of an initial change in economic activity. To effectively use these models, analysts must collect detailed information about the project or program under study. Analysts also need to be aware of the assumptions and limitations of these models (Bess & Ambargis, 2011).

The most conflictive assumptions are related to the constancy of the input technical coefficients ($a_{ij} = x_{ij}/X_j$), the impossibility of factor substitution, and the considerations of final demand as an independent variable. Despite these limitations, the input-output model is of tremendous practical value and importance. Input-output analysis

is usually used for national economic planning. The input-output model provides the necessary information about the structural coefficients of the various sectors of the economy during a period of time or at a point of time, which can be utilised for the optimum allocation of the economy's resources towards a desired end. In addition, the input-output model is also used for national income accounting, because it provides a more detailed breakdown of the macro aggregates and money flows.

3. Methodology

Firstly, we will devote this section to analysing those methodological aspects related to the main analytical instrument– the harmonised OECD Input-Output Tables. The first edition of the OECD Input-Output (I-O) Database dates back to 1995 and covered 10 OECD countries covering the period 1968 to 1990.

Input-output tables describe the sales and purchases relationships between producers and consumers within an economy. They can be produced by illustrating flows between the sales and purchases, both final and intermediate, of industry outputs or by illustrating the sales and purchases, both final and intermediate, of product outputs.

From the analytical point of view the IO Database serves for a number of uses. Traditionally, the more frequent analyses were those that identify the importance of any industrial sector or product to economic output or growth, not just as a share of gross value-added but as a contributor of activity or growth in other sectors. Progressively, IOT are also being used in environmental analysis, in some cases to measure direct and indirect pollutants produced by industrial activity within an economy and at other times to contribute to footprint analyses or studies on global value chains. The latter are the most recent types of application of the OECD IOT database.

In terms of international comparability, the OECD IOT database is also used as a diagnostic statistical tool. For example, some National Statistics Institutes use the OECD harmonised tables in a diagnostic way to assist the construction of their own input-output tables.

The research developed in this work can be categorised within structural change and globalisation studies focused on activities related to health and social works.

The process of compiling the database begins with the request to national statistical institutes (NSIs) to provide data in accordance with a harmonised industry structure based on the International Standard Industrial Classification of all Economic Activities (ISIC). ISIC Revision 3 provides the basis for the 2006 edition, as was the case for the 2002 edition. The 1995 edition was compiled on the basis of ISIC Revision 2. However, in order to minimise compliance costs and to maximise cooperation, the requests stipulate that this pro-forma should not be a pre-requisite, and that any relevant data (input-output and/or supply-use tables), at the most detailed and practicable level, should be welcomed in any (detailed) format.

Obviously, this is only the first stage of the process. Each of the submissions, and those received in earlier years, need to be converted onto a harmonised basis. This means that they are industry-by-industry harmonised; on the same price basis (basic prices); aligned to the industry classifications used in the OECD system; and aligned

in their treatment of concepts. In addition, other adjustments are needed to overcome differences in some concepts, most notably the treatment of financial intermediation services indirectly measured (FISIM) and differences in the treatment of other items such as non-residents' expenditure and residents' expenditure abroad.

The latest set of OECD harmonised national Input-Output Tables presents matrices of inter-industrial flows of goods and services (produced domestically and imported) in current prices (USD million), for all OECD countries and 27 non-member economies (including all G20 countries), covering the years 1995 to 2011. Country and sector coverage is reflected in Table 1.

The OECD database of harmonised national IOTs takes the industry \times industry approach. This allows better integration with collections of statistics compiled according to industrial activity such as R&D expenditure, employment, foreign direct investment and energy consumption. The type of data received from each country varies considerably. Some countries have been able to provide symmetric I-O tables at basic prices at the required 48 industry level, whereas others have only been able to provide supply-use tables at purchaser's prices, for example, using the industrial classification and industry detail usually presented in that country. Naturally this means that for many countries the data provided needs to be transformed or manipulated into the harmonised symmetric 48 industry-by-industry basis.

Otherwise, regarding prices, most European countries follow the basic price (bp) valuation system in producing symmetric input-output tables. However, supply-use tables, which are the core building block used by the OECD to produce industry-by-industry input-output tables, typically show intermediate and final demand transactions in purchasers (pu) prices. The process of converting these into basic prices adds an additional approximate element. Imports are valued at basic prices of the country of origin; i.e., the domestic and international distribution included in goods imports in c.i.f. purchasers prices are re-allocated to transport, trade and insurance sectors of foreign and domestic industries.

Country Code	OECD Country	Country Code	Non OECD Country	Industry Code	Industry Description
AUS	Australia	ARG	Argentina	C01T05	Agriculture, hunting, forestry and fishing
AUT	Austria	BGR	Bulgaria	C10T14	Mining and quarrying
BEL	Belgium	BRA	Brazil	C15T16	Food products, beverages and tobacco
CAN	Canada	BRN	Brunei Darussalam	C17T19	Textiles, textile products, leather and footwear
CHL	Chile	CHN	China	C20	Wood and products of wood and cork
CZE	Czech Republic	CHN.DOM	China Domestic sales only	C21T22	Pulp, paper, paper products, printing and publishing
DNK	Denmark	CHN.PRO	China Processing	C23	Coke, refined petroleum products and nuclear fuel
EST	Estonia	CHN.NPR	China Non processing goods exporters	C24	Chemicals and chemical products
FIN	Finland	COL	Colombia	C25	Rubber and plastics products
FRA	France	CRI	Costa Rica	C26	Other non-metallic mineral products
DEU	Germany	CYP	Cyprus	C27	Basic metals
GRC	Greece	HKG	Hong Kong SAR	C28	Fabricated metal products
HUN	Hungary	HRV	Croatia	C29	Machinery and equipment, nec
ISL	Iceland	IDN	Indonesia	C30T33X	Computer, Electronic and optical equipment
IRL	Ireland	IND	India	C31	Electrical machinery and apparatus, nec
ISR	Israel	KHM	Cambodia	C34	Motor vehicles, trailers and semi-trailers
ITA	Italy	LTU	Lithuania	C35	Other transport equipment
JPN	Japan	LVA	Latvia	C36T37	Manufacturing nec; recycling
KOR	Korea	MLT	Malta	C40T41	Electricity, gas and water supply
LUX	Luxembourg	MYS	Malaysia	C45	Construction
MEX	Mexico	PHL	Philippines	C50T52	Wholesale and retail trade; repairs
MEX.GMF	Mexico Global Manufacturing	ROU	Romania	C55	Hotels and restaurants
MEX.NGM	Mexico Non-Global Manufacturing	RUS	Russian Federation	C60T63	Transport and storage
NLD	Netherlands	SAU	Saudi Arabia	C64	Post and telecommunications
NZL	New Zealand	SGP	Singapore	C65T67	Financial intermediation
NOR	Norway	THA	Thailand	C70	Real estate activities
POL	Poland	TUN	Tunisia	C71	Renting of machinery and equipment
PRT	Portugal	TWN	Chinese Taipei	C72	Computer and related activities
SVK	Slovak Republic	VNM	Viet Nam	C73T74	R&D and other business activities
SVN	Slovenia	ZAF	South Africa	C75	Public admin. and defence; compulsory social security
ESP	Spain	RoW	Rest of the world	C80	Education
SWE	Sweden			C85	Health and social work
CHE	Switzerland			C90T93	Other community, social and personal services
TUR	Turkey			C95	Private households with employed persons
GBR	United Kingdom				
USA	United States				

Fig. 1: Inter-Country Input-Output (ICIO) Database: Country and industry coverage

The tables are intimately related to OECD's Inter-Country Input-Output (ICIO) Tables in which the diagonal blocks represent domestic transaction flows of intermediate goods and services across industries, while the off-diagonal blocks represent the inter-country flows of intermediates via exports and imports. The ICIO is the main source of the indicators produced under the joint OECD-WTO project to measure Trade in Value Added (TiVA), and it also contributes to environmental analyses by being a central input into the measurement of CO2 embodied in international trade.

The OECD ICIO database is built on the OECD harmonised individual country input-output tables. It currently covers 57 countries and 37 industries and serves as the major data source for the first OECD-WTO public database on "Trade in value-added" (TiVA). The database provides TiVA indicators for the years 1995, 2000, 2005, 2008, 2009, and 2011 for 57 individual countries and a "Rest of the World" aggregate, with a selection of 18 industrial aggregates. The OECD has engaged a set of activities with a view to develop the coverage and quality of ICIO tables as well as to produce annual tables in the near future. The 2015 edition of OECD Inter-Country Input-Output (ICIO) Tables is based on ISIC Revision 3 and was released on June 2, 2015. The latest version of ICIO tables was posted on 18th June 2015 after some minor corrections to the 1995 table. Tables can be downloaded for free from <http://www.oecd.org/sti/ind/input-outputtablesedition2015accesstodata.htm>.

The OECD Inter-Country Input-Output Database is not currently the only one. The other two major ICIO have been constructed by the Global Trade Analysis Project

(GTAP) and the World Input Output Database (WIOD) projects respectively. These ICIO databases have been developed due to a growing recognition in the official statistics community of the increasing global production fragmentation and of the need to have a comprehensive and up-to-date global I-O table, in order to measure trade in value-added properly and in a timely manner.

The World Input-Output Database (WIOD) is developed by a consortium of eleven European research institutions, and funded by the European Commission. The WIOD contains time series of inter-country input-output tables from 1995 to 2011. It uses supply-use tables (SUT) from individual countries' national accounts as the starting point to integrate with bilateral trade statistics and derive the final symmetric worldwide I-O table (WIOT), covering 27 EU members and 13 other major economies (Timmer, Dietzenbacher, Los, Stehrer, & de Vries, 2015).

The Global Trade Analysis Project (GTAP) Data Base, developed and maintained by the Center of Global Trade Analysis at Purdue University, has been used in thousands of economy-wide analyses over the past twenty-five years. While initially focused on supporting trade policy analysis, the addition of satellite accounts pertaining to greenhouse gas emissions and land use has resulted in a surge of applications relating to climate change as well as other environmental issues. The Data Base comprises an exhaustive set of accounts measuring the value of annual flows of goods and services, with regional and sectoral details for the entire world economy. These flows include bilateral trade, transport, and protection matrices that link individual country/regional economic datasets. Version 9 disaggregates 140 regions, 57 sectors, 8 factors of production, for 3 base years (2004, 2007 and 2011). The great success enjoyed by this Data Base stems from the collaboration efforts by many parties interested in improving the quality of economic analysis of global policy issues related to trade, economic development, energy and the environment (Aguiar, Narayanan, & McDougall, 2016).

Because trade in value-added is not readily observable, it is difficult to assess the accuracy of measures estimated from different ICIO tables with different country/sectorial coverage and construction methodologies. Until 2014, no attempt had been made to compare these three global ICIO databases with official macro-economic statistics and also among themselves to evaluate their accuracy. In 2014, Jones et al. (2014) studied the similarities and differences among these three major inter-country input-output databases and found that GTAP-WIOD differences are much more significant than those noted between the OECD-WTO and WIOD.

In this work we will combine information deriving from the previously mentioned analytical instruments— the OECD Input-Output Tables and the OECD ICIO database, in two time-periods, 1995 and 2011.

The geographical scope covers all countries included in the OECD IOT and ICIO— the 34 OECD countries, another 27 non OECD countries, plus an aggregate representing the rest of the world. Besides the global data, we will focus our analysis on the industry (C85) "Health and Social Works".

With data provided by the OECD National IOT, we will describe the direct and indirect effects of the Health and Social Works industry on national production and what changes can be observed between 1995 and 2011.

Then we will try to find an explanation for these changes. As we said in the introduction section, the main hypothesis of this work is that globalisation and the variation of the structure of imports in the health sector increases international differences in the impact of the sector in national economies.

The verification of this hypothesis will be tested by means of the econometric technique known as Difference in Differences (DiD). That econometric model will disclose whether those countries that practised a commercial openness policy for imports in the health industry show greater differences between total and domestic effects (direct + indirect). In other words, we will examine whether globalisation makes the differences greater between total and domestic production multipliers.

The DiD method estimates the counterfactual change in the result for the treatment group by calculating the change in the result for the comparison group, which allows taking into account any constant difference over time between the two groups (Gertler, Martinez, Premand, Rawlings, & Vermeersch, 2011).

In more detail, what it is being applied is the double difference. The first difference is calculated, taking into account the before and after results of the experimental group, that is, considering the constant factors in time for the same group. But to observe the variable factors over time, we should measure the change before and after the results in the control group that was exposed to the same conditions. This is the second difference. Thus, the DiD method would combine the two false counterfactuals (before and after comparisons, and comparisons between experimental and control groups) in order to generate a better estimate of the counterfactual. This method does not require rules for the allocation of individuals in the treatment group, but entails that the control group could represent a change in the results that the treatment group would have experienced in the absence of the program.

Difference in Differences treatment effects (DiD) have been widely used when the evaluation of a given intervention involves the collection of panel data or repeated cross sections. DiD integrates the advances of the fixed effects estimators with the causal inference analysis, when unobserved events or characteristics confound the interpretations (Angrist, J.D. and Pischke, J., 2009).

For econometric assessment of the impact of an openness policy (imports) in the intermediate inputs of the health industry on the difference between total and domestic effects, the next base regression is used (Pérez López, C. & Moral Arce, I., 2015):

$$Y = a_0 + a_1G + a_2T + a_3G*T + e \quad [1]$$

Y is the difference between total and domestic effects of the health sector on the whole national economy.

G is the dummy variable that distinguishes the group (treatment or control).

T is the dummy variable defining the baseline and the endline.

G x T is the interaction between the dummy variables G and T; its estimated coefficient is the value a_3 , statistical of difference in differences, which is that which assesses the impact of globalisation on the difference between total and domestic production multipliers.

e represents the error term.

In addition, with the information provided by the ICIO database, we will analyse the modification of the imports structure in the health and social works sector.

For the treatment of data and application of statistical techniques, SPSS software package (Statistical Package for Social Sciences) has been used.

4. Results

The average value of the output multiplier in the health and social works sector was 1.8395 in 2011. This means that each additional monetary unit devoted to the final demand of this sector generates, directly and indirectly, an increase of 1.8395 dollars in the whole output of that national economy. This average value is much more reduced than those that we usually hear in politicians' statements on the news, which are sometimes two or three times greater. In 1995 the average value of the output multiplier was 1.7733, so the increase was rather modest.

If we calculate the production multiplier without including imported inputs, we will have a different value for this multiplier. That new value reflects the "domestic" impact of one additional dollar spent for the final demand of one production sector on the whole "domestic" economy. This value remained almost invariable throughout 1995 (1.4791) and 2011 (1.4818). The most remarkable thing is the progressive growth of the distance between these two multipliers, the total and the domestic one.

In general, for the health and social works sector, differences between total and domestic production multipliers in 2011 are greater than in 1995. Considering the Rest of the World as the country number 62 in our sample, the previously mentioned differences increased in 73% of countries. And, that percentage increases to 79% when only OECD countries are taken into account.

The differences between 2011 and 1995 values have been checked by means of the statistical T test. The T test confirmed the existence of a statistically significant difference between the multipliers gap in 1995 and 2011.

Within the group of OECD countries, the total production multiplier grew in 83% of cases between 1995 and 2011. For the same period, that growth can only be observed in 50% of cases for the domestic production multiplier.

In addition, in spite of the total production multiplier being greater in 2011 than in 1995, the domestic production multiplier decreased between 1995 and 2011 in 13 OECD countries (e.g., USA, Spain, the Netherlands, Japan, Germany, etc.). This phenomenon is much less frequent in non OECD countries.

Regarding the differences among countries, the variation coefficient indicates greater dispersion among countries in 2011, although it is not relevant and is specifically concentrated in non OECD countries.

Once having ascertained the increasing gap between national and domestic multipliers (multipliers gap), we found some interesting associations of this phenomenon with the globalisation process.

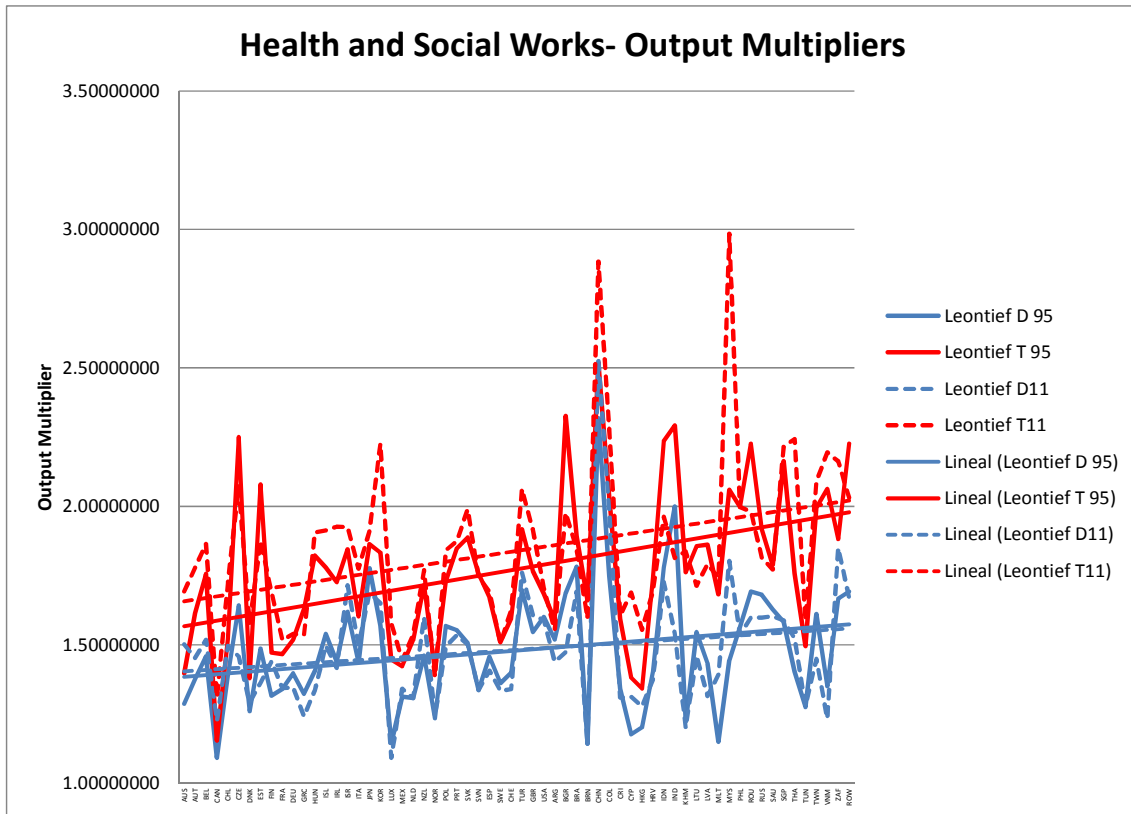


Fig. 2: Total versus Domestic Multipliers

Two indicators can inform us about the degree of openness in national economies. The first one is a general indicator and refers to the whole economy, i.e., to the different economic activities. This is the so-called “Trade in goods and services” published by the OECD. One of the measures offered in that publication is the percentage of imports to the GDP. This measure is available for 40 countries, 34 OECD plus 6 non OECD countries, from 1970 to 2015.

Figure 2 shows a clear positive association between the degree of commercial openness and the gap between production multipliers (total and domestic) for the Health and Social Works industry in 2011. This association could be considered weak because it is comparing a global indicator with another that is very specific and exclusively related to one particular branch of activity.

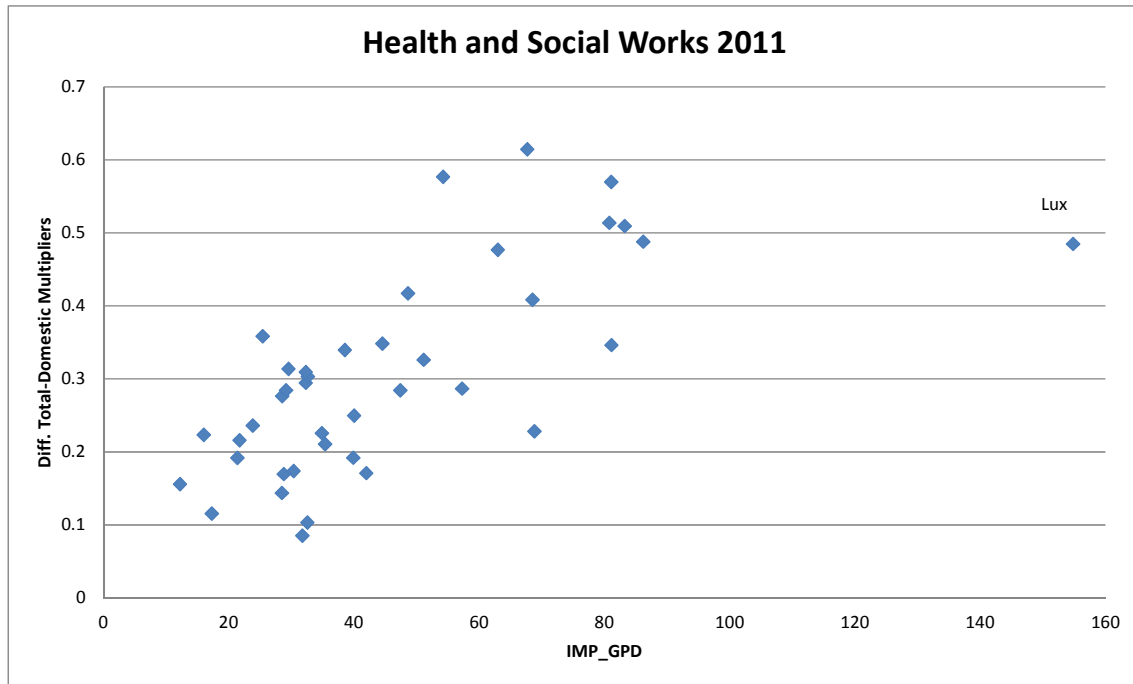


Fig. 3: Imports Share in GDP vs. Multipliers Gap

Thus, we need to associate the multipliers gap with a second indicator more specific and referring exclusively to the Health and Social Works services. This second indicator is the ratio of imports to intermediate inputs (intermediate consumptions) in the Health and Social Works sector. It shows the percentage of inputs that this production sector needs to buy abroad. As this percentage is growing larger, a greater share of total output multiplier is needed to cover those imports.

Figure 3 also exhibits a positive association between the ratio of imports to intermediate consumptions and the multipliers gap for most countries. The great heterogeneity among the group of countries included in the sample justifies the presence of outliers in the picture; we are including countries with a very different degree of development and social conditions.

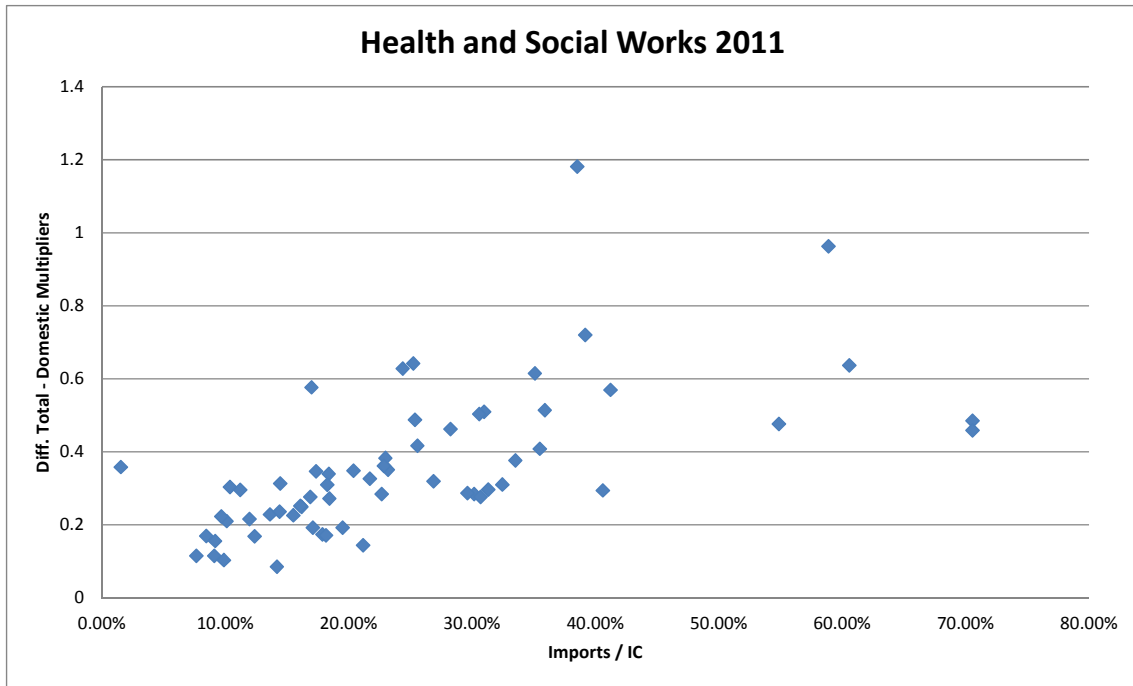


Fig. 4: Imports Share in Intermediate Consumptions vs. Multipliers Gap

As the share of imports in intermediate inputs has followed an increasing trend for most countries since 1995, we can intuitively think that this trend explains the growing multipliers gap.

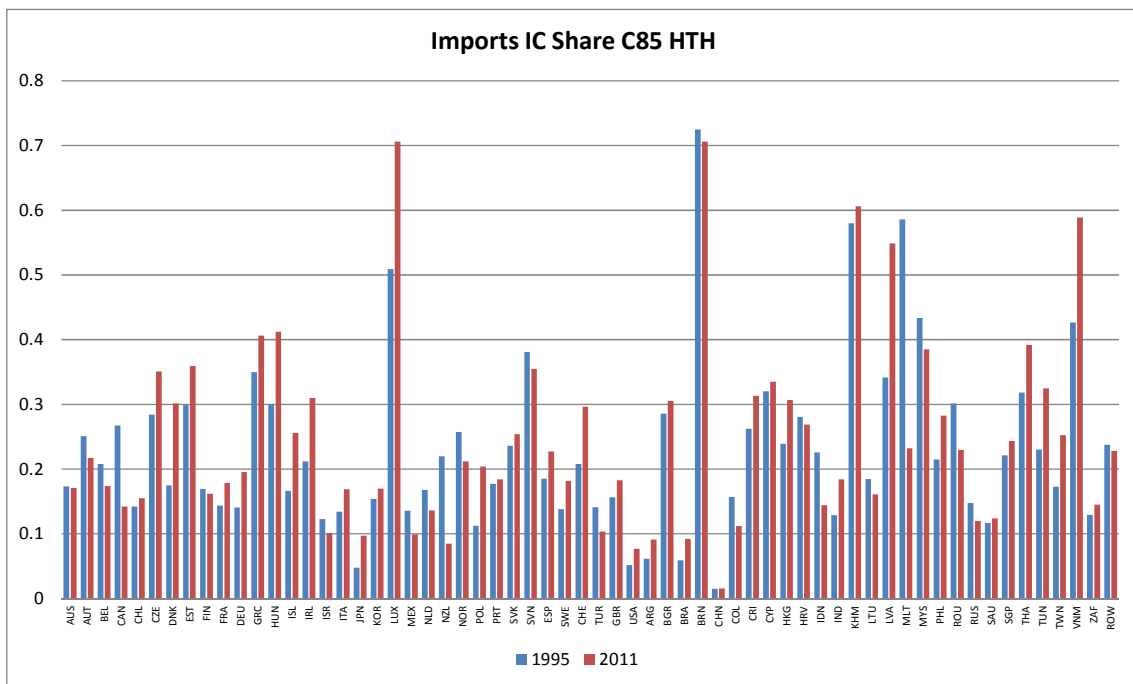


Fig. 5: Imports Share in Intermediate Inputs

In order to test the causality of the relationship between the growth of imports share and the multipliers gap, we built a DiD econometric model. As this type of model requires the comparison of an experimental group with a control group, we have divided our sample with 62 countries into two groups according to their share of im-

ports in the total output of the Health and Social Works branch. Those countries with a share of imports greater than the median have been included in the experimental group. This group represents all countries that followed a commercial policy in favour of stronger foreign relationships and external trade.

As external trade and commercial openness strengthen competitiveness, we have utilised total output as denominator instead of intermediate consumptions in the creation of the experimental and control groups.

Variables Entered/Removed ^b			
Model	Variables Entered	Variables Removed	Method
1	GxT, T, G ^a	.	Enter

a. All requested variables entered.
b. Dependent Variable: Y_DifTD

Model Summary ^b					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.330 ^a	.109	.086	.1777394030	2.006

a. Predictors: (Constant), GxT, T, G
b. Dependent Variable: Y_DifTD

ANOVA ^b						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.462	3	.154	4.876	.003 ^a
	Residual	3.791	120	.032		
	Total	4.253	123			

a. Predictors: (Constant), GxT, T, G
b. Dependent Variable: Y_DifTD

Coefficients ^a								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	.306	.032		9.579	.000	.243	.369
	G	-.023	.045	-.062	-.512	.609	-.113	.066
	T	-.021	.045	-.057	-.464	.644	-.110	.068
	GxT	.169	.064	.395	2.644	.009	.042	.295

a. Dependent Variable: Y_DifTD

Fig. 6: Difference in Differences Model Results

The results of the DiD model indicate that those countries which increased their imports share have also augmented their multipliers gap. Globally considered, the model fits the data well, with a significant value for the F test. In contrast, the sample autocorrelation of the residuals has been tested and the Durbin-Watson test close to 2 indicates no autocorrelation. Finally, the most important thing in a DiD model is the statistical significance of the coefficient for the GxT variable. In this model, the sign is positive and the p value close to zero. Thus, we can say that those countries included in the experimental group have greater growths of multipliers gap.

Finally, we will look for reasons for these changes in multipliers gap. Concretely, we are going to study the share of each industry in the structure of intermediate consumptions and imports and how the shares have changed over the studied period.

The Health and Social Work industry has its intermediate inputs very concentrated in four specific industries: chemical products (C24); computer, electronic and optical equipment (C30-33); wholesale, retail trade, and repairs (C50-52); R&D and other business activities (C73-74). In 1995 these four activity branches concentrated 46% of intermediate consumptions and 68% of imports. In 2011 the relative importance of these four suppliers was equally relevant, 43% of intermediate inputs and 65% of imports.

From 1995 to 2011, two of these four activity branches gained importance in imports, chemical (pharmaceutical products) and R&D and other business activities (consultancy). Thus, the increase of resources devoted to those imports meant that the domestic output multiplier did not grow at the same pace as the total output multiplier.

Industry Code	Industry Description	IC	IMP IC	IC	IMP IC	IC 95	IMP IC 95	IC 11	IMP IC 11	IC 11/95	IMP IC 11/95
		Share 95	Share 95	Share 11	Share 11						
C01T05	Agriculture, hunting, forestry and fishing	1%	1%	2%	1%	7494.7649	634.7015	47627.5892	3703.2536	6.35	5.83
C10T14	Mining and quarrying	0%	0%	0%	1%	1362.9660	287.1762	7196.4759	1585.6657	5.28	5.52
C15T16	Food products, beverages and tobacco	3%	4%	3%	4%	26442.6116	3180.6842	70255.6485	10727.6271	2.66	3.37
C17T19	Textiles, textile products, leather and footwear	1%	2%	1%	2%	7349.9524	1948.1826	17153.5101	5605.6485	2.33	2.88
C20	Wood and products of wood and cork	0%	0%	0%	0%	886.5241	125.5098	5508.6497	354.8355	6.21	2.83
C21T22	Pulp, paper, paper products, printing and publishing	3%	3%	2%	1%	25107.3484	2018.5534	42620.8456	4221.5845	1.70	2.09
C23	Coke, refined petroleum products and nuclear fuel	1%	1%	1%	2%	6419.4304	1011.2311	29766.6660	6851.1612	4.64	6.78
C24	Chemicals and chemical products	19%	33%	17%	35%	148159.3435	26143.2931	369665.9442	99449.5159	2.50	3.80
C25	Rubber and plastics products	1%	2%	1%	2%	9442.0011	1432.3144	24322.0165	5568.1692	2.58	3.89
C26	Other non-metallic mineral products	1%	1%	0%	0%	4609.3916	506.7182	9336.7122	1108.7726	2.03	2.19
C27	Basic metals	0%	0%	0%	0%	1185.5808	201.2884	3807.5629	881.8078	3.21	4.38
C28	Fabricated metal products	0%	0%	0%	0%	2775.7299	351.5764	7489.5843	1191.2017	2.70	3.39
C29	Machinery and equipment, nec	1%	2%	1%	1%	4996.3427	1619.6644	20148.6512	3313.0822	4.03	2.05
C30T33X	Computer, Electronic and optical equipment	4%	16%	2%	8%	27394.2764	12443.5959	46957.7448	24392.1589	1.71	1.96
C31	Electrical machinery and apparatus, nec	0%	1%	0%	1%	2458.8783	655.0841	5154.8516	1538.7473	2.10	2.35
C34	Motor vehicles, trailers and semi-trailers	0%	1%	0%	1%	1932.0290	414.0879	6182.2858	1926.8999	3.20	4.65
C35	Other transport equipment	0%	0%	0%	0%	913.5102	163.6170	3282.6324	627.5702	3.59	3.84
C36T37	Manufacturing nec; recycling	2%	3%	2%	5%	12902.3238	2190.0000	43864.7643	14580.2834	3.40	6.66
C40T41	Electricity, gas and water supply	3%	0%	3%	1%	26330.4775	315.9878	62616.0185	2048.0679	2.38	6.48
C45	Construction	2%	0%	2%	0%	14220.9009	211.7767	40876.7090	705.7409	2.87	3.33
C50T52	Wholesale and retail trade; repairs	12%	14%	11%	13%	91474.1505	10854.7396	235815.8032	38758.6292	2.58	3.57
C55	Hotels and restaurants	2%	0%	2%	0%	14490.0214	36.2900	47938.4146	112.9023	3.31	3.11
G60T63	Transport and storage	3%	5%	3%	4%	24244.6697	4046.0096	59721.8401	10337.8446	2.46	2.56
C64	Post and telecommunications	3%	1%	2%	1%	19814.2032	626.3838	52205.7556	2517.1653	2.63	4.02
C65T67	Financial intermediation	6%	2%	7%	4%	48844.3869	1932.6734	151586.5305	10394.2063	3.10	5.38
C70	Real estate activities	7%	0%	6%	0%	53543.3009	101.5509	139292.4292	348.1692	2.60	3.43
C71	Renting of machinery and equipment	1%	0%	1%	1%	4956.2720	364.3036	21469.9531	3097.7684	4.33	8.50
C72	Computer and related activities	1%	1%	2%	2%	9702.6893	487.9541	45073.6313	4522.5441	4.65	9.27
C73T74	R&D and other business activities	11%	6%	14%	8%	88808.8613	4640.9575	298268.7966	23616.9036	3.36	5.09
C75	Public admin. and defence; compulsory social security	1%	0%	1%	0%	10624.5664	116.3598	24443.8254	496.0656	2.30	4.26
C80	Education	1%	0%	1%	0%	6371.4487	64.7720	20444.9679	268.3282	3.21	4.14
C85	Health and social work	6%	0%	8%	0%	48075.0753	29.7392	179772.9022	135.6871	3.74	4.56
C90T93	Other community, social and personal services	3%	1%	3%	1%	20298.6828	546.5457	64115.8503	2911.3481	3.16	5.33
C95	Private households with employed persons	0%	0%	0%	0%	0.0000	0.0000	0.0000	0.0000		

Fig. 7: Intermediate inputs and imports by industry

In general, we cannot say that the intermediate inputs structure has suffered relevant changes between 1995 and 2011. Most industries show quite similar values of 'share' in both years. However, imports gained relevance in two of these main supplier industries.

In addition to the persistence of the high intensity in imports of the industries with a greater share in intermediate consumption, we have observed that industries with less relative weight as suppliers grew more intensively and more based on imports during the studied period.

In absolute values, intermediate inputs in 2011 are equal to 2.85 times those of 1995, and imports in 2011 are 3.61 times greater than those of 1995. Nevertheless, 14 industries with a moderate relative size showed a growth rate higher than the average in intermediate inputs and imports as well.

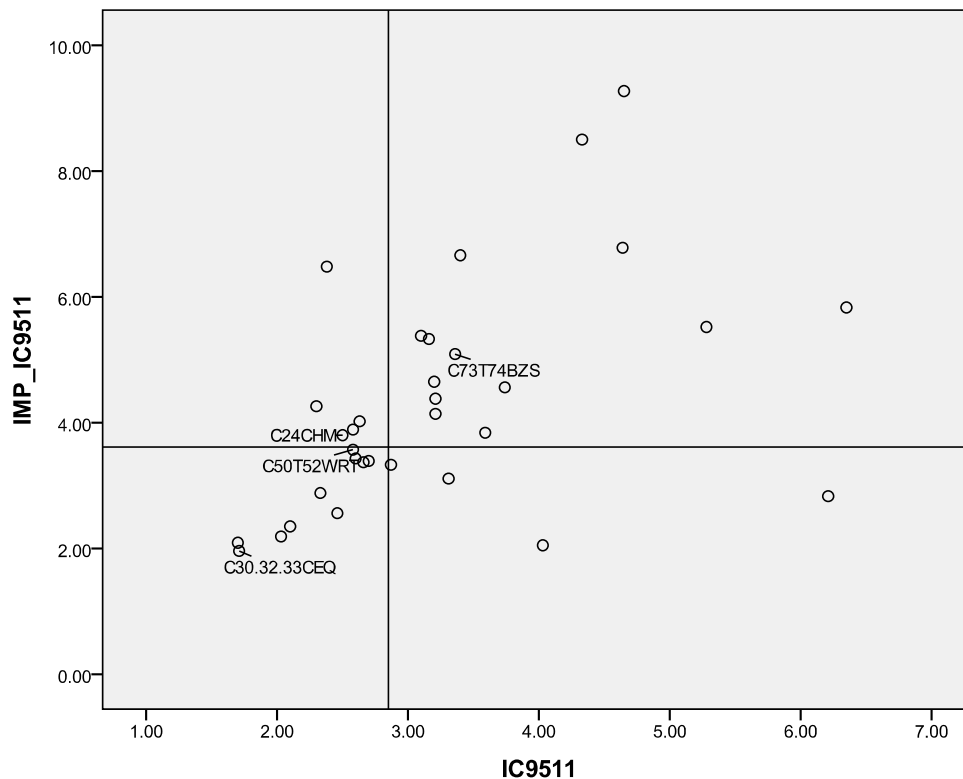


Fig. 8: Industries' share in intermediate inputs and imports

5. Conclusions

This work focused on the concept of multipliers gap, understood as the difference between the output multiplier obtained from the Leontief inverse matrices for domestic production and imports. In our sample with 62 countries from around the world, in 2011 only 17 countries had multipliers gap less than in 1995.

The main hypothesis was formulated as follows: "Globalisation and the change in the structure of imports in the health sector increases international differences in the impact of this sector in national economies." To measure these international differences, we have assessed the divergence of output multipliers— domestic and total.

That hypothesis has two propositions. The first one affirms that a deviation in trends of total and domestic output multipliers for the health sector occurred during the period 1995-2011. The second one speculates on the cause of this divergent evolution and attributes that behaviour to globalisation and the structure of imports.

The first proposition was confirmed directly by descriptive data and by the T test. Both showed that the difference between output multipliers, domestic and total, became greater during the studied period. In general, domestic multipliers remained

rather stable, while total multipliers presented increments greater than 6.6% or 8.3% in OECD countries.

Nevertheless, a first conclusion is that, despite the increasing multipliers gap, those countries with greater increments in total output multiplier also show the greatest positive variations in domestic output multiplier.

The second proposition has been confirmed with the DiD econometric model and with the analysis of variations, industry by industry, in the inputs and imports structure of the health sector. The DiD model results demonstrated a positive causal relationship between imports intensity and globalisation and multipliers gap. On the other hand, the industry by industry analysis showed a double influential shift towards the strengthening of imports in the health and social works industry. On the one hand, two of the most important supplier industries (chemicals and consultancy) have maintained their share in terms of inputs and imports. These two industries concentrate a high proportion of inputs and a high proportion of imports of the health sector. On the other hand, several industries with less relevance in terms of inputs have augmented notably their import shares.

Two main limitations of this study must be stated. Both of them are related to the use of the input-output model. The first one is specifically related to the limitations of the input-output model, derived from some assumptions mentioned in the section on the rationale of the input-output model that are related to the constancy of the input technical coefficients, the impossibility of factor substitution, the considerations of final demand as an independent variable. The second limitation refers to the methodological difficulties for homogenising IOT elaborated with different national norms. Those difficulties and the existence of three alternative inter-country input output databases have been specified in the methodological section.

As a third limitation, or better, as a line of advancement in this research track, we must mention the role of exports. This work omitted the role played by exports related to the health industry. Exports were not included in the main objective of this study, but two considerations should be taken into account regarding the health sector. First, the presence of international agreements (e.g., in the European Union) and the predominantly public character of this sector in many countries limits the monetary flows derived from services provided to foreigners. But, at the same time, for countries with a strong private healthcare sector, health exports could be a relevant way to improve competitiveness and complementary increases of total output and total output multipliers.

Another complementary line of study could be the extension of this analysis to the employment and value added multipliers.

The most relevant contribution of this work is the verification of the initial hypothesis and the consequences derived from it. Once we have a general verification of the increase of output multipliers gap linked to globalisation and imported inputs for a sample with 62 countries, country by country specific analyses can be carried out with a combined use of the OECD IOT and ICIO databases. From the perspective of economic policy implications, the verification of the gap multipliers hypothesis reinforces the importance of a continuous surveillance of those multipliers in order to formulate realistic forecasts about the capacity of final demand (public and private) of healthcare services boosting domestic output.

Finally, it is important to take into account the double role played by globalisation. Imported inputs have gained strength in national production structures, and certain patterns of specialisation along production chains can improve competitiveness. Specifically, in the health and social works sector, on average, the imported inputs have risen from 3.6% of total output in 1995 to 4.9% in 2011. With regard to the value of intermediate consumption in the health sector, the imported inputs have increased from 10.3% in 1995 to 13.1% in 2011. This increase in participation is consistent with recent studies published on the integration of national productive structures in global value chains. However, from the perspective of our analysis, the greater trade openness in the health sector in particular coincides with generally stagnating domestic output multipliers that limit the direct and indirect impacts of final demand for health services.

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EDUCATING THE FUTURE GENERATION OF SERVICE INNOVATORS IN EMERGING MARKETS: A TALE FROM THE LAND OF 100000 LAKES

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This paper highlights the role of Higher Educations Institutions in educating the future generation of service innovators and their potential contribution to the service industry growth in emerging economies. In this study, first a global view of service innovation programs in HEIs shows the progress of service innovation education. Second, a single case of service innovation program in the land of 100,000 lakes is presented. This case serves as a trigger to consider how to embed service innovation education in emergent economies to strengthen their future innovation capabilities. The study suggests that educational transformations need to take place for this purpose.

1. Introduction

The role of higher education institutions (HEIs) is pivotal, because they are always been an important part in transforming the society. HEIs educate the future generations of professionals. They often develop the pedagogical approaches and aim to include the latest findings revealed through the execution of research. Further, HEIs apply research findings into practice in both working life and in their education programs. Recently, the role of HEIs was specified also to enable graduates from various disciplines to become T-shaped professionals or adaptive innovators (see for example ([Bishop et al. 2008](#); [IfM and IBM 2008](#); [Spohrer et al. 2010](#)))

HEIs reach out the society around them; whether it is business organisations, public sector or non-profit organisations. A rich research tradition of university – industry (U/I) relationships testifies this. Identified is for example the interaction with working life; the activities, the benefits and the barriers of the interaction, the implications, and the relationships between universities and industry in various disciplines ([Deschamps et al. 2013](#); [Harryson et al. 2007](#); [Jongbloed et al. 2008](#); [Walsh et al. 1997](#)). Moreover, many scholars ([Britto et al. 2013](#); [Deschamps et al. 2013](#)) document that the initiatives for collaboration exist around the world. Yet, scarce are investigations how these relationships influence on the curriculum development of HEIs.

In HEIs education– on both Bachelor and Master level – the focus of the studies is to solve a wide variety of complex problems and challenges. For this, the students need to learn novel skills. Moreover, similarly the teachers need to continuously learn themselves new skills, use them and educate them to students. This is because the new capabilities related to service innovation (SI) are not necessarily evolved within firms and the lack of needed know-how reduces service research impacts in society ([Tossavainen 2012b](#)).

The purpose of this paper is to explore opportunities the HEIs have in shaping their education programs and curriculum based on the latest changes in business discipline. As the change to service economy is ongoing, service innovation is moving ahead. Thus, HEIs need to be able to educate future professionals that fit better in changing economy and contribute the growth of the society.

Service-oriented research has brought a wide variety of new knowledge and theoretical proposals. As such, in the last decade, it has acquired its place in marketing and management literature. While it is an evolving discipline, many programs remain on conceptual level. Innovation capability, development skills, and productivity knowledge have become a global challenge. As an emerging discipline, the service research can be examined from strategic, development, or execution levels ([Ostrom et al. 2010](#)). Furthermore, service innovation, service development and service design has been identified as interrelated concepts.

To simplify the conceptual variation, we use the term service innovation in this paper. It entails the service innovation, service development and service design approaches. We argue that incorporating service design approach into service development will enable service innovation. Therefore, the focus of analysis has been on exploring the service design as a new approach in HEIs.

Service innovation is related to the change from industrial logic to service logic. While majority of the business organisations still apply the industrial logic many, new firms and industries (besides the traditional service sector) have chosen the service logic as the business logic. This understanding and change needs to be embedded in degree programs in order to support the ongoing transformation of the society. If HEIs do not actively react on this education challenge, other actors like consultancy firms will move in full speed into this sector. However, their work often lacks on pedagogical approaches or academic research with theoretical and practical contributions. Consultancy companies do not educate future professionals.

To work collaboratively in service innovation requires new mind set, competences and skills. In future, the collaboration of customers and other stakeholders in order to develop and innovate service is expected ([Frow and Payne 2011](#); [Segelström 2013](#); [Tossavainen 2013](#)). The ability to integrate and collaborate with various stakeholder groups such as customers, users, suppliers, subcontractors, state or municipal officials, authorities, other professional groups, and the firm's own employees from various expertise areas can be achieved ([Tossavainen 2016](#)). But this requires new skills and competences among them service design.

In order to achieve service innovation, multiple stakeholders work collaboratively and co-create together service that fits the needs of the customers and business criteria of the service providers. The holistic approach considers in an integrated way strategic, system, process and touchpoint design decisions that require interdisciplinary approaches and methods in ever-learning cycles ([Tossavainen and Kaartti 2015](#)).

Therefore, with SI the different theoretical logics and constructions alongside the practical methods, tools and techniques, the act of balancing theory and practice remains within the professional educators.

The paper continues with the following: First, a global view of service innovation programs in HEI is presented in order to see the development progress of service innovation education offering. Then a collection of courses and service design map are presented. This analysis highlights the opportunity to compete thru the disruptive educational experiences also in emerging countries. Second, a single case of the pioneering Master's degree program in service innovation is presented. Finland, the land of 100,000 lakes, has a good international reputation in education in general and especially in the service domain. The tale that includes experiences from Laurea University of Applied Sciences. Third, we analyse the findings and suggest considerations for HEIs to develop their curriculum. Finally, conclusions are drawn and future research directions are offered.

2. The global view on service related programs

Service innovation and service design has grown considerably as an economic activity. Variety of service related programs have emerged into higher education, to prepare future professionals with new competences. This includes capabilities to guide innovation by fostering the co-creation of value with users and to design the best experiences with customers alongside with generating a good return on their investment. For example, Tossavainen ([2012b](#)) explains the service capabilities as the function of service logic adoption and the use of service driven methods that include a combination of service development and service design methods and techniques. Therefore, the programs need to include the theoretical background for understanding why to use variety of methods.

As with any industry, new degree programs are established around the fresh topic. Yet, there is little analysis of the content of those new programs. A search was conducted in academic journals for this kind of studies but any publications in the last five years (2011-2015) were not found ([Ferruzca et al. 2016](#)). A study of Robert's ([2015](#)) reveals that the higher education curriculum - in general - is shaped by academics' beliefs about educational and contextual influences. Five orientations to curriculum design were identified which provide insights into the influences which shape curriculum and teaching practices, and how they respond to the educational change. These are discipline-based orientation, professional and academic orientation, personal relevance orientation, social relevance – reform orientation, and systems design orientation

This chapter explores the progress of the emergence of programs related to service innovation in the higher education. The analysis covers three sources of information: Top 50 universities, a list of syllabi published by a service research community and an open service design world map.

2.1. Top 50 universities

Within the analysis of the Top 50 universities, in which 13 meet our selection criteria, 30 service design programs are offered. We provide an international comparative

analysis based on the type of the program and its curriculum content. We looked for those service innovation programs that have service design as a contributor in the curriculum

To select the HEIs, the Times Higher Education World University Rankings 2015-2016 ([Times Higher Education](#)) for the top 50 universities were analysed. This ranking allows identifying, from an academic point of view, the service design programs offered leading universities. Then the web site for each of the 50 universities were examined to identify service related programs. Thirdly, the program description; curriculum was reviewed.

In order to categorize the competences of the curriculum, a matrix was developed ([Ferruzca et al. 2016](#)). The competences were business competence in service innovation and service design competence. The exploratory review of top 50 universities revealed that 13 of them offer 30 programs to approach to service design. 7 are offered as executive programs, 10 are related to undergraduate programs and 13 are part of graduate programs.

The findings of this study indicate that some of the fifty best global universities (26%) offer a service design program. Most of them are part of master's degree programs in several domains like design, business, information systems, information and knowledge management, manufacturing and human computer interaction. Just a few programs are completely focused in service design. This was the case of executive programs.

Also, the most popular topics of study covered in curriculum are those related to user-centric service design and managing the business service. However, only 2 service design programs seem to cover all the areas of expertise services designers and developers need.

Finally, most of the programs are offered by universities in the USA (19 of 30), followed by the United Kingdom (8 of 30) and then Canada, Honk Kong and Sweden offer one program each one.

2.2. Service Syllabi

SERVSIG ([SERVSIG 2016](#)) is a well-known platform (www.servsig.org) for those interested in service research in academia or industry. It is an international service research community. The community of SERVSIG has co-created a syllabi of service logic related courses provided around the world. The published set of 69 service syllabi was analysed with the aim to complement the previous international comparative study. Each of the syllabi published in SERVSIG's website was examined following the same criteria described in section 2.1.

The exploratory review of 69 service syllabi revealed that 56.5% are related to undergraduate programs and 43.5% are part of graduate programs. Most of the programs are offered by universities in the USA (71%), and the rest by eight different countries. Noteworthy is that it does not include any emergent economy.

The conclusions of this study indicate that most of the programs are completely marketing oriented (88%) and thus they include more curriculum about business management and leadership competences. Just a few includes themes about service design competences.

2.3. Service Design World Map

The SDWM ([Service Design World Map 2016](#)) is an open and collaborative map on the web where different service design actors like consultancies, schools or companies can be identified. For this study, we focused on HEIs because they are the only to offer education programs. For each of the HEI identified a review of its academic website was analysed in order to identify what kind of service design program they offer according to previous criteria in section 2.1.

The analysis of the Service Design World Map (SDWM), in which 20 schools meet our selection criteria, offer different types of service design programs which have been also reviewed.

The exploratory review of 30 HEIs revealed that 20 offer a total of 23 service design programs. For the rest of the HEIs, we didn't find any related syllabi. Most of the programs are offered by design schools in Europe and the USA. However, 2 of them are offered in Brazil and 2 more in Chile.

The findings of this study indicate that most of the programs are design oriented (88%) and thus service design competences, covering themes like value co-creation and user-centric service design, have a central position in their curriculum. Most of the HEIs offer design education.

3. The tale of Service Innovation and Design master's degree program in Finland

At Laurea University of Applied Sciences (in short: Laurea), the globally pioneering master's degree program in service innovation and design (in short: SID) incorporates business studies with service development competences in order to educate future business practitioners with specific service design skills. Thus, the SID program aims to provide students with multidisciplinary knowledge in the recent development in the service marketing and management disciplines and service design.

Laurea operates in the Greater Helsinki Metropolitan area in Finland. Laurea has ca. 8000 students and 500 faculty and staff members. Laurea is the most awarded university in Finland (www.laurea.fi) since the Finnish Higher Education Evaluation Council (FINHEEC) has audited and nominated five 'Centre of Excellence' assessment awards to Laurea in 2003-2012. The 2016 audit results are pending.

The first SID master's degree programme curriculum was developed in 2008 for the relevant licence application submission to the Ministry of Education and Culture. SID is globally the very first business driven master's degree program focused on service innovation and design. Therefore the history of the SID program is elaborated in detail in several published articles (see for example [Ojasalo and Ojasalo 2012](#); [Ojasalo 2012](#); [Ojasalo and Ojasalo 2009](#)) and not described in detail in this paper.

Prior the SID program, service innovation, design or development studies could only be found as an individual module or as an additional part in main stream study units.

To start with, there was no curriculum that could be benchmarked. Therefore, the development of the SID program was based on an extensive fact-finding exercise that was carried out to examine the significance of service innovation, service development and service design competences, and the future competence needs. As a result of development efforts that included the extensive involvement of both international and regional actors, a curriculum was drawn. It was a good response to anticipating the new competence needs of the working life. It is also a competence-based curriculum designed to create distinctive contemporary competences needed in society today. The main combination of the competences are a) business competences in service innovations and b) service design competences.

The master's program has been implemented since 2009 with the first enrolment of the students. From the start, the program was subjected to systematic evaluation (Self-evaluation report 2015, internal document). Only some minor adjustments have been done during the annual evaluation of the curriculum in later years.

The development of the program and later on the evaluation of the program draw widely on the variety of service-related research in the field, international and Finnish networks, and feedback from students, teachers and other stakeholders. The teachers in the SID programme actively carry out service innovation research, participate in academic and professional conferences and seminars of this field, thus keeping up to date on the latest information and competence needs. Besides conducting research in the field, the teachers maintain broad working life networks. The teaching staff in the program is experienced in both theory and practice: teachers have a doctorate, a licentiate or a Master's degree in the field with strong working life experience. Moreover, foreign experts are involved in the programme providing specific expertise. (Self-evaluation report 2015, internal document.) Laurea has also an active role in regional development and further developing the university – industry relationships ([Laurea-ammattikorkeakoulu 2010](#); [Tossavainen 2007](#); [Tossavainen 2012a](#))

The selection of teaching methods and learning environments is guided by the specific learning outcomes of the SID programme and the student feedback in particular. The teaching is based on the pedagogical approach of Learning by Developing (LbD). The LbD approach ([Raij 2007](#); [Raij 2014](#)) places the students in the centre of his/ her learning experience. Both individual work and group work is carried out throughout the studies. As the approach is very work life oriented, majority of the learning exercises are based on real life challenges. This provides for each student in each study work an authentic case to solve, partnership with professional working life, experiential learning opportunities and research-based information building. In keeping with the learning outcomes, the SID program favours a variety of creative, participatory methods which allow all participants to benefit from the students' prior learning as comprehensively as possible. Competence is actively created together. (Self-evaluation report 2015, internal document.)

Classroom teaching provides the basis for learning new skills and competences. The creative communal work is emphasized during the contact sessions. The contact teaching is supported by online learning environments. As the digital environments in both business and in education develops quickly, it is incorporated with the studies.

Over the years, effective practices have been established for planning, implementing and evaluating the programme, which ensure its continuous development of the SID

program. As stated in the previously, the program has been subjected to systematic evaluation since 2010. The SID programme has participated in two curriculum reviews implemented in Federation of Universities of Applied Sciences, in Finland, (FUAS) cooperation. In 2010–2011, the programme took part in an internal FUAS cross-evaluation of Master's degree programmes. This evaluation comprised an extensive self-evaluation and peer evaluation, and it targeted broadly the objectives, planning, implementation, results and impacts of the programme. In 2011–2012, the SID program took part in the international FUAS Curriculum Review process. The latest evaluation was carried out in the beginning of the year 2016. The authority responsible for this international audit was the Finnish Education Evaluation Centre (FINEEC). The SID program was the sample of master's degree education at Laurea.

For each of the evaluations, an extensive self-evaluation report has been produced within the teacher team of the programme supported by the top management and support functions. As part of the self-evaluations, several key strengths and also some areas for development have been identified. Based on the results of the evaluation, the following best practices are identified:

1. *A comprehensive feedback collection system that supports programme development: involving students extensively in programme development.*
2. *Common follow-up indicators and jointly set targets: systematic monitoring of the indicators.*
3. *Uniform programme processes and clearly defined tasks and responsibilities of the actors relevant to the programme.*
4. *Competent and committed personnel: a common focus and ability to respond fast as a result of the long-term shared planning and implementation work of the teacher team.*
5. *Active participation of the teachers in networks of their field and close contacts with SID alumni helps to maintain working life relevance.*

To conclude the short tale, the SID program is a not a traditional one. SID program is not only a business degree. Further, it is not just a set of methods. It is a truly novel degree program faces altogether different challenges. Among those are 1) the forerunner's position, 2) the un-developed discipline, 3) the status of the paradigm shift found in service business research, and 4) the participative multi-stakeholders' perspective. Furthermore, SID students play a crucial role in providing feedback of the studies and they return thru engaging graduates (alumni) to promote the thinking and the program.

4. Suggested considerations

Based on the comparative analysis of wide spectrum of data on HEIs, programs and syllabi, we have provided an extensive view of the current understanding of service innovation education. Although the service innovation and especially service design has gained a foothold in Europe and USA, the review of service innovation programs in HEIs suggests that the development progress of service innovation education offering in emerging economies is slow. Only a few service design programs were identified in emerging markets (China and Brazil). However, service design educations seem to be well established in developing economies like the USA, the United Kingdom and European countries. Also, only a few programs have an integra-

tive orientation that supports developing the required competences for service design and development.

The paper suggests that curriculum development is needed to take place in educating the future generation of service innovators and their contribution to the service industry growth also in emerging economies. Through the analysis, we have identified some key suggestions to HEIs to consider. The first five suggested considerations are categorized by Roberts (2015) albeit aimed for undergraduate curriculum development: discipline-based orientation, professional and academic orientation, personal relevance orientation, social relevance – reform orientation, and systems design orientation. The following considerations are based on the results of the studies presented in this paper.

Table 1. Suggested considerations to improve Service Innovation and Design Programs

SUGGESTED CONSIDERATIONS	NEED 1	NEED 2	EXAMPLE	BENEFITS
Discipline-based orientation	Discipline clarity	Emerging disciplines are more holistic; move away from disciplinary silos to combinations of knowledge	A staff of teachers with different disciplines; service design programs with an integral orientation	Better university capacity building; better sense of multidisciplinary work
Professional and academic orientation	Provide range of future pathways	Balancing the learning experience with professional and disciplinary knowledge.	Real problem based learning supported by research activities, personnel with academic and professional background support this	Professional practices learned; models, processes, methods, techniques and tools
Personal relevance orientation	Sensing the everyday experiences	Design meaningful learning experiences	Individual and group assignments; learning from each other, co-creation, continuous feedback discussion and feedback, integrations of the studies and working life on personal level	Personal growth; lifelong learning; professional growth
Social relevance – reform orientation	understanding of social issues and structures, with a view to social reform	Developing service innovation and design programs for emerging markets	Transformation of society; business approach change from industrial to service logics,	Buildings capabilities to strength the service industry in emerging markets; Foster multidisciplinary work to solve societal challenges
Systems design orientation	Effective and flexible system for learning	Design better educational technologies	Combination of contact and online work, authentic cases integrated to the studies, experimental learning, uniform programme processes	Better digital culture
<i>Reach out</i>	<i>Working life</i>	<i>Working life needs</i>	<i>Engage stakeholders;</i>	<i>Improved professio-</i>

<i>through interaction for development</i>	(firms, organisations, etc.) are the best to defining future competence needs	to be involved in developing programs and curriculums more extensively	Establish advisory boards with practitioners; establish regular practices for academia - industry	nal capabilities with future business practitioners
<i>Uniform programme processes</i>	Systemic understanding of the actors, roles, and tasks	Provide information and enable understanding how the education works	Curriculum descriptions, role descriptions, program description, individual course descriptions	Share information, and create wider knowledge – beneficiary for developing needed competences
<i>Holistic service innovation and design set-up</i>	Theoretical and practical knowledge on service innovation and service design; interrelated courses	Practice methods, techniques and tools with real life problems and challenges	Use same case for several individual study units to improve the learning experience	Service innovation is holistic approach and requires examination on multiple perspectives
<i>Continuous discussion and feedback with students and alumni</i>	Students are the users of the education service and working life is the customer of the education service	To improve the status quo, the students and alumni experiences are valuable in co-creation of the program	Systematic feedback collection system, regular discussions with alumni	Modify the program fast in detail level; development based on actual experience
<i>Competent and committed personnel</i>	Continuous learning is a must for the personnel	The latest knowledge injected into education programs	Encourage research participation of networks, publishing, international joint activities,	Continuous improvement actions, up-to-date knowledge, better learning experiences

Table 1 depicts some of the main considerations found during the study. As we agree on the suggestions by Roberts (2015), we found them too narrow. In general situation, and in undergraduate context, they form a good basis to start the development. In the case of the emerging discipline, such as service innovation, the principles are slightly different. First of all, the HEI should understand the education as a service and apply the basic principles of service logic into the institution. Moreover, it is important to achieve service innovation to apply those novel competences and skills with models, methods, techniques, and tools to develop and to design the program and curriculum.

5. Discussion

Higher education institutes emphasise providing the training and skills for employment. At its best, this is closely linked to the good industry practices. Aligning education with industry needs is a topical issue while a mismatch between skills and job means that the match between education and employment opportunities can be improved (Moss Kanter 2012).

However, prior to the SID program, service innovation, design or development studies could only be found as an individual study module or as an additional part in

main stream study units. The syllabi by SERVSIG shows the majority of individual courses related to the marketing discipline. Service innovation is a holistic approach and touches other functions of the organisations from marketing, to logistics, production, to finance and human relations. Individual course or study units can be a good starting point for a HEI to get involved with a new topic. The SID program experience shows that in order to provide the required holistic view on service business and service innovation the whole program should be established. This case serves as a trigger to consider how to embed service innovation in the HEIs in emergent economies to strengthen their future SI capabilities.

Service innovation and design education should matter to emerging markets because its practice in global scale has grown in the last years. Service design has the capacity to increase innovativeness in product-services also through visualization of the holistic service development process ([Tossavainen and Kaarti 2015](#)). Besides, the service industry in emerging markets has a potential to grow and improve the societies. For example, according to the INEGI (The National Statistics Institute in Mexico), the service sector in Mexico was the main engine of economic growth in 2015. It has had a good performance also in the last years. However, as the rest of Latin America, the third sector needs to improve. According to REDLAS (The Latin American Network for Research on Services) more efforts are needed to better understand the role of services in this region ([REDLAS 2016](#)).

This paper contributes to understanding of higher education institute's challenges developing their service innovation program.

5.1. Conclusions

This paper introduced a comparative study of the programs in the emerging field. The analysis has shown that majority of the service related education is based on individual course and holistic degree programs are scarce. The tale of the land of 100000 lakes has shown that novel approaches can be taken in program and curriculum design. The results of the analysis show that especially the Latin American region is behind in the development of the service innovation and design skills and competences. This paper described a pioneering degree program as a case example of integrating theoretical and practical knowledge into novel and sought after competences. The paper provided some considerations for the interested parties. Our opinion is that in order to achieve innovative education offering and educate the future service developers, the educational systems needs to be understand as a service and thus the principles of that logic should be applied in practise.

To conclude, the analysis has an explorative character which should be considered as a first attempt to approach the actual state of art in service innovation and design education and what are the challenges in this domain. Besides, because not all the reviewed syllabi had clear information about curriculum, identifying educated competences was challenging. Nevertheless, this paper can be a useful material for those interested in launching a service innovation and design program in emerging markets or improving existing ones.

5.2. Future research suggestions

An interesting avenue for future research in context of emerging markets is to study how the teaching team is educated for the 1) substance, i.e. transformation of service

business economy, 2) pedagogical reforms, e.g. competence-based, student-centred education, 3) requisites, i.e. service innovation and design processes, models, methods, techniques, and tools.

Also, it is necessary to do research for understanding the service sector in emerging markets with the aim to study how to better introduce service design in these countries. The study could reveal different competency needs in emerging markets in contrast to those of developed countries. We foresee that some of the new competences and skills are similar but differences may appear in research.

Additionally, to understand better the progress of service design education, a survey to gather information from practitioners and scholars could be developed.

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ENABLING A RESOURCE INTEGRATION PRACTICE THROUGH THE CROWD

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The aim of the study is to build a value co-creation based practice to useful apply crowdsourcing. It investigates the recent and blurred phenomenon of crowdsourcing as an emerging process that takes place through the actors' resource-integrating efforts in task-based service contexts (e.g. crowdsourcing online platform). The study depicts crowdsourcing according a value co-creation framework and reconceptualizes it as repeated organisational practice that results from and shapes the actors' resource integration process. The study offers the opportunity to reflect on the systemic and recursive nature of the RI process and on the conditions and dynamics affecting its reproducibility within the practice of crowdsourcing.

1. Introduction

The pervasiveness of interactive technologies and the rethinking of business models, led to the development of new co-creating business practices that focus on collaborative instances and sharing and on the broader engagement of the stakeholder (Colurcio, 2016). In this context, the crowdsourcing is acquiring considerable importance both in business practice and in the literature. About the 90% of Best Global Brands developed crowdsourcing projects in 2015 increasing investment for this scope by the 50% over the previous year (eYeca, 2016).

The analysis of information about the scientific production from 2006 to dateshows an increasing trend, which corresponds to the gradual evolution of the concept and managerial implications underlying it. Compared with first contributions, which focused on the lexicon and on the conceptualization of the phenomenon (Howe, 2006), as well as, on the role of technology (Brabham, 2008) in the collaborative relationship between the company and the crowd, an on the strategic implications of crowdsourcing (Agerfalk; Fitzgerald, 2008), the most recent studies address more the need to provide practical support to the business, to define and codify types of crowdsourcing (Pripic et al., 2015) and to frame the phenomenon to create and capture value (Koheler, 2015).

The collaboration and, more specifically the integration of resources between different actors (Colurcio et al., 2014), arises now as pre-conditions for the definition of the process of creation and value capture (Zott et al., 2011) according to the new demands of the sharing economy (Owyang et al., 2009).

Internet and interactive technologies enhance the mobilization and combination of the resources of the different actors (Caridà; Colurcio, 2013; Schau et al., 2009); although such technologies are a mandatory condition to create value, their mere existence doesn't ensure the value creation in practice (Echeverri; Skalen, 2011).

According to the Service Dominant Logic (Vargo; Lusch, 2008), value is co-created through a process of multiple interactions and integration of multi-directional resources (Kleinaltenkamp et al., 2012). Such conceptualization encloses the concept of reciprocity and the combination of resources from different actors (value co-creation) as fundamentals. In this perspective, companies are required to redesign their business models as a function of practices that enable the integration of resources and value co-creation (Storbacka et al., 2012).

In spite of the increasing interest in the topic and of the strategic implications of crowdsourcing, to our knowledge, contributions that deal with crowdsourcing in the practical perspective of the (co) establishment of the value still lacking. Indeed, with the exception of the work of Koehler (2015), which identifies the business model schemes for the creation and capture of value, current studies, including those emphasize the benefits of crowdsourcing and its potential for the creation of value, don't adopt a marketing perspective.

This study contributes to the advancement of the theoretical debate on crowdsourcing. First, it provides a framework of the phenomenon from the marketing perspective of the value co-creation. In addition, it enriches the empirical evidence about resource integration research, which until now are rather abstract in nature. Second, the study outlines the main dimensions for the development of a co-creative practice of crowdsourcing. Such practice emerges from the deep analysis of Co-contest that is an Italian platform of crowdsourcing specifically addressed to the world of the interior design.

2. Literature review

This study is focused on two theoretical streams of research: studies on crowdsourcing and studies on value co-creation and resource integration according to the Service Dominant Logic (SDL) perspective.

2.1 Crowdsourcing

The term crowdsourcing was coined by Jeff Howe (2008) to enclose in the well-known phenomenon of outsourcing the emerging phenomenon of the collective intelligence. According to Howe (2006), crowdsourcing is *"the act of a company or institution taking a function once performed by employees and outsourcing it to an undefined (and generally large) network of people in the form of an open call"*. (Howe, 2006; Digout et al., 2013; Erickson et al., 2012; Geiger et al., 2011).

Crowdsourcing addressed widely managerial and practical literature (Erkinheimo; Dombowsky, 2013; Gatautis; Vitkauskaite, 2014) and many definitions are available.

Estellés-Arolas and González-Ladrón-de-Guevara (2012) provided the following definition that well depicts the essence and the diverse implications of the phenomenon:

“Crowdsourcing is a type of participative online activity in which an individual, an institution, a non-profit organization, or company proposes to a group of individuals of varying knowledge, heterogeneity, and number, via a flexible open call, the voluntary undertaking of a task. The undertaking of the task, of variable complexity and modularity, and in which the crowd should participate bringing their work, money, knowledge and/or experience, always entails mutual benefit. The user will receive the satisfaction of a given type of need, be it economic, social recognition, self-esteem, or the development of individual skills, while the crowdsourcer will obtain and utilize to their advantage that what the user has brought to the venture, whose form will depend on the type of activity undertaken”.

Crowdsourcing is used by companies to source new product, advertising, activation or retail ideas among creative crowds, and not just video content anymore (Roth Y., 2015; Roth Y. et al., 2016). Indeed, the crowd is a relevant source of innovation (Brem; Bilgram, 2015) for firms and the collective creativity is a valuable contribution as it matches knowledge and creative potential belonging to several individuals. Collective creativity is a unique and not replicable resource that comes from interaction between many different actors. The role of social media for the development of the interaction between business/brands and the crowd is crucial (Colurcio, 2016).

The review of literature showed that many studies addressed crowdsourcing to collaborative innovation (Chesbrough, 2006). These studies focused on creativity, development of the innovative process, and the engagement of external actors (Chesbrough, 2006) as the lead users (Von Hippel, 2009).

The interactive technologies enable the interaction and the combination of knowledge and experience (Colurcio et al., 2012; Boulaire et al. 2010; Peppler; Solomou, 2011), which originates the collective creativity as single and unique contribution. (Majchrzach; Malhorta 2013; Hargadon; Bechky 2006). Crowdsourcing is a relevant way to open up a company's business model to external partners and particularly the collective intelligence distributed among the crowd (Chanal; Caron-Fasan, 2010; Schenk; Guittard, 2011; Digout et al. 2013; Malone et al. 2010; Djelassi; Decoopman, 2013). It allows the collaboration and, more specifically, the integration of resources of different actors, that is the fundamental pre-conditions to co-create and capture value.

2.2. Value co-creation and resource integration

According to the Service Dominant Logic (Vargo; Lusch, 2004) value *“is always co-created, jointly and reciprocally, in interactions among providers and beneficiaries through the integration of resources and application of competences”* (Vargo; Lusch, 2008; Vargo, Maglio; Akaka, 2008). This implies two main assumption, resources do not have value per se, and all social and economic actors are resource integrators (Vargo; Lusch, 2008; Vargo; Maglio; Akaka, 2008). Value is the outcome of activities and interactions in which resources are integrated; it is co-created and assessed in use (Laamanen; Skalen, 2014; Gummerus, 2013). Resource integration, instead, is the means through which resource integrators (actors) co-create phenomenologically

determined value through process(es) and forms of collaboration (Kleinaltenkamp et al. 2012).

According to Edvardsson et al. (2014), resource integration relates to the methods through which resources are integrated and used by actors, *“it consists of cooperative and collaborative processes between actors, leading to experiential outcomes and outputs, as well as mutual behavioral outcomes for all actors involved”*. Others authors focus on the relationship between companies and their customers (Lusch; Webster., 2011; Hakanen; Jaakkola, 2012; Jaakkola; Alexander, 2014; Nambisan; Baron, 2007), linking the concept of resource integration to the customer’s participation in a company’s value creating process. Others extend value co-creation from a dyadic (firm-customer) perspective to the actor to actor (Lusch; Webster, 2011) or the network to network context (McColl-Kennedy et al., 2012) as multidirectional and service beneficiary centered process. From the network perspective some contributions remark the embedded nature of relationships and how value is driven by the individual’s ability to access, adapt, and integrate resources through routine practices within networks (Akaka et al., 2012).

Collective dimension of value creation draws the attention to the economic and social actors that interact and exchange resources across and through networks (Laamanen; Skalen 2014; Vargo; Lusch, 2008), as well as, to the nature, mobilization and use of resources (Kleinaltenkamp et al., 2014) and thus to the development of the resource integration process. It relates the incorporation of an actor’s resources into the processes of another actor in accordance with their expectations, needs and capabilities and implies a social and cultural process that enables an actor to become a member of a network (Gummesson; Mele, 2010). In this view, it is a continuous process relating a series of activities performed by an actor (Payne et al., 2008) that occurs through a specific set of interactions between actors and particular resources (Ballantyne; Varey, 2006; Peters et al., 2014). More specifically, interaction allows actors to access to additional resources, and thus to create new exchangeable resources through integration (Vargo; Lusch, 2011). Value co-creation is a process of multiple interactions and multidirectional resource integration (Vargo; Lusch, 2008) that require first of all the dynamic alignment/matching of resources between actors. Resources are not simply in existence but rather must come into being (Löbler, 2013), they can be view as a dynamic concept (Zimmerman, 1951; Pels et al., 2009) that is constituted and reconstituted through the practice of resource integration itself: *“resources are not: they become. The usefulness of any particular potential resource from one source is moderated by the availability of other potential resources from the other sources, the removal of resistances to resource utilization, and the beneficiary’s ability to integrate them”* (Vargo; Lusch, 2011, 184). Therefore, resources are becoming (things, persons, machines, money, institutions, or concepts) only when they are integrated through interaction to perform an intended activity (Löbler, 2013).

3. Research design

3.1 Methodology

The aim of the study is to build a value co-creation based practice to useful apply crowdsourcing. It investigates the recent and blurred phenomenon of crowdsourcing

as an emerging process that takes place through the actors' resource-integrating efforts in task-based service contexts (e.g. crowdsourcing online platform).

Accordingly, the study adopts an abductive research approach (Dubois; Gadde, 2002) characterized by an iterative process of systematic combinations and inferences that match theory with reality (Dubois; Gadde, 2002). It is particularly appropriate when pursuing theory development; that is, refining existing theories rather than inventing entirely new ones (Van Echtelt et al., 2008; Caridà et al., 2016).

For this reason, we have chosen the single case study method as it is "an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (Yin, 2009; Della Corte et al., 2013) and can help us conducting a deep analysis in order to understand the empirical implications and to investigate the phenomenon of crowdsourcing according to the value co-creation marketing perspective.

The research process has been developed in two phases. The first phase related to the research planning and the literature review, whereas, the second phase related to the observation and the analysis of CoContest dynamics.

Data have been collected through the analysis of documents and texts, non-participant observations and an interview of CoContest's CFO e Co-Founder. This research stage allowed us to better understanding the core elements of CoContest.

First of all, we developed a documentary analysis as it is an useful research method for integrating investigation conducted through direct observation (Hammersley; Atkinson, 1995). We focused on existing documents as media reports, publicity materials, procedural documents (e.g. contest rules, reward policy, etc.) and on material provided by CoContest. Then, we observed the platform activity (launch of contests, interactions between designers and customers, all comments and feedbacks provided by customers etc.) for nine months (December 2015 – May 2016) to understand the experiences and dynamics of interaction into the community. The data emerged from direct observation has been analyzed and interpreted according to the research framework followed. Finally an in-depth interview to the CoContest's CFO and Co-Founder. have been made

3.2 Research framework

Data has been analyzed according to the framework, which comprises and emphasizes the value (co) creation process proposed by Caridà, Colurcio and Melia (2016). It is a suitable construct to investigate collaborative networks as CoContest.

The framework is based on the following four main elements:

- The actors and the roles they enact are generic entities, who have the capability to integrate resources (Vargo; Lusch, 2008). They are engaged in exchange relationship (Vargo; Lusch, 2011) and act as resource integrators to carry out activities (Mele et al., 2010);

- The resources, as knowledge, skills, effort and technology (Akaka; Vargo, 2013), that act upon other resources to foster new way of creating value (operant resource);
- The activities, that are the active doings actors carry out through a specific set of interactions (Ballantyne; Varey, 2006) and resources integration from multiple sources (McColl-Kennedy, 2012). They can be referred to as the Co-s for innovation (Russo Spena; Mele, 2012);
- The value, as the potential outcome that actors can extract from the interaction (Caridà; Colurcio; Melia, 2016). According to Sweeney and Soutar, (2001), value is an abstract concept with specific meanings that vary according to context. It is not limited to the economic or financial aspects but encompasses different interrelated dimensions. The first is social, which is related to the benefits derived through interactions, for example emotional support, self-esteem and social enhancement (Sicilia; Palazon, 2008). The second is emotional, which is related to the utility derived from the affective states (Sheth et al., 1991). Finally, value can be epistemic, which is related to the capacity to arouse curiosity, to provide novelty and/or to satisfy a desire for knowledge (Pura, 2005). It includes the concept of learning as the gaining of knowledge (Bourdeau et al., 2002).

3.3 The CoContest network

CoContest is an innovative crowdsourcing platform that is rapidly developing (Colurcio, 2016). It is a platform dedicated to the interior design, that is a sector traditionally dominated by big professional offices that limit the economic perspective and business for younger designers and experts.

Founded in 2012, CoContest allows architects and interior designers to provide service solutions, and thus to find new customers, to prove their expertise and to obtain new sources of profit, by challenging peers in true competitions. Interior designers can freely register themselves on the platform and access to all open contests. They can upload their curriculum vitae and projects realized beyond co-contest, using in this way a space that become a worldwide “showcase”. The customers propose the contest, and after the registration, pay for service and establish the brief, the deadlines, the arrangements for participation and the reward for designers. They select the winner’s contest through the mechanism based on the creativity and meritocracy.

After registration, consumers choose the typology of project among six categories, on the basis of their needs: i) interior (house, cottage, farmhouse, loft); ii) main rooms (bathroom, kitchen, bedroom); iii) other rooms (basement and attic, gym rooms); iv) business (shop, office, co-working, bed & breakfast); v) entertainment (bar, restaurant, lounge bar); vi) outside (gardens, swimming pool, vegetable garden, roof, garage). Then, they select one of the three packages offered: concept, project and advanced, considering the type of output needed and the price paid. In concept and project, the reward has been studied to obtain the maximum participation from designer and keeping the costs lower than off-line similar services. The advanced offers have been studied for the advanced ideas. Users, indeed, can receive not only the description project and the planimetry of the spaces, but also 3D image, recommended decors, color scheme and accessories, the detailed floor plans of the house,

the section for understand the vertical distribution and the preliminary cost forecast of each individual project.

For the duration of the contest (from 14 to 120 days), consumers and designers can interact through the chat “Question & Answer”. Platform offers others interesting spaces as the section CoContest Task, where the customers have the possibility to obtain concepts and projects also in 48 hours. CoContest magazine, instead, is a space where are upload articles spotlighting interior designers and their work, interior design tips to create an impressive home, and some of the best projects. It is divided in different category for example, before & after, design news, designer spotlight, designers tips and tutorials, DIY and home decor.

At this time, it has launched about 400 contests About 25000 architects, engineers and interior design from 90 countries take part in the CoContest community.

4. Findings

In this section we report the results of our study we carried out according to the framework proposed by Caridà, Colurcio and Melia (2016).

Actors and roles

The main actors involved within the network are experts, as architects and interior designers, and clients who can be business or private.

Experts act as primary resource integrators, as they provide concepts and projects on family or working spaces to renovate or on new buildings and gardens to design. For them, co-contest is not only a new job opportunity but it is the possibility to take a challenge and to compete with others experts all over the world.

Clients, business or private, are a typology of actors who affect decisively the creative process as they launch the contest, answer to requests for clarification of the designers, influence a designer’s activity on the basis of their own needs, exchange information and ideas with designers during the contest, as revealed by following quote:

“What an exciting adventure that I was involved in. I’m so grateful for the three weeks working along side with unknown designers. As in nature, ruthless necessity drives all of us to make difficult choices. I tried to weigh all proposals carefully, analyzing different aspects by making use of the assessment tools provided by the site. Many thanks to everyone for all of their wonderful assistance, experience and professionalism until the end of the competition”.

Giovanni, CoContest consumer

Usually, private customers ask for restyling of houses, office and the retail outlets. Business actors such as estate agencies, instead, use CoContest to offer to their customers (buyers and sellers) a service of virtual home staging to highlight the quality of the property, making the sale easier and faster. Building companies, finally use this platform to obtain in outsourcing several projects for the fulfillment of the property.

Co-contest is another important actor of this network. As a hub, it enhances the integration of resources among all players involved in the project. It plays as intermediary of the innovation process establishing connections and relationships among the actors of the community. Thanks to co-contest, actors are networked each other, as the following quote revealed:

“It was an unconventional and outstanding experience! CoContest gave us the choice to choose from several different design solutions so that we could pick the one that best suit our needs. I’m fascinated by how CoContest is revolutionizing the interior design world, allowing anyone to reach hundreds of designers from all over the world”.

Dave, CoContest consumer

CoContest allows the matching of the actors skills and knowledge to improve their effectiveness as resource integrators and to set up a new ways of creating value. Furthermore, CoContest improves the learning and empowerment process of consumers through the section “Tutorial & Support”, where are shared several documents, videos and tutorials on different aspects (permission, tax breaks, template CAD etc).

Resource exchanged and integrated within the network

All actors are resources integrators. They integrate their own resources in different ways and intensity depending on the typology of role, skills and of relationship they engaged. Specifically, they integrate human - knowledge, skills, time, effort - as well as non-human resources relating to the platform technical infrastructure.

The main resources that actors integrate within the community of CoContest are creativity, knowledge and technical competences.

Technology (especially referred to the technical infrastructure of the digital platform) is a core factor for the process of resources integration and for the development of collaborative approach to the value creation. CoContest is an user-friendly interface designed to ensure access and transparency of the community members (as following quote revealed), sharing of information and to provide the opportunities to collaborate. It is fundamental for stimulating and driving participants activities.

“My experience with CoContest was amazing. The site is really well done, simple and user-friendly. The staffs were friendly and polite. For a very small price, I received 19 different projects, all well researched and developed. It was very difficult to choose the winner.”

Lara, CoContest consumer.

Social networks as Twitter, Facebook, Pinterest and Google+ complement the technical infrastructure provided by CoContest, which are used mainly by the company to communicate news on interior design sector and to share news and ideas also published on CoContest magazine. The Bloglovin’, the official company’s blog, is another important element of technical infrastructure used to spotlight interior designers’ work and some of the best projects realized through CoContest.

Activity

Activities can be simple activities, which don't require emotional and cognitive involvement of the designer such as, the observation of all open contests or the viewing of projects presented by other designers within a closed contest.

Activities are complex when they require the actors' cognitive effort. Customer, after the launch of the contest, interacts and dialogues with designers sharing its needs and wishes. It is called to explain its project describing in technical way the space to renovate. Finally, he evaluates each project assigning a score and chooses the winner of the contest.

Designers and consumers co-design and co-develop the projects. Comments and suggestions for concept/project improvement are allowed by the direct interaction among the customer and designers along the duration of the contest. Through the chat "*Question & Answer*", indeed, designers can ask information and explanation to the consumer fostering the process of creation, learning and sharing of new knowledge and solutions.

Moreover, consumers become also co-creators of CoContest platform as revealed by the following quote:

"I would like to suggest to improve the feedback section in regards to when is time to rate the projects, please keep a permanent number on each individual Job, because how is now the number showed is just related to the position and this change every time I put/change an evaluation. Hope make sense to you."

Adriano, CoContest consumer

Value

Different types of value emerge from CoContest platform: economic and financial, social, emotional and epistemic. For designers (crowds), value relates first of all the opportunity to increase their professional opportunities as well as to obtain visibility and social recognition as a "professional designer" by business and private customers. They enhance their visibility globally: i) uploading their curriculum vitae and their own projects realized beyond CoContest; ii) being part of the best designers ranking of the week or month; iii) or simply because their projects become public and visible from all users of the platform.

Social recognition emerges from a rewarded mechanism based on the meritocracy and transparency, in which the selection depends only on the quality of design and the designer's creativity. Recognition is also enhanced thanks to opportunity for the winners of the best contests to be advertised on the magazine Casa24 of "Il Sole 24 Ore" (a trade magazine).

Finally, designers extract economic value from the collaboration as they gain monetary reward (which depends on the package chosen if concept, project or advanced) for each project won (the top three classified win the 70%, 20% and 10% respectively of the award).

For customers (crowdsourcers), value is economic, experiential and relational. Economic value emerges from the possibility to obtain several projects and ideas from different designers spending less than off-line similar services. But, above all, they are engaged in an experiential process that enhances their competence and knowledge on the world of interior design and property renovation, but also makes

them entertained and fulfilled. Moreover, value for customers also depends on the collaborative nature of the creative process. They are partners in the process of idea's creation in which they participate very deeply and continuously. It is a great self-esteem benefit and gratification.

“Positively exceptional. Getting multiple ideas is very important in any projects because it gives us the power to choose”.

Francesco, CoContest consumer

Also for CoContest value is economic and relational. Economic value originated not only from the payment of different packages offered (concept, project or advanced), but also from all services with fee offered through the platform, as the possibility to make private the contest (that is visible only between the consumer and designers, and not indexed by search engines), to convert the floor plan to DWG (the professional CAD format), to translate in English the description of the contest or to promote the contest to get the attention of designers.

Relational value concerns the loyalty established between the platform and the satisfied customers who sometimes launch a second contest for others properties or rooms of the house and contribute to spread the knowledge on CoContest among friends and relatives as following quotes revealed:

“I'd definitely use CoContest again and so I recommend it”.

Maria Luisa, CoContest consumer

“Easy to use and quite intuitive. A great help in both inspiration and saving time. A great idea, that we plan to use again in future and we will recommend it to friends and family too”.

Pietro, CoContest consumer

“It was a very positive experience and I'll be sure to pass the words on to my friends and colleague”.

Emanuele, CoContest consumer

5. Discussion

Crowdsourcing platforms are open systems which favorite the interaction between different actors (the crowd and crowdsourcer) and the resources integration process (Lusch; Nambisan, 2015), that is a condition for the co-creation of value.

The analysis of CoContest showed that crowdsourcing platforms are place where different actors with specific interest (business in this case), interact to convert value creation into a value co-creation process. They work as a connection place where all the actors integrate resources (information, skills, competences, knowledge creativity) and cooperate to gain a competitive advantage for the entire system. Value (economic and financial, social, emotional and epistemic) emerges only from the integration of resources (Caridà et al., 2014; Vargo; Lusch, 2008) and the transformation of resources. It relates to the engagement of all actors (Chandler; Vargo, 2011) and to the interaction and relationship between them. CoContest ensures preconditions for

triggering and developing resource integration (Colurcio et al., 2014) that is the matching between skills and knowledge of different actors. It empowers the actors: due to their engagement in the relationship they become effective resource integrators and thus value co-creators (Vargo, 2008; Vargo; Lusch, 2008).

The technology plays a critical role in this process of value co-creation (Maglio; Spohrer 2008) as it is an activator of the same resources, and it can increase the value in use (Storbacka et al., 2012); information technology, and Internet-based technology, in particular, allows the actors to access additional resources (Vargo; Lusch, 2011) and represent a privileged channel to activate and convey interactive relationships. In addition, the platform is also a set of functional attributes that define the marketplace in which the crowd and crowdsourcer meet. It offers many possibilities: from simple opportunity to look around and/or to gain visibility to the development of effective business relationships.

The crowdsourcing digital platform allows comparison with a multiplicity of actors in a very short time (the duration of the contest); it activates the spiral the knowledge that, through the interaction between individuals and different contexts leads to the combination of such knowledge (e.g. learning), and thus to the increasing of the value available to the subjects involved in the interaction.

Interaction is allowed by the contest that enables the development of the fundamental condition for the co-creation of value (Vargo; Lusch, 2008). The interaction consists of dialogue or effective collaboration between different actors. It enables the creation of value not only for all those involved, but also for visitors to the platform or that are marginal users. The value is co-created by crowdsourcer and crowds and can be distinguished in i) value for crowdsourcer, ii) value for the platform, iii) value for crowds. In this view, crowdsourcing appears as a practice that enables value co-creation as it allows the encounter and interaction between an actor (the crowdsourcer) and a multitude of different parties together (the crowd), and offers to such different actors enabling conditions to share resources and to co-create value through the recombination of the same resources.

Although, the platform provides the necessary space for the orientation of the crowd and crowdsourcer and for the development of the relationship, it does not ensure the effective and positive development of the relationship and if the resource integration process itself.

Interactive technologies and crowd engaging methods hatch non-negligible risks. Indeed, the possibility to make public the full details of the design solutions submitted to the contest allows all actors, including those didn't take part to the process of value co-creation, to easily capture the value generated through the platform, for example, by putting in practice some plagiarism activities. This event is really hard to regulate and to manage; it implies the risk to destroy value, as it depletes actors who contribute to the process with their own resources to create value but fail to capture it.

6. Limits and further research

The study is exploratory and has been developed through a qualitative methodology to analyze in depth a new and scarcely understood phenomenon. The research fo-

cused on a single (collaborative) network; therefore, main limitations depend on the generalizability of results (theoretical generalizability rather than statistical generalization).

Furthermore, crowdsourcing is a practice still in an embryonic stage of development that is complex and risky to be managed. To assess the impact and the effects, in terms of business performance, further research should be directed to a detailed survey of the phenomenon and its analysis for different business sectors in order to highlight any contextual variables and objective variables. In addition, longitudinal analysis should be implemented to verify the sustainability of the initiatives in the medium term (at least three years after the launch of the platform).

Finally, data we analyzed results from CoContest community and from a direct interview with CoContest's CFO e Co-Founder. Further research should address the point of view of designers as well as of all actors involved in the network.

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EVALUATING LEARNING DISABILITY CASE MANAGEMENT FROM A SERVICE DELIVERY NETWORK PERSPECTIVE

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Service Delivery Networks (SDN) have not been widely considered in complex service environments such as healthcare. There is reported concern for service network functioning of Care Programme Approach (CPA) Case Management in UK Mental Health and Learning Disability services. In this study we adapted the concept of the SDN for an exploratory investigation of a series of CPA case reviews in a Learning Disability Service. Based on a template analysis, we described a SDN at the intersection of patient, commissioner and clinician network participation. From this vantage point we elicited a marked variation in SDN participation quality, giving rise to suggestions for service improvement and further research.

1. Introduction

Important themes in contemporary healthcare are the importance of empowered patient centred approaches, and improving the management of long term complex conditions. The notion of users of health services being empowered has been an embedded ideal for a long time (cf. WHO 1986). Some commentators have pointed out that it is one thing to advocate patient centred care approaches, another to put it into practice (Edwards, 2011), and point out a lack of clarity as to how to operationalise empowerment (Laverack; Labonte, 2000, Brandsetter et al, 2014). However, following a systematic review of the literature, one of the key themes in evaluating empowerment is service users participation in the care process (Cyril; Smith; Renzaho, 2015). Therefore the notion of participation in the process of complex case management is an interesting area of study.

In the UK, in practical terms there are some pressing reasons to explore this theme further. First, there are conspicuous recent examples of case management failure, where dis-empowered patients have suffered poor care both in a general health setting (Francis, 2013), and in a Learning Disability hospital setting (Flynn; Citarella, 2012). Second, standard approaches to case management are still in development, but for UK mental health with a longer track record in this than other specialist areas there are reported variations in quality of participation practice (Goodwin; Lawton-Smith, 2010). Third, there are emerging insights from the wider, mainstream service literature that might be usefully applied in healthcare (Osbourne; Radnor; Nasi,

2012), anchored by concepts such as value in healthcare, defined as the patient feels they are better off than before as a result of service (Porter, 2010, Porter; Lee, 2013).

With regard to value in healthcare, Porter's original modelling of the value creation process as value chain to healthcare has been supplanted by more service logic based models, including value networks (Normann; Rairez, 1993, Stabell; Fjelstadt, 1998) and value co-creation in a network context (Edvardsson; Tronvoll; Gruber, 2010). In an empirical example, McColl-Kennedy et al (2012) adopt a customer service network perspective to study value co-creation styles in patients participating in care in a cancer clinic. Meanwhile the case management literature is redolent with service network implications (Nolte; McKee, 2008). Therefore, building on this work, we argue that it is useful to apply a contemporary service network perspective to participation and value creation in health. We further argue that it is particularly topical to explore this theme in a UK Learning Disability setting. In the example of service failure at Winterbourne View Hospital cited above (Flynn; Citarella, 2012), the poor quality of participation of the stakeholder network in the case management reviews was directly implicated.

2. Research Questions

In this paper, we further explore in the literature the network theme in case management, and the case management system in UK mental health care, the Care Programme Approach (CPA). We investigate the concept of the Service Delivery Network (SDN) as a necessary condition for value co-creation (Tax et al, 2013), and how it might be applied in complex service settings such as healthcare. In the light of that exploration we conduct a case study based investigation of the quality of participation making up the SDN in a series of CPA case reviews in a UK Learning Disability Hospital.

The proposed research questions are:

- i. What is the apparent SDN configuration for a series of CPA case management reviews within a specialist Learning Disability Service?
- ii. What implications for service improvement, service management and case management development arise from this application of the SDN concept to CPA case management reviews?
- iii. What implications for mainstream service management and service network theory flow from an application of SDN to this complex service area?

In order to assist with exploring the patterns of interactions across participant networks, techniques from Qualitative Comparative Analysis (QCA) were used to support the cross case comparisons (Ragin, 2008; Ragin; Byrne, 2009). We will argue that the SDN can be viewed as the intersection of participant networks, and from that vantage point it is the optimal participation and alignment from all stakeholder networks, not just the individual service user, that drives the quality of the SDN in these complex service areas. Suggestions for further practice and investigation are discussed.

3. Case Management as collaboration in service networks.

In order to address the needs of service users with long term conditions a model of care is required that promotes working in partnership with service users and other care agents to optimise outcomes (Nolte; McKee, 2008). This requires a process of collaborative planning (Lorig, 1993). Case management is essentially an integrationist approach to collaborative planning, often associated with cases of multiple complex needs (Krumholz et al, 2006). The field of case management and care integration is fragmented however and Nolte and McKee argue that it is difficult to define a generally accepted model that applies across all settings and contexts. Nevertheless, one framework that is perhaps gaining more ground than others, they cite, is the Chronic Care Model (CCM) (Wagner et al, 1999; Wagner et al, 2001). The Chronic Care Model (CCM) envisages a high quality interaction between a proactive clinical team and activated patients. The model is conceptualised as having strong links between the service delivery system and community resources, with a focus on functional and clinical outcomes, and is redolent with network considerations that have yet to be fully developed and operationalised.

In this context, Goodwin and Lawton-Smith (2010) distinguish between hierarchical approaches to case management, best suited for predictable and well defined case management needs such as single disease chronic conditions, and care co-ordination approaches. These rather feature collaboration and co-operation across organisations 'knitting together' care from multiple sources. They associate this approach with cases involving complexity, multiple morbidity and uncertainty, as may be found in mental healthcare. We would propose that the care coordination approach to case management best resonates with challenges in contemporary healthcare management. Goodwin and Lawton-Smith propose that the Care Programme Approach (CPA) case management system used in UK mental healthcare provides a helpful focus of study for understanding the care co-ordination approach, they argue that it holds lessons for wider healthcare case management.

3.1. The Care Programme Approach.

The CPA case management system was introduced in 1991 and provides for a named care co-ordinator and a person-centred process for assessing and reviewing patients with complex conditions, integrating necessary resources and working collaboratively with patients, carers and stakeholders to best effect (Department of Health 1990; 2008). Patient progress is assessed through a series of CPA review and planning meetings. The role of collaborative CPA planning sits at the heart of the care co-ordination process. All mental health service providers are required to deploy CPA in managing complex conditions, and it has general acceptance in clinical use (Kingdon; Amanulla 2005). In principle, CPA case reviews offer a convenient window for the study of patient-level mental health service as it is practiced in the UK.

There has been criticism of CPA as it has been practiced. Although in many instances CPA has been valued by service users, it is reported that it has not been consistently implemented as intended. There have been examples of a loss of relationship and engagement with the service users, not addressing areas that matter to service users and not sufficiently engaging family members (Goodwin; Lawton-Smith,

2010). There has been empirical work that confirms its configuration within services needs improving, with wide variation in practice (Carpenter et al, 2004, Rose, 2003), and instances of it being applied *to* rather than *with* service users (Rose, 2003). In an analysis done by Simpson, Miller, and Bowers (2003a, 2003b) CPA implementation difficulties can be linked to a lack of unifying philosophy and a disconnect from the wider case management literature. In other words CPA has potential for value generation as a complex case management system, but in its implementation the service benefit has been variable.

A particular challenge for CPA case management has been in UK Learning Disability Care. In 2007 came the discovery of extensive poor care and mistreatment of Learning Disability service users at Winterbourne View Hospital. In the subsequent review (Flynn; Citarella, 2012), the failure of the CPA case reviews to raise awareness with the relevant network of stakeholders such as family, commissioners and clinicians was identified as an issue. In other words, one view of the scandal is that it represents a failure of engagement of the service delivery network in CPA case management. This example illustrates the potential importance of properly structured and functioning service networks supporting service value generation in CPA case management, and indeed case management generally.

3.2. Service Networks.

According to Borgatti and Halgin (2011) the concept of a network both in the business and public sector literature is well established. A network is a set of actors or nodes that are interconnected. The nature of a node is that it consists of an actor, or a group of actors with collective agency. Inter-connections are reciprocal relationships and interactions which can take many forms. Borgatti and Halgin make a distinction between network theory and theory of networks, the former being concerned with how different properties of networks affect the world, which is the focus in this paper. In particular they discuss how different properties produced by the quality of ties and the shaping of the participants can have different effects. In the service and marketing literature however there is a tension between those that embrace networks and wish to propose a grand theory of embedded services in social systems (Vargo; Akaka, 2012; Akaka; Vargo; Lusch, 2013) and those who argue that these concepts have not been sufficiently developed and that the simple dyadic perspective remains sufficient for practical management purposes (Winklhofer; Palmer; Brodie, 2007).

3.3. Service Networks vs Focal Networks.

Möller (2013) usefully frames the debate by discriminating between the study of markets as networks, which are unbounded, and the study of focal nets and strategic nets, which are grounded by addressing practical considerations. Focal networks and strategic networks are tools concerned with service analysis and consist of just those actors and interactions that are practically perceived as relevant (Arjoutsijarvi; Möller; Rosenbroijer, 1999). Strategic networks (or value networks) refer to focal networks that are intentionally planned rather than simply emergent in the service sphere (Möller; Rajala; Svahn, 2005, Raab; Kenis, 2009). The value of exploring the network perspective is to develop a rich picture of the configuration of participants that exist in a particular setting and why. The lack of a theory testing dimension could be said to be a weakness, however Möller argues that strategic networks are directly related to the service value generating system, likely to impact on organisa-

tional effectiveness. Möller notes the potential of case based analytic techniques developed by Ragin (Ragin, 2008; Ragin; Amoroso, 2010) as a means of testing this.

3.4. Service Delivery Networks (SDN) as a Particular Form of Focal Service Networks.

A particular kind of focal or strategic network, the service delivery network (SDN) has recently been a subject of inquiry by Tax et al (2013). Tax et al agree that understanding service experience for customers is better viewed in network terms. For their argument, a customer journey consists of dyadic encounters with a series of providers or organisations, which together form the service delivery network. The authors specifically cite the experience of healthcare as a complex service encounter where the concept of a SDN might well apply. It is key to their proposition that the SDN is an ego network focused on the customer or service user, and that the SDN includes a co-ordination function for these multiple interactions. As it stands, it is not clear whether their concept of a SDN simply captures an emergent focal network, or whether it can be applied in practice to play a role in predicting and testing the relationship between network configuration, the value generating system and organisational effectiveness.

The stance adopted by Tax et al (2013) is specifically focused on the customer as participating in an ego centric network, and a SDN is defined as two or more organisations that are perceived as responsible for the provision of a connected, overall service. However it is not clear that that is sufficient (Ford; Hakansson, 2006). From the value generating system point of view, Grönroos and Gummerus (2014) define three potential spaces or bubbles for interaction: the customer space, the provider space and a shared space where interaction takes place. In other words it is important to define the chosen vantage point for applying a network perspective. Möller is concerned with the provider vantage point of view when suggesting that strategic networks are intentionally planned. Tax et al propose a customer vantage point, but they also highlight the possibility of a collaborative space for parties for co-ordination of the elements of service, consistent with Grönroos and Gummerus' shared bubble. Grönroos and Gummerus also accept that value creation takes place in a network context based on a series of dyadic exchanges as the manner of interaction. In other literature it is the shared space where stakeholders collaborate that is emphasised (Ballantyne et al, 2011), with uniquely determined actor to actor multi-party interactions and interconnections (Vedel; Geersbro; Ritter, 2012). In healthcare for example Zolkiewski and Turnbull (2002) define a focal network as the multi-party collaboration between a customer network, a supplier network and an indirect network (including other relevant organisations). It seems a reasonable extension of Tax et al's concept of a service delivery network that it can be applied from customer perspective, provider perspective or a collaborative perspective. As indicated by Borgatti and Halgin (2011), it is for the investigator to define the network under consideration. There is a consistent theme in the health and public sector service literature of the care experience taking place at the intersection of a number of participant networks: typically service user, provider and care purchaser (Provan; Millward, 1999, Ritter, 2000; Zolkiewski; Turnbull, 2002). We propose that a service delivery network concept can be applied to the collaborative space in a service system.

A further difficulty with Tax et al's version of SDNs is that it treats all other parties in the service experience (alters) on equal terms as a series of relationships with indi-

viduals. Again healthcare provides a good example of why this might be questioned. In McColl-Kennedy et al's (2012) study of co-creation style in healthcare, the authors elucidate that part of the patient style consists of their relationships within their personal networks (friends and family etc). However, there is a further distinct set of relationships with the clinicians concerned, who are in their own professional networks. We would argue that there are within personal network relationships, and between network relationships that are important characteristics of the service space. The advantage of developing a SDN from the perspective of the intersection of participating networks would be to complement insights from McColl-Kennedy et al's work, and shed light on between network interactions, that might further enrich the more simplistic view that Tax et al adopt.

In summary, there is work to be done to capture the multiple stakeholder network perspective to the case management review process in complex healthcare, with CPA case management in UK Learning Disability care a particularly topical focus of concern. We propose that a service delivery network concept can be used to capture a strategic network, where the focus of the SDN is the collaborative space between the service user and participating organisations, and the SDN now becomes defined as two or more organisational networks, together with the service users network, that are responsible for the provision of an overall connected service. This brings the concept into line with the direction of travel of contemporary literature, and more firmly links SDNs to the service value generating system. This sets the stage for theory testing with regards to the influence of the shape and quality of the SDN on organisational effectiveness as envisaged by Möller (2013). This is an area that has not so far been empirically explored in more complex healthcare settings such as case management.

4. Methodology.

For this investigation we were able to collaborate with a UK Learning Disability Trust. The Trust provides in-patient mental healthcare to patients with complex needs associated with learning disability and autism, and services are structured into four service areas: care in a medium-secure setting, care in a low-secure setting, a women's service and an enhanced-care (or rehabilitation) service. Patients within the services are all subject to CPA case management review and the Trust operates a protocol describing the process, underpinned by patient-centred values. Within that protocol, CPA case reviews take place at least every six months. All relevant stakeholders are invited to attend.

In this study we have adopted a multiple embedded case study methodology using template analysis (King, 2012) to explore the network context to a systemic cross sectional sample of 20 cases of CPA case reviews in the Trust. Within case study literature it is legitimate for the focus of investigation to be a defined entity or phenomenon within an organisation (Woodside; Baxter 2011; Yin, 2014). The investigation sits within the theory-building phase of research (Christensen, 2006). Approval was obtained from the Trust's Research Committee to undertake the study. No direct patient contact was required for the study and the investigation was structured as a service evaluation project and not a clinical study. All records remained confidential and no information was extracted from which an individual patient would be identifiable.

Sample and Data. The sample was selected comprising the first five cases scheduled from each of the four service areas following research approval to reflect a broad view of CPA across the organisation. As a service-process study, apart from gender and service area, demographic data on patients were not included. For each CPA review, reports are tabled and the attendance and minutes of the meeting are recorded. The data obtained for study consisted of all documentation filed in the electronic case record for the most recent CPA care review for the selected cases. This documentation consisted of the minuted record of the CPA review plus additional reports tabled by professionals and patients. This was a study of documentation as distinct from oral information or direct observation. Atkinson and Coffey (2010, p80) argue that “documentary materials should be considered as evidence in their own right” and the construction and conventions associated with documents, in this instance being the official record of the CPA review, are also part of the document’s reality, a version of reality that can be usefully studied. We therefore have regarded the study of the official CPA meeting record, within an interpretive paradigm supported by the inter-textual consistency between cases, as a valid perspective for investigating the functioning of CPA reviews.

The Template. The data obtained from the official CPA documentation was explored using a template analysis (King 2012). As allowed by the methodology, we have used knowledge from the literature to develop a suitable template for investigating network participation. The literature identifies the principle participant networks in health and public sector services as being a patient or service user network, a clinician network and a commissioner network as the dominant sources of agency (Zolkiewski; Turnbull, 2002, Provan, Milward, 1999). Meanwhile, again as permitted by the methodology (King, 2012), following an exploration of the first 6 cases, the emergent evidence of participation practices consisted of *representation* of stakeholders at CPA case reviews, the inclusion of stakeholder perspectives into the reviews by way of reports or *structuring* of space for discussion and evidence within the discourse recorded of active *contribution* (Spurrell; Proudlove, 2014). The mature resultant template is shown in Table 1.

The *patient network* would encompass the individual service user and their family and friends. In addition, it would also include those who might provide support in an advocacy role (e.g. mental health advocates, solicitors) and professionals from the service users home area community team (e.g. local care co-ordinator, community nurse, social worker). It might have been argued that these professional should be located in a different network, but from the patient eco-system perspective these are all agents whose primary purpose is to support the service users in their own communities.

The *clinician network* was considered to be the designated multidisciplinary team responsible for the case. The team might include a broad range of clinical disciplines, including a named responsible clinician, medical staff, nursing staff, occupational therapists, psychologists and other forms of specialist therapists.

Meanwhile, the *commissioner network* covered the service commissioners or their agents.

For the three further emergent subthemes, *Representation* captured the attendance of representatives from participant networks at the CPA case review. *Structuring* re-

flected the extent to which structured space was built into the CPA discussion to encourage contribution from participant networks and *Contribution* reflected the extent to which there was active or passive involvement evident in the documentation from each network. These are important as they encompass the participation practices for each stakeholder network through which the interactions and interconnections of multi-level service exchange are structurally transacted, as envisaged by Vedel, Geersbro and Ritter (201).

Table 1. Mature Template for exploring network participation in CPA case reviews.

Template Theme	Template Sub-themes and Nature of Evidence
<p>Network Context</p> <ul style="list-style-type: none"> • Patient Network Perspective • Commissioner Network Perspective • Clinical Team Network Perspective 	<p><u>Representation</u></p> <ul style="list-style-type: none"> ○ Personal attendance at CPA review by network members <p><u>Structuring</u></p> <ul style="list-style-type: none"> ○ Structured documentary space within agenda or demonstrated in discussion minutes. <p><u>Contribution</u></p> <ul style="list-style-type: none"> ○ Views reactively elicited in discussions and documentation ○ Pro-active expression of views in minutes and co-production of reports to inform the review process.

Analysis

The data for each case was reviewed for accuracy and completeness. The template themes and subthemes were encoded into NVivo version 10 (2014). Each set of case documentation was imported into the NVivo project and the data was examined and coded to the template nodes. As an exploratory investigation, data analysis was undertaken using pattern matching of the coded data, consistent with the cross-case synthesis approach to case study analysis described by Yin (2014). A rich picture was developed from the documentary data of the consistency and extent to which the template captured the network context to CPA case reviews and the range and richness of participation for each network was considered and described.

Following comments by Möller (2013), in order to examine the patterns of network participation practices in a more structured fashion, we drew on the principles of fuzzy set Qualitative Comparative Analysis as described by Ragin, (2008, 2006). This analytic technique makes use of set theory to represent qualitative data in a format whereby case level data can be aggregated and interactions and patterns can be evaluated. This is a quantitative technique that is able to operate with small case samples and avoids some of the difficulties of normative statistical techniques in qualitative research (Ragin, 2008, Ragin; Byrne, 2009). The technique relies on assessing the degree of membership of cases to the defined set of interest in a considered process, termed 'casing'. In this study the primary set of interest is the set of

rich participation practices, where participation practices have been operationalised as Representation, Structuring and Active Participation, as above. We followed a methodology on casing for investigating social phenomena at the micro level (Basurto; Spear, 2012), with definite set membership defined as 1, definite non set membership was defined as 0 and the transition point of equipoise between in and out was 0.5. We mapped the degree of rich participation practice set membership for each network for each case and charted the overlaps in practice variation for further examination.

5. Results.

Our findings demonstrated that there was considerable variation to the participation practices associated with each of the patient, clinician and commissioner networks, which ranged from some very rich profiles to more limited ones. After describing the key findings for each participant network, we have used QCA methodology to illustrate these variations, and the degree of concordance of participation between patient, clinician and commissioner networks.

The Patient Network The findings for the patient network ranged very broadly. In one case the only participation was partial attendance of the service user, with no support from other possible network members such as family, home team or advocates. At the other pole, service users pro-actively contributed, co-produced progress reports and included support from family members, solicitors, advocates and social worker of nurse from home area in their network. Generally structuring of space within the review for patient network contribution was limited. Figure 1 displays the quality of patient network participation for each case in terms of the aggregation of fuzzy set memberships for *Representation*, *Structuring* and *contributing*. As permitted within QCA methodologies, using researcher (MS) judgement a cut off of .7 was proposed as a reasonable threshold for good participation practice. Only 6 out of the 20 cases achieved that threshold.

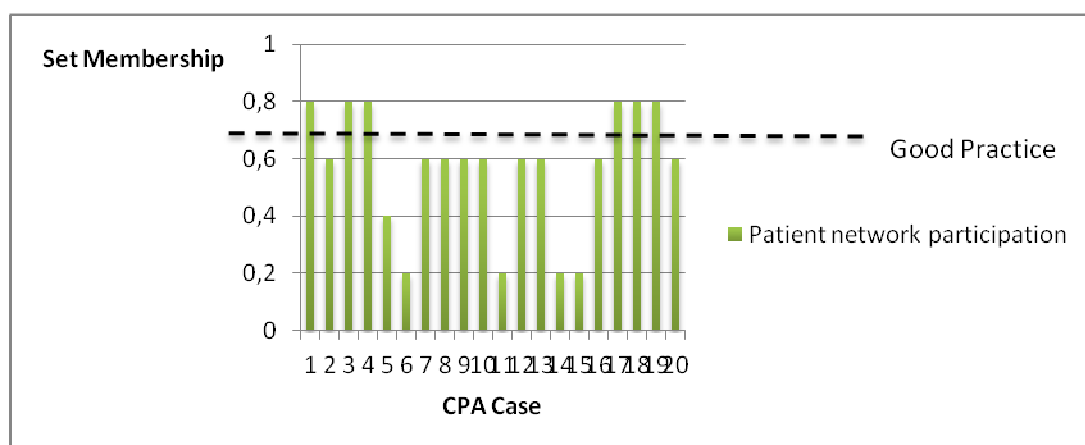


Figure 1. Chart of fuzzy set membership of rich participation for Patient Network

The Commissioner Network Similarly there was considerable variation in Commissioner participation. A broad view was taken to allow that other parties such as social workers or community nurses might have roles in representing commissioners. Even allowing for that however, commissioner attendance was limited for this cohort, although in a number of cases apologies were noted. Within the structuring of discus-

sion space within CPA reviews there was not a clear sense of what might matter to commissioners as such, but for about half of cases there was a focus on care pathway progression, which some might assume coincides with what matters to commissioners. Again, the variation of commissioner participation is reflected in Figure 2, within a QCA framework. In this case only 4 cases reached the threshold we suggest as reasonable quality of practice. Therefore, there is evidence for scope to improve both the involvement of commissioners in CPA and to give further attention to what matters to commissioners within the format.

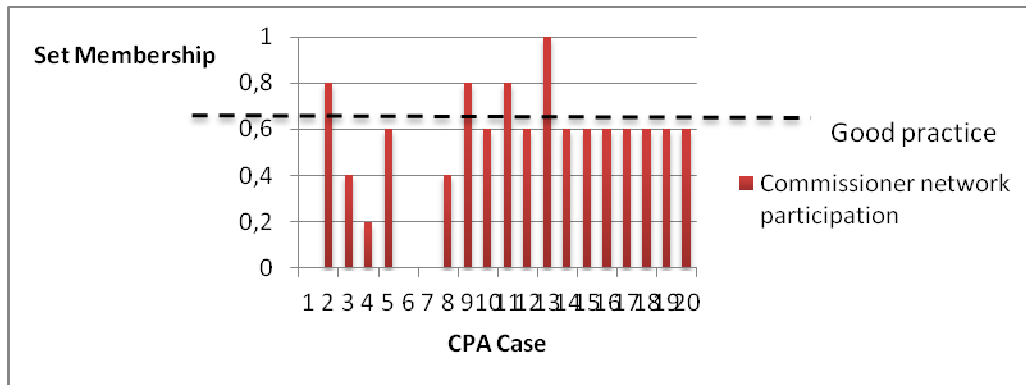


Figure 2. Chart of fuzzy set membership of rich participation for Commissioner Networks.

The Clinician Network For the participation of clinicians, the key finding was the variation in richness of the multi-disciplinary team (MDT) representation and the level of collaborative practice that was seen. Thus, for some cases ‘the MDT’ consisted of just the Responsible Clinician (RC) and a nurse. This contrasted with other cases, which benefitted from the RC, a specialty doctor, the case manager and the unit manager as well as occupational therapy (OT) and psychology or psychological therapist representation. Generally, there was OT input for the most part. The psychological service input was the most variable feature, being only available in about half of cases. Figure 3 represents the variation across cases taking into account attendance and degree of proactive contribution. Only 6 cases reached threshold for reasonably good participation, similar to above.

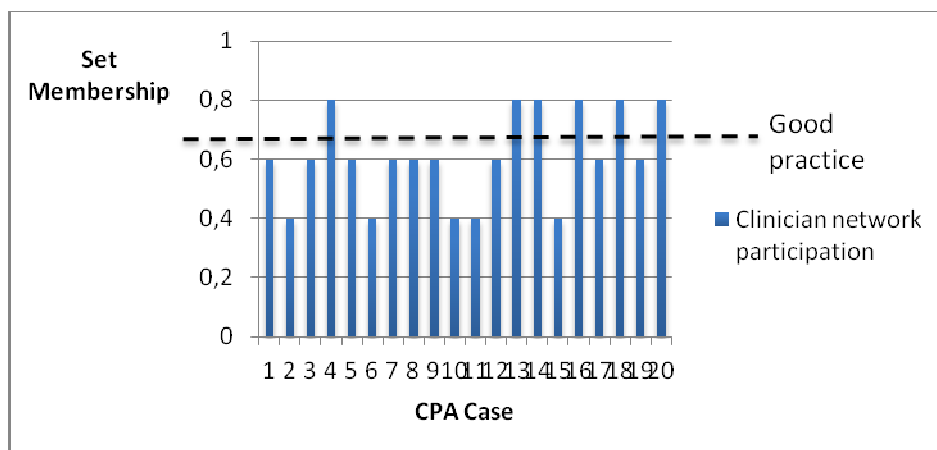


Figure 3. Chart of fuzzy set membership of rich participation for Clinician Network.

Network Interconnection. Having illustrated the variation in network participation across the sample using QCA, the interconnection between the networks at the case level can be seen by charting the set intersection for the three networks. Figure 4

integrates the variation in participation practices described above for each network to illustrate that different networks are behaving differently at different times. In other words there are not consistently cases where everyone is engaged and participating together, leaving other cases where engagement and participation is poor and simple suggestions of sharing best practice could be applied. Rather the picture appears to illustrate a more complex inconsistency between participating networks.

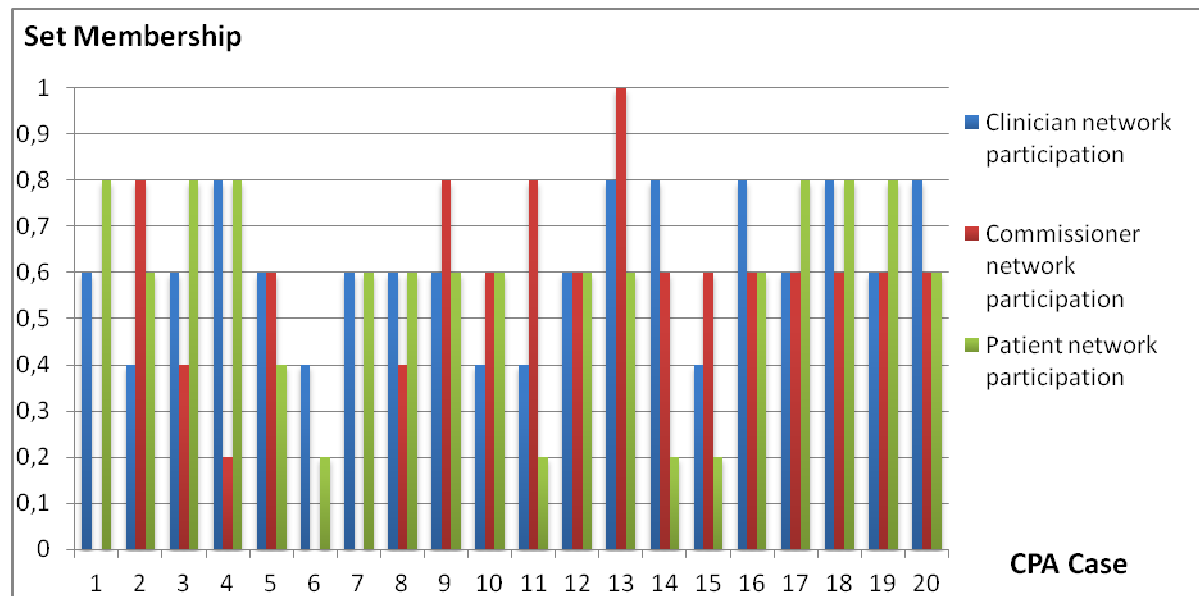


Figure 4. Chart of fuzzy set membership of rich network participation for each of patient, commissioner and clinician networks for a sample of CPA case reviews.

In order to examine this apparent disconnection, the degree of set overlap was calculated using fs/QCA software designed for the purpose (Ragin; Charles; Davey, 2014, Version 2.5). The coincidence of rich patient and commissioner participation was .58 (where 1 is complete coincidence), Patient and Clinician participation was .76 and clinician commissioner was .64. The degree of overlap of rich participation for all three was only .52. This is consistent with a greater disconnect for commissioner network engagement and that overall there does not appear to be a strong alignment between networks in the participation process.

6. Discussion.

In this investigation we have elicited the service delivery network (SDN) associated with CPA case management reviews in a learning disability service at the intersection of 3 participating networks relating to patients, commissioners and clinicians, as evident in the review documentation. From this vantage point, a notable variation to the quality of participation was identified for each network across the series of cases, the implications of which are further discussed.

Participating Network Variation

The effect of the variation in practice from stakeholder networks across cases was that each emergent SDN appeared to present a rather unique participatory profile. As the quality of the SDN is presumed to be important in setting the stage for value creation (Tax et al., 2013), this can be seen as a key issue of service effectiveness.

This study has specifically examined the documentary reality of CPA case reviews. There may well have been further interactions between stakeholder networks that were not captured from this perspective, either in the reviews themselves, or in interactions outside the review process. We would argue that CPA case reviews are a key forum for identifying and communicating the value proposition of the service, which should be reflected in the documentation. This would not detract from other interactions also taking place. It remains the case that some review practices demonstrated richer involvement of participants than others, which requires explanation.

Different stages and rhythms of care.

This study was a cross-sectional view of cases at different stages of care. Between case variation may simply reflect the evolution of engagement, or natural fluctuations in participation over time. Such fluctuations might for example reflect changes in patient confidence over time, or even fluctuating availability of professionals responding to competing demands to attend other meetings. It would be interesting to consider whether a more consistent picture emerged over a longitudinal perspective. From our data however, we would argue that such explanations are not sufficient to account for the marked level of variation identified. Aspects such as the way reviews were structured would not have been time dependent. Variation was seen just as markedly in professional practices as for patients and carers, and professional practices might be expected to be more consistently pro-active across the whole care period.

Participation Style.

Expressed in terms of 'co-creation style, it has already been highlighted by McColl-Kennedy and colleagues that variations in patient participation style might be an expected feature in healthcare (McColl-Kennedy et al, 2012; Sweeney; Danaher; McColl-Kennedy, 2015). Our findings suggest further that a consideration of the different co-creation styles for participating clinicians, commissioners and other stakeholders might also be relevant. Moreover, it might also be expected that a further source of variation would be created by the interactions of different patient styles with different clinician or commissioner styles, and from the influences on those relationships from the other parties (Vedel; Geersbro; Ritter, 2012). Therefore a further opportunity for service improvement lies in developing optimal models for all participant engagement, not just as individuals but as interacting participating networks.

Lack of organising framework

Building on the theme of developing optimal models, it may be that a broader lack of consistency lies in how CPA reviews were framed. Different reviews might have viewed their purpose and objectives differently, for example. There is a difference between using a CPA review to report on progress, and using CPA as a creative space for designing new care approaches. There is a lack of theory based framework development to guide Case Management (Nolte; McKee, 2008), including CPA (Simpson; Miller; Bowers, 2003a; 2003b). Within the SDN concept, Tax et al (2013) assume that there should be some kind of a service framework to support participant collaboration. This is mirrored in other commentary on the importance of an emergent platform to engage participants to support value co-creation (Grönroos; Voima, 2012). There is widespread recognition in the service literature of the merit of structuring such as blue printing or touchpoints for guiding value creation in service (Alter, 2008; Kimbell, 2011; Bitner; Ostrom; Morgan, 2008), which may well have some ap-

plicability here. Therefore, we would argue that a review of the operating framework that underpin CPA from a service theory perspective would lead to a better, more consistent framing of the participation practices within the SDN with a view to connecting with the value generating process.

What are the implications for CPA Case Management? As a standard feature of UK mental healthcare, it is legitimate to consider wider inferences from this case study series on a systemic basis (Yin, 2014). The key implication from this study is to confirm the previously reported variation in CPA patient engagement between services (Goodwin; Lawton Smith, 2010, Carpenter et al, 2004, Rose, 2003). Further, it extends that finding to include variation in engagement of other participants (clinicians and commissioners), and for that variation to potentially extend down to the case level in practice. In other words, if these findings are repeated in other services, it might be that there is a level of systemic difficulty that has not been previously appreciated, and which would be consistent with the concerns that emerged following the review of practice at Winterbourne View (Flynn; Citarella, 2012). Indeed, there is an initiative in hand to promote improved case management in Learning Disability care in the UK (Department of Health, 2012). As Simpson, Miller and Bowers (2003a; 2003b) indicate, there may well be a need for further theory development to support the functioning of CPA case management. We would argue that a consideration of the concept of SDN quality would be one important dimension to include in policy development and this paper makes a contribution to suggesting how this might be put into practice.

What are the implications for Case Management more broadly? As indicated above, there is an opportunity for extending learning from CPA case management to case management more generally (Goodwin; Lawton-Smith, 2010). Although the cases studied were selected from a particular organisation in a particular service area, they do present good examples of complex challenges for care co-ordination. Therefore, it is more generally useful to offer a framework, based on the concept of the SDN as the intersection of stakeholder networks, that directs attention to the potential richness of resource availability from all sources on a case by case basis.

When Nolte and Mackee (2008) point out that the case management literature has tended not to address more complex cases, they do not define what makes a complex case. The population studied involved people with a Learning Disability and some significant mental health problem sufficient to require hospitalisation. This argues that it would be reasonable to justify these as within the more complex range of healthcare support needs. In addition, either through limitation of capacity or through legal constraints, it could not be assumed that patients were able to make unconstrained choices. This issue of service user constraint has previously limited the application of mainstream service models to such areas of public service (Baron; Harris, 2008). Similar conditions might well apply in other areas of healthcare, such as care of the elderly for example. In this study, by locating the individual patient perspective within a network of patient supporters, who collectively have agency as a service entity (Freund; Spohrer, 2013), we propose an empowerment of the patient perspective in case management. This effect would be in counter-point to the agency of other stakeholder networks, within the SDN concept.

What are the implications for applying the concept of the Service Delivery Networks (SDN)?

In this investigation, to explore a particularly complex area of service exchange, we

have proposed some adaptations to the SDN configuration described by Tax et al. (2013) to better reflect more complex multi-party service exchange. It is consistent with other literature on public sector services that we have shifted the vantage point of the SDN to the intersection between participating networks (Provan; Millward, 1999, Ritter, 2000, Zolkiewski; Turnbull, 2002). It is important to note that this perspective is one of many SDNs that could have been elicited for exploration that might equally be of relevance and interest to consider. It is the researcher that defines the network of interest, as indicated above (Borgatti; Halgin, 2011). We justify our choice of vantage point as a pragmatic, appreciative stance, as permitted in case study investigation (Cox; Hassard, 2005), whereby this vantage point proves useful in bringing out fresh insights into opportunities for service improvement.

In Figure 5 we have illustrated the shift in vantage point that we are proposing, with implications for one way of exploring the connection between the SDN and the value generating system. In our proposal, consistent with Gronroos & Gummerus (2014) it is in the collaborative space that the participants engage, with emergent exchange of resources for benefit as the value generating process (cf. Ballantyne et al, 2011, Zolkiewski ; Turnbull, 2002). In this context the SDN we have revealed different agents participating with different degrees of sophistication (Vedel; Geersbro; Ritter, 2012). Extending Vedel, Geersbro and Ritter, our findings suggest that the alignment to the richness and sophistication of participating networks might also be important for the quality of the SDN.

Therefore, a model of the complex exchange SDN has been described which encompasses the richness of the participating networks in terms of empowering agency from all stakeholders, and capturing the sophistication of that participation in terms of representation, structured space, contribution and the degree of alignment of these qualities at the case level. As suggested by Möller (2013), we have using set-theoretic techniques from QCA with which to capture this qualitative signature of participation profile for individual SDNs. Our proposition is that this SDN qualitative signature would be related to service outcomes valued by all stakeholders. This model would be useful for service managers looking to develop case level insight into a key component of value creation. Further research is required however to empirically test whether in fact SDN quality does relate to aspects of value creation in practice. At this stage, this has been a limited application of QCA techniques. There are critics of QCA, and some object to the role of the investigator in making structured judgments about inclusion of cases in set membership (cf. Bennett; Elman, 2006). However, the approach is gaining credence in many public sector settings (Rihoux; Rezsöhazy,; Bol, 2011), and of interest for further research, the methodology does allow for potentially testing causal relationships, for example between quality of SDN and valued service outcomes.

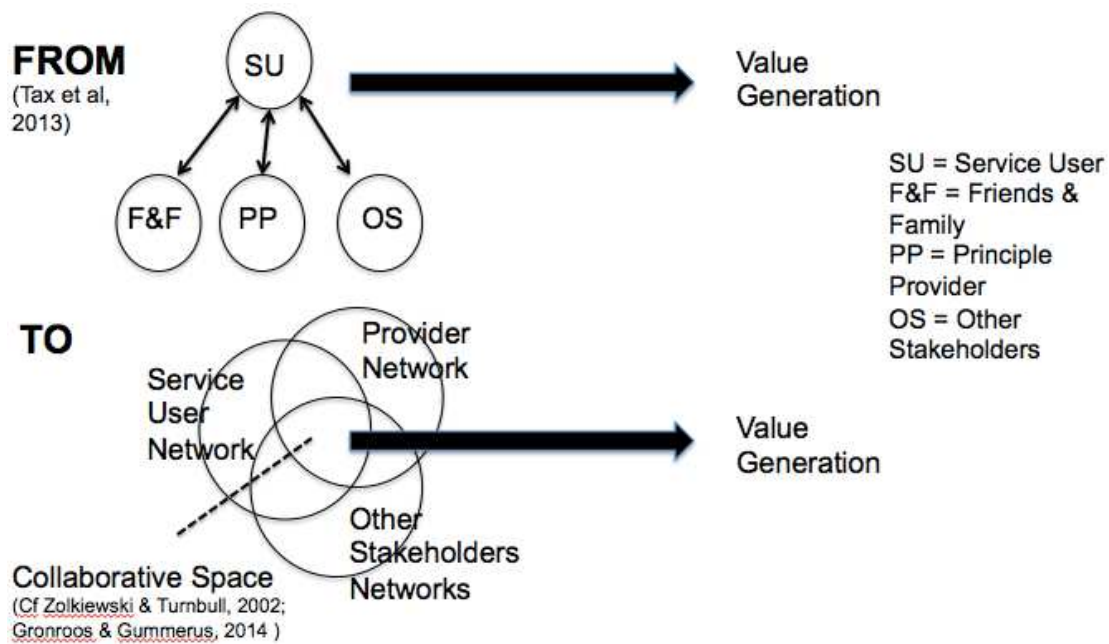


Figure 5. Choosing the vantage point for a Service Delivery Network (SDN) perspective in complex service exchange, such as healthcare.

7. Conclusions.

In conclusion, a SDN perspective from the vantage point of an intersection of stakeholder networks has provided a useful tool for elucidating variation in CPA participation practices in a UK Learning disability setting. The investigation adds to the body of empirical work looking to understand CPA and case management more broadly, as well as serving as a helpful worked example of the application of this service network concept in a complex service area. Further, this study illustrates how it is possible to bring into focus aspects of the shape and functioning of the parties that are involved in complex case management, an issue increasingly seen as important for understanding care integration and service delivery improvement. This study was limited to a cross sectional view of the evolution of care over time, and represents findings from within just one provider organisation from the particular perspective of the documentary reality.

Nevertheless, the particular findings in this study replicate that there is an issue of variation in practice to be found specifically in CPA case management in mental health, and further to suggests that this practice variability might penetrate down to the individual case level. However, by developing a rich qualitative picture of variability in SDN functioning, we are able to introduced a more nuanced view as to how factors such as variation in style of participation from all agents, the evolution of the service relationship over time and their interactions might all play a role. Within the framework of the SDN as a component of the service value generating system, we would expect that these factors ought to be demonstrably linked to valued service outcomes. This would be an area for further investigation.

A further contribution of this study has been to usefully adapt and extend the concept of the SDN from its application to essentially dyadic exchanges in simpler ego-networks to a much more complex service scenario involving multi-party exchange

and interactions, with a service focus at network interfaces as being a more suitable vantage point. This development is of interest in supporting mainstream management looking to a better aggregated understanding of case level service experience, and also in suggesting pathways that might lead to better research frameworks for studying wider case management across healthcare, as well as complex service scenarios more generally.

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ENVISIONING POTENTIAL VALUE CREATION THROUGH MANAGING RESOURCE BECOMING

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Within a research context of resuming business, the purpose of this paper is to elaborate on the issue of potentiality of dormant resources for actor to actor (A2A) value creation following business closure, also developing a discussion on resource becoming. On the issue of identifying and acknowledging potential resources when resuming business, we see resource becoming as contingent on acknowledging potential resources, using previous experience of combining resources, and envisioning future resource integration for value creation. Equally we argue that re-configuring resources is essential to resource becoming. As an illustration for our discussion we use a case study of a re-opened Swedish iron-ore mine after twenty years of closure.

1. Acknowledging Dormant Resources

During a complete business closure, relationships and activities linked to the business are terminated, and all kinds of resources tied to the business are either left unused or reconfigured and/or removed for use in a new type of business. Hence, remains of the past are seen as potential but dormant resources in the form of personal relationships and knowledge, physical artefacts and other residues that may again become useful.

Envisioning potential value is an inseparable feature of doing business. Taking a resource perspective to service innovation and value creation, integrating and combining resources is not only a matter of seeing the potential in and integrating readily discernable resources, but just as much to identify and acknowledge resource potentiality also in entities not evidently seen as resources, i.e., dormant resources (cf. Read et al., 2009). This is not the least relevant considering resource spatiality, as in connections to a particular place. Furthermore, interacting and integrating with actors as, or linked to, potential resources from the very onset opens for multi-beneficial value creation.

Integration of resources within a network of actors is a prominent feature of the service-dominant (S-D) logic, manifested in the service ecosystem framework (e.g. Vargo; Lusch, 2016). Resources are in general most often discussed as being already actualized; resources “are”, and acknowledged as such by the focal actor (cf.

Schumpeter, 1934). However, the key resource underlying all other resources considers the ability of an individual to perceive and enact the resource potential of any means available to a firm (Litz, 1996). Such a dynamic perspective is encapsulated in the view that “resources are not; they become” (Zimmermann, 1951). That is, managing resource becoming is vital, as is realizing that potential resources are only acknowledged and put into use given the ability to perceive them.

Within a research context of resuming business, the purpose of this paper is to elaborate on the issue of potentiality of dormant resources for actor to actor (A2A) value creation following business closure, also developing a discussion on resource becoming. Building on the A2A orientation of S-D logic (e.g. Vargo; Lusch, 2011), value creation in a particular business context, at a particular place, is seen as facilitated by the integration of resources by actors interrelated in a complex service ecosystem.

There has been some research interest in what happens after business closure to unused resources, such as, for example, the buildings and roads remaining at an old industrial site (Collaton; Bartsch, 1996). Also, reactivation of ended business relationships that are seen as important potential resources has been acknowledged (Gidhagen; Havila, 2016). However, what remains to be explored is the issue of how previously used resources in a former place of business are available to be vitalized for the same or a new type of use. This longitudinal view brings a dynamic perspective to resources.

2. Methods

To explore the potential of dormant resources for A2A value creation in resuming business, the research is based on a single case study; a useful exploratory approach for theory building (Yin, 2009). The case considers a Swedish iron ore mine that was closed in 1992 and reopened in 2012. The chosen research design combines primary and secondary data, considering both the focal company and other relevant actors of the service ecosystem. Apart from studying official company information and newspaper articles, primary data was gathered through twelve interviews with individuals considered to be key informants (Marshall, 1996). The interviews were made with one of the founders of the mining company, three consecutive CEOs and other managers and key employees of the company; as well as with adjacent suppliers in the service ecosystem and representatives of the local municipality.

3. Main Contributions

One main contribution to service research is the focus on the resource-integrating role when resuming business, essential to value creation in A2A service ecosystems, and resource becoming, especially considering the potentiality in dormant resources. The presented framework of resource becoming and configuring provides a conceptual tool for an enhanced understanding of factors affecting the value creation process in any particular place and context, from a service ecosystems perspective.

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FIFTEEN ADVANCES AND FIFTEEN CHALLENGES FOR SERVICE INNOVATION STUDIES

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In an article entitled “Twenty challenges for innovation studies”, Ben Martin (2015) lists the twenty challenges that “innovation scholars” will have to face over the coming decades. This prospective exercise is based on a review of twenty major advances in this field of research since its creation. In this contribution, we carry out a similar exercise, but focusing only on services. Our goal is twofold. It is, first, to account for the main advances of the “Service Innovation Studies” over the last twenty five years, distinguishing, on the one hand, advances in theoretical conceptions, and, on the other hand, advances in innovation modes and institutional arrangements. It is, second, on this basis, to provide an agenda establishing a certain number of research priorities in this area.

Keywords: service innovation studies, research advances, research challenges

1. Introduction

In an interesting programmatic article entitled “Twenty challenges for innovation studies”, Ben Martin (2015) lists and discusses the twenty most important challenges that “innovation scholars” will have, according to him, to address over the coming decades. This prospective exercise is based on the review of twenty major advances in this field of research since its creation fifty years ago under the name of “science policy research” (see Appendix 1).

In this contribution, we wish to carry out a similar exercise, but focusing only on services. Therefore, our aim is to account for the major advances in “Service Innovation Studies” (SIS) and to provide an agenda setting research priorities in this area.

However, services are not absent from Ben Martin’s analysis. First, some of the challenges envisaged are horizontal: they concern all sectors. Second, even if Martin didn’t explicitly mention it, others mainly originate in service activities. This is the case, for example, with the “shift from visible innovation to dark innovation”. But above all, the shift from innovation in manufacturing to innovation in service is designated by Martin as one of the most important of the twenty challenges for IS over the coming decades. However, the place given to services in the major challenges for IS is not, in our view, sufficient and satisfactory. It deserves to be further clarified. A fo-

cus on services and the challenges they raise is justified, if only by the centrality of services in contemporary economies. Is it necessary to remind that they now account for over three quarters of the wealth and jobs in all developed countries and that the emerging and developing countries are no exception to this universal process of tertiarisation?

However, the exercise that we propose to carry out suffers from several limitations. First, it is not possible to provide an exhaustive list of challenges, but our purpose is merely to identify a sufficient (necessarily arbitrary) number to establish a research agenda and generate debate among service innovation scholars. Second, it should be admitted that the “newness” of the identified issues is relative. In some cases, these issues have already been addressed in the literature, even on an ad hoc basis. It is seldom an absolute novelty. These issues are sometimes the exploitation of particular aspects of a major advance (already acknowledged). For example, reconciliation of service innovation and social innovation is a new challenge (challenge n° 2), which can be interpreted as an enrichment of the recognition of the existence of specific forms of service innovation (advance n° 3). Similarly, the “smart service ecosystems” challenge (challenge n° 4) can be considered as the deepening of the research trajectory illustrated by the endogenization of technological innovations (advance n° 2).

However, the exercise that we propose keeps all of its interest for different reasons. First, although it will still be possible for an attentive reader to identify an existing reference on a challenge considered as new, including it in our list means it is a rich research field which exploitation is still in its infancy. Such a field constitutes a powerful research trajectory, which has not revealed all its secrets, and that we must keep on exploring. Second, whatever the degree of real novelty (which is arbitrary), as highlighted by Martin (2015), the interest and novelty of the proposed exercise is to bring together in a single analysis, these different challenges.

As with IS in general, a good way to consider the major challenges in SIS is to start by reminding the main advances since the establishment of the SIS field. Indeed, the survey of the advances is a useful tool for identifying the gaps and the potential directions for further research.

On the whole, this mainly theoretical work is organized in two sections. In the first section, we state the main fifteen advances achieved in the area of SIS over the past two decades, distinguishing two different but linked groups: on the one hand, advances in theoretical concepts, and, on the other hand, advances in innovation modes and institutional arrangements. In the second section, we examine the fifteen main challenges that could structure our research agendas over the future.

2. The fifteen major advances in SIS over the past two decades

SIS are a relatively young field of research which we can date the emergence in the second half of the 80s and early 90s. This field was born from the convergence of two originally independent research trajectories. The first is the trajectory of “service studies” concerned by the rise of service activities and how it affects public policy and business management. The second is that of “innovation studies”, concerned about

providing policy makers and business managers with tools for managing and supporting innovation.

Despite its young age, this field of research is relatively prolific and it has already resulted (which is a sign of maturity of the field) in a number of “surveys”, whether these are general surveys devoted to innovation in services in general or specific surveys devoted to a particular (sectoral or thematic) aspect of innovation (see table 1).

Table 1: General and specific surveys on innovation in services (non-exhaustive list) (enriched from Gallouj and Djellal, 2015)

General surveys	
- Droege et al. (2009)	- Gallouj and Djellal (2010)
- Bryson and Monnoyer (2004)	- Howells (2007, 2010)
- Coombs and Miles (2000)	- Windrum (2007)
- Gallouj (1994, 2002a, 2010)	- Pilat (2001)
- Gallouj and Savona (2009, 2010)	- Drejer (2004)
- Gallouj and Windrum (2009)	- Rubalcaba et al. (2012)
- Miles (2002, 2005)	- Carlborg et al. (2014)
	- Djellal and Gallouj (2015)
Specific (sectoral) surveys	
- Innovation in hospitals	- Djellal and Gallouj (2007a)
- Diffusion of innovation in health services	- Greenhalgh et al. (2004)
- Innovation in public services	- Djellal et al. (2013)
	- Windrum and Koch (2008)
	- Gallouj and Zanfei (2013)
	- Miles (2013)
	- Arduini and Zanfei (2014)
- Innovation in Tourism	- Hjalager (2010),
- Innovation in logistic services	- Chapman et al. (2003)
Specific (thematic) surveys	
- Typologies of innovation in services	- Snyder et al. (2016)
- The servitization of manufacturing	- Baines et al. (2009)
- New service development	- De Jong and Vermeulen (2003),
	- Johne and Storey (1998)
- Innovation indicators	- Djellal and Gallouj (1999)
	- Drejer (2004)
	- Gault (1998)
	- Evangelista and Sirilli (1995)
- Innovation and employment	- Djellal and Gallouj (2007b)

Relying in particular on these surveys and carrying out a survey of surveys, we have compiled a list of what we consider the fifteen major advances in the field of SIS since their advent, nearly a quarter century ago (see table 2). This survey of surveys and the identification of these fifteen advances will make it possible to identify a certain number of knowledge gaps in SIS and a certain number of challenges for this field.

The first seven advances reflect changes in the recognition of SIS, in the general theoretical perspectives and the understanding of the fundamental nature of service innovation, while the other eight rather correspond to advances in innovation modes and institutional and regulation arrangements.

Table 2: Fifteen advances in service innovation studies

• *Advances in the recognition of SIS, in the general theoretical perspectives and the understanding of the nature of innovation*

1. From non innovative services to services as simple adopters of technological innovations
2. From services as simple passive adopters to services as active adopters or even producers of technological innovations
3. From services as adopters/producers of technological innovation to services as producers of specific innovation forms
4. From innovation in some specific service sub-sectors to innovation in all service activities
5. From innovation *in* services to innovation *through* services
6. From innovation in services to service innovation (everywhere)
7. From publications in existing journals to the creation of specialized journals

• *Advances in innovation operating modes and institutional and regulation arrangements*

8. From Oslo Manual 1997 edition to Oslo Manual 2005 edition
 9. From assimilation surveys to demarcation and integration surveys
 10. From assimilation policies to demarcation and integration policies
 11. From the search for productivity to the quest for performance
 12. From services industrialization to goods servitization
 13. From the linearization of the innovation process to the recognition and strengthening of a multifaceted natural interactivity
 14. Balancing the intrinsic tension between service standardization and service customization
 15. Balancing the intrinsic tension between service regression and service extension
-

2.1 The advances in the recognition of SIS and in the general theoretical perspectives

Innovation economics, like many other fields of economic theory, was built on the manufacturing field. Economic analysis has long considered that the innovation issue does not concern services. Services do not innovate or to a negligible extent. The conquest of IS by services has been gradual. It is possible to account for the gradual recognition of SIS, its legitimacy, through successive changes, which reflect advances in the general theoretical perspectives.

Advance 1. From non-innovative services to services as simple adopters of technological innovations

After an outright denial phase, the first advance achieved by SIS is the recognition of a minimalist innovation activity, limited in its nature and in its source, which is reduced to the adoption of technical systems produced by the manufacturing sector. The technologies in question are technologies for the transportation of information or material (ICTs, road, air, rail, sea transport systems, etc.). This advance illustrates a technologist and industrialist or assimilationist view of innovation (Gallouj, 1994, 2010): just as in manufacturing, service innovation is primarily supposed to consist in a material artefact. Besides the *exogenous* dimension of technologies (these are indeed only considered as service production factors), this progress also reflects a *subordinate* position of services vis-à-vis manufacturing. After all, services simply adopt, relatively passively at this stage, innovative technologies produced in manufacturing sectors. Technological trajectories at work in services are therefore “supplier-dominated” according to Pavitt’s typology (1984).

Advance 2. From services as simple passive adopters to services as active adopter or even producers of technological innovations

The second advance achieved by SIS is the shift from services as simple *passive adopters* to services as *active adopters or even producers* of technological innovations. This vision is still technologist and industrialist or assimilationist, since innovation is still limited to technical systems. But a double movement of endogenization and autonomisation of innovation dynamics in services characterizes this advance. The *endogenization* of technologies (especially ICTs) means they are no longer subject to a simple passive adoption, but instead to more complex managerial mechanisms of integration or embedding in the organization. *Autonomisation* for its part reflects the fact that service organizations can, in some cases, stop depending on suppliers from manufacturing sectors, by producing their own innovative technical systems. In some cases, the autonomisation (vis-à-vis the manufacturing sector) can go so far as to the inversion of the balance of power. Indeed, service providers may dominate their industrial suppliers and orient their technological trajectories, for example, by imposing the functional and technical specifications of new products. Such “customer-dominated” trajectories manifest themselves, for example, in large-scale retailing (where large-scale retailers often dominate their industrial suppliers).

Advance 3. From services as adopters/producers of technological innovations to services as producers of specific forms of innovation

The concepts of innovation, we have discussed in advances 1 and 2 makes it possible to only grasp the tip of the iceberg of innovation in services (Figure 1). This visible part of innovation is the one that is perceived by traditional indicators, such as R&D and patents. It is reduced to technological product and process innovations.

SIS highlight an innovation gap, that is to say, the existence of invisible or hidden innovations. Thus, advance 3 consisted in focusing on the submerged part of the innovation iceberg, and in accounting for non-technological forms of innovation: intangible product and process innovations, organizational innovations, methodological innovations, marketing innovations. Therefore, this advance reflects a displacement of the analytical focus from visible innovation to invisible (hidden or forgotten) innovation. It illustrates the transition from a technologist, industrialist or assimilationist perspective to a non-technologist, service-based or demarcation perspective (Gallouj, 1994, 2010). It assumes, for SIS, to free themselves from conceptualizations inherited from an industrialist culture and to begin to unlock the cognitive process. It

should be noted that, in his research agenda for IS, Ben Martin (2015) evokes the shift from visible innovation to dark innovation. But he does not explicitly recognize what this progress in IS owes to SIS.

The non-technological character of these invisible innovations does not mean that they are not based or cannot be based on material technologies (IT or telecommunication systems, means of transportation, for example), but that they are not consubstantial to them and that they can in some cases dispense with them.

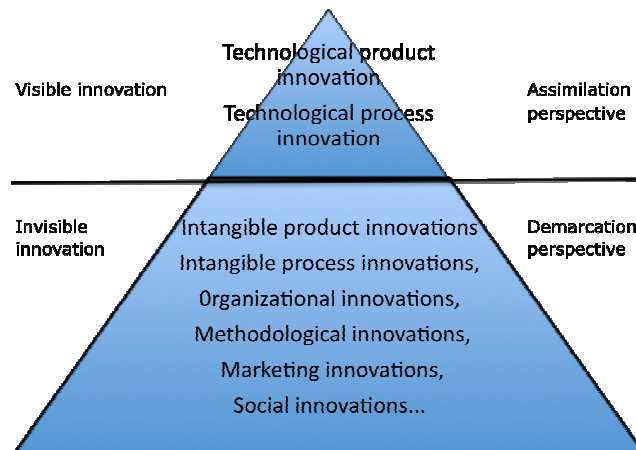


Figure 1: The innovation iceberg (Source: Djellal and Gallouj, 2016)

Advance 4. From innovation in some specific sectors to innovation in all service activities

The search for the specificity of innovation in services was initially performed using as main field of investigation knowledge intensive services: knowledge intensive business services (KIBS), but also information services, in particular financial services. Several reasons can be given to explain this empirical focus. First, knowledge-intensive services are the purest of the pure services. They are the ones that best meet the technical criteria of intangibility, heterogeneity, inseparability (of production and consumption) and perishability (non-stockability), which are supposed to distinguish services from goods. This “purity” is an asset when one seeks to identify the characteristics of services innovation (related to the fundamental nature of these activities). Second, these services are knowledge and information intensive, which makes them inherently particularly sensitive and open to innovation issues.

However the question of the specificity of the forms of innovation has rapidly disseminated to many other empirical investigation fields. These include, among others, transportation, trade, cleaning, hospitality, tourism, health⁴³, public services, etc.

⁴³ The innovation which is addressed here is not biomedical and pharmacological innovation that has been the object of a long-standing and abundant literature, but innovation in services peripheral to the provision of care (e.g., catering, hospitality, cleaning, trade, etc.)

Advance 5. From innovation in services to innovation through services

An important advance in SIS is the recognition of the key role of knowledge intensive business services (consultancy in its various professional or technological forms, engineering, R&D) in their clients' innovation dynamics (especially industrial clients). KIBS are not only the most innovative service sector and the main sector addressed by SIS (see advance n° 4), but as knowledge processing and producing machines, they also support innovation activities in other organizations. They not only play the role of facilitator, diffuser of industrial innovation, but also the role of sub-contractor or co-producer of this innovation. Recognition by SIS of the role of KIBS reflects the shift from the recognition of innovation *in* services to the recognition of innovation *through* services.

This *essential* relationship (innovation *through* services) may be considered at the micro or macro level. At the micro level, the literature describes the existence of an interactional model of innovation (Gallouj, 2002c), which complements the traditional Schumpeterian entrepreneurial and monopolistic models (Schumpeter 1 vs. Schumpeter 2 models). Whereas in the latter models, respectively, the individual entrepreneur and the R&D department embody the entrepreneurial spirit, in the interactional model, it is embedded in the external service providers (KIBS). At the macroeconomic level, European statistical analyses underline a strong correlation between the share of KIBS in total employment and national performance in terms of innovation (European Commission, 2008). The theoretical perspective illustrated by this recognition of the role of KIBS in innovation dynamics is called *inversion* (Gallouj, 2010). It reflects an inversion of the balance of power between manufacturing and services in terms of innovation.

Advance 6. From innovation in services to service innovation (everywhere)

The most complete theoretical advance is the one that consists of replacing the opposition between goods and services by the idea that all is service and consequently, that everything is service innovation. Therefore there is a shift from an assimilation/demarcation perspective to a synthesis or integration perspective (Gallouj, 1994, 2010), which waives opposing goods and services to try to develop unifying theoretical models that account for innovation in all its forms (visible and invisible) in both goods and services.

A number of theoretical models have emerged, that share the common assumption of a blurring of the boundaries between goods and services and therefore suggest integrative analyses of goods and services and innovation in goods and services. These analyses include the functional economy (Stahel, 1997), which defines both goods and services by the function (service) they provide, the experience economy (Pine and Gilmore, 1999), which defines them by the experience they provide to consumers, the approach in terms of characteristics developed by Gallouj and Weinstein (1997) (see also de Vries, 2006; Garcia-Windrum and Goñi, 2008), which defines any good and service as the implementation of competence and technical characteristics in order to produce services characteristics (utilities or use values). In this approach, it is the action on the characteristics (their addition, deletion, association, dissociation, formatting) that defines innovation and its various modalities.

Among the more recent integrative approaches, which are very popular, one can also mention the "Service-Dominant Logic" (Vargo and Lusch, 2006), which defines value by the value-in-use, therefore blurring the difference between goods and services,

and the new “science service” perspective (Maglio and Spohrer, 2008), which is a science of both services and goods. Therefore there is a shift from a situation where science was not interested by services and service innovation to a need to develop a (multidisciplinary) services science (see challenge n° 14).

Advance 7. From publications in existing reviews to the creation of specialized reviews

The early important works on innovation in services have been published in general management or innovation management journals as well as in industrial and innovation economics journals. The journal *Research Policy* in particular has published a number of seminal articles in the field (especially the pioneering work of Barras)⁴⁴. The edition of scientific journals specialized in services is one of the important advances in SIS that testify to their growing legitimacy. Table 3 provides a list of these journals, indicating their date of creation and their editor. The table does not take into account a certain number of journals covering specific services sub-sectors, e.g., health services, tourism, transportation and logistics...

Table 3: List of scientific journals in the field of services economics and management

Journal	Creation date	Publisher
Economia dei Servizi: Mercati, Istituzioni e Management	2006	Il Muliano
European Review of Services Economics and Management (ERSEM) (replacing Economies et Sociétés, EGS series)	2016 1995	Les Classiques Garnier Les presses de l'Ismea
e-Service Journal	2001	Indiana University Press
International Journal of Service Science, Management, Engineering, and Technology (IJSSMET)	2010	IGI Global
International Journal of Services, Economics and Management (IJSEM)	2009	Inderscience
International Journal of Services and Operations Management (IJSOM)	2005	Inderscience
International Journal of Services Operations and Informatics (IJSOI)	2006	Inderscience
International Journal of Services Sciences (IJSSci)	2008	Inderscience
International Journal of Services Technology and Management (IJSTM)	2000	Inderscience
Journal of advanced Research in Service Management (JoARSM)	2014	Advanced Research (ADR) Publications (India)
Journal of Service Management (JOSM) Formerly International Journal of Service Industry Management	2009 1990	Emerald
Journal of Service Research (JSR)	1998	Sage
Journal of Service Science Research (JoSSR)	2009	Springer
Journal of Service Science (JSS)	2008	The Clute Institute
Journal of Service Science and Management (JSSM)	2008	Scientific Research
Journal of Services Marketing (JSM)	1987	Emerald
Managing Service Quality	1991	Emerald
Manufacturing and Service Operations Management	1999	Informa

⁴⁴ Within the book published by Gallouj and Djellal (2015), bringing together 43 reference articles in the field of SIS, 12 articles were published in *Research Policy*.

(MSOM)		
Service Business	2007	Springer
Service Management	2005	Scientific Journal of University of Szczecin (Poland)
Service Science	2009	Informa
The Service Industries Journal Formerly known as Service Industries Review	1983 1981	Taylor & Francis

2.2 Advances in operative modes and corresponding institutional and regulation mechanisms

The next eight advances concern the organization modes and the institutional environment of service innovation. These advances are part of two separate groups. The first group includes advances that express the shift from one state to another, while the second (which includes only two cases) brings together advances that rather involve a dialectic relationship (tension, confrontation, balance) between two opposite states. In most cases, these advances illustrate, for operational fields (managerial, institutional or political), changes in theoretical perspectives (assimilation, demarcation, integration) or tensions between these perspectives.

Advance 8. From Oslo Manual 1997 edition to Oslo Manual 2005 edition

Theoretical advances outlined above induced significant institutional advances. Thus, the Oslo Manual published by the OECD, which sets international conventions for the definition and measurement of innovation (especially in order to homogenize national surveys) has undergone several revisions, according to the theoretical advances in SIS and the rise of their legitimacy. Thus, the first version established in 1992 (OECD, 1992) illustrates the ignorance or denial phase of the service innovation issue. Indeed, the guidelines suggested by this first version only address manufacturing activities and explicitly exclude market and public services.

The revised version published in 1997 (OECD, 1997) also addresses market services, but it only takes into account technological products and processes innovations. It therefore corresponds to the theoretical perspective that we have labelled technologist and industrialist or assimilationist. A major institutional advance was made in 2005 (OECD, 2005), as far as, in particular in order to take into account the specificities of services in a service-based/demarcation perspective, the Manual also now recognizes some forms of non-technological innovations: “marketing innovations” and “organizational innovations”.

These institutional advances that were induced by theoretical and empirical advances in SIS in turn have driven a powerful dynamic of empirical research in this area (see advance n° 9).

Advance 9. From assimilation surveys to demarcative and integrative surveys

The previous institutional advances have led to advances in surveys devoted to innovation in services. Thus, again as part of the shift from assimilation to demarcation and integration theoretical perspectives, assimilationist surveys have given way to demarcative and integrative surveys. The assimilationist or “subordinate” surveys

(Djellal and Gallouj, 1999) simply apply to services questionnaires designed for manufacturing and focus on technological innovation. They usually reflect a simple transposition to services of the OECD Oslo Manual guidelines (1992 version) developed to provide definitions of technological innovation in manufacturing. Demarcative or “autonomous” surveys for their part are based on definitions and questionnaires developed to address specific forms of innovation in services.

The questionnaires designed on the basis of the latest revision of the Oslo Manual (OECD, 2005) can be considered as integrative surveys, insofar as they apply the same innovation indicators for goods and services. It is, one might say, a demarcative integration as far as new types of non-technological innovation (organizational innovation, marketing innovation) are introduced to address, in a new way, innovation in goods and services.

The general lessons to be drawn from Community innovation surveys carried out on the basis of these last conventions include the following ones:

- The performance of services in terms of innovation is significant. The myth of services as stragglers in terms of innovation is questioned.
- Some service sectors are even more innovative than manufacturing sectors. This is the case with KIBS and engineering.
- Organizational and marketing innovations (non-technological innovations) occupy an important place in services, often more important than in manufacturing.
- Services are not the only ones to introduce new services. All economic sectors are introducing this type of innovation.

Advance 10. From assimilation policies to demarcation and integration policies

Advances in terms of public policies to support innovation in services have naturally followed the same path as that of theoretical perspectives, ranging from assimilation to demarcation and integration (Rubalcaba, 2006). It should be noted that these advances more often reflect an evolution of the theoretical consciousness than of concrete political achievements. Thus, public support for innovation policies in services has first of all focused on an assimilationist (and technologist) perspective: they were content to apply to services industrial (mainly scientific and technical) policy. These policies are inadequate and it is necessary to implement differentiation or demarcation policies that take into account the specificities of services: i) the often interactive dimension of their product and therefore of their innovation and the inability to distinguish the product, the process and the organization; ii) a lower R&D activity than in manufacturing and an R&D of a particular nature; iii) less visible results of innovation due to the immaterial dimension of the service; iv) higher risk levels and stronger market failures; v) difficulty of appropriation of innovation and easy imitation... Finally, given the convergence between goods and services, integrative innovation policies are emerging which aim in particular at promoting “product-service systems” and at supporting both the tangible and intangible dimensions of innovation strategies in service firms.

Advance 11. From the search for productivity to the seek for performance

The productivity and performance issue in services has been addressed in three ways, which reflect three stages in the evolution of the theoretical thinking and managerial, institutional and policy practices.

The first stage is the observation of low productivity in services. This finding is in particular expressed by pioneering studies by Clark (1940) and Fourastié (1949). It results in considering the low productivity as an intrinsic characteristic which constitutes the criterion for defining services in a positive way in order to distinguish them from the two other sectors conversely characterized by a higher productivity growth rate. This conception of stagnant services (given their low technology intensity and low productivity growth rate) is at the heart of Baumol's unbalanced growth model (Baumol, 1967).

The second stage was to challenge the idea of low natural productivity of services. This challenge is based on two arguments, one methodological and the other managerial (Djellal and Gallouj, 2008). The managerial argument highlights the systematic and often effective implementation of productivity growth strategies in all service firms and organizations, whether public or private. The search for productivity gains (particularly through the standardization and industrialization of the service and the use of technical systems) has long been a strategic imperative in many service organizations (Levitt, 1976). The methodological argument for its part consists in the questioning of the productivity measurement methods, which are faced with a difficulty of defining the output and measuring it in volume. In this case, the hypothesis is that the measurement of productivity in services is flawed. It is probably underestimated and in all cases different from what manufacturing-biased indicators and methods do measure.

The third stage suggests to substitute to the measurement of productivity (industrialist concept) a multi-criteria evaluation of performance, and to renounce a religion of growth (GDP) in favour of sustainable development and growth of well being (gross domestic happiness). Convention theory, for example, provides an interesting heuristic framework for addressing, in a pluralistic way, the question of the definition and justification of products and performance, distinguishing between the industrial world (the world of volumes and technical operations) and other worlds favouring other systems of definition and justification of value. These include the market and financial world (the world of monetary and financial values), the relational and domestic world (favouring the interpersonal relationships, empathy and trust relationships consolidated over time, a world that gives central importance to the quality of relationships in the product evaluation), the civic world (that of social relationships based on the concern for equal treatment, fairness and justice), etc. The performance of an organization or a nation can be assessed according to these different worlds, which may be complementary or competitive.

Advance 12. From services industrialization to goods servitization

These two contradictory processes of services industrialization and goods servitization contributed to blur the distinction between goods and services in contemporary economies. In these economies, these two processes historically follow one another. Indeed, within a basic principle of assimilation to the dominant economic and theoretical models, service firms and organizations have made efforts to industrialize, make their product more material and less blurred. The process of goods servitization, which reflects the rise (in different forms) of the service-based dimension in the

supply of manufacturing firms, appeared later. It is this time lag that is expressed by the idea of a shift from services industrialization to goods servitization. However one process does not replace the other. In contemporary economies, both industrialization and servitization coexist, either in a given organization, sector or economy.

The industrialization of services is an old trend well described by Levitt (1976), who defines it as a strategic imperative for service firms. It is part of the assimilation perspective (assimilation of services to goods). It is based on the increasing mechanization, the application of industrial production methods (Taylorism, Fordism), the addition of goods to services⁴⁵ and the search for productivity gains. It is a real “natural trajectory” within the meaning of evolutionary theory (that is to say, a trajectory which applies to many sectors if not to all). This trajectory is powerful as far as it continues to be at work today. It is manifested especially in the implementation of low cost business models in a growing number of service sectors.

The goods servitization is for its part a generic strategy to transform in different modes (more or less old), the supply of goods in service delivery. It therefore covers the following different modes whose relationships to the issue of innovation are evident:

1) (Mechanical) addition of services to a supply of goods, in order to differentiate it and increase its quality (Furrer, 2010). Thus, the addition of pre-sales and after-sales services, which made the success of Fordist economies, is a longstanding modality of servitization.

2) Simultaneous (though not necessarily integrated) offer of goods and services by manufacturing firms so that iconic industrial firms (particularly in IT)⁴⁶ have become primarily service providers, as far as the major part of their turnover and their profit comes from the sale of services.

3) The rise of integrated “products-services” offers which literature refers to using a variety of different terms⁴⁷: complex packages or compacks (Bressand and Nicolaidis, 1988), Product-Service Systems (Goedkoop et al., 1999; Mont, 2000), Product-Service Bundles (Vandermerwe and Rada; 1988. Stremersch et al, 2001), (customers) solutions (Matthyssens and Vandembemt, 2008; Evanschitzky et al., 2011, Bonney et al., 2009), hybrid products (Shankar et al., 2009), hybrid solutions, hybrid offerings (Ulaga and Reinartz, 2011), hybrid innovations (Shankar et al., 2007)...

4) The change in the use or consumption mode of the good by the consumer, combined with a change in the “business model” of the producer. The firm no longer provides a good, and the consumer no longer acquires ownership of a good, but both respectively sell and buy the use of this good and the service it provides. Thus, in this

⁴⁵ It should be noted that the addition of goods to services contribute to the industrialization of services, while the addition of services to goods falls within the scope of the process of servitization of goods. These are two different ways to build Products-Services Systems.

⁴⁶ IBM and Benetton have long been cited as the archetypes of this trend, which has spread to many manufacturing firms.

⁴⁷ The references are only intended to illustrate the variety of terminologies used to describe the same economic reality. They do not necessarily indicate the inventor of each concept discussed.

perspective, it is not anymore, for example, cars, copiers, machines that are sold, but the kilometres travelled, the quantities of photocopies made, the workings hours, etc.

The industrialization of services is an assimilationist modality of innovation in services, while the servitization of goods is a generic (integrative) modality that places service innovation at the heart of the industrial innovation dynamics. Indeed, service innovation becomes central in manufacturing firms and sectors. It is a key source of competitive advantage.

Advance 13. From the linearization (closing) of innovation processes to the recognition and strengthening of a natural and multiform interactivity (openness)

In the field of IS, Ben Martin emphasizes, as an important advance in theoretical analysis and corporate practices, the shift from the linear model to the interactive model. The linear model describes a planned and systematic innovation process, which sequentially connects R&D, production and marketing phases. It is often associated with well formalized, specialized and rather closed innovation structures. This linear model is in difficulty to quickly respond to the dynamics of a turbulent environment. It is often replaced (in the organization of enterprises, as in the theoretical debate) by a more flexible, interactive and open model of innovation, which was recently popularized by the fashionable concept of open innovation (Chesbrough, 2003).

This change in management practices and theoretical approach (underlined by Ben Martin in his survey of advances in IS) does not homothetically apply to services. Indeed, first, the R&D activities that constitute the initial phase of the linear model are rare in services. Second, the first empirical works devoted to the organization modes of innovation in services converged on the pre-eminence of flexible, less programmed and institutionalized innovation processes. But above all it appeared that services are interactive and open by nature as far as they give a central place to the consumer, who is, in many cases, co-producer of the service.

Given these findings, first of all, we are witnessing, in service organizations, efforts triggered to the linearization of innovation models and, in managerial sciences, recommendations in favour of linearization strategies. Thus, inspired by the New Product Development (NPD) perspective, which provides very precise methodologies for the design and production of new goods, within the general framework of the linear model, the service management specialists developed New Service Development (NSD) methodologies (Scheuing and Johnson, 1989; Easingwood, 1986; De Brentani, 1989; Edvardsson and Olsson 1996).

However, if it continues to attract the interest of researchers in management science, this linearization is increasingly challenged by interactivity, co-production and opening up, which seem, as we have already pointed out, to be natural technical characteristics of services. Thus, one cannot say that SIS shifted from the linear innovation model to the interactive innovation model, but instead that they shifted from linearization efforts (again in an assimilationist perspective) to the recognition and the strengthening of an existing natural reality: interactivity and smooth and flexible openness.

The interactivity and openness in question covers a wide variety of different (internally and/or externally) cooperative models, more or less sophisticated and formalized.

They include, in particular a certain number of unplanned or emerging models (rapid application model, practice based model, bricolage innovation model and ad hoc innovation model) whose characteristic is to be closely linked to learning by doing, using or interacting. These micro-models we do not detail here (see Toivonen and Tuominen, 2009; Gallouj and Weinstein, 1997; Fuglsang, 2010; Toivonen, 2010 and Fuglsang and Sørensen, 2011) describe various “mechanisms” at work within organizations for producing incremental innovations related to the dynamics of internal or external change.

Open innovation also covers at different analytical levels, innovation dynamics in interaction with customers and users, with consultants, and with multiple partners within innovation networks or systems. The latter is a research challenge we will address in section 2 of this work (challenge 11).

Advance 14. Balancing the « intrinsic tension » between service standardization and service customisation

The advances we look at from now do not involve a transition from one situation to another, but rather the search for a balance between two states (or two dynamics) in tension, within an organization, a sector or the whole economy.

We previously mentioned service industrialization in its opposition to goods servitization. It is another tension (well documented in the literature) which is raised here, namely the tension between the industrialization/standardization of service and its customization, that is to say the opposition between repetition and personalization. Indeed, while industrialization/standardization aims to erase the specificities of the service in order to provide a homogeneous service, customization, in contrast, emphasizes the diversity and strives to offer a particular service tailored to the specificities of the customer. Taken separately, these two processes are important innovation trajectories in services.

But a new innovation potential is provided by the reconciliation of these trajectories in the same firms or the same sectors. The assimilation-demarkation-integration paradigm can once again be applied here. The implementation by a firm of an industrialization strategy for its service offering (McDonald's, for example) falls within the scope of an assimilation perspective. Customization strategies fit into the demarcation perspective. Finally, when the same organization mobilizes both, reconciling industrialization/standardization and customization, it is an integration perspective that is at work (Djellal and Gallouj, 2008). For example, banks, through their multi-channel offers, reconcile, on the one hand, standardized quasi-products and automated self-service and, on the other hand, customized high value-added services.

Advance 15. Balancing the intrinsic tension between service regression and service extension

Another important advance in SIS is the recognition of the idea that innovation can originate not only in the extension/complexity of the service, but also in its regression. This tension between two opposing basic principles is not independent of the previous one (the tension between standardization and customization). While the previous advance (the tension between standardization and customization) is based on the reorganization of the service offering, this new tension assumes a positive or negative development of the range of services offered.

On the theoretical level, this advance in the innovation modes is based on the old idea, developed in the field of services marketing, according to which the service consists of one or more central services associated with a certain number of peripheral services. It is also based, in the field of economics, on the Lancasterian approach to the product as a combination of services characteristics. In both conceptions, innovation can come not only from the addition of services (or services characteristic), but also from the removal of services (or services characteristics). This paradoxical idea that innovation can also come from service regression is of course illustrated by low cost services that develop in all services sectors (air transportation, fast food, hard discount, etc.).

3. Fifteen challenges for service innovation studies

If, as has already been noted, there is a significant number of surveys of the literature on innovation in services, and if most of the works suggest in their conclusion some research directions for the future, however, publications exclusively devoted to prospective studies and research agendas on innovation in services are scarce. Nevertheless, one can mention the following few exceptions: Gallouj et al., (2015); Maglio et al., (2014); Ostrom et al., (2010) (which reflection, it is true, concern management research priorities for the science of services in general including service innovation; Spath and Ganz (2008) and Ganz and Meiren (2003) (both focused on the future of service research in general); Dahl et al., 2014 (focused on innovation in social services)...

If some of the advances we have outlined in the previous section reflect historical established and irreversible findings, others are research fields that have been the object of sufficiently numerous studies that they cease to be priority challenges. We now turn to a selection of fifteen major challenges for SIS over the next decade (see table 3).

To formulate these fifteen major challenges, we do not anymore use the formulation "from... to" that was used to account for the main advances, but we identify general themes which SIS must address (or focus on more) in the future. The major advances that we accounted for concerned, essentially, the recognition of innovation in services (its legitimation as a research object), its definition, its organization and implementation, its measurement, the institutional arrangements designed to promote it. Research should now be extended to other topics that relate to important socio-economic issues.

It should be noted that taking into account these new issues often brings us back to reconsider, in new ways, some of the previous issues, particularly the definition of service innovation and its measurement. It should also be noted that these challenges are not completely independent one of each other. They overlap in some respects. For example, "population ageing" and "developing countries" are not independent of "social innovation" insofar as service innovation in developing countries and service innovation in its relationships with ageing are partly based on social innovation. Similarly, the "new evaluation challenges" are transverse to most other challenges. Finally, the challenge concerning the development of religious innovation trajectory is linked to the challenge concerning service innovation in developing coun-

tries. After all, many religious services innovation (especially in the field of tourism and financial innovation) are implemented in these countries.

Table 3: Fifteen challenges for service innovation studies

Service innovation and the environmental challenge
Service innovation and social innovation
Service innovation and developing/emerging countries
Service innovation and smart service ecosystems
Service innovation and the religious trajectory
Service innovation and population ageing
Service innovation and the gender agenda
Service innovation and new evaluation challenges
Service innovation in forgotten sectors
Service innovation and ethical and societal issues
Service innovation, innovation networks and innovation systems
Service innovation and entrepreneurship
Service innovation, employment and skills
Service innovation and multidisciplinary: towards a service science?
Service innovation studies and service innovation degrees

Challenge 1. Service innovation and the environmental challenge

In a post-industrial and service economy, environmental economics was, essentially, built in response to damage caused by intensive industrial and agricultural economy (depletion of non-renewable resources, proliferation of waste, pollution, desertification, deforestation, global warming...). It continues to convey a strong industrial connotation, although some services (tourism, transportation, etc.) can play an important role in environmental degradation. Thus, as rightly pointed by Gadrey (2010), “services are ignored by political environmentalism, while environmentalism is neglected by the service economics” or “with a few exceptions, the economics of services, as currently constituted, takes little account of environmental or social considerations”. The effects of services on the environment are seldom at the heart of the concerns of researchers.

This research gap is even more evident regarding the issue of innovation in services in its relationships with the environment issues. The theoretical but also political challenge of these issues is yet huge, because, as highlighted by Gadrey (2010), the future of the service society will be primarily played out in the ecological field, either positively or negatively, and it is closely related to the nature of the innovation trajec-

tories it can generate. It is therefore necessary for SIS to address the nature of the ecological impacts of service innovation and to discuss the public policies that are likely to promote the most positive impacts.

In this general research agenda, an important hypothesis deserves further theoretical and methodological exploration. This is the positive myth⁴⁸ claiming that services are, by nature, environmentally friendly.

This supposedly green nature of services mainly relies on analytical and theoretical arguments. Chief among them is the idea that the immateriality of services makes them, by definition, more environmentally friendly than material goods. For example, some arrangements (or business models) related to the rise of services that have sprung up in firms or society in general, mechanically induce a dematerialization and therefore positive environmental effects. This is illustrated by the goods servitization processes and especially by one of its well-known operative form, namely the Products-Services System (SPS) (see advance n° 12). SPS in their various forms (product, use or results oriented SPS, cf. Tukker, 2004), which were implemented in order to improve competitiveness are increasingly analysed as factors of positive environmental externalities. The underlying idea is that adding services or service to goods or considering goods through their uses, their results, the services they provide, contributes to the overall dematerialization of the solution offered to the client and thus to make it greener. The so-called sharing economy or collaborative consumption, which favours the shared use of goods (carpooling, car sharing, rental or exchange of personal goods, etc.) and their reuse, rather than their private use and their disposal, is another illustration of these mechanisms that induce dematerialization of economic activity.

Some of the theoretical arguments mentioned above in favour of the green nature of services are questionable including from the theoretical point of view itself. Thus, services are far from green by nature and they are more “material” than it appears. After all, their production requires material resources and energy, and above all, the service transaction is often based on an interaction that requires displacements that are particularly harmful to the environment (Djellal and Gallouj, 2016; Fourcroy et al., 2012). Moreover, it is not sure that environmental benefits generated by an increase of immateriality are not encumbered by the so-called “rebound effect”. The success of a more eco-friendly service can after all lead to an increase of its consumption, which contribute to cancel the ecological benefit achieved. However, even if environmental benefits are achieved, they are not necessarily reallocated to green practices⁴⁹. Other undesired effects may occur, which may also strain the ecological benefits of the sharing economy. The environmental benefits achieved through the service innovations of the collaborative consumption (especially extending the life of the product) can, for example, contribute to slow technological progress in energy saving. Furthermore, the effectiveness of certain formulas of the sharing economy

⁴⁸ It should be noted that this positive myth contrasts with the many negative myths that describe the supposed weaknesses of services: their unproductive nature, their low capital intensity, their low-skill labour, their low productivity, their inability to trade and innovation (Gallouj, 2002b).

⁴⁹ For example, profits or savings made by carpooling via BlaBlaCar or housing rental through the Airbnb platform can be reallocated to the purchase of a plane ticket to go on holidays, which is not eco-friendly.

such as carpooling can influence public transportation policies over time, leading them to reduce their efforts in terms of public transportation.

If theoretical arguments exist both to justify or question the natural sustainability of services and the positive or negative correlation between the rise of the service content in the solution provided to the client (in the SPS, for example) and environmental sustainability, on the other hand, the arguments are seldom supported by measurements and evaluations. Research efforts should therefore focus both on further theoretical argument, but also and especially on measurement and evaluation.

Challenge 2. Service innovation and social innovation

Service innovation studies and social innovation studies are two research areas that have developed separately but which resemble each other in many ways. 1) They have developed on the margins of the dominant academic schools (especially innovation studies) and have struggled to establish their legitimacy. They nevertheless managed to establish significant research communities, organizing their own recurring conferences and publishing their own scientific journals. 2) The construction of their legitimacy was more based on the needs of the real world (the socio-economic world: companies, associations, citizens, etc.) than on the academic sphere. It was supported by government initiatives (national funding, European funding). 3) Their research object is complex, as far as it is unwilling to existing analytical categories. It is essentially “human-centred” even if technologies, especially information technologies, play an increasingly important role in it. Its boundaries are blurred and shifting. Thus this object hardly lends itself to measurement.

Paradoxically, these two research fields, similar in many ways, seldom intersect. Thus, the cross-references between them are very reduced. Conferences organized by one field seldom welcome scholars from the other. This lack of interaction is partly explained by the different disciplinary backgrounds: sociology for social innovation studies, economics and management for service innovation studies.

However, service innovation studies and social innovation studies can enrich each other on many points, which are worth exploring (Djellal and Gallouj, 2012): theoretical perspectives which are favoured, the nature of innovation and the question of its identification and its measurement, its modes of organization, its ownership regimes, the evaluation of its effects, public policy to foster innovation. Better mutual understanding of social innovation and service innovation in the light of each other should help to further reduce the gap of hidden or invisible innovation in our economies, and allow us to move towards a new comprehensive innovation paradigm.

Challenge 3. Service innovation and developing/emerging countries

Except for certain traditional sectors such as tourism (source of currency) or public administration (source of malfunctions), the services issue remained for a long time absent from the research on developing countries (DCs). Development economics was naturally also built on industrial and agricultural models and references. However, although it appeared later than in developed countries, the universal process of tertiarisation has not spared the DCs. For example, as they develop, emerging and transition countries cease being only “the world’s factories” to also become their “offices and research centres”. After all, in 2014, services represent nearly 70 % of GDP in Brazil, 63 % in Russia, 57 % in India and 51 % in China.

The rise of services in developing countries opens up new fields of research, involving important economic and political issues. The countries concerned by this structural change are aware of this, as illustrated, to some extent, by the creation of research centres on services and the establishment of learned societies in this area. One example is the creation of REDLAS (Latin American Network for Research on Services) on the model of the European Association of Research on Services (RESER).

A key question that of course arises in this general framework of services and development is that of innovation in services. This question is largely unexplored. However it is as strategic for developing countries as for developed countries and researchers will have in particular to consider to what extent it needs to be addressed in different ways, not only compared to developed countries, but also for the different types of DCs concerned (least developed countries, emerging countries, etc.). One of the problems to overcome, especially in order to achieve quantitative studies, is the difficulty to access to data.

Using once again the assimilation/demarcation/inversion/integration analytical framework, we can formulate a certain number of assumptions and raise a certain number of questions that need further exploration in the future.

Taking the point of view of the assimilation/subordination⁵⁰ perspective, several assumptions can be formulated.

- First, in developing countries, assimilation/subordination is twofold. Indeed, services are certainly subordinate to manufacturing (supplier-dominated). But they are also subordinate to the manufacturing industries of the developed countries (North-dominated), since most of the technological innovations used by services originate from manufacturing firms in Northern countries: computers, trains, boats, airplanes, incinerators, scanners, etc.

- Second, as in developed countries, in developing countries, ICTs are expected to play an important role in the service innovation issue. Thus electronic services (e-commerce, e-banking, e-government, etc.) seem to have reached advanced stages of development in some emerging countries (BRIC), much more advanced than SIS in this field. Moreover, ICTs offer many opportunities to the economies of the South. They allow a certain autonomisation (*vis-à-vis* developed economies) of the innovation dynamics, and the beginning of the transition from an assimilation to a demarcation perspective. For example, ICTs are used to produce social innovations targeting inclusive purposes: mobile telephones are for example the source of many innovative services (e.g. in the microfinance field).

Taking now the point of view of the demarcation perspective (that is to say seeking for specific forms of innovations usually invisible because of their non technological nature), it can be assumed that developing countries benefit from greater degree of freedom and more opportunities for innovation. After all, the innovations highlighted by this perspective have several characteristics that can help their emergence in de-

⁵⁰ This assimilation/subordination perspective hypothesizes, it should be remembered, a similarity of innovation in manufacturing and services. This innovation is mainly reduced to technical systems originating from manufacturing firms (which dominate services).

veloping economies: i) they are relatively cheaper than technological innovations, because they do not require significant investments in R&D and patents (frugal innovation); ii) they do not necessarily require complex, institutionalized and permanent structures; iii) they may be the result of mere imitations; iv) they are based on the participation of clients, users or even civil society.

The demarcation perspective applied to services innovation in developing countries is manifested, for example, by innovation trajectories that originate in sustainable development and social innovation issues (see the previous two challenges). Social innovation (which, as pointed out in our discussion of challenge n° 2, is essentially a service innovation) plays an important role in these countries that experience significant social problems. These innovation trajectories concern all sectors: tourism, finance, retailing, public services, etc. They include, among others: green tourism, which aims to preserve the natural, social and cultural heritage, ethical and inclusive finance, fair trade, urban mobility, etc. It should be noted that some of these social innovations (born South) can spread in developed countries.

However the demarcation perspective also manifests itself through more traditional innovation trajectories, which may be inspired by innovations from developed countries, but which are most often different from them by their adaptation to local contexts. These include, for example, tourism in its multiple forms, including medical tourism in response to the needs of rich countries; the extremely rapid spread of large scale retailing in some developing countries, linked to rapid urbanization and the increasing entry of women into the labour market; mobile services and service innovations it creates; traditional banking system and financial innovation.

The inversion perspective, it should be remembered, raises at the micro, meso or macro level, the question of the role of knowledge intensive business services (KIBS) in the innovation of their industrial or service clients. KIBS are thus essential components of innovation systems. They are a knowledge infrastructure that complements that of the state (education and research system). They are most often deficient in Emergent (National) Innovation Systems. They are therefore an interesting research topic from both the theoretical and the public policy point of view. The question of conditions of constitution and strengthening of a KIBS sector in developing countries is essential in view of the strategic role of KIBS in growth and innovation. The offshoring of high value-added services such as product development, R&D projects, IT development, etc. contributes to the growth of KIBS. Service scholars should devote more attention to these issues.

Finally, as regards the integration perspective, it may be asked whether, somehow, the developing economies did not invent the functional economy and the strategies for extending the life of goods (to be convinced it may suffice to take into consideration the age of the vehicle fleet in some developing countries). However, “services around the product” and “product-service systems” are still weak in most developing countries, while these are important areas of service innovation. All these issues provide interesting challenges both for research and organizations management.

Challenge 4. Service innovation and smart service (eco) systems

SIS were initially built in opposition to the technologist perspective which reduces innovation in services to the mere (passive) adoption of technologies by service activities, i.e. to the diffusion of industrial innovations in services.

In firms and organizations practices, as well as in academic work, this concept of a technology exogenous to services gives way to a concept that endogenizes technologies in the service or in the service organization. This means that services integrate these technologies, incorporate them and modify them in order to adapt them to their organization and the idiosyncratic nature of their activities. These technologies are not anymore production factors that are analysed through their impacts on productivity and other economic variables (such as in the strictly technologist configuration discussed above), but they are hardware components of the product, inseparable from their intangible components. To describe such an incorporation of technology in services, the literature replaces the concept of diffusion with the new concept of technology infusion (Bitner et al., 2000).

The advent of the so-called *Smart Service Systems* (SSS) is an additional step, a higher level of complexity in the process of endogenization or incorporation of technology in services. SSS reflect the highest degree of infusion. They combine smart technologies, individuals (customers, producers, citizens...), organizations that interact to share resources and co-create value. These service systems are “smart” because they automatically collect information during service transactions and turn them into knowledge. They are able to learn and transform themselves, and use the knowledge gained to adapt the service offered or to design new services. These SSS are open systems. They are connected to other SSS from which they can learn and that they can transform themselves. Various agents of different sizes can implement SSS: firms, public administrations and associations.

The social media platforms, like Facebook, Twitter, and LinkedIn are SSS. These strongly developing social networks interact in many ways with the economic networks that can rely on them to co-produce service innovation (Uratnik, 2016). The interconnection between social and economic networks (the blurring of boundaries between them) is a research topic that needs further development.

However other systems also belong to this category of SSS: smart vehicles, smart roads (which are integrated into the more general category of smart mobility), smart grids, smart buildings (which are systems capable of ensuring better air services quality, better energy efficiency, better earthquake safety) and, more broadly smart cities. All of these are systems that are in their infancy, and which represent considerable economic and research issues. Thus, within the framework of this smart dynamics, there is a shift from the smart object to the intelligent infrastructure and then to the smart city. However, the evolution potential of SSS is huge: smart region, smart nation and smart planet.

New horizons are open to SSS and service innovation by the so-called Internet of Things and Big Data. The Internet of Things, which is the third revolution of the Internet (Web 3.0), means the connection between objects in various fields. It is responsible for the exponential increase in data on the network and therefore for Big Data. Big Data leads to an extremely detailed knowledge of the customer and his/her needs and behaviours. It is therefore the source of significant reservoirs of new services and new products. But it also raises ethical issues related to data secrecy and privacy protection (cf. challenge n° 10).

SSS are, up to now, mainly envisaged from a practical and descriptive angle. They therefore constitute a clear priority for theoretical and empirical future research.

Challenge 5. Service innovation and the religious trajectory

In contemporary economies, religious dynamics are the source of sometimes violent political upheavals, regularly related by medias. A brighter side of these dynamics is however also at work. Religious dynamics are also at the origin of innovation dynamics. Thus, religious values can be the source of economic values.

This paradoxical convergence between religion (synonymous with conservatism) and innovation (synonymous with change) is an interesting field of investigation, particularly but not exclusively in developing countries. This field of religion push service innovation is not new. Throughout history, many social and service innovations have had religious roots. In Christian civilization examples include, among others, orphanages, hospitals, charitable organizations, etc., and, in another perspective, the creation, in their time, of cooperatives and mutuals founded by Christian trade unionism. The flourishing theme of Islamic finance (renamed and generalized into ethical finance) is another obvious illustration of religion push service innovation.

The religious innovation trajectory has long been closely linked to that of social innovation (cf. challenge 2). After all, religious organizations have always been heavily involved in arrangements created to support people in need (health, education, etc.). But this religious innovation trajectory increasingly manifests itself in many other sectors, resulting in many innovative services: financial innovations we have already mentioned, religious tourist packages, innovations in hostelry (e.g. Islamic hospitality and especially the so-called Sharia-compliant hotels⁵¹), halal shelves in retailing...

Thus, the religious innovation trajectory (in the field of services) is a powerful trajectory, which potential areas of application are manifold, but which is not enough addressed by research in service economics and management. Here again, academic research is very late compared to the practices of firms and organizations.

This religious innovation trajectory may be faced with more or less important institutional, legal or cultural obstacles. These obstacles emerge, for example, in the case of a tourist package that would involve gender segregation (pool or beach for women only, schedules adapted to gender, women but also men dress codes). They also manifest themselves through the principle of secularism in public services, which prohibits certain religious innovations, where it is applied.

We are not dealing here with the ability of religious minds to innovate (some studies tend to show a negative correlation between individual and national religiosity and propensity for innovation, others conclude that innovation is religion-neutral). But what we are concerned with is how organizations innovate (introducing technological or service innovation) to meet the “religious need”.

Religious organizations, it should be noted, are also service organizations, that can be studied from the perspective of innovation. They may provide religious or secular “clients” (literally or figuratively) with religious or not religious innovative products or services. They can also innovate their process and their organization. The supply of education and health services is well known. But many other examples can be envisaged: the Internet distribution of religious (or monastic) products (Pasquier and Morin-Delerm, 2012) and more generally using the Internet for religious community

⁵¹ These hotels that even develop in some European cities, provide many peripheral services, for example, a player mat, a marker (or a compass) to indicate the direction of Mecca, a prayer room, halal food, etc.

building. However works on this topic are scarce, the main reason being again that innovation and religion are considered contradictory (see also challenge n° 9 devoted to the service sectors forgotten by SIS).

Challenge 6. Service innovation and population ageing

The population ageing issue in its relationship with innovation is not mentioned by Ben Martin in his list of challenges for IS (Martin, 2015). However it constitutes an important socio-economic and research issue for the future. Indeed, projections from the European Commission (European Commission, 2012) forecast that, in European Union, the share of seniors (those over 65) will reach 30 % in 2060, while it was 17 % in 2010. Such a demographic shift will have significant consequences on the production system as a whole and on the structure of consumer needs. We consider, for our part, that in a service economy, service innovation has to play an important role in dealing with this major societal challenge, i.e. to take care of senior citizens and provide them with appropriate services. We must therefore devote a sustained research activity to this issue in the future.

Population ageing can take many facets that can be sources of innovation. The *first facet* is the human resource gap in manufacturing or service firms. This gap and the declining productivity that can result from it may be offset by technological innovation efforts in goods and in services (robotics and automation). The *second facet* is the rise of the so-called “silver economy”. After all, senior citizens are a population whose purchasing power and availability for consumption are above average. Offering them relevant services and products is an important economic (and hence research) issue. The *third facet* is the dependency and vulnerability of the elderly. It is also a major source of services innovation.

Whatever facet of ageing is considered, the major targets of innovation in services for the elderly, that SIS should explore are the following ones (Djellal and Gallouj, 2006): 1) The forms of assistance and residential provision (institutions, domiciliary services, networks, etc.); 2) The technologies (technical systems, architecture and ergonomics, smart housing, methods, etc.), which may have medical or non-medical purposes (telehealth v.s. telecare); 3) The human environment of the elderly, whether that be family carers or care personnel; 4) The services provided to the elderly (domestic services, care services, financial and insurance services, leisure services, retailing services, catering services, transportation, etc.).

Challenge 7. Service innovation and the gender issue

In his 20 challenges for IS (see Annex 1), Ben Martin (2015) identifies the need for a shift from “boy's toys” to “women's liberation”. He considers that IS have mainly focused on innovations that reflect males' interests, what he calls the “boy's toys” (electronics and IT, automobiles and pharmaceuticals, for example). They showed little interest, so far, for other both economically and socially important technological innovations, which promoted, to some extent, the liberation of women, namely the technologies of the domestic sphere: refrigerator/freezer, microwave oven, washing powder/detergent, washing machine/tumble drier, vacuum cleaner, etc.

In the field of services as well, where the female workforce holds a dominant position in certain activities and sub-sectors, the question of the relationship between service innovation and gender is an important research challenge for the future. It is not sufficiently explored, while different characteristics of services (their centring, in some

cases, on the domestic sphere and social issues, their relational nature) seem to provide fertile ground for the expression of female creativity and innovation.

The question of service innovation in its relationship with the women issue can be seen from at least two different angles: i) the role of service innovation in women's liberation, women's empowerment and gender equality; ii) the role of women as actors in service innovation. In the former case (i), one moves the liberating power of innovation, not from innovation as boy's toys to the technological innovations of women liberation (such as in Martin's analysis), but from technological innovation (in all its forms) to non-technological and service innovation. After all, there is a long list of service innovations that allowed the women to leave the home confinement for insertion in the labour market. These include, among others, childcare services, home delivery, etc. In the latter case (ii), the question of the place of women in the innovative service entrepreneurship (see also challenge n° 12) should also be considered. The research agenda should assess both their contribution to service innovation and innovative entrepreneurship, i.e. to estimate the "gender gap" in terms of service innovations and entrepreneurship.

Challenge 8. Service innovation and new evaluation challenges

If certain aspects of the innovation gap have been filled, as we pointed out in Section 1, others remain or emerge. Thus the evaluation challenge is not closed. It particularly concerns the following areas: non-technological product innovations (e.g. a new insurance contract, a new financial product, a new area of expertise in consulting), non-technological innovation processes (methodologies, protocols), ad hoc and tailor-made innovations, innovation in complex packages, new concepts, new formulas (for example, in retailing, hotels, restaurants, etc.), social innovation, innovation in public services.

These new evaluation challenges are often closely related to the first seven challenges listed above. After all, it is the challenges linked to ecological issues, social innovation, developing countries, population ageing, the place of women that raise new measurement and evaluation challenges for service innovation and service performance in all their forms.

Another problem of definition and evaluation is still pending. It concerns research and development. Thus, if the Oslo Manual has been revised several times, and if a new revision is under consideration, this is not the case with the Frascati Manual, which provides definitions and indicators of R&D. Thus, the latest version of the Manual (OECD, 2002) is still technology and science biased, while R&D activities in services often have a composite character, mixing aspects of S&T, H&SS, organizational engineering, etc. H&SS are not sufficiently taken into account, and organizational engineering is not regarded at all (Djellal et al., 2003; Miles, 2007).

It should be noted that this evaluation and measurement issue is also complicated by the changing nature of the boundaries between services and goods. Given the changing nature of the products, international classifications setting these boundaries are increasingly questionable, and dealing with these issues are research priorities for service studies and SIS (see Broussolle, 2016 and Hill, 1999).

Challenge 9. Service innovation in forgotten sectors

As we have stressed in the advance n° 4, research on innovation is eligible to spread in all service sectors. The literature has however focused on particular sectors (KIBS and informational services) before spreading to other sectors (trade, hotels, transportation, etc.). However it should be pointed that some service sectors continue to be forgotten by SIS. These neglected sectors include, among others: religious organizations, prisons, driving schools, hairstyles services or beauty treatments, body care services, laundry services, funeral services, police, fire services, social housing services, non-profit organizations... SIS should establish a systematic list of these forgotten sectors and undertake empirical investigations to understand the possible innovation dynamics.

Challenge 10. Service innovation and ethical and societal issues

Service innovation is the source of a number of ethical and societal questions that are important and interesting research issues for many disciplines: economics, management, sociology, psychology, law but also engineering sciences, philosophy, etc. Here we only mention three particularly suggestive examples.

The first example is the many problems of security and data protection linked to the proliferation of digitized information in some service innovations (particularly in the context of smart service systems). Problems arise in the economic sphere. These are the usual problems of protection of innovation. But they also arise in the private sphere. Service innovations related to what is generically called social media raise many issues of infringement of privacy, trust and confidentiality.

The second example is the loss of freedom caused by automating many technology based service facilities, particularly in the private sphere. This applies, for example, to the automation of all forms of transportation (especially motor transportation), which provides a powerful service innovation trajectory for the near future (The National Academies, 2014). This loss of individual freedom is offset by an expected social benefit that is increased safety and comfort.

The third example is the manifestation of a social opposition to some services innovation. A typical example is, in some countries, the opposition from taxi drivers to Uber services (private cars with driver). As Schumpeter masterfully theorized, technological innovations are both destructive and creative. Economic history tells us many events where workers revolted and broke the innovative machines they accused of destroying their jobs: silk workers revolt in France, Luddites revolt in England in the early 19th century. In the service economy, this opposition to innovation manifests itself, not necessarily against technological innovations as such, but against new business models and service innovations, which challenge incumbent market structures.

Challenge 11. Service innovation, innovation networks and innovation systems

One of the important advances in the field of IS underlined by Ben Martin (2015) is the shift from "individual actors to systems of innovation". A considerable increase in work on networks and innovation systems can be observed, stimulated in particular by the umbrella concept of open innovation. However services and service innovation are most often excluded from these works. Indeed, the concepts of innovation networks and systems that have been very successful in evolutionary economics and sociology of innovation were constructed (both on the theoretical and empirical point of view) as industrialist and technologist concepts and organizational arrangements.

Although public research (and therefore public services) plays an essential role, the key players of innovation networks and systems are manufacturing firms and the form of innovation that is the main purpose of these networks and systems is technological innovation (with a focus on High Tech). Thus, essentially, the “Low Tech” sectors and the services, which account for the major part of our wealth and our jobs, are relatively absent from network and systemic analysis.

A research priority that began to emerge some times ago, but which deserves special effort is the question of innovation networks and systems in which service organizations would occupy a central place (and would not be content to be support agents) and in which the production of non-technological forms of innovations could take the place it deserves. The purpose is, somehow, to tertiarize the concepts of innovation systems and networks. One can therefore ask, for example, whether the concept of sectoral innovation system (Malerba, 2002) can be applied to the service sectors. It would also be necessary to continue the work recently initiated on public-private innovation networks in services (Gallouj et al., 2013).

Challenge 12. Service innovation and entrepreneurship

No one can dispute that, in contemporary economies, most of the creations of firms either innovative or not are achieved in the service sector. However, scientific works on the relationship between entrepreneurship and service innovation are too scarce. The effort undertaken within SIS to bridge the innovation gap (see the first six advances discussed in the first section) does not seem to be applied to innovative service entrepreneurship. Thus, paradoxically, the research on this topic is lagging behind. It is necessary to fill this research gap given the strategic importance of the dynamics of entrepreneurship in our economies. This important question can be addressed in parallel with some other general thematic issues discussed above: namely social innovation (potential source of social entrepreneurship), environmental issues (source of ecological entrepreneurship), gender issues (and women's entrepreneurship), the ageing challenge (and what could be called the silver entrepreneurship, to designate not entrepreneurship supported by seniors, but entrepreneurship based on innovations for seniors), etc.

Challenge 13. Service innovation, employment and skills

One of the main myths about the service society is that it would be “a society of servants”, certainly creating jobs, but low-skill or “Mac” jobs (Gallouj, 2002b). This myth is easily invalidated by the statistical analyses, which show a dual service society, which is both the main employer of low-skill and high-skill jobs. Thus, the service society seems to be as much a society of servants as a society of engineers and managers.

If the works devoted to the relationship between services and employment and qualifications are not uncommon, this is not true of those devoted to the relationship between service innovation and employment and qualifications. This is a research topic that deserves to be explored in the future, as it involves significant challenges for the future of firms.

After all, the development of certain service innovations creates job categories and skills types that did not exist before. Thus, most of the IT-related professions that thrive today did not exist a few years ago. This applies, for example, to data scientists, social media analysts (The National Academies, 2014). Similarly, most of those

that will be important in the near future do not exist today. In total, the prospective analysis of how service innovation will change the panorama of jobs and skills is a priority for research, business management and public policy.

Challenge 14. Service innovation and multidisciplinary: towards a service science?

Given its evolution, particularly its hybridization with technical systems (IT platforms), the “service” entity that was originally a fuzzy and quite simple entity (which even led to its denigration by economic analysis) has become a complex object, a “service (eco) system” linking sophisticated and scalable technical systems, increasingly competent human actors and multiple organizations (see challenge n° 4). If one wishes to understand how these “complex human-centred” service systems” (Maglio et al., 2014) function, a strictly disciplinary vision is inadequate. It is necessary to mobilize and confront approaches and methods that borrow from different disciplines: economics, management, sociology, psychology, computer science, operations research, industrial engineering, etc.

This is the great ambition of the advocacy for the construction of a “service science” originally launched by US researchers, but which is increasingly relayed in Europe (Chesbrough and Spohrer, 2006; Larson, 2008; and Maglio al., 2010). The service science project is to develop, on a fundamentally interdisciplinary basis, a theory of services and service innovation. Although it attaches great importance to information technology, it doesn’t fall into the scope of an assimilationist perspective that would seek to industrialize and materialize an initially immaterial object, but rather of an integrative approach that gives human beings an equally central position in the “complex human-centred services systems”. The association of the terms “science” and “service” reflects the desire to introduce in services and their innovation dynamics, more measurement, formalization, systematization, modelling, sustainability, possibility of replication, although the human component of the system makes this aspiration difficult. This interesting research project that has already given birth to four scientific journals featuring the expression “Service Science” in their title (Service Science, International Journal of Service Science, Management, Engineering and Technology; International Journal of Services Sciences, Journal of Science Service) is still in its pre-paradigmatic phase and it is therefore a promising research program.

Challenge 15. Service innovation studies and service innovation degrees

The final challenge that we now address is not strictly a research challenge. It is an educational challenge, which is, it is true, closely linked to research challenges. This challenge raises the question of the ability of SIS to support the creation of specialized lectures or specialized degrees (bachelor degrees, master degrees, MBA) in the field of innovation in services.

In universities, many degrees in economics and management of innovation are backed by IS. However, up to now, to our knowledge, too few universities offer specific courses devoted to economics or management of innovation in services and none offers specialized masters backed by SIS. In economies dominated by services, this decoupling of research on service innovation and education in the same field is a sign of infancy of SIS. Therefore to permanently establish the academic legitimacy of this research field, efforts remain to be undertaken in the educational sphere.

4. Conclusion

SIS are now about a quarter of century old. Although still marginal compared to the well-established field of IS, they nevertheless bring enough work together so that it is possible to consider to take stock of progress. Literature surveys are regularly carried out which demonstrate that a critical threshold has been reached in terms of publications volumes. Our survey enabled us to identify no less than fifteen of these surveys devoted to innovation in services in general and about twenty specific surveys devoted to a particular sector or theme over the period 1994-2015 (see table 1).

In this work, building on these surveys, we began by remembering the major advances achieved in SIS (fifteen in total). On this basis, we tried to identify key research priorities for SIS in the future (fifteen thematic priorities also on the whole). These priorities complement or illuminate from a new angle the twenty priorities established by Martin (2015) for the widest field of IS.

In a relatively new field such as SIS, which is not stabilized, the boundaries between the acquired knowledge (advances) and knowledge to develop (the challenges, research priorities) are not always well drawn. Thus, some of the issues that we have outlined in the “advances” are still very fertile research fields that could therefore, easily, be integrated into the “challenges”. Thus it could be noted, for example, that in Gallouj et al. (2015), “The reconciliation of industrialization and customization of services” and “The Service regression vs. the service extension dynamics” are discussed as “emerging developments”, while in this article we consider the tensions between the opposing principles described by these couples as advances in the SIS. Conversely, some of the issues that we have assigned to the “challenges” or “research priorities” category are not necessarily always completely new (a careful reader would certainly be able to point out a possible existing article addressing the issue in question). Nevertheless, they are included in the challenges, because their exploitation by SIS is still in its infancy.

The number of research priorities selected (fifteen) is obviously arbitrary. It would be possible to add much more challenges to be addressed by SIS. These include the following ones that we will just mention without developing them:

- The link between service innovation and economic crisis. As noted by Martin (2015), who identifies it as one of the challenges for IS, financial innovations that are at the origin of the latest economic crisis are not (sufficiently) addressed by IS. It is even more surprising that SIS have neglected them, as far as financial innovations are service innovations.
- New customer roles in service innovation. While recognizing the customer's role in service production is an old and well-documented phenomenon, new research avenues are open especially by new technologies that lead to consider new roles for clients in service co-creation and innovation.
- Service innovation and international trade. It is important to discuss, for example, how service innovation contributes to the growth of international trade in services and what types of service innovation are the most successful in this contribution.

- Service innovation and public policy. Despite political recognition of the importance of service innovation, political actions to foster service innovation and academic research on these actions are still far from sufficient.
- Service innovation and geographic issues. Thus, for example, the mapping of the geography of service innovation is largely lacking.

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Annexe 1:

Twenty advances in science policy (Martin, 2015)

1. From individual entrepreneur to corporate innovators
 2. From *laissez faire* to government intervention
 3. From two factors of production to three
 4. From single division to multidivisional effects
 5. From technology adoption to innovation diffusion
 6. From science push to demand pull?
 7. From single factor to multi-factor explanations of innovation
 8. From a static to a dynamic model of innovation
 9. From the linear model to an interactive “chain-link” model
 10. From one innovation process to several sector-specific types
 11. From neoclassical to evolutionary economics
 12. From neoclassical to new growth theory
 13. From the optimising firm to the resource-based view of the firm
 14. From individual actors to systems of innovation
 15. From market failure to system failure
 16. From one to two “faces” of R&D
 17. From “Model 1” to Model 2”
 18. From single technology to multiple-technology firms
 19. From national to multi-level systems of innovation
 - 20. From closed to open innovation**
-

Twenty challenges for innovation studies (Martin, 2015)

1. From visible innovation to “dark innovation”
2. From innovation in manufacturing to innovation in services
3. From boy’s toys to “women’s liberation”
4. From national and regional to global systems of innovation
5. From innovation for economic productivity to innovation for sustainability (“green innovation”)
6. From innovation for economic growth to innovation for sustainable development
7. From risky innovation to socially responsible innovation
8. From innovation for wealth creation to innovation for well-being (or from “more is better” to “enough is enough”)
9. From “winner take all” to “fairness for all”
10. From government as fixer of failures to the entrepreneurial state
11. From fait-based policy (and policy-based evidence) to evidence-based policy?
12. Balancing the intrinsic tensions between intellectual property and open source
13. Balancing the intrinsic tensions between exploration and exploitation
14. Balancing the intrinsic tensions between closed and open innovation
15. Balancing the intrinsic tensions between competition and cooperation
16. Pricking academic bubbles
17. Identifying the causes of the current economic crisis
18. Avoiding disciplinary sclerosis
19. Helping to generate a new paradigm for economics – from Ptolemaic economics to ???
20. Maintaining our research integrity, sense of morality and collegiality

FORMES, TRAJECTOIRES D'INNOVATION DES NOUVEAU MODELES DE CROISSANCE ET ROLE DES SERVICES : LE CAS DE L'ÉCOLOGIE INDUSTRIELLE ET DE L'ÉCONOMIE DE FONCTIONNALITE.

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Avec le renchérissement du prix de l'énergie et des matières premières, et le développement des préoccupations environnementales, les entreprises sont à la recherche de nouveaux modèles de croissance. Ce travail étudie les dynamiques d'innovation que l'écologie industrielle et l'économie de fonctionnalité contribuent à développer, en mettant l'accent sur le rôle des services. Ces modèles peuvent être à l'origine de la création d'externalités positives au niveau du territoire, grâce au partage et la mise en synergie de ressources matérielles et immatérielles, et conduire à la constitution de « patrimoines immatériels collectifs ». Les services sont essentiels au développement et à la pérennité de ces modèles.

1. Introduction

Le modèle de croissance matérielle intensive à la base de la croissance des trente glorieuses n'est plus adapté à la dynamique économique. Dans les années 80, les limites de ce modèle se sont encore renforcées suite au risque de pénurie d'énergie et de matières premières, puis au développement des préoccupations environnementales. Certains entrepreneurs sont à la recherche de nouveaux modes d'organisation prenant en compte ces contraintes. Deux modèles se détachent par leur caractère opérationnel : l'écologie industrielle (EI) et l'économie de fonctionnalité (EF). Ces modèles ont émergé du brassage des idées nouvelles issu des années 1980 suite à la remise en cause des vertus de la croissance par le Club de Rome (1972). La dynamique associée à l'EF s'appuie sur le passage à une logique de service. Des entreprises manufacturières cherchent à modifier leur offre, en substituant la vente d'un service à la vente d'un bien (le bien précédemment vendu devenant le support du service), voire plus largement la vente d'une solution intégrée dont la rémunération est associée à la performance obtenue. Ce changement de perspective permet d'accorder la création de valeur ajoutée à la réduction de la part des ressources matérielles dans l'usage des produits. La durabilité et le caractère évolutif des produits sont alors recherchés, plutôt que son remplacement. La dynamique de l'EI repose sur le recyclage, la mutualisation des achats et des échanges de flux pour valoriser les déchets et réduire les coûts de production d'un ensemble d'entreprises. Si la logique servicielle n'est pas considérée comme le cœur de ces synergies, elle

joue un rôle important dans leur accompagnement et leur pérennité (Laperche et al, 2014).

Ces modèles rencontrent cependant un certain scepticisme. Les avantages économiques et le caractère innovant de l'EF n'est pas toujours perçu par les acteurs, la question de la durabilité des produits sur laquelle repose le modèle constituerait même un frein à l'innovation (Buclet, 2005a). A contrario, de nombreux auteurs insistent sur le fait que l'EF formerait une innovation de rupture tant au niveau du modèle économique d'entreprise que pour l'aménagement du territoire (Gaglio et al., 2011, Robert et al., 2014). Quant à l'écologie industrielle, si les synergies sont montrées en exemple, ces mêmes études révèlent un certain nombre d'obstacles à leur mise en œuvre (Erkman, 2001 ; Gibbs et al., 2005; Duret, 2007).

L'objectif de ce travail est de mettre en évidence les formes et trajectoires d'innovation que le modèle de l'EI et l'EF contribuent à développer, et en particulier d'identifier le rôle des services dans ces nouveaux modèles. Ces trajectoires sont-elles vraiment porteuses d'éléments de rupture par rapport au modèle traditionnel fordiste ? Quel est le rôle des services dans la mise en œuvre de ces innovations ? Dans une première section, nous présentons ces deux modèles économiques, leurs points communs, et leurs relations à la dynamique servicielle. Dans une seconde section, nous analyserons les dynamiques d'innovation que ces modèles économiques génèrent. Dans une troisième section, nous discuterons des enjeux de ces modèles pour la croissance des pays développés et du rôle des services.

2. Economie industrielle et Economie de fonctionnalité : des objectifs similaires

L'objectif de l'EI est de réorganiser le système industriel de manière à le rendre compatible avec la biosphère et viable à long terme (Frosch, Gallopoulos, 1989). L'EI est une approche systémique qui se concentre sur les systèmes industriels. Elle consiste à prendre pour modèle le fonctionnement des écosystèmes naturels : les activités industrielles constituent des écosystèmes particuliers dont il convient de boucler les flux. Ce modèle économique cherche à renouveler les configurations productives en passant d'un système linéaire à un système plus circulaire. Selon Erkman (2004), l'écologie industrielle utilise quatre leviers : boucler les flux de matière et d'énergie, décarboner l'énergie, limiter les pertes par dissipation, valoriser systématiquement les déchets, ainsi que dématérialiser l'économie (produire avec moins de matières et d'énergie par unité de croissance).

L'EF consiste en la modification de la proposition de valeur de l'entreprise. L'entreprise remplace l'appropriation privative du bien par l'accès à l'usage d'un bien (Bourg, Buclet, 2005, Du Tertre, 2006, Van Niel, 2014). Autrement dit, les besoins du consommateur sont satisfaits non pas par l'achat d'un bien répondant à ce besoin mais par l'achat de la fonction du bien répondant à ce besoin. L'expression « économie de fonctionnalité » (service economy) est attribuée à Stahel et Giarini (Giarini, Stahel, 1986, 1989). Ce modèle s'inscrit aussi dans la perspective du développement durable car l'objectif économique est de « créer une valeur d'usage la plus élevée possible pendant le plus longtemps possible, tout en consommant le moins de ressources matérielles et d'énergie possible » (Stahel, 2006). Ce modèle économique s'opérationnalise essentiellement au travers de modèles d'entreprise cherchant à

concevoir des solutions systémiques pour répondre aux attentes des ménages (B to C) ou d'autres entreprises (B to B).

Au niveau empirique, il y a presque autant de variations d'EF qu'il y a d'applications. Ces applications peuvent s'inscrire dans un cadre contractuel relativement simple, de type offre de location de courte durée avec assurance (ex : Zilok), de type leasing (ex : Lokéo), ou de ventes fonctionnelles (ex : Electrolux, vente de cycle de lavage). Enfin, elle peut prendre la forme d'une contractualisation au résultat, dans laquelle la responsabilité du prestataire est plus étendue (ex : atteinte d'un niveau de confort thermique, d'un niveau d'éclairage, comme CLARlight) (Van Niel, 2014) Ces offres contraignent l'entreprise à revisiter son modèle économique car la structure des coûts est radicalement différente du cas de l'appropriation privée. Les dépenses du client (coûts d'accès) deviennent proportionnées à l'usage, les coûts de fonctionnement sont à la charge du prestataire du service. Si les offres de solution sont basées sur la performance, le mécanisme de rémunération peut introduire le partage des économies réalisées, mais aussi des pénalités pour le prestataire lorsque les résultats obtenus sont inférieurs aux objectifs mentionnés dans le contrat. (Van Niel, 2014). L'offre proposée peut aussi être plus systémique, impliquant de nombreux acteurs sur des partenariats de long terme. Il peut s'agir de l'élargissement d'une problématique sectorielle (ex : passage d'une prestation de soins à une logique de santé) ou de problématiques territoriales (problématique de la mobilité d'une zone urbaine) (Du Tertre, 2011).

L'EF constitue un des moyens pour dématérialiser l'économie, elle forme donc l'un des développements opérationnels de l'EI, au même titre que l'éco-conception et les symbioses (Stahel, Giarini, 1986 ; Adoue, Georgeault, 2014). Cependant, selon Du Tertre (2011), le modèle de l'écologie industrielle est moins avancé que le modèle de l'EF sur le plan du découplage croissance/flux de matières, car l'EI est toujours basé sur une croissance économique lié au volume d'achat (absence de découplage) et peut induire des effets rebonds.

Si ces deux nouveaux modèles économiques semblent s'appuyer sur des logiques différentes, une partie des objectifs sont communs. L'EF, l'EI, cherchent toutes deux à expérimenter de nouveaux modèles, plutôt que de les théoriser, et les relations de coopération entre acteurs, tout comme l'intégration du territoire dans le processus productif, forment le cœur de ces modèles (Maillefert, Robert, 2014). Dans ces deux modèles, la production se fonde sur des principes de coopération plutôt que de concurrence. La mutualisation des usages entre acteurs, les dynamiques de coproduction entre usagers, entreprises et acteurs territoriaux sont représentatifs des modèles d'EF les plus élaborés (Maillefert, Robert, 2014 ; Vuidel et al, 2012). L'EI repose sur une coopération interindustrielle mais peut inclure des échanges avec les collectivités territoriales. Les acteurs utilisent des pratiques de mutualisation des flux (achats, déchets à valoriser, etc.) et des stratégies de substitution de ressources afin de recycler certains flux. Les modèles d'EF et d'EI sont susceptibles d'impliquer le territoire dans le processus productif. Dans les pratiques d'EI, la construction d'un objectif commun d'action collective s'élabore généralement à partir d'un territoire. Dans les initiatives les plus élaborées d'EF, les solutions systémiques tendent à créer des externalités sociales et environnementales positives sur le territoire concerné (Maillefert, Salchli, 2010).

3. La dynamique de l'innovation

Afin de rendre compte de la dynamique d'innovation à l'œuvre dans ces deux modèles, et dans la mesure où les changements sont susceptibles de s'inscrire dans une dynamique territoriale, il est nécessaire de prendre en compte différents niveaux d'analyse des trajectoires d'innovation. Après avoir présenté le cadre d'analyse, les trajectoires d'innovation sont exposées.

3.1. Des enjeux micro, méso et macroéconomiques

Trois échelles analytiques sont nécessaires pour rendre compte des différents types de changements engendrés par le modèle économique de l'EI et de l'EF.

La dimension microéconomique s'attache à identifier les modifications liées à l'offre globale de l'entreprise (les produits proposés, les changements des configurations productives, l'organisation de l'entreprise). Le nombre d'acteurs impliqués peut être très différent en fonction du type d'EF mis en place. Dans la plupart des cas, ce changement de modèle n'est réalisable qu'en faisant appel à un/plusieurs prestataires extérieurs ou à une « institution tierce attestant, par exemple, du caractère écologique de l'offre proposée » (Zacklad, 2007, p. 2). Dans ce cas, une perspective méso-économique est plus indiquée pour rendre compte des constructions organisationnelles et des interactions entre acteurs. Le développement de telles offres requière la mise en commun d'un « bien partagé » (confort énergétique, mobilité, santé) sur lequel s'opère l'articulation des différentes prestations (Zacklad, 2007). Les problématiques territoriales et les enjeux de ces modèles seront mis en lumière par une perspective macroéconomique. Ce découpage est cependant essentiellement analytique, les enjeux territoriaux, méso-économiques et micro-économiques, étant imbriqués.

Les dynamiques d'innovation propres au modèle d'EI et d'EF possèdent, selon nous, des points communs, qu'il convient de mettre en évidence. Une grande partie de la littérature consacrée à l'innovation dans le modèle de l'EI et de l'EF explique la viabilité de ces modèles économiques en insistant sur les innovations technologiques et le progrès technique. Or ces trajectoires technologiques ne sont pas suffisantes pour garantir le bon fonctionnement de ces modèles. Elles sont même susceptibles de conduire à des dérives d'un point de vue environnemental (Diemer, 2010, 2012 ; Du tertre, 2011). Les changements de nature organisationnelle sont aussi de plus en plus mis en évidence dans la littérature, notamment en sciences humaines (Dannequin, Diemer, 2009 ; Boiral, J. Kabongo, 2004 ; Beaurain, Brulot, 2011). Mais d'autres dimensions sont aussi à prendre en compte. Pour fonctionner, ces modèles font appel aux logiques servicielles. Ces logiques sont au cœur même du concept d'EF qui transforme la vente de bien en une prestation dont l'un des éléments moteurs est la relation de service. Pour l'EI, cette perspective est beaucoup moins mise en valeur par la littérature. Or, ces logiques servicielles sont indispensables pour assurer l'organisation et la logistique de la symbiose industrielle (Laperche et al. 2014). Par ailleurs, l'EF (et de la coopération), et l'EI (et territoriale) s'appuient sur un réseau d'acteurs qui conduit bien souvent l'entreprise à élargir le périmètre des activités (saut systémique partenarial et spatial) et engendre le développement d'un « *écosystème productif* » créateur d'externalités sur le territoire.

L'approche du produit et de l'innovation en termes de caractéristiques est un cadre analytique permettant de rendre compte de ces évolutions. D'inspiration lancastérienne, et proposée initialement par Saviotti et Metcalfe (1984), cette approche définit le produit comme la mise en relation de vecteurs de caractéristiques et de compétences. Elle permet de décrire un système technique et son évolution. Cette approche a ensuite été amendée pour rendre compte des prestations de services (Gallouj, Weinstein, 1997 ; Gallouj, 2002 ; Gallouj, Savona, 2010). Le produit (bien ou service) comporte des caractéristiques de service, formalisées par le vecteur $[Y]$, des compétences internes du prestataire de service $[C]$ et externes (compétences du destinataire du service) $[C']$, des caractéristiques techniques internes $[T]$ et externes (caractéristiques techniques du destinataire du service) $[T']$ (cf. Figure 1).

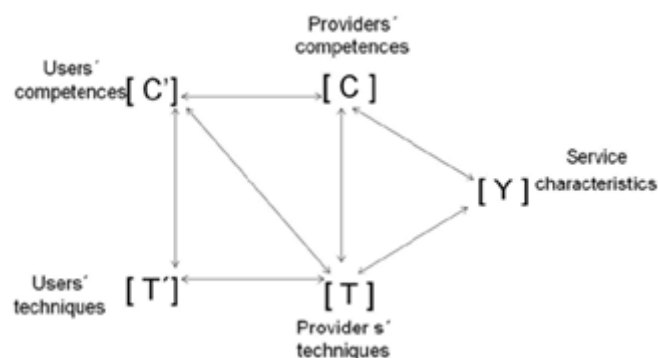


Figure 1 : Le produit comme vecteur de caractéristiques et de compétences (characteristics-based approach)

Source : Gallouj, Savona, 2010.

Ce perfectionnement donne au modèle une dimension « intégratrice » (Gallouj, 1994) puisqu'il est possible de rendre compte à la fois de services purs basés uniquement sur la prestation de compétences et des connaissances, en coproduction avec le bénéficiaire du service, tout comme d'offre globale incluant la production à la fois de biens et de services. De plus, il peut être utilisé à un niveau micro, méso ou macro-économique.

3.2. Les dynamiques d'innovation

3.2.1. Un changement de la configuration productive et de l'offre proposée

La perspective micro-économique s'attache plus particulièrement aux changements de la configuration productive. Le passage d'un modèle économique d'entreprise manufacturière à un modèle d'EF est considéré comme une innovation de rupture en termes stratégiques, notamment dans les versions d'EF les plus élaborées (Gaglio et al, 2011). L'introduction d'une dynamique servicielle (passage de la vente d'un bien à la vente d'une solution globale riche en prestations de service) se traduira par l'augmentation du poids des compétences du prestataire en relation avec le client (C), et la mise en place d'une co-production avec le bénéficiaire de service (appari-

tion d'un vecteur (C') correspondant aux compétences du client). Le vecteur des caractéristiques techniques (T), qui permettaient d'offrir un produit rendant la fonctionnalité correspondante (Y) est toujours présent. En revanche, ce vecteur (T) correspond alors aux caractéristiques de l'équipement mis à disposition du client (dans le cas du passage à une location par exemple) et non plus au produit vendu. Ce changement dans les droits de propriété a un impact sur l'environnement. L'entreprise, maintenant propriétaire du bien qui est mis à la disposition du client, est incitée à prolonger la vie du produit afin de le mettre à disposition des clients pendant une durée plus longue. D'un point de vue analytique, ce nouvel objectif peut être représenté par l'enrichissement du vecteur (T) avec des caractéristiques de durabilité du produit (facilité de réparation, gestion des déchets). Les fonctionnalités proposées aux clients (vecteur Y) évolue aussi : le coût d'usage et d'entretien des biens est pris en charge par le prestataire, les options de service proposées sont plus nombreuses.

De nombreux auteurs associent la dynamique d'innovation liée à l'EF à l'écoconception du produit et la recherche d'éco-efficience. C'est une trajectoire essentiellement technologique et organisationnelle, attachée aux supports (au sens large) sur lesquels le service repose. Le support du service est rendu plus modulaire et recyclable, afin de réduire son coût d'entretien, et si possible économe en ressources et en énergie, tout comme le processus de production (Bourg, Buclet, 2005). Le rôle des nouvelles technologies de l'information et de la communication (NTIC) est important dans ces offres de produits/services car ces technologies conditionnent la réalisation de l'offre. Un grand nombre de données clients doivent être partagées entre les différents partenaires. Ainsi, la trajectoire technologique implique aussi l'appropriation de technologies informationnelles. Dans une proposition d'EF, la dynamique de création de la valeur devient radicalement différente. L'investissement dans des connaissances annexes au domaine de base devient indispensable pour proposer la nouvelle offre, et constitue les ressources clés des solutions déployées. Cette montée en compétences des entreprises manufacturières, devenues prestataires de service, portent sur la pertinence des solutions déployées, elles influencent directement la qualité et la « performance » de la solution. La dynamique d'innovation est ainsi aussi relationnelle et méthodologique.

La dynamique d'innovation de l'EI poursuit quant à elle, un objectif de dématérialisation et de bouclage des flux. Ces entreprises industrielles abandonnent le mode linéaire de production engendré par la société productiviste associé à la consommation de masse et la production de déchets, pour un réseau industriel complexe dans lequel l'innovation relève des stratégies de mutualisation/substitution de flux, sur le partage d'investissement et de ressources matérielles comme immatérielles entre différents acteurs. Les synergies de substitution portent sur la détection de nouvelles filières de valorisation, sur l'identification de co-produits et de déchets valorisables auprès d'autres entreprises. Les synergies de mutualisation concernent les matières premières, le traitement collectif des déchets, le transport. Tout comme l'EF, l'EI s'appuie aussi sur une trajectoire d'innovation technologique et organisationnelle. Les premiers travaux (en ingénierie) se sont concentrés principalement sur l'évaluation du métabolisme industriel (identification des flux de matières) et la valorisation systématique des déchets (changements du vecteur des caractéristiques techniques et de process (T) de l'entreprise). Mais cette trajectoire technologique n'est rendue possible qu'en mutualisant les flux et donc en coopérant avec d'autres parties prenantes. La trajectoire d'innovation est ainsi tout autant technologique qu'organisationnelle. Les travaux analysant la dimension organisationnelle de l'innovation sont issus de plusieurs courants (économie de l'innovation (Dannequin,

Diemer, 2009) ; approche ressources-compétences (Boiral, 2005 ; Boiral, J. Kabongo, 2004) ; école de la proximité (Beurain, 2008 ; Beurain, Brullot, 2011), économie de la fonctionnalité (Bourg, Buclet, 2005). Ces travaux mettent l'accent soit sur l'innovation organisationnelle, soit sur le savoir-faire organisationnels comme source de différenciation et d'avantages compétitifs, soit sur la dynamique économique territoriale, ou encore sur la dématérialisation de l'économie. Ils insistent tous sur l'importance de la coordination interindustrielle sur le long terme dans la mise en place des synergies. Cette coordination génèrent des routines et des apprentissages organisationnels susceptibles de donner lieu à des innovations organisationnelles, méthodologiques et servicielles (identifiables via le vecteur [C], [T]). Par ailleurs, comme dans l'EF, l'application des NTIC constitue un outil décisif dans la mise en place de l'EI, en améliorant l'utilisation des ressources de la firme (Diemer, 2010). Cette coopération entre acteurs, propre à l'Ei et l'EF, est d'avantage mis en évidence à l'échelle méso-économique.

3.2.2. La multiplication des parties prenantes

Dans le modèle d'EF, tout comme le modèle d'EI, la notion de réseau d'acteurs (parties prenantes) ou réseau de partenaires externes (collaboration et co-crédation avec les fournisseurs, clients, distributeurs, concurrents et autres parties prenantes) est essentielle. (Maillefert, Robert, 2014). Ces coopérations permettent de proposer des solutions personnalisées par l'adjonction de nouvelles fonctionnalités (EF), par le partage de compétences (vecteur C) et de caractéristiques techniques et de process (vecteur T) entre parties prenantes (EI et EF).

Dans le modèle d'EF, c'est la coordination active et volontaire des parties prenantes qui crée la valeur d'usage supplémentaire et garantit la pérennité de l'offre. Assurer une flexibilité d'accès au bouquet de produits-services génère la confiance mutuelle (Zacklad, 2007).

Pour réaliser cette offre, l'entreprise externalise certaines parties de la prestation et de ce fait, développe des partenariats avec d'autres prestataires de service. Les clients ont une place essentielle dans cette structuration de l'offre puisqu'ils peuvent être amenés à co-concevoir et co-produire et co-évaluer cette offre (Du tertre, 2011, Vaileanu-Paun, 2009). Le client peut mettre en œuvre ses compétences (C') ou ses propres caractéristiques technologiques (T') (utilisation de sa voiture dans la prestation globale de transport). Il peut aussi éventuellement imposer un autre prestataire pour finaliser cette offre globale en fonction de ses besoins et de l'intensité de la personnalisation du service. Cette offre globale amène parfois à prendre en compte des acteurs concernés par la prestation, sans être nécessairement des prestataires directs de l'offre, telles que les collectivités territoriales, ou des associations (Zacklad, 2007).

Dans le modèle d'EI, la mise en œuvre de synergies industrielles induit une organisation des flux mutualisés. De ce fait, la coordination est aussi importante que la dimension technique. La confiance mutuelle, la proximité géographique et le partage de mêmes valeurs sont essentiels pour réaliser cette valorisation (Diemer, 2010). Repenser l'activité en fonction des possibilités de valorisation interne ou externe des résidus s'appuie sur la mobilisation de savoirs théoriques (scientifiques, techniques, juridiques, commerciaux) et de compétences acquises par la pratique [C]. Ces savoirs sont obtenus de différents acteurs, prestataires de service de conseil, collectivi-

tés territoriales, associations, etc. et ne sont par conséquent, pas forcément visibles à partir de l'analyse micro-économique de l'offre globale.

La représentation analytique de la dynamique d'innovation à un niveau méso-économique suppose d'intégrer l'ensemble des parties prenantes concernées. Ce cadre d'analyse multi-acteurs associé à l'approche en termes de caractéristiques a déjà été proposé par exemple en vue de représenter l'action du secteur public dans l'innovation de santé (Windrum, Garcia-Goñi, 2008) ou bien afin d'identifier les partenariats public-privé dans le cas de l'innovation hospitalière (Gallouj et al., 2015) dans le cadre d'une approche fonctionnelle ; ou encore dans une tentative de spatialisation de l'innovation de services, en ajoutant les acteurs mais aussi les ressources de ces acteurs au modèle (Delaplace, 2016). Chaque partie prenante à l'offre de service (EF) ou à la symbiose industrielle (EI) est représentée par l'introduction de vecteur de compétences et de caractéristiques technologiques propres à chacun des partenaires. Certains sous-ensembles de ces vecteurs seront éventuellement mis en commun (mutualisation) entre plusieurs partenaires. Les partenaires coopèrent ensemble et avec le client. Cette représentation peut aussi intégrer les préférences des acteurs qui peuvent interférer dans la proposition d'offre des prestataires. Cette représentation souligne la complexité des structures (publiques, privées, éventuellement associatives) associée à cette coopération. Bien que la représentation en termes de caractéristiques ait plutôt pour objectif la représentation d'une offre (biens/services), cette représentation peut être amendée en vue de rendre compte des relations interindustrielles propres au cadre de l'EI. Les synergies donnent lieu à la mise en commun de compétences, de techniques entre les différents prestataires, ou bien rendent possible de nouvelles offres de produits/services.

2.3.3. Vers des problématiques territoriales et d'évaluation

L'EI et l'EF, en engageant de nombreux acteurs sur une offre globale ou une symbiose industrielle, ont la particularité d'amener à un déplacement systémique des offres/activités proposées.

L'offre d'EF s'appuie sur un « bien partagé indivisible » (Zacklad 2007) (ex : la mobilité, la sécurité, la santé, etc.), susceptible d'inclure des enjeux territoriaux. Selon cet auteur, ces enjeux comportent des dimensions écologique (air, eau, sol...), humaine (santé, culture, langue, sécurité, bien être...) et économique (infrastructure de transport, ressources de production d'énergie...). Ainsi, les entreprises impliquées dans ces projets participent au développement d'externalités positives socio-économiques et environnementales pour le territoire (création d'emplois, de nouvelles activités, apaisement des tensions sociales, etc.) et contribuent à la création d'un « patrimoine collectif immatériel » (Du Tertre 2006). Se pose alors la question de l'identification du rôle de chaque acteur partie prenante à la prestation, de leur rémunération, et de leur participation, au-delà de la prestation elle-même, à la création de ce patrimoine (trajectoire méthodologique et institutionnelle). Cette trajectoire est nécessaire à l'acceptation sociale de ces modèles économiques. L'évaluation de ces externalités, et donc des performances des différents acteurs, s'élabore à un niveau macro-économique. Elle nécessite une réflexion sur la création d'indicateurs et plus généralement de nouveaux outils d'évaluation incluant ces externalités. En effet, ces impacts socio-économiques et environnementaux, bénéfiques pour le territoire, ne sont pas évalués à leur juste valeur dans les critères de performance issus du modèle fordiste.

L'EI est aussi susceptible d'amener à une stratégie de développement soutenable du territoire (Beurain, Brullot, 2011), dans la mesure où les synergies se déclinent à l'échelle de l'entreprise, de réseaux d'entreprise, comme du territoire (Maillefert, Robert, 2014). L'EI implique différentes dimensions territoriales (aspects techniques, environnementaux, sociaux, économiques; emplois locaux). Ainsi, l'évaluation de la « *maturité cognitive* » de ce territoire (Cerceau et al, 2014) ou du processus de développement territorial de l'EI (trajectoire méthodologique et institutionnelle) devient complémentaire aux démarches d'écologie territoriale centrées sur la comptabilisation des flux de matières et d'énergie sur un espace territorial donné (Barles, 2010, Maillefert, Robert 2014, Decouzon, Maillefert, 2012)).

Les modèles d'EI et d'EF, peuvent être accompagnés d'une sensibilisation des acteurs afin de provoquer une évolution de leurs comportements, et un changement dans leurs pratiques d'évaluation. La dynamique d'innovation serait alors plutôt de nature méthodologique et institutionnelle. Elle concerne l'identification du contenu des effets directs et indirects des services rendus au territoire ainsi que leur évaluation. Des modèles multi-critères et multi-acteurs réalisés dans une perspective macroéconomique peuvent alors être mobilisés pour rendre compte de la participation de tels réseaux d'acteurs à l'innovation et aux problèmes sociétaux (Hyytinen et al, 2014).

4. La place des services dans les dynamiques d'innovation

L'analyse de trajectoires d'innovation amène à plusieurs réflexions.

- La logique de service conditionne le développement et la pérennité des solutions d'EI et d'EF.

Le passage à une logique servicielle dans le cas de l'EF, en plus de l'appropriation des supports des services, modifie les conditions d'accessibilité à la prestation. L'accessibilité n'est plus seulement basée sur la solvabilité du client, mais aussi sur l'accès temporel, culturel, géographique, cognitif à la solution (Gaglio et al, 2011).

Pour favoriser cette accessibilité, l'entreprise a tout intérêt à fidéliser le client puisque le revenu dépend de la période sur laquelle le contrat avec le client s'instaure. Cette nouvelle dynamique de service induit une montée en compétences des prestataires, pour répondre aux demandes spécifiques et personnalisées des clients, et instaurer ce nouveau type de fidélisation. La dynamique industrielle, qui reposait sur le conditionnement de masse des consommateurs par l'intermédiaire de la publicité, et qui prenait appui soit sur le volume vendu, soit sur les effets d'intégration, de réseau et d'apprentissage, laisse place à une dynamique de fidélisation servicielle, qui nécessite une logique de proximité et de réseau (Zacklad, 2007). Cette fidélisation soutenable ne propose pas seulement de rendre compatible les éléments du bouquet de produits-services (fidélisation par les effets d'intégration et d'apprentissage) mais de créer de nouvelles fonctionnalités issues de l'intégration de ces composantes (logique servicielle).

En ce qui concerne l'EI, la conception de synergies à l'échelle du territoire est en mesure de développer un « écosystème industriel » porteur d'externalités positives

pour le territoire. Si les synergies s'appuient sur des développements technologiques et impliquent des changements organisationnels, c'est grâce à la présence et au développement de certaines fonctions de service (conseil, formation, coordination) que ces synergies sont rendues possibles et pérennes. Ces fonctions sont développées non seulement par les industriels initiateurs des synergies, mais aussi par des prestataires de service publics, privés ou associatifs (collectivités territoriales, club d'entreprises, services de conseil, de formation, etc.). Ces prestataires de services favorisent la coordination des acteurs sur le territoire (Laperche et al., 2014). Par ailleurs, les synergies font aussi appel à des prestataires de service tels que les services de transports, les services liés à la collecte et au recyclage des déchets, ou des services associés à la consommation de ressources (eau, électricité) et qui ne sont pas toujours comptabilisés comme des activités de service (par la nomenclature d'activités françaises).

- La réduction des impacts environnementaux liée à la logique servicielle n'est pas systématique.

Le passage à l'EF contribue à augmenter la part des ressources immatérielles (voire découpler les flux de revenu de la croissance matérielle) et ainsi à réduire les impacts environnementaux. Cependant, seules certaines formes d'EF amènent à un développement plus soutenable. Par exemple, les trajectoires d'éco-efficience auxquelles sont associés ces modèles économiques ne sont entreprises que si elles amènent une rentabilité importante. Ainsi, les premières réalisations d'EF n'ont pas été conçues dans une optique de réduction de matières (Buclet, 2005b). Certains industriels cherchent simplement, en proposant des services à côté des biens, à augmenter la création de valeur ajoutée et donc leur chiffre d'affaires, sans aucune préoccupation environnementale. De ce fait, le développement durable n'est qu'« une des conséquences possible des stratégies relevant de l'EF » (Zacklad, 2007, p.1).

- Pour que les externalités positives créées par la dynamique servicielle puissent se développer, la coopération associée à la dynamique servicielle doit se décliner aux différentes échelles (micro-méso-macro).

En effet, les avancées technologiques (à caractère environnemental) peuvent être compensées par des effets rebonds générés par un effet revenu (accroissement des quantités consommées suite à la baisse de leur prix) et un effet substitution (changements de consommation) (Buclet 2005, Diemer, 2009). De plus, des effets rebonds indirects liés à la consommation d'énergie nécessaire pour produire les produits économes en énergie, ainsi que pour alimenter et recycler le matériel informatique, peuvent apparaître (Diemer, 2010). Ainsi, les externalités environnementales positives perçues au niveau micro-économique, sont plus que compensées par les effets négatifs générés à l'échelle macro-économiques.

Pour qu'elle amène à un développement soutenable, la dynamique servicielle ne doit pas seulement être pensée au niveau de l'entreprise mais aux différentes échelles (micro-méso-macro). Autrement dit, la trajectoire technologique, pour être viable (et engendrer des externalités positives au niveau macro-économique), doit être accompagnée d'un changement de comportement de la part des industriels et des consommateurs, ainsi que d'une nouvelle manière d'évaluer la création de valeur.

Que ce soit pour l'EF ou l'EI, c'est l'élargissement d'échelle qui permettra de rendre pérenne le modèle, en prenant en compte l'ensemble des acteurs potentiellement

concernés par les offres/synergies, en identifiant les ressources et les compétences de l'espace considéré (le territoire), en favorisant le partage ou la mutualisation de ces ressources et compétences. Cette coopération rend possible le développement de nouvelles activités (notamment de service), et tend vers la création progressive d'un « patrimoine collectif immatériel » caractéristique du territoire concerné (Du Tertre, 2011).

5. Conclusion

Les modèles d'EF et d'EI comportent des dimensions communes (dynamique de coopération, relation au territoire). Ils s'appuient sur des trajectoires d'innovation proches, en particulier technologique et organisationnelle (notamment d'éco-conception, d'éco-efficience). Mais ces trajectoires d'innovation considérées seules ne peuvent aboutir à un développement durable pour le territoire car elles peuvent être mises en œuvre de manière inappropriée (recherche de rentabilité uniquement économique, effets rebond...).

Les dynamiques relationnelles participent pleinement à la durabilité de ces modèles économiques. La trajectoire d'innovation relationnelle constitue le cœur du passage à l'EF, puisque dans ce modèle, l'échange marchand ne relève plus de paiements à l'unité mais d'un accès à un service ou une offre globale (produits/services) qui modifie le poids des ressources matérielles et immatérielles (en faveur des dernières) et transforme radicalement le management de ces activités. Par ailleurs, l'absence de transfert de droit de propriété participe à la protection de l'environnement en réduisant la consommation de matières via la disparition de l'obsolescence programmée des matériaux, et l'augmentation de la durée de vie et du caractère recyclable des équipements-supports des services. Cette dimension servicielle est aussi importante dans le modèle d'EI car elle participe à l'un des objectifs de l'EI qui est la dématérialisation de l'économie. Par ailleurs, l'EI s'appuie sur des fonctions de service essentielles à sa mise en œuvre (coordination, formation, logistique, etc.) ainsi qu'à la pérennisation des synergies.

Pour rendre compte de cette dynamique d'innovation, trois niveaux d'analyse ont été mobilisés (micro, méso et macro-économique) apportant chacun un éclairage différent et complémentaire sur les trajectoires d'innovation. Si le niveau micro-économique permet de rendre compte des évolutions dans les offres proposées, le niveau méso-économique autorise une mise en perspective des différentes parties prenantes à ces modèles. Le niveau macro-économique est utilisé pour retranscrire les dynamiques de construction de l'évaluation de la performance associée à ces nouveaux modèles.

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FROM CHANNEL MANAGEMENT IN SALES AND DISTRIBUTION TO CO-EVOLVING SERVICE ECOSYSTEMS

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The aim of the study is to discuss the service network, its actors and their roles, benefits and limitations, and the emergence of service ecosystems. The research question is: Which factors facilitate and hinder the networked value co-creation on service network level? The study used qualitative single case study methodology, and the research data was collected from a manufacturer and six dealer companies. The case provided empirical insights on the current level of systems thinking in service ecosystems. The paper aims to contribute to the literature on service (multi)channel management by systems approach, particularly from the viewpoint of the business networks and ecosystems in the downstream dimension.

1. Introduction

It is common for companies to utilise intermediary actors – such as dealers and distributors – in their global sales and distribution to carry out responsibilities like distribution of products, customer relationship management, marketing and after sales services. As early as the beginning of 2000s, the growing importance of channel intermediaries became recognised due to their increasing size, improved level of product knowledge, technical competence and specialisation, among other issues (Kalafatis, 2000). The channel structure through which end-customers are served is case-specific, depending upon the ability of the company and its intermediaries to create value relevant to end-customers (Kalafatis; 2000, Payne; Frow, 2004).

The multichannel management literature has often focused on the competitive advantage of channel strategies from the viewpoint of a single company (Gadde, 2016, Frazier, 1999, Kalafatis, 2000, Olsson et al., 2013, Skarmeas et al., 2008). However, as is highlighted in the service ecosystem literature, a focal company and its intermediaries integrate resources in interaction with each other and the (end-)customer (Vargo; Lusch, 2008), and thus, all changes in any of organisations influence others. It can be stated that *the actors form a sales and distribution network*. Co-evolution between network actors – as a key characteristic of the ecosystem approach – is a baseline for this study.

The offerings of manufacturers are becoming increasingly digital, knowledge-intensive and complex. Alongside this trend, servitisation has had an effect so that offerings now contain more intangible resources, such as service and knowledge, which increases the importance of customer focus (Baines et al., 2009, Oliva;

Kallenberg, 2003). As the nature of offerings evolve, network actors' roles and responsibilities may change, and as a result for example manufacturers may be pressured into reconsidering their sales and distribution networks and rethinking also their channels and intermediaries, their roles and responsibilities.

This case study explores a sales and distribution network from the viewpoint of a manufacturer (the focal company) and its intermediaries. In the case, the ongoing change and evolution of the manufacturer's offering is resulting in the manufacturer company considering taking more responsibility for solution sales, especially in the case of more demanding customers, and reclaiming some selling activities and returning others to its subsidiaries. The aim of the study is to discuss the service network, its actors and their roles, the benefits and limitations that the current network model sets, and the emergence of service ecosystems. The research question is: Which factors facilitate and hinder the networked value co-creation on service network level? The paper aims to contribute to the literature on service (multi)channel management by systems approach, particularly from the viewpoint of the business networks and ecosystems in the downstream dimension.

The paper begins by presenting the current understanding of the main themes of the study. The materials and methods chapter elaborates on the background of the study and the data collection. This is followed by a brief discussion of the case findings, after which the paper concludes with a final discussion, outlines lessons learnt, and presents further research suggestions, and limitations.

2. Current understanding

The change from traditional channel models to networked value co-creation systems is driven by market forces such as increasing complexity of products and variety of customer needs, and is enabled by new technologies and business practices (Christopher; Ryals, 2014; Gadde, 2016). The future direction of academic research on channel management in distribution and services needs to address these changes in the business world. Therefore, the focus should be broadened from the strategies of one company to network actors operating as an entity.

Furthermore, it is important to note that systems thinking in itself is not a new concept in the research stream of supply chain management, where structures have been regarded as multi-level sub-systems, i.e. tiers of suppliers and customers (Lusch, 2011). However, although the systems approach is not a new concept, most studies have a rather traditional view of distribution organised through channels (Kalafatis, 2000, Olsson et al., 2013, Skarmetas et al., 2008) with few studies perceiving it as a network phenomenon (Gadde, 2014).

The following discussion proceeds from multichannel management, which typically discusses distribution from the perspective of one actor at a time, to systems thinking, which emphasises networks and ecosystems and their co-evolving nature. This paper looks at the downstream side of the focal company's (manufacturer) network.

2.1. Multichannel management

In his review, Gadde (2016) sums up that the roots of channel management approach have "evolved through influences from marketing management and the socio-

behavioural view of distribution". In the course of time, the perspective on the organising and management of distribution have shifted and evolved: first, manufacturers were seen as channel captains controlling the behaviour of their business partners and the entire distribution system, later the concepts of power and control mechanisms were discussed, after which the literature focused on the increasing importance of intermediaries and collaborative relationships. (Gadde, 2016.) Typically, channels research has taken manufacturer's perspective, and studied, for example, how channels should be organised and how the channel relationships should be managed from the manufacturer's viewpoint (Frazier, 1999). However, in recent studies, the main emphasis has been on inter-organisation coordination of distribution network constellations (Gadde, 2014, Gadde, 2016).

Multichannel management is manufacturers' answer to the diverse needs of customers: developing a variety of ways to reach out to customers, and in this, utilising the resources of various types of intermediaries (Kalafatis, 2000, Gadde, 2016). The channel structure appropriate for an organisation depends upon the combination of approaches that can best attract the final customers, which in turn will depend upon the organisation's and intermediaries' ability to create value relevant to those customers. Besides considering customer needs, circumstances such as capacity, competencies and capabilities together with business ambitions play a role in the decision-making concerning channels. For a focal company to be able to decide on which channels to use they need to understand the nature of channel types, i.e. how they function and their benefits and limitations. (Kalafatis, 2000, Payne; Frow, 2004.) In B2B markets complex account management and large product portfolios are typical, which makes a thorough evaluation and utilisation of a wider range of channels important (Courtheoux, 2003, cited in Payne; Frow, 2004).

In addition to considering the target customers' current buying behaviours and motivations, a company should also consider how these might change over time (Wilson et al., 2003, cited in Payne; Frow, 2004). Thus, in multichannel management, the challenge lies in understanding both the nature of company's channel structure now and how it can be expected to alter in the future (Payne; Frow, 2004).

In the literature, the relationship between a manufacturer and its intermediaries has been discussed, too. In order for a manufacturer to ensure efficient exporting and distribution and to have competent intermediaries, it needs to exchange knowledge on new products with its intermediaries, develop operating systems for ordering and inventory control, and provide training that facilitates sales and services (Skarmeas et al., 2008). Maintaining close ties with retailers and distributors gives the manufacturer access to information about consumer reactions to its products, making it possible to quickly adapt production processes, e.g. to improve the product mix and packing, if needed (Pimentel Claro; Oliveira Claro, 2010).

2.2. Business networks and service ecosystems

In the literature of *business, service or industrial ecosystems* the economic outcomes and business relationships between actors are highlighted. In his seminal work, Moore (1996) defined a business ecosystem as "*an economic community supported by a foundation of interacting organisations and individuals – the organisms of the business world*". A shift in what is valued drives the need for different models and affects the terminology utilised in the business ecosystem literature, resulting in the introduction of the service ecosystems concept. It has been defined as a "spontane-

ously sensing and responding spatial and temporal structure of largely loosely coupled, value-proposing *social and economic actors* interacting through institutions, technology, and language to (1) co-produce service offerings, (2) engage in mutual service provision, and (3) co-create value” (Vargo; Lusch, 2011, 185). Within the service-ecosystems approach, “service flow emphasises the continuous, dynamic and adaptive flow of service (i.e. intangible assets such as knowledge and skills) exchanges through interactions among networks of actors reciprocally engaged in value co-creation through complex relationships” (Barile; Polese, 2010).

To sum up the difference between the two approaches, business ecosystems have been approached as a source of competitive advantage for individual companies in the strategic management literature (Adner, 2012, lansiti; Levien, 2004), whereas service ecosystem discussion highlights interaction between the loosely-coupled ecosystem actors as a main characteristic (Barile; Polese, 2010, Vargo; Lusch, 2011). In line with the above definitions, this study highlights the interacting and co-evolving nature of ecosystems and distinguishes them from business networks by the broader settings of ecosystem members – in addition to business relationships, actors may have other kinds of direct and indirect linkages to each other. Therefore, the variety of actors is the major difference between the two concepts, i.e. business ecosystems and networks (Heikkilä; Kuivaniemi, 2012).

Figure 1 illustrates the layered structure of service ecosystem. In service ecosystems the following actors form the service network and have key roles: service provider, user/customer, broker/intermediator, and – in the case of digital services – the role of platform owner must be highlighted (Riedl et al., 2009).

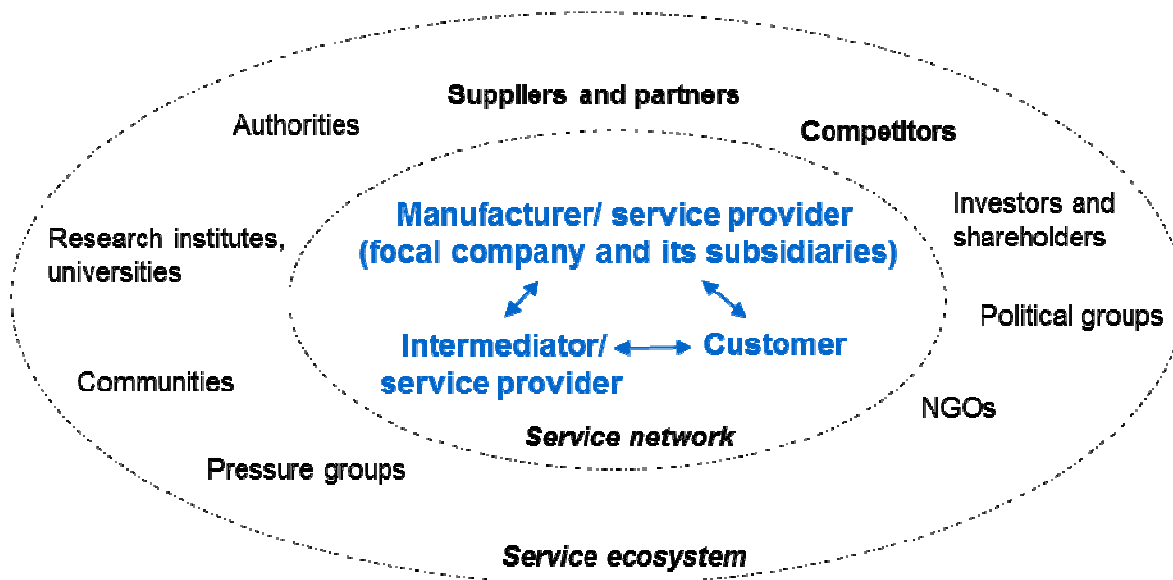


Fig.1 The layered structure of an ecosystem (modified from Prescott et al., 2002, Donaldson; Preston, 1995, Koivisto et al., 2004, Palomäki et al., 2014).

In a service ecosystem, actors integrate resources in interaction with each other (Vargo; Lusch, 2008). *The consequential co-evolution within an ecosystem is a key assumption in this study.* In other words, as the definition from Vargo and Lusch (2011) suggests, service ecosystems reconfigure themselves, they are dynamic and

potentially self-adjusting. Therefore, an actor's ability to understand and orchestrate dynamic strategic interactions, actions and perceptions of the other actors in the ecosystem is a key success factor in ecosystems.

2.3. Synthesis of the current understanding

Service ecosystems need to be explored in-depth in order to understand the change required in the mind-sets of all involved actors. In particular, this concerns studies on distribution and sales, since there has been little research on this.

Table 1 summarises the key characteristics of channels, networks and ecosystems. The service ecosystem approach has a strong focus on collaborative processes (Lusch, 2011), thereby highlighting co-evolving, indirect relationships and weak ties. Thus, combined competition and collaboration, as well as shared resources, are characteristics of a service ecosystem, whereas the role of effective governance, knowledge sharing, and the application of resources have been noted as central issues in network models (cf. Dyer; Singh, 1998). In the channel management literature, in turn, the main focus has been on company specific competitive strategies (Gadde, 2016).

Tab.1 Key characteristics of channel, network and ecosystem models.

	Channels	Networks	Ecosystems
Actors and their roles	Suppliers, customers and intermediators	Different roles of key actors	Variety of actors (stakeholders) involved
Relationships and Interaction	Dyadic, arm's-length business relationships Sequential operations	Direct business relationships, effective governance Co-operation and collaboration	Direct and indirect relationships, weak ties Collaboration and competition

Due to the current trends in business life, such as servitisation and digitalisation, the nature of offerings is changing, raising the need to rethink the current collaboration models in distribution and services, i.e. manufacturers (or other focal companies) need to reconsider the channels and intermediaries, their roles and responsibilities. Furthermore, as the success of a company is nowadays dependent also on its collaborators, companies cannot do these considerations alone. Therefore, it is important also to view the theoretical groundings of the relevant concepts in order to understand the different logic of action needed within them. On the other hand, the literature of channel management in distribution and services needs to be addressed and contributed to according to these changes in the business world.

3. Materials and methods

In this qualitative, single case study, the focus is on a sales and distribution network in which the ongoing change and evolution of the manufacturer's (focal company) offering is expected to result in changes within the network, such as changes in actors' roles and responsibilities. Case study methodology was chosen as it is suitable for analysing situations involving complex and multiple variables and processes, and

for asking how and why questions about events over which the investigator has little or no control (Yin, 2003).

3.1. Background to the focal company and its sales and distribution network

The focal company is a medium-sized manufacturing company, which offers production solutions including equipment, production management software and services. In this study, the focus is on the sales and distribution network of the focal company. The sales and distribution network comprises both direct and indirect channels towards the customer: direct channels that include the direct sales carried out by the focal company and its subsidiaries, and indirect channels that include distributors and dealers. The focal company is very international and has an extensive global sales and distribution network including subsidiaries, distributors and dealers: it has over 15 subsidiaries in 15 countries and distributors in over 60 countries, and it carries out regular deliveries to 70 countries.

The focal company's offering is becoming more complex and knowledge-intensive. The role of software in the products is becoming more important, and, along with this development, the company is also offering more consultation-type services. With this growing share of services, the company wants to stand out with its solution-centric approach to customers' problems. In general, a focal company product is purchased for professional use, and the typical customer is demanding and appreciates the technical expertise of the seller.

This case was selected because it gives practical insights on:

- the actors' roles in the sales and distribution network of a company that has a long and successful history in global business and distribution
- the challenges in network dynamics (changes in roles, distribution of work, etc.) when the offering of the focal company evolves
- the contradiction between management and co-evolution in the networked business of a manufacturer.

3.2. Data collection

The research data was collected from multiple sources: a total of 12 semi-structured interviews with focal company representatives (6) and dealers (6), and a workshop with the focal company representatives. In total, 14 company representatives were interviewed. A semi-structured interview method was used for the interviews. The important themes and guiding main questions were decided beforehand, but the discussion was kept open and the interviewees were given a great deal of freedom to discuss the issues freely and from their own perspectives. The interviews were carried out by two researchers and were recorded and transcribed. The interviewees from the focal company were people whose roles were connected to the managing and operations of the company's sales and distribution network, both on strategic and operational levels. The interviewees from the dealer's side had managing roles and significant experience with collaborating and co-operating with the focal company.

Between the two interview sets, a recapping workshop with the focal company representatives who were also interviewed was organised to discuss the findings of the first interview round and ensure a coherent understanding of the sales and distribution network model of the company. The following table presents the entire data collection process.

Tab 2. The collected data and process.

<p>1. Interviews – 6 focal company (manufacturer) representatives (located in Nordic country A)</p> <p><i>The aim of the interviews: to gain a coherent understanding of the sales and distribution network model of the focal company, benefits and limitations, from the focal company's perspective</i></p>
Export manager
Vice president, with a special focus on supply chain management
Business development manager
Business development manager
Project manager, with a special focus on supply chain management
Sales manager
<p>2. Recapping workshop</p> <p><i>The aim of the workshop: to specify and expand on the model of the sales and distribution network (based on the understanding gained from the focal company interviews), the strengths and development needs of the network, as well as the roles of intermediaries</i></p>
The interviewed 6 focal company representatives (see above)
<p>3. Interviews – 6 dealer companies, 8 representatives in total</p> <p><i>The aim of the interviews: to gain an understanding of how the dealers operate, their development needs, and how they perceive the collaboration with the focal company</i></p>
Sales Business manager (Dealer 1, Central European country B) and procurement manager
Business manager (Dealer 2, Central European country C)
Sales manager (Dealer 3, Central European country C)
Business manager (Dealer 4, Nordic country A)
Business manager/ entrepreneur (Dealer 5, Nordic country A)
Entrepreneur (Dealer 6, Nordic country A)

The themes for the interviews included:

- For the interviews with the focal company representatives: basic company information (offering, customers, competitors, future development); export and international markets (exporting history and present status, steps towards internationalisation, collaboration in internationalisation, successes and challenges in internationalisation); organising and managing the sales and distribution network

(how sales is organised in different markets, the responsibilities of different intermediaries, challenges and successes of the network, collaboration and information flow between the focal company and intermediaries); perspectives on the future.

- For the interviews with the dealer representatives: basic company information (including its role in the network); dealers' offerings; relationship with the focal company (history, practices, communication, successes and challenges); market, customers and customer information (what customers appreciate and expect, customer profiles, anticipated changes in customer needs); sales and marketing (collecting customer feedback, motivation for selling the products and services of the focal company, focal company's support for the dealer); perspectives on the future.

The collected data was analysed to create descriptions of the sales and distribution network and its actors, and of the pros and cons of the current network model, collaboration and actor roles.

4. Case findings

The case findings are discussed in the following sections. First, the current network model is described in the section 4.1. and then pros and cons are summarised in the section 4.2.

4.1. The sales and distribution network of the focal company

The current network model of the focal company (manufacturer) and the roles of the key actors (focal company, intermediaries and customers) were discussed in the interviews. Figure 2 illustrates the key actors and their roles within the service network. The key roles of intermediators within the sales and distribution network of the company are presented and described below:

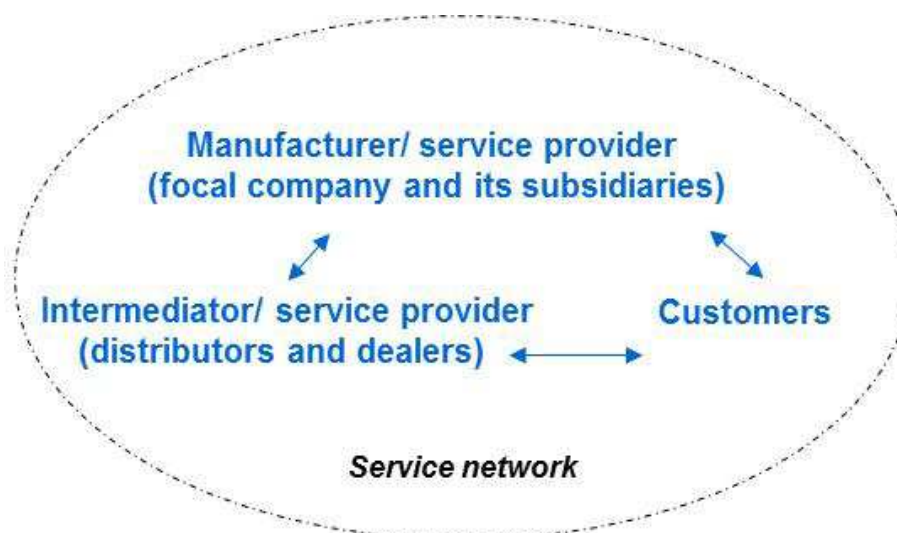
- *Subsidiaries* (wholly owned by the focal company) organise and manage sales and services in their areas, are responsible for local marketing and warehousing and for building and managing the local dealer network. They have own stock and demonstration machines. Subsidiaries carry out sales and manage local key customerships; they have two channels towards end-customers: through dealers and direct sales (key accounts). Subsidiaries are familiar with the products and services thoroughly as the personnel are well trained on the machines, and have a good understanding of local customer needs.
- *Distributors* operate in countries in which there is no subsidiary. They may represent many product types, products and brands – possibly including other brands within the product field of the focal company. They are responsible for organising and managing their sales and services and have their own stock. Establishing a distributor in a new country is an important step in making the brand known there. Distributors pass certain customer leads to the focal company. According to the focal company, simple product sales and sales of productised services suit distributors the best.

- *Dealers* operate in countries in which there is a subsidiary. They represent a wide repertoire of machines, and typically prefer basic machines that are easy to sell and use. They manage their own sales and customerships, and may also offer services and electronic commerce.

The focal company itself is responsible for the management of global key customers (accounts). It builds and manages its networks, and manages and supervises collaborative relationships with network actors. It manages marketing efforts, maintains and manages the central warehouse, and provides its intermediaries in the sales and distribution network with training, technical support and guidance, as well as sales support (e.g. by taking part in customer visits with dealers). It manages customer feedback and complaints, collected directly and through dealers and distributors, and complaints-related issues on the strategic level. It has the most comprehensive understanding of and access to customer information, as well as a visionary understanding of the direction and future development needs of the company and its networks.

Customers expect knowledge-intensive solutions, and getting more from one service provider. As a consequence, solution sales expertise and new ways of contacting and selling to customers can be expected to become crucial to the success of the focal company and its networks.

As illustrated in Figure 2, both the manufacturer and the intermediators operate as service providers. Therefore, they have varying and complement roles in the service network, i.e. also the intermediators are active actors, not just passive channel members. The growing importance of direct, consulting solutions sales guides the devel-



opment of offerings and the network.

Fig. 2 The key actors and their roles (the service network of the focal company).

In general, selling this kind of equipment is very cyclical, i.e. dependent on industry-level changes, such as economic situations and trends. From the viewpoint of the focal company, maintaining more direct contact and building partnerships with customers instead of just supplying equipment every now and then evens out fluctua-

tions, and can therefore be more practical and profitable. On the other hand, such change in roles may have an influence on intermediators' interest and commitment to actively develop the network. The focal company considers the change as important and wants to invest in it, and with these ongoing changes in mind it examines respectively different network models (structure, roles, resources and fields of know-how and expertise).

4.2. The pros and cons of the current service network

In order to foresee the influences of the on-going changes, co-evolution between the network actors, the pros and cons regarding the collaboration are summarised in Table 3.

Tab 3. The pros and cons of the current service network

Pros	Cons
<i>The focal company</i>	
<ul style="list-style-type: none"> • The best and most up-to-date technological and R&D expertise • Strong understanding of the offering • Expertise on solution sales • Better opportunities to control the brand and keep it consistent • Developed IT solutions that make it easier for the focal company to be in direct contact with customers and allows it to take more responsibility 	<ul style="list-style-type: none"> • The need to further develop solution sales expertise of the focal company • Confusion in responsibilities may negatively affect the relationship between the focal company and a dealer: It can be unclear to dealers whether customers are being approached directly by the focal company or through dealers
<i>Subsidiaries</i>	
<ul style="list-style-type: none"> • Credible actors and creation of credibility in the market • Strong expertise and familiarity with the products and services • Company goals are easier to put into practice in the case of subsidiaries, subsidiaries are also easier to monitor • The focal company gets more and superior information from subsidiaries (e.g., market and customer information) • Developed IT solutions allow subsidiaries to take more responsibility with customers and business 	<ul style="list-style-type: none"> • Currently, solution sales have not fully been put into practice in the subsidiaries, i.e. subsidiaries may lack the expertise to sell solutions (customer-orientedness, comprehensive solutions, sales arguments, software, service sales)
<i>Distributors</i>	
<ul style="list-style-type: none"> • Distributors have good know-how of local markets and their potential • The geographical coverage that the distributor network provides to the focal company 	<ul style="list-style-type: none"> • Not as familiar or up to date with the offering, may lack expertise relating to products, software, solution sales and IT • The level of commitment to the focal company varies • Culture-related issues may make collaboration with distributors challenging • Information flow from distributors to the focal company is lacking (e.g. customer feedback)
<i>Dealers</i>	
<ul style="list-style-type: none"> • Extensive sales and service networks 	<ul style="list-style-type: none"> • Deficiencies in the technical and sales expertise of some dealers, especially related to more complex

<ul style="list-style-type: none"> • Capability to manage their local networks efficiently • Know-how about tailoring products and services to local circumstances and needs • Good capability to sell the simpler machines that could also be bought over the internet, from online shops, and some dealers of the focal company already offer this opportunity 	<p>products, solution sales and IT</p> <ul style="list-style-type: none"> • Difficulties with keeping up with the products • Dealers differ in their business profitability, and levels of commitment and contact • Challenging to create common practices (related to training etc.) with dealers • Partly inefficient stock management • Information flow from dealers is lacking • Cultural differences with some dealers • Dealers sometimes have conflicts with each other when they approach others' customers
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Pros and cons of the current service network and network actors.

As we can see from the findings presented in the table above, the key factors that facilitate the change in the sales and distribution network of the manufacturer include the technological and R&D expertise of the focal company and its subsidiaries, a solid understanding of the offering, the focal company's and its subsidiaries' expertise on solution sales and better opportunities to control the brand as well as the challenges related to the collaboration with some of the dealers and distributors, recognised both by the dealer and focal company representatives. From the focal company perspective, there seems to be lots of variance in the expertise and commitment among dealers and distributors, also which encourages the focal company to consider reorganising sales and distribution in case of the more complex products. However, in the interviews, dealers and distributors were acknowledged for their good knowledge of local markets and their potential.

5. Discussion and conclusions

In the case of more complex products, the focal company needs to consider what is the best way to serve customers, and then decide on practical measures such as whether to take back some of its sales and services, or to continue to operate via intermediaries and provide them with more training and sales support. The focal company may also need to consider whether it needs new types of sales partners, for example, in order to ensure the competence of its sales and services. Also the focal company itself and its subsidiaries might have capability requirements – e.g. need for new personnel, trainings and tools – in order to ensure successful sales. Furthermore, changes made in the network may put some pressure on logistics, such as warehousing, for example.

However, it needs to be highlighted that although the focal company is, to some extent, discussing moving its sales and distribution operations back to itself and its subsidiaries, this is in relation to the more developed products. In the offering of the focal company, the basic equipment is still in a central role, and for these the sales and distribution, as it is, is crucial, as the intermediaries carry out a great deal of the important sales and services and act as customer contact points at the local level. If the emphasis in the product offering would change very radically, the fear could be that

the end customer would remain distant and market-specific needs undiscovered, making it harder for the company to develop its offering in market-specific way.

In line with previous literature (Gadde, 2014), the case illustrates how the characteristics of the offering may influence the way a manufacturer operates in global distribution, so that technically demanding customer relationships are managed by the manufacturing companies themselves, and distributors carry out the selling of more standardised products. Thus, the offering influences the way activities and responsibilities are divided between a focal company and its intermediaries, creating settings for the roles of the actors. More complex products make the focal company change its role and activities, urge it to get closer to the customer, which in turn affects the whole network.

This case provided empirical insights on the current level of systems thinking in service ecosystems in practice. Based on this case study it can be stated that companies' views on broader ecosystem are quite limited – and this although they already have good deal of collaboration experience on the (service) network level. As a managerial implication, we suggest that companies would develop a broader view on the dynamic strategic interactions, actions and perceptions in their ecosystem – for instance, the activities of competitors as well as customers' customers should be actively followed and evaluated, in order to foresee the future customer needs and changes in business. The way companies think needs to change substantially to enable networks to work and develop through collaboration and co-evolution on the service ecosystem level, instead of being managed, orchestrated and led almost solely by the focal company in the network. Also, in the case this paper presents, possible changes in the network were discussed mainly by the focal company and on its own terms – at least at this point.

Another managerial implication is that the sales and distribution network needs to be considered as an entity, on a wider ecosystem level, in which changes come to fruition in a co-evolving manner, influence other actors and reflect back on the focal company and its business activities. Furthermore, the case illustrated that in practice the collaboration models are hybrid and none of the models - channel, network or ecosystem model (summarised in Table1) - exist purely.

Further research is needed on companies experiencing similar changes and on studying how the offering complexity affects the interactions and collaboration in sales and distribution network and the roles of network actors. This research paper only addressed the perspectives of the focal company and its dealers. In future research, the perspectives of other network actors should be studied to gain deeper insight into the dynamics of networked value co-creation.

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FROM CUSTOMER VALUE TO CUSTOMER WISDOM – MANAGING AND MEASURING CUSTOMER VALUE CO- CREATION IN DIGITAL SERVICE SYSTEMS

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This paper examines how to engage the actors of digital service systems in measuring services through their life. Companies' measurement systems are still very traditional and do not take into account the challenges and opportunities that the transition of value co-creation has brought to the production of customer value. This study contributes to this research gap of measurement and management of customer value co-creation through a multiple case study carried out at companies providing digital b2b services.

1. Introduction

Digitization has brought extensive changes to businesses. The complex nature of the digital economy is characterized by various functions and provides global access to knowledge and information. It furthers transitions in the way people and organizations interact and behave. An emerging idea in the management literature is that firms exist in order to create value and that the creation of value enables firms to create well-being and thus survive in the digital economy. Previous studies have highlighted the need to understand the value customers derive from services because value is perceived and determined by the customer on the basis of value-in-use (e.g., Vargo and Lusch, 2008). In addition, instead of focusing on how customers can be engaged in co-creating with the company, service providers should focus on becoming involved in customers' lives through the other service systems in which they are already engaged (Grönroos and Voima, 2013; Heinonen et al., 2010). Thus, there is a need to extend the notion of engagement to other key actors in a service system (e.g., Chandler and Lusch, 2015) from the management and measurement of the value co-creation process to the end user of the digital service (Saunila et al., 2016).

Companies' measurement systems are still very traditional and do not take into account the challenges and opportunities that the transition of value co-creation has brought to the production of customer value. Hence, there is a need to address how to motivate and engage customers to evaluate services throughout their service life and to provide measurement information to the service provider in a way that supports the development of business strategy, service design, and delivery and extends the customer experience of the value of the service (cf. Bititci et al., 2012; Ukko and Pekkola, 2016). The objective of this paper is to contribute to that research gap by

examining what engages the actors of digital service systems in measuring services throughout their life. The results show engagement patterns and practices in digital b2b contexts.

This paper is organized as follows: The theoretical background of the research is presented by discussing how value is created in service systems. Perspectives of measuring customer value creation are also presented followed by the theoretical framework of the research. Next, the research methodology is described. Finally, the results of the research are presented in terms of what engages the actors of digital service systems in measuring services throughout their life.

2. Theoretical framework

2.1. Value creation in service system

2.1.1. Definition of service system

In a competitive and turbulent environment, collaboration between companies is necessary in order to respond to customers' demands more effectively and efficiently (Bititci et al., 2004). A shift from simple (collaborative) organizations involving a few partners to complex systems of organizations working together to create value (e.g., Bititci et al., 2012) has created new prerequisites for collaboration. This has led to organizations forming service systems where collaboration is characterized by the relationships occurring between people, service processes, and physical elements (Tax and Stuart, 1997). Thus, service systems are formed by collections of resources that can create value with other service systems by sharing information with them (Gruhl et al., 2007), and interacting is the key component for co-creating value (Maglio et al., 2009). Wang et al. (2016) define service systems in the production context as a combination of products and services, which means that service systems work toward producing material goods and intangible services (Wang et al., 2013, 2016) in order to create value for customers.

As service refers to the application of competence for the benefit of another, service involves applying competence and integrating the applied competences with other resources and determining benefit (meaning value co-creation; Maglio et al. 2009). Maglio et al. (2009) define these interacting entities as service systems. More precisely, the authors state a service system is "a dynamic value co-creation configuration of resources, including people, organizations, shared information (language, laws, measures, methods), and technology, all connected internally and externally to other service systems by value propositions."

2.1.2. Definition of value creation

Traditionally, "value" refers to the value that the service generates for the customer (Ulaga and Chacour, 2001; Woodruff, 1997), that is, the relationship between the benefits and the sacrifice derived from the service (Parka et al., 2013; Zeithaml, 1988). The service-dominant logic presented by Vargo and Lusch (2004) emphasizes customer value-in-use (e.g., the solution to the problem as received by the customer) instead of just the immediate output of the service or value-in-exchange (e.g., the

purchase price of the service). Thus, the alternative view of value creation, value-in-use, is related to the service-dominant logic in which the roles of producers and customers are not distinct and value is co-created (Vargo and Lusch, 2008; Vargo et al., 2008). Grönroos (2011) defines value creation as “the customer’s creation of value-in-use.” He maintains that value creation is not an all-encompassing process. Consequently, the design, development, and manufacturing of resources and the back-office processes are not part of value creation.

The service management studies highlight that value is perceived and determined not by the producer but by the consumer on the basis of value-in-use (e.g., Vargo and Lusch, 2004, 2008). However, it has also been argued that it is not only the determination of value but also value creation that becomes controlled by the customer (Grönroos, 2011; Grönroos and Voima, 2013; Heinonen et al., 2010). Value creation in services can also be defined as a service system that is a configuration of resources (people, information, and technology) connected to other systems by value propositions (Maglio et al., 2009; Spohrer et al., 2007; Vargo et al., 2008). Value is created collaboratively in service systems that interact through mutual service exchange relationships, improving the adaptability and survivability of all the service systems engaged in the exchange by allowing the integration of mutually beneficial resources (Vargo et al., 2008). This indicates that instead of focusing on how customers can be engaged in co-creating with the company, service providers should focus on becoming involved in the customers’ lives through the other service systems in which they are already engaged (Grönroos and Voima, 2013; Heinonen et al., 2010).

2.1.3. Perspectives on value creation

Ulaga and Chacour (2001) regard the formation of value from an inter-organizational point of view as created through collaborative relationships and not just through the delivery of products and services. To understand value creation in collaborative relationships, three perspectives can be presented: the provider perspective, the joint perspective, and the customer perspective (Grönroos and Voima, 2013). For the *provider perspective*, by providing potential value-in-use, the firm can be characterized as a value facilitator (Grönroos and Voima, 2013). In this perspective, the company is in charge of the production process, which mostly involves the generation of potential value—or value facilitation—in which resources for customer use are developed, designed, manufactured, and delivered without any direct interaction with the customers (Grönroos, 2008, 2011; Grönroos and Voima, 2013). In the *joint perspective*, value co-creation can be defined as the provider’s opportunity to engage in the customer’s value creation process or the customer’s opportunity to engage in the provider’s processes as a co-creator (Grönroos, 2011; Grönroos and Voima, 2013). In direct interactions with the customer, the firm may have an opportunity to engage with the customer’s value creation process and take on the role of value co-creator. If customers are engaged in design or product development processes or in deliveries or front office operations, direct interactions take place during those processes and joint value creation is made possible (Grönroos, 2011). In the *customer perspective*, the customers are in charge of their own value-creating processes in which value for them is created or emerges as value-in-use (the generation of real value) (Grönroos, 2011). No direct interactions exist and no co-creation takes place (Grönroos and Voima, 2013). In this perspective, when there are no interactions, customers are engaged in independent value creation through interactions with the resources obtained from a

company and those that are otherwise necessary and available to them (Grönroos, 2011).

2.2. Perspectives of measuring customer value creation

The prior studies highlight the importance of connecting the customers to the evaluation and measurement of customer value creation (Bititci et al., 2012; Ukko and Pekkola, 2015, 2016). However, it is argued that performance measurement systems are designed in a way that matches the organizational objectives rather than focusing on the uniqueness of the service business or the customer value creation (Amir et al., 2010). In general, the transition from product- to service-dominant thinking is challenging for researchers and practitioners alike, requiring fresh and innovative thinking as to how organizations need to be configured, measured, and managed (Bititci et al., 2012; Laine et al., 2012; Ng and Nudurupati, 2010). The fact that the value of a service is perceived and determined by the customer on the basis of value-in-use highlights the customer's role in the measurement of service operations. So far, the majority of customer-facing measures, such as on-time delivery, flexibility, responsiveness, accuracy of documentation, and even customer satisfaction, tend to focus on value-in-exchange rather than on value-in-use-through-life (Bititci et al., 2012). Grönroos and Voima (2013) state that in the context of value creation, the customer sphere has traditionally been ignored and that the role of the provider has been emphasized, which was natural when value was regarded as a function of activities controlled by the firm (value embedded in producer outputs). This has also been the case with performance measurement systems, which have focused on the measurement of those activities controlled by the firm, ignoring the measurement of the joint and customer spheres (Amir et al., 2010; Chenhall, 2003; Jääskeläinen et al., 2012).

The customer is in a central role in service measurement and evaluation when value is determined on the basis of value-in-use, which is a continuing process that does not end with the delivery of a service (Neely et al., 2011; Vargo et al., 2008). According to Neely et al. (2011), since the delivery process of a service is effectively hidden from the customer, the business has to work hard to educate the customer about the value of the service delivered. Getting the balance right between visible and hidden processes becomes essential. The customer and most of the value-in-use are invisible to the company, and value-in-use emerges not only in interactive processes but also in customers' non-interactive processes (Heinonen et al., 2010). Thus, value-in-use represents more than physical activity and includes mental activity as well (Heinonen et al., 2010), and the role of companies would be to understand and measure the customers' value creation processes embedded in the customers' practices and contexts. This means there is a need to understand the co-creating activities in order to identify activities that customers are involved in with other individuals, companies, or service systems (Heinonen et al., 2010).

It is thus essential to explore how customers can be motivated to evaluate products and services throughout their life and provide the measurement information to the service provider in a way that supports the development of business strategy, service design, and delivery as well as furthering the customer experience of the value of the service (Bititci et al., 2012; Ostrom et al., 2010); Ukko and Pekkola, 2015, 2016). Few studies have been conducted that focus on engagement in a b2b context. Ukko and Pekkola (2016) studied how to motivate customers to evaluate the services and val-

ue creation and to participate in the measurement process. The results showed that the most important issue concerning motivation is that the customers should be treated and contacted as individual customers; this indicates that the service provider is interested in specific customers and their unique needs. This is usually not the case, for example, in the annual customer satisfaction survey where the customer's role as a developer of services is usually ignored (Parasuraman, 2004; Tucker and Pitt, 2009; Ukko and Pekkola, 2016; Williams and Saunders, 2006). The study of Ukko and Pekkola (2016) also showed that collaboration around the measurement and development of service operations seems to be a more appropriate way to work, as opposed to working alone. Some prior studies present that participation-enabling socialization was perceived to increase trust, openness, and commitment among the service system (Busi and Bititci, 2006; Pekkola and Ukko, 2016), ensuring the implementation of the development issues around the evaluation and measurement of delivered services on both sides (Ukko and Pekkola, 2016). Further, if the delivered service operations are critical for customer activities, the customers seem to have more intrinsic motivation to evaluate and measure the services (Ukko and Pekkola, 2016).

2.3. Summary

Prior studies indicate that if companies aim to create value and sustain competitive advantage through value facilitation, value co-creation, or value creation, the value creation structures need to be understood, measured, and managed, otherwise the objectives will not be achieved and value creation will fail (cf. Verdecho et al., 2009; Ukko et al., 2015; Ukko and Pekkola, 2016). A further analysis of the findings is conducted against the framework presented in Figure 1. This framework involves similar spheres for value creation as presented by Grönroos (2011) and similar spheres for measurement of value creation as presented by Ukko and Pekkola (2015, 2016) but adds the aspects of digital products and services as well as the end customer's role in a digital b2b context.

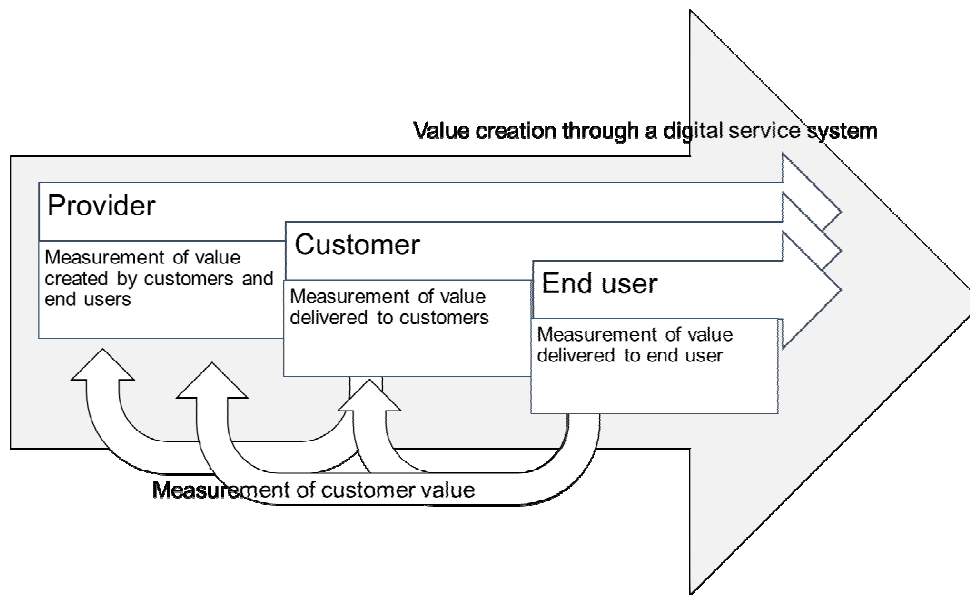


Figure 1. Theoretical framework of the research

In Figure 1, the theoretical framework that is used to guide the research is presented. The proposition is that the actors of a digital service system need to be engaged in providing measurement information and somewhat measuring services. The engagement patterns and practices in a digital b2b context are revealed as a result of the research.

3. Research methodology

The research was based on a multiple case study carried out at companies providing digital b2b services. Four different-sized IT companies constitute the empirical setting; one of the companies is large, two are small, and one is a micro company in an expansive phase. The basic nature of digitality in service and solution production is similar in all these case study companies. The service (or product) construction process is partly digital and partly physical, reflecting the front-end phase of production. At the back-end phase, the complete services and solutions are provided in a digital format. The companies have striven for long-term customer relationships and do not want to play the role of a one-time supplier. General information about the companies and the overall practices of measuring customer value are briefly reported in the following sections.

3.1. Case descriptions

Case A is an IT company that employs 20 people. It focuses on supporting its customers' operations and businesses in a digital environment. As a fast growing company, it offers a wide range of digital services, including customer relationship management (CRM) and enterprise resource planning (ERP) software, application development, e-commerce solutions, design services, and data center services. The

digital services and solutions this company offers are strongly based on customization and versatility because it aims to build long-term customer relationships instead of one-time deliveries.

Case B is an IT startup that employs about 10 people. It offers IoT-based solutions and services to its clients to help support their sales and industrial plans. The company provides a digital sales solution, which helps its clients understand customer processes and challenges, for example, by integrating its own products into its clients' processes. The company also provides administrative support services to its clients to help them control and manage their industrial plans. By utilizing this solution, the physical environment turns into a virtual model where processes, documentation, and related machinery can be explored. The company also aims to support and develop its customers' operations over the long term.

Case C is a small company employing about 50 people and provides services related to the measurement of customer experience. It utilizes big data and analytics platforms to deliver business value to customers. The company was founded in 2007 but has grown rapidly and has large customers around the world. The main business idea is to compete in quality and managing the details of service experience and in that way provide value elements that were missing from the large operators.

Case D produces a broad range of digital and IT services. It is a large international company, but the case investigation is based on two units in Finland employing over 1000 people. Their services include, for example, system deliveries (e.g., ERP), software solutions, and data center services. Their solutions are not heavily customized according to customers' preferences, but the value is to provide comprehensive solutions so that the customer gets all services in the same place. To better meet the customers' needs, the company has begun to track the mechanism between successful product–service–delivery and value elements in the delivery process.

3.2. Data gathering and sources

The various data collection methods utilized were interviews, focus groups, and participant observations in meetings in which a selected focus group was involved (see Table 1). An observational method was used to collect the data on the process of designing practices in creating customer value. In addition, documentation related to the arranged focus groups were analyzed in each company.

Table 1. Data gathering and sources

		Case A	Case B	Case C	Case D
Focus Group 1	Themes	Development needs of customer value	Development needs of customer value	Development needs of customer value	Development needs of customer value
	Participants	Managing director	CEO	Head of development	Senior developer
	Type of data	Documented focus group discussions; Observations of the focus group	Documented focus group discussions; Observations of the focus group	Documented focus group discussions; Observations of the focus group	Documented focus group discussions; Observations of the focus group
Inter-views	Themes	Measurement of value; Actor participation of measurement; Actor motivation of measurement	Measurement of value; Actor participation of measurement; Actor motivation of measurement	Measurement of value; Actor participation of measurement; Actor motivation of measurement	Measurement of value; Actor participation of measurement; Actor motivation of measurement
	Participants	Managing director, Software specialist, Producer of electronic content (2), Operative services expert	COO, Sales and project engineer, Software specialist	Head of development, R&D engineer, Product management manager	Head of services, Head of CRM, Business executive, Senior developer, User experience executive
	Type of data	Recorded and transcribed interview data	Recorded and transcribed interview data	Recorded and transcribed interview data	Recorded and transcribed interview data
Focus Group 2	Themes	Development actions of customer value measurement	Development actions of customer value measurement	Development actions of customer value measurement	Development actions of customer value measurement
	Participants	Managing director	CEO	Head of development	Senior developer
	Type of data	Documented focus group discussions; Observations of the focus group	Documented focus group discussions; Observations of the focus group	Documented focus group discussions; Observations of the focus group	Documented focus group discussions; Observations of the focus group
Focus Group 3	Themes	Tracking the progress of development actions	Tracking the progress of development actions	Tracking the progress of development actions	Tracking the progress of development actions
	Participants	Managing director	CEO	Head of development	Senior developer
	Type of data	Documented focus group discussions; Observations of the focus group	Documented focus group discussions; Observations of the focus group	Documented focus group discussions; Observations of the focus group	Documented focus group discussions; Observations of the focus group

To avoid observer bias, face-to-face interviews were also utilized. To acquire a comprehensive view about patterns of usage and behavior at each level, employees from different hierarchical levels and job descriptions were included in the research process. The aim of the interviews was to achieve an overall view of the customer value co-creation process and its measurement in digital services. All the interviews were recorded and transcribed to enable in-depth analysis.

The interview data consisted of semi-structured face-to-face interviews with eight managers and eight employees for approximately one hour each. The interviewees were selected on the basis of having responsibilities for customer value creation. In addition, interviews with employees with an operative role were conducted in all of the four case organizations to capture different perspectives on the topic. The data were analyzed case by case in terms of content analysis. Common and diverse patterns among the different companies were also analyzed and discussed in the light of prior literature.

4. Results and analysis

4.1. Results from cases

In this section, the results from empirical analysis are presented case by case. The key findings from each case are presented in Table 2.

Table 2. Summary of results from cases

Practices of measurement	Perspectives		
	Provider	Customer	End user
Measures of value			
Case A	Customer profitability; Workload of customer; Customer liquidity	Meeting schedule targets; Response time; Communication frequency; Frequent orders from customers; Reasoning based on interaction	Amount of users compared to goals; Sales through digital service; The number of users reached
Case B	Customer profitability; Customer satisfaction; Customers activity on use of digital services; Profitability of offered digital services for customers	Sales through digital service; Changes on maintenance time and costs; Increased work safety; Increased customer contacts; Increased offerings; Increased sales; Increased knowledge sharing; Activity on use of digital services	Increase quality of services and devices purchased; Decreased costs of products/services
Case C	Customer profitability	Savings; Return on investment; Customer specific evaluations; Reported errors	End-user loss; New end users; Technical functioning of service; Satisfaction/experience surveys
Case D	Customer profitability; Customer investments; Expansions of customer product portfolio; Sales data; Service capability; Workload	Satisfaction survey; Customer interviews; Achievement of project goals; Frequent orders from customers; Reasoning based on interaction	Sales through digital service; Number of users reached; Comparison to set goals
Information gathering			
Case A	Actively from own operations; Subjective assessment based on customer interaction; Objective data of end user behavior	Unknowingly based on communication with provider; End-user behavior based on its own initiative	Unknowingly based on usage behavior; Based on error messages
Case B	Actively from own operations; Actively from customers while designing and developing digital services together with customers; Objective data of customer use and behavior through analytics	In plan managing solution actively from own operations at all organization levels; In sales solution actively from own operation and actively from end-users operation during the sales and after sales processes	Mainly based on error messages; Based on the user experiences of purchased services and devices
Case C	Objective data about technical functioning from end user; Comparative data from other actors; Subjectively based on customer interaction	Qualitative and quantitative data from end-customer behavior; Based on communication with the provider	Based on error messages
Case D	Actively from own operations; Actively from selected customers through interviews; Through customer satisfaction surveys; Objective data of end user behavior through analytics	Unknowingly based on communication with provider (through interviews and steering groups); End-user behavior based on its own initiative	Unknowingly based on usage behavior
Information exploitation			
Case A	Possibilities for new products, services, business	Not independently; Benefits from provider exploitation	Not independently; Benefits from provider exploitation
Case B	Possibilities for product development and new products; Possibilities for increased user experience; Possibilities for new business and business areas	Possibilities for plan management development; Possibilities for education of employees; Possibilities for work safety development; Possibilities for product development; Possibilities for development of sale processes; Possibilities for education of salesmen	Not independently; Benefits from provider and customer exploitation; Possibilities for decreasing risks in purchasing of services and devices

Case C	For improving the product/service; Increasing customer satisfaction	Independently to marketing; Prioritizing error solving and investments	Benefits from provider exploitation; Benefits from customer exploitation
Case D	Possibilities for improved customer satisfaction	Mainly independently (web analytics data); Benefits from provider exploitation	Not independently; Benefits from provider exploitation; Benefits from customer exploitation
Motivation to share information			
Case A	Satisfied customers; Incomes; Lower costs	Critical product or service; Possibilities of smoothening of operations or cost reductions if personal dynamics favor; Personal interest from provider; Concrete benefits or needs to be solved; Cost effectiveness of sharing information; Trust in providers expertise in solving problems; Providers ability to articulate the benefits	Possibility for improvements in user experience of the digital product/service
Case B	Necessary for offered digital solutions and services; Satisfied customers; Product development; Incomes	Critical product or service; Possibilities to gather, store, and share information from different levels and different operations; Important for customer to define the critical and necessary targets; Level of involvement of customer in designing and development phase of the digital services	Possibility to better quality of products/services
Case C	Satisfied customers; Incomes	Possibilities of smoothening of operations and processes; Improvement in end-user retention; New business; Better profits	Better functioning of the product/service
Case D	Satisfied customers and end users; Incomes	Possibility to share personal knowledge; Concrete benefits (e.g., price reductions, smoothening of operations); Co-development and deepening the relationship; Who receive the information (tech vs sales); Possibility to influence; Criticality of product/service; Benefits until the end customer (improved satisfaction or business); Cost reductions	Criticality of product/service; Personal interest from provider/customer

4.1.1. Case A

The results from case company A show that the most important motivating factor for the customer to share information regarding products and services is how critical the service is for them. Criticality of the service is strongly correlated to money loss because if the service does not work, it can cause end customers to move to services from other similar providers. The software specialist from company A said:

Quite often if the problem is acute, they are really motivated (to share information). In general, as soon as it considers their activity or equivalent where to get money, they will be immediately motivated. (Software specialist from company A)

The majority of the information is received based on the customer's own initiative, and relationships are seen as one important factor, particularly to compete against larger competitors. First, if the customers feel that their opinion is valued and they are contacted personally, they are more motivated to share measurement information than if they are asked to fill out a general satisfaction survey on the Internet. Second, the personal relationship between the provider's representative and the customer's representative motivates sharing of information. In this situation, the customer is engaged in the service process in a way that is motivational and enhances the customer's independent initiative to measure services. The operative services expert stated that:

The majority of it is direct feedback is from the customer, for example, in the design phase. So it of course relies very much on the customer's own initiative and communication. (Operative services expert from case A)

Case company A has already reached a mature phase, and its main emphasis on gaining understanding of customer value creation is to develop existing services and plan complementary features to existing services. Thus, information from customers and end users play a crucial role in developing new services. More could be done if relevant information could be collected from customers. As the managing director of the company stated:

Perhaps we should first know how to sell and tell them (customers) that we will be able to refine it (information). They need to understand the value of the information they have and that we have expertise and the technical capability to collect and refine the information. (Managing director from company A)

4.1.2. Case B

Based on the results of case company B, customers cannot be sufficiently motivated by means of external factors, such as money and cost reductions. Customers need to have internal motivation to measure service through the service's life. The products and services that company B provides are dependent on the nature of their customers. The customer's participation in the development and implementation phase determines the quality and goodness of the final product.

Products and services enable data collection, allocation, and sharing from many different places and from different levels, and therefore it is important that the customer be involved in deciding where and how the information is collected. In this way the customer benefits the most from the gathered information and can exploit it in communicating with users. Thus, customer participation is strongly correlated to the fluency of future operations and acts as a strong motivational factor to share information. The challenge in disseminating information is that there are long traditions of disguising information. Although the motivation to share information exists, the culture hinders putting this into practice. Thus, it becomes critical to create arenas to share and collect tacit knowledge of people from all levels of a company. As the COO of the company stated, these act as important engagement patterns between the provider and customer.

The customers are very interested in how their own personnel behave and use these digital tools. The idea is to capture tacit knowledge about units around the world and utilize it elsewhere. (COO from company B)

Thus, it was seen as an important factor to share information if the information could be transformed for the purpose of learning and developing the customer's own knowledge regarding their personnel's tacit knowledge. For example, the company is a startup, and it is crucial to locate information and measures that can be used for supporting sales not only to gain new customers but to increase sales from existing ones. Thus, the customers need to understand that by sharing information, improvements in their products and services can be made.

4.1.3. Case C

The results from case C indicate that customers are very willing to share measurement information if the product or service is critical to the end user (in addition to their own perspective). In this case, the measurement is concentrated on measuring the end user and end-user experience and the technical functioning of the service. Company C is a startup and competes in agile operations, which is one reason for cus-

tomers to choose its service. It can make fast adjustments and react quickly if enough relevant information is provided. Thus, its customers are motivated to share information because they acknowledge that actions are made based on that information. Based on results from company C, the benefits of sharing information need to be clear to the customer in terms of business benefits at the end. This requires concrete and clearly articulated information or benefits that the customers are clearly aware of. This can be due to the service that is somehow critical to the end customers. As the R&D engineer of the company stated:

It motivates if it produces business, better margins, new customers, or something else that benefits business. But at the end, there needs to be some monetary benefit. (R&D engineer from case C)

4.1.4. Case D

Company D revealed that because the digital service business environment is changing constantly, the provider and customer need to create added value for the end user all the time. This requires being involved in customers' everyday operations. Thus, it is easier to motivate a customer to share information, especially when the service is usually critical to the customer when doing business.

The results from case D also indicate that the customers are very willing to both measure services and share measurement information if the benefits are clear. These benefits can relate to customers' operations or inter-organizational relationships. This requires that the benefits are reflected until the end user. The business executive from case D indicated:

If the customer sees it useful, whether it benefits the customer's operations to deal with us, the customer's activities with third parties, the customer's internal operations, or adds to their knowledge and know-how considering their clients. (Business executive from case D)

Customers in the business can be very aware of both service/product and provider options. Thus, the personality behind the product and service plays a crucial role in keeping customers and in motivating them to share information. As the user experience executive stated:

It already has some value, if a person feels that this is somehow a personal service to me. (User experience executive from case D)

As a big company, the interviewees also saw compensations and cost reductions as one way to motivate the customer to share information. By providing products and services that a number of other companies are also providing, they considered the compensations meaningful because it was not possible to compete with customization.

4.2. Cross case analysis and summary of the results

The results of explored engagement patterns of customer value in a digital b2b context revealed the following: Based on the findings, the entire chain from provider to user needs to be taken into account in the value co-creation process of the digital service because customer value is not based necessarily in a particular physical lo-

cation of conducting the service but could also be formed virtually (using technology) or mentally (e.g., by sharing ideas). This requires understanding the engagement patterns and practices relevant for each actor of the service system. Different parts of the service system cause different requirements for measurement and management of value co-creation. Instead of focusing only on the engagement patterns of the customer interface, it should also focus on the user of the digital service, which is also heavily affected by the customer's operations and the business environment. Service providers can get the best view of the customer and user interface by involving customers in the measurement process. The customer's role as the information provider and gatherer should be emphasized more because the customer is able to examine value creation through personal requirements as well as the specific needs and goals of the user.

These findings of engagement patterns, i.e., factors that motivate the customer and user to measure services through their life, are presented in Table 3 where the engagement patterns are classified and analyzed based on provider characteristics.

Table 3. Results of cross case analysis

Engagement patterns	Characteristics of provider	Company affecting	Engagement patterns
	Size	Maturity of relationship	Variety of customers/services
Criticality of service	Important in companies of all sizes	Important in all types of relationships	Important in variety of customers/services
Personality of service	Small companies serve personally from front to back end of service production; In larger companies personality is highlighted only in selected customers that are used as references to other cases	Personality of service increases with the maturity of the relationship	A greater variety of customers usually means a more personal service production; Depends on the type of service
Trust between the actors	Small companies highlight building trust	Trust is necessary for long-lasting relationships	Variety of customers require building trust and close relationships because preferences vary; With a uniform customer base, this is not highlighted as much
Compensation	Small companies do not see importance but large companies do	Used in the early phases of a relationship	Beneficial to uniform customer base; More valued if rather general (not highly customized) service
Possibility of new business	Not affected by provider size	The more mature the relationship, the more willing the customers are to share the benefits	A more varied customer base leads to fewer possibilities of competition and greater willingness to share information
Improvement of knowledge	Important in companies of all sizes	Important in companies of all sizes	Important in companies of all sizes
Providers' ability to sell	Crucial for small companies; Important in companies of all sizes	Crucial for startups; Important in companies of all sizes	More crucial when highly customized services

The results of the cross-case analyses show that the more critical the service for customers and end users is, the more willing they are to share measurement information. Also, if the information is collected in a personal way rather than through general and anonymous tools, for example, the general customer satisfaction survey, customers and end users are more engaged in sharing their knowledge. This was the case whether the provider company was small or large, or startup or more mature company.

The companies also highlight the possibility of new business and the improvement of knowledge as important factors that motivate the customer and user to measure services through their life. This can be due to the variety of customers they have and the close relationships with them. Thus, shared information can be very specific, thus providing more possibilities for learning and business.

When the variety of customers was small, the role of compensation in engagement seemed to increase. Compensation in terms of reductions in usage cost or prizes from best feedback were considered important for larger companies. This can be a result of the nature of the relationships with customers and end users. The relationships in these cases were not so personal, and external motivation factors were considered as important. When the relationships between the provider and the customer/end user were closer, the internal motivation was considered more important and the engagement patterns differed. Building internal motivation and engagement during the front-end phase of service production was seen as crucial for both small companies; the maturity of the company did not play much of a role.

Although the customer was in control in the measurement of value co-creation, the provider's ability to sell was considered an important engagement pattern. At least in small companies, the long relationships that had a high level of mutual engagement were the result of selling work at the beginning and then focusing on trust as the main engagement factor.

5. Conclusions

This study increases the understanding of what engages the actors of a digital service system to measure services through their life. Despite the increasing amount of literature on business actor engagement in the digitalized world, theory is still lacking that reflects the complexity and dynamism when value is created to customers through digital services. In addition, there have been few studies focused on engagement in a b2b context.

This study suggests that the most important customer engagement patterns in digital b2b service systems are the criticality and personality of the service as well as the amount of new business opportunities, improvement of own knowledge, trust, and compensations received. A provider company's ability to sell was seen to be a crucial factor motivating the customer and user to measure services through their life. This study highlighted the importance of engagement during the front-end phase of production. At the back-end phase, the complete services and solutions are provided in a digital format; thus, the role of engagement in creating value is shaped by the maintenance and updating of the solutions provided. Moreover, the role of engagement was found to be highly dependent on a customer's activity of participation prior to the development and implementation phase of service production.

As a practical implication, these findings increase the understanding of engagement patterns in different types of companies and so can assist practitioners in constructing their value propositions. In addition, the division of engagement patterns assists in managing the phenomenon because they are more easily measurable and manageable than the whole phenomenon.

The results of this paper are based on the case studies of four companies, and so the generalizability of the findings is limited. However, due to the nature of the research subject, the use of an in-depth case study is a proper research strategy to gain a deeper understanding of the engagement patterns of value co-creation in digital service systems. More in-depth action research and case studies are needed to validate our results in terms of suitability, usefulness, and acceptability.

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HOLISTIC SERVICE DEVELOPMENT IN THE PUBLIC SECTOR– CASE STUDY FROM FINLAND

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In the service logic research literature, the service provider can have a role of a value co-creator, offering the inputs to the customer's value creation process and actively assisting the customer. The employees play a crucial role in the success of the service process and value creation. The purpose of this case study is to increase understanding of the challenges related to the development of a customer oriented holistic service in a multilevel service organisation in the public healthcare services. Based on the interviews, the challenges were related to management and supervisory work, resources and their utilisation, operational models, people's grievances related to their own work, and the transfer of information.

1. Introduction

Service as a business logic has aroused substantial interest over the last few years (Grönroos 2007;2011). The key notion is that although a customer buys goods or services, they are both consumed as services, or goods are perceived as resources in a process that is then consumed as a service (Grönroos 2006;2008; Vargo;Lusch 2004). According to the service logic research literature, the service provider can have a role of a value co-creator, not only offering the inputs to the customer's value creation process, but also actively assisting the customer. The employees are those performing these tasks and thus play a crucial role in the success of the service process and value creation. (Grönroos 2007.) The increasing interaction between the customer and the service employee enables greater variance between customers to influence the design and delivery of the service (Vredenburg;Bell 2014).

Service management research has gained interest in recent years in the international public sector research literature (Radnor, Osborne, Kinder; Mutton 2014; Osborne;Strokosch 2013;Osborne 2010). Also research in health care field has noticed the concept of value co-creation. Hardyman, Daunt and Kitchener (2015) studied how value is co-created during health service encounters, McColl-Kennedy, Vargo, Dagger, Sweeney and van Kasteren (2012) as well as Elg, Engström, Witell and Poksinska (2012) studied co-creation styles and how customers can contribute in developing health care services. Nordgren (2009) noticed that the current focus on productivity is misleading in health care, as it ignores the contribution of the patient in value creation. Nevertheless, according to Grönroos and Ravald (2011), helping customers in value creation is not a one-sided process only, but the service logic has

two aspects: logic for consumption and logic for service provision. Still, the customer perspective has been in focus in the discussion of service logic (Grönroos 2008). According to Grönroos (2007), adapting the service logic requires employee support, meaning that service-oriented values should dominate in the organisation.

In Finland, the public sector aims to steer its operations and strategies towards customer centrality. The structure of the Finnish health and social services will be reformed in the near future by bringing healthcare and social services together at all levels so that they will form customer oriented entities. (Alueuudistus 2016a.) The aim is to see the customer needs as a unity and serve the customer according to “one-stop-shop” principle. This requires that different service providers share information efficiently. Also it is required that someone has to be responsible for knowing what the customer needs. This is seen to save time and money, when unnecessary and overlapping procedures are minimized. (Alueuudistus 2016b.)

The purpose of this study is to increase understanding of the challenges related to development of customer oriented holistic service in a multilevel service organisation, aiming to a comprehensive customer service system in the context of public health services.

2. Theoretical background

A recent study by Grace and Iacono (2015) reports that internal customers have received very little research attention in the value co-creation process. According to them, employees as internal customers are resource integrators and key value beneficiaries in the value co-creation process. Consequently, the service provider should pay close attention to internal marketing and other efforts to support its employees in providing the best possible service to the customers (Grönroos 2007). Grönroos (2007) points out that people are both a critical resource and a bottleneck in most service business. Cadwallader, Jarvis, Bitner and Ostrom (2010) note that for many companies designing and executing customer focused service strategies is a challenge. According to them, as well as Bitner, Ostrom and Morgan (2008) and Melton and Hartline (2010) frontline employee participation plays a crucial role in innovation implementation in the service context. Also Grönroos (2007) states that the strategy will fail, if the service employees are not motivated to act in a customer oriented way. Their attitudes, commitment and performance will have an impact to the success of a relationship. (Grönroos 2007.)

Employees and customers, in addition to technology and time are crucial in the development of successful service system. (Grönroos, 2007.) The service system of an organisation, which may be decomposed into several subsystems, can be seen as a configuration of people, technologies, and other resources (Patrício, Fisk, Falcão e Cunha & Constantine 2011). As most services are dependent on other services, a holistic approach at the whole service system should be applied (Ojasalo; Ojasalo 2009). Hence, the processes in the organisation should be designed so that it would be possible to deliver a total service offering for the customer. As Grönroos (2007) notes, inappropriate management or information systems, as well as limited abilities of the customers to adjust to the systems, may cause frustration and complications for the employees.

Developing the service system to the direction of customer orientation and one-stop-shop –principle requires a cultural change, which, according to Sundberg and Sandberg (2006), is harder in the public sector than in other sectors due to bureaucracies. They state that moves towards flat and loose structures would weaken predictability, fairness and continuity, which are prioritised above innovation and change in public organisations. Their findings revealed that cross-functional work and processes may collide with the traditional and hierarchical command and control structures, causing collaboration problems in the organisation. Athanasaw (2003) notes that cross-functional teams may lower barriers on cooperation between divisions in an organisation. Cross-functional teams will succeed and have an impact on organisational performance and improvement of service delivery only with support of management through team building, team training and team recognition (Piercy, Philips; Lewis 2013). Sundberg and Sandberg (2006) state that managers often underestimate the importance of breaking the functional mind-set in an organisation. According to Piercy et al. (2013) focusing on overcoming resistance to change is critical to each team, and they call for more empirical research investigating team-based working practices in the public sector (Piercy et al. 2013).

3. Methodology

The case study research was selected as the main research approach of the present study, as the case study is argued to be particularly useful when there is only a little knowledge on the phenomenon, the phenomenon cannot be studied outside its natural context, current theories seem inadequate, the research topic areas are new, the phenomenon is broad and complex, or when the social system under study is complex and unique (Bonoma, 1985; Eisenhardt, 1989; Easton, 1995; Miles and Huberman, 1994; Yin, 2008). A case study is widely used to examine the decisions and behavior of groups and individuals within organisations, and in inter-organisational relations (Dubois and Gadde, 2002; Halinen and Törnroos, 2005; Easton, 2010).

Our target organisation is currently piloting a new kind of way of organising social and healthcare services for their clients. The objective is for people to be able to get all the help they need from one place, and if they need several services, these services will be organised and integrated together in a rational manner as a holistic, customer oriented service. The organisation has multi-level services, which is why its operations and service production are regulated by many different laws, operational methods, clientship criteria and information systems. In order for the organisation to work as desired, 1) the service needs of a client requiring several different services should be identified soon, which requires from front-line employees both sensitivity and the ability to find out client needs as well as the ability to organise the necessary services for solving clients' situations, and 2) the organisation should work in cross functional teams in accordance with the clients' best interests, even if the old operational models and information systems have not yet advanced to support this kind of operation.

In order to identify the challenges in the holistic service systems, we interviewed seven employees. Two of them are responsible for the development of the holistic service system, and five of them represent different service levels or modules in the organisation. Two groups of interviewees gives us an opportunity to hear different

perspectives of service organisation. Three of these employees were recruited to the organisation due to the forthcoming changes in the service system, and some of them were present employees, but who have to learn new ways to operate in their everyday work.

Our target organisation wishes to work in a customer oriented manner, stop pushing clients back and forth between different services, and remove all boundaries between services, as they believe that it will improve the service and is more cost-effective. At the same time, it will allow the right services to be produced for the client at the right time. The developers understand the significance of interaction between the client and employee.

4. Results

This study contributes to the literature on service development in public sector by increasing understanding about the challenges of developing holistic services in a multilevel organisation. This study reviews the challenges related to the change of providing all social and healthcare services through one service unit, a well-being centre, instead of offering services provided by several different units. Based on the interview materials analysed, the challenges were related to management and supervisory work, resources and their utilisation, operational models, people's grievances related to their own work, and the transfer of information.

4.1. Management

The pilot project for the well-being centre has started in order to find a new model for combining social and healthcare services and forming cross functional teams to meet the clients' service needs. Issues related to management were brought up in the interviews with both the employees and developers.

Based on the interviews with the developers, the previous structure of these services has not been supportive of the new kind of operations:

I6: Cooperation is talked about a lot, but service structures and management really don't support cross functional work very well, and the idea is that [the study area] is now the test and a pilot project, where integration is implemented at a local level.

According to the developers, developing the operations is still mostly about developing their own operations:

I6: What does integration even mean? It's quite a distant idea. Of all discussion, 98% is related to the internal development of their own operational unit; it is not yet easy to think about the integration required for the entire well-being centre. --- If they [managers of service fields] have that kind of idea about what kinds of new operational methods they'll allow and how they are changed, how their own service structures are dispersed to better support the well-being centre concept, there's a lot of work to be done.

Management was also brought up as a challenge in the interviews with the employees, and one interviewee wondered how the community of a well-being centre could

become efficient when the operational methods and management styles of the various services are so different.

I5: It is challenging to bring a group this big together into one efficient working community when they have such different working methods and managers. This [pilot project] aims to combine services that are classified under healthcare services and that have, to some extent, different legislation than those working under social services. Even working together may not increase clients' satisfaction with the services they receive.

According to the employees, other leadership challenges were that they could not meet the executive managers, the areas of responsibility concerning the development of the well-being centre had not been defined well enough, and there is no organised model for the development work. One interviewee felt that employees do not have the possibility to influence the development of the well-being centre.

Regarding supervisory work, both groups brought up that the well-being centre will have several supervisors. According to the developers, this, in part, hinders the flow of information. In the initial situation of the well-being centre, the healthcare services alone have eight operational units, which all have their own supervisors and phone service hours. According to one interviewee, customer oriented service would be achieved when the operators significant to the client all work together, which is not happening right now. Another interviewed person sees the scattered management as challenging, as it affects communication. If there were fewer supervisors, it would facilitate internal communications, according to the interviewees.

I6: and with regard to communication, it's difficult that the supervisors are so scattered. And that the whole structure is so scattered, employees are mostly together and then there is some individual supervisor there; maybe if the group was smaller and managed the entire building, they could communicate internally, systematically.

In the employee interviews, three out of five employees brought up issues related to supervisory work. The issues brought up were linked to 1) shortcomings of concrete actions, development discussions and supervision, 2) lack of support and everyday presence, and 3) the many levels of management.

I2: And the thing I would like to have, which has not been brought up, is a development discussion. So that I would have a supervisor who could take charge of that. -- We don't really have that kind of discussion in our social care worker teams, about how we actually do our jobs.

4.2. Resources

The developers' comments did not refer to lacking resources, but four employees out of five brought up resources, which could refer to either the time or employees available.

Time was mentioned as a resource that was lacking when the matters being discussed were 1) internalising the issues brought by the change, 2) developing the operations, or 3) not having the time for all the matters required for client work. On the other hand, the resources were related to the comments of two interviewees about how 4) employee resources are often low, which affects the operations.

I5: Sometimes information seems insufficient in relation to the confusion of the situation, there has only been little time to prepare for matters and changes.

I3: Ideas may come up, but they get buried under all the busy work, as client work takes such a large share of the time.

4.3. Operational models

Four employees brought up the differences between operational models, which are related to either 1) differences between social and healthcare services, both in relation to operational models and to 2) how clients' situations are reviewed. The differences in operational models also came up, when 3) workers attempted to set up joint meetings. Also, 4) ignorance of the operational models of others was brought up in the comments of three interviewees.

I1: This traditional model of thinking sits tight. Healthcare has certain operational criteria, principles and models and a very specific hierarchy, and there are also clear boundaries between social services and healthcare services. -- So the question is how these operators from different sectors can start to work together. -- It's a big challenge.

According to the developers, the old operational models create challenges for developing the well-being centre, as they do not support the implementation of cross functional cooperation. The old operational models are partly due to indicators guiding the operations, which emphasise the 1) percentage of answered phone calls and affect the 2) attitudes related to information systems. The old operational models are also connected to 3) recognising one's own role as well as to 4) how the client may experience the service.

The interviews with developers brought up underlying factors of the reasons due to which the operational models differ from each other. One reason could be that the person's or family's need for help may be seen differently in various services. How clientship is defined also varies between the services. On one hand, this offers the clients a large number of different services to choose from. On the other hand, it is thought that whichever service the client first uses affects how the service fulfils the client's original service need from the client's perspective.

I6: Working separately has led to a situation where a person's or a family's need for help is seen differently in every place. This enables quite a big selection of combinations for the clients, too. And abusing the services is easy, too.

4.4. Identifying the faults in one's own work

Each employee brought up challenges related to their own work, either at a general level or in a very concrete manner. Challenges or shortcomings were related to 1) changing the operational model (either their own or generally), 2) the extensive eval-

uation of clients' service needs, 3) the impact of one employee's absence, and to the fact that the 4) population within one employee's area of responsibility is very large in the well-being centre.

13: Overall, you should be as open to change as possible, in order for this well-being centre to come true. -- So you should be willing to change the methods themselves, even if they conflict with the previous model.

4.5. Problems with the information flow

According to the employees, problems related to information flow were linked to both 1) the incompatibility of different information systems between healthcare and social services, and 2) the crucial people missing from the meetings. Employees should have the opportunity to 3) look up any information related to the change when they have the time. On the other hand, it was seen that 4) there were gaps between the different operations, which hindered the flow of information.

In the interviews with the developers, the impact of operational models on how the problems related to information systems could be solved was brought up, and changing the old operational models is seen as the supervisors' duty.

16: But even though this is possible for families with children, this possibility is not really used; consent [for looking at client information from various systems] is not requested, so that they [various service providers] would be able to see the information. I mean, it's rare if it is requested. It just isn't the usual method.

14: Even though these registers cause problems for us, it would take an actual change in legislation to make it work better.

5. Discussion of findings

The main purpose for our target organisation is to pilot a new way to organise social and healthcare services. The organisation has multi-level services, and operations and service production are regulated by many different laws, operational methods, clientship criteria and information systems. In spite of these, the service employees need to cooperate to provide holistic service for the client, if needed. As Cadwallader et al. (2009) note, the translation of customer-focused service strategies into results by successfully executing them is challenging.

Grönroos (2007) stated that the people are critical resources and bottleneck in the service business, and Melton and Hartline (2010) as well as Bitner et al. (2008) see the front line employees, and their involvement in the development and implementation of a new service, is crucial, this study confirms that. But our case shows that critical for the success of change to customer orientation is the attitudes and behaviour of top management and supervisors, who should accept the idea and encourage the front line employees to act in a customer oriented way. The challenge is that the old leadership culture does not support the new way of thinking, the customer orientation. Employees do not seem to believe that they have an opportunity to have an impact on the development of the well-being center, and they think the change process is not properly managed. On the other hand, it seems that the vision of the

change is neither clear for the managers and supervisors. Sundberg and Sandberg (2006) have also stated that managers may often support the functional mind-set in an organisation instead of breaking it.

The developers pointed out that the one reason for this pilot-project is to find out the ways how different services can cooperate. But according to them, the management is still discussing about their own operations instead of how to cooperate. Sundberg and Sandberg (2006) findings revealed that cross-functional work and processes may collide with the traditional and hierarchical command and control structures, causing collaboration problems in the organisation, which is in line with our results. Piercy et al. (2013) notes that the use of cross-functional teams can only have an impact to the performance and improvement of the service delivery if they have the support from management.

Organisational structure with several levels of supervisors complicates information flow, and the understanding of the everyday operative organisation of tasks and responsibilities. Employees seem to need more support from their supervisors wishing them to be more often present in the everyday activities. This is in accordance to Piercy et al. (2013) that managers and supervisors need to be able to be approached and they need to be trusted. Also Whittaker et al. (2007) revealed in their study that there is a relationship between the supervisor feedback environment and role clarity.

According to the findings of this study, different operational models in health services and social services affect to the service provision in the new wellbeing centre, making it difficult to implement crossfunctional cooperation. Building cross-functional teams suffers for these differences, not least because of different information systems. Grönroos (2007) notices that computerized systems and information technology in the service provision should be designed from customer oriented perspective. He also states that technology and how to use it might be a bottleneck in a service process, which may cause frustration and complications for the employees, which is in accordance with our results.

Some of the differences in operational models are caused by laws, which cannot be changed in this piloting project, but the employees and their supervisors need to find ways how to cooperate despite these challenges. As Athanasaw (2003) notes, cross-functional teams may lower barriers on cooperation between divisions in an organisation. What is interesting to note here, is that there were two types of responses to this challenge: according to one the only way to improve this is a change in the legislation, but according to another opinion a solution would be a change in attitude, meaning that willingness to change some everyday operational practices would solve the problem.

6. Conclusion

Developing the service system to the direction of customer orientation and one-stop-shop –principle requires first of all a change in the organization culture and management. According to our findings, when the front line employees need to change their action towards customer oriented holistic service, it requires adequate information systems, clear instructions and support from the management and supervisors. First of all the management has to be committed and supportive to this kind of change.

We agree with Sundberg and Sandberg (2006) who claim that in the public sector, the coexistence of horizontal and vertical management structures is crucial have to be also horizontal. They note that a successful change requires strong process owners, in our case leaders of cross-functional teams, which according to Athanasaw (2003) can lower the barriers in the organisation. Nevertheless, support from the management is needed (Piercy et al. 2013). We conclude that when the management and supervisors have a customer oriented attitude, it is possible to overcome the challenges with / in the operational models and service delivery in every day working practices.

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HOW DOES INNOVATOR'S DNA WORK IN SERVICE SYSTEMS FOR NEW ENTREPRENEURSHIP ACCELERATION?

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The paper explores and measures the contribution of innovator's DNA model (Dyer et al., 2009) in sustaining and developing entrepreneurial teams' strategic innovation learning within a leading business accelerator in London. Embedded and longitudinal in depth single case study approach: Innovation Warehouse (London, UK). The theoretical conceptual and empirical model highlights the cause to effect relations existing among the latent variables (questioning, associating, experimenting, observing, learning) of innovator's DNA model and its outcomes (value proposition, business network, shared cognitive strategic scheme). The single case study approach and the restricted borders of the business ecosystem analysed. The paper is a theoretical contribution on the effectiveness of innovator's DNA model adoption in business acceleration contexts. Moreover, it gives a managerial contribution to improve acceleration mechanisms for strategic innovation of new entrepreneurial teams.

Keywords: innovator's DNA; entrepreneurship; shared strategic cognition; strategic innovation, strategic execution.

1. Introduction

The paper explores and measures the contribution of innovator's DNA model (Dyer et al., 2009) in sustaining and developing entrepreneurial teams' strategic innovation and learning within a leading business accelerator in London.

Business incubators are popular tools to accelerate the creation of successful entrepreneurial companies, providing their tenants with a mix of (Cantone et al., 2013): infrastructure, business support services and networking (McAdam and McAdam, 2008; Bruneel et al., 2012).

2. Theoretical background

2.1. The determinants of value co-creation process

This paper is developed within the theoretical background of value co-creation through network interaction (Gummesson & Mele, 2010) in business and service ecosystem (Vargo *et al.*, 2008). A business incubator is a business ecosystem, in which value is co-created (or co-destroyed) through mutual interactions between several players (ie. business angels, mentors, incubated firms, Business Academy, other service providers) existing in the business acceleration process in the perspective of a service consumer (Lusch and Vargo, 2006; Korkman *et al.*, 2010; Russo-Spena and Mele, 2012; Eriksson *et al.*, 2014).

In order to explain how this value co-creation process works in a business accelerator we adopt a model, developed by Dyer *et al.* (2009), that already exists in literature: "Innovators DNA". Indeed, the original aim of this theoretical framework is to put in evidence the "discovery skills" of innovative entrepreneurs and examine "*when and how they came up with the ideas on which their business was built*" (Dyer *et al.*, 2009, p. 62). These "innovation skills" are out-and-out action patterns that distinguish the mind-set of innovative entrepreneurs from the other business people and the approach they come up with creative, breakthrough and visionary business idea. The empirical research carried out by the Authors (Dyer *et al.*, 2009, p. 63-66) highlights that innovative entrepreneurs have the following distinctive skills: 1. Associating, "the ability to successfully connect seemingly unrelated questions, problems, or ideas from different fields", in order to generate learning; 2. Questioning, the ability to question right, provocative and unconventional questions, "that challenge the common wisdom"; 3. Observing, the ability to scrutinize any small detail of the social and business phenomena (i.e. potential customers behaviours), "in order to gain insights about new ways of doing things"; 4. Experimenting, the active experimentation and exploration in order to create innovation; 5. Networking, the conscious effort "to finding and experimenting ideas through a network of diverse individuals [...] with different kinds of ideas and perspectives", in order to extend the own knowledge domain.

To recognize how the action patterns or discovery skills work together is more effective to represent them as the metaphor of DNA (Figure 1).

Associating is like the backbone structure of DNA double helix. The other action patterns or discovery skills - questioning, observing, experimenting and networking - wind around this backbone. They stimulate, reinforce and consolidate the technology venture project, through the spawning of learning process inside the team members of new technology-based ventures. Associating/learning is the core construct of the value co-creation process of a business accelerator.

Researchers have used experiential learning theory as a framework to theorize about the processes of research innovation, entrepreneurial opportunity recognition, ideation and knowledge acquisition (Kolb 1984; Corbett 2007; Armstrong and Mahmud 2008; Gemmell, Boland *et al.* 2012; Gemmell and Kolb, 2013).

We are arguing that, in a business ecosystem, the value co-creation process is shaped on the action patterns mentioned above in order to nurture the "discovery skills" of entrepreneurial teams

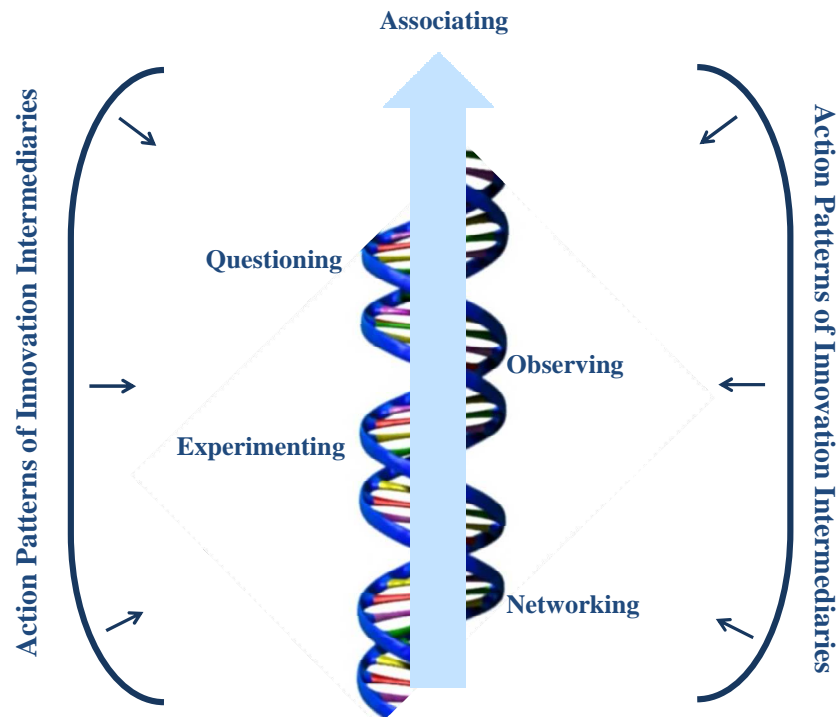


Figure 1. The action patterns of value co-creation process within a business accelerator.

Source: adapted from, Dyer *et al.*, 2009.

Entrepreneurs are entrepreneurial as differentiated from managerial or strategic, because they think effectually (Sarasvathy, 2001; 2005); they do not spend energies trying to predict the future. To the extent that the future is shaped by human action, it is much more useful to understand and work with the people who are engaged in the decisions and actions that bring it into existence. Brockner *et al.* (2003) described several central tasks for a successful entrepreneurial action, including conceiving and screening the entrepreneurial idea, procuring resources, and proving the business model through execution (Shane and Venkataraman, 2000). The innovation process (Zampetakis and Moustakis, 2006) is composed of two main phases:

- the initiation stage - initiation of an idea or proposal in start process (Pierce and Delbecq, 1977); aware of the innovation, forms an attitude towards it; identify knowledge that meets those needs, that evaluates the new product and feasibility (Frambach and Schillewaert, 2002);
- the implementation stage - can see adoption idea or proposal follow-up (Pierce and Delbecq, 1977); period of experimentation through which innovative ideas are incrementally translated into good practices (Zeldin, *et al.*, 2005).

Thus, within a business accelerator probably some action patterns contribute to this initiation stage allowing entrepreneurial teams to screen the ideas, improve knowledge and awareness about it, define better the value proposition. We label this phase “strategic discovery” and probably observing and questioning are very critical for such an aim. Some other action patterns serve to the implementation stage allowing entrepreneurial teams’ execution of their business idea. We label this phase “strategic execution” and probably experimenting and networking are very critical for such an aim.

2.2. The outcomes of value co-creation process

Which are the outcomes of Dyers's *et al.*, (2009) action patterns for value co-creation within a business accelerator?

Firstly, correctly 'designing' a value proposition, then implementing and commercially refining viable architectures for revenues and costs, are critical to the enterprise success. They are essential when the enterprise is first created; but keeping the business model viable is also likely to be a continuing task (Teece, 2010). Ostwerwalder *et al.*, (2014) recognized the relevance that value proposition design has in early stage start-up.

Secondly, some more recent works on entrepreneurship and networking see networking as very important for successful entrepreneurial ventures (Peprah, 2012). Setyawati *et al.* (2011) studied what makes successful entrepreneurs in Indonesia; they observed that networking is an important factor for developing a successful entrepreneurship. In another study by Lechner *et al.* (2005) networking is strongly needed to develop entrepreneurial capabilities since networking enhances learning.

Theoretical and empirical works (Hoang and Antoncic, 2003) on network influence on entrepreneurship seeks to understand (1) how networks affect the entrepreneurial (value co-creation) process and how they lead to positive outcomes for the entrepreneur or their firms (networks as independent variables) and (2) how entrepreneurial (value co-creation) processes and outcomes in turn influence network development over time (networks as dependent variables). In our study we have labelled networking the first construct and business network the second one and we have tried to estimate both in the same model.

Thirdly, the ultimate goal of the action patterns' leverage is to create a shared cognitive scheme inside the founders' team that effectively guides the decisions and conducts to face the challenges of the new technology-based venture.

This consideration is coherent with the study by Ensley and Pearce (2001) on Top Management Teams (TMTs) of 88 and 70 new ventures, all of which were members of the 1994 and 1995 inc. 500 (American) ranking, respectively. They demonstrated that cognitive conflict is positively associated with shared strategic cognition and that this result is congruent with Klimoski and Mohammed's (1994) argument that team processes affect the development of team mental models.

The team processes of engaging in cognitive discussion of the elements of organizational strategy can positively influence the shared understandings of the mental maps of TMT members and thus leading to shared strategic cognition. The terms shared cognitive schema can be related to Knight *et al.* (1999) definition of strategic consensus, "*When we aggregate individual mental models of strategy to the group level, we assess the level of strategic consensus, which is the extent to which the individual team members' mental models overlap*".

The studies in management literature on strategic consensus (Knight *et al.* 1999) and shared cognition (Ensley and Pearce, 2001) have focused mainly on variables related to the composition (location, functional, age and educational, employment diversity) of the entrepreneurial team or the eventual decision making (level of cognitive and affective conflict), and its implications on new ventures performance.

In this paper, instead, we are mainly interested in exploring how incubation value co-creation mechanisms could be useful to the elicitation and alignment of a strategic thinking in the entrepreneurial team, and in determining a shared attitude to the interpretation and response of market dynamics.

3. Research methodology

The embedded and longitudinal in-depth single case study (Hamel, 1993; Yin, 1994; Easton, 1992, Perry, 1998; Saunders *et al.*, 2000) is the research approach adopted. It has applied to a leading international business accelerator: Innovation Warehouse (London, UK).

Qualitative in-depth interviews (McCormack, 2004; Boyce & Neale, 2006) were carried out among key actors of the organizations (18 to IW organizational members, 25 to entrepreneurial teams' members). Furthermore, ethnographic participation of the researchers was performed during the key events and the activities of the center.

The findings of the qualitative research phase have informed the theoretical background of the paper and the subsequent step of the quantitative survey on accelerated firms.

The paper measures the impact of the latent constructs of value co-creation process (the 4 action pattern mechanisms of Dyer's Model) on learning/associating (Figure 2) of accelerated firms operating in Innovation Warehouse and its outcomes.

A confirmatory factor analysis by SEM (Structural Equation Model) based on Partial Least Square (Wold *et al.*, 1984, Tenenhaus *et al.*, 2005) has been implemented on the data provided by a quantitative questionnaire on 44 key players (founders, CMO, CTO) of accelerated startups. The start-ups have been profiled in (5) Founded, but not yet operating on the market; (26) early stage (operating on the market from 1 to 24 months); and (13) later stage (more than 24 months on the market). The field research phase was conducted from January to March 2015.

The structural equation model aimed to measure the impact of action patterns on new entrepreneurship value co-creation process inside Innovation Warehouse has been shaped from the findings of qualitative interviews and the main literature on the topic reported in the theoretical background.

4. Findings

The theoretical conceptual and empirical model highlights the cause-effect relations existing among the latent variables (questioning, associating, experimenting, observing, learning) of innovator's DNA model (Dyer *et al.*, 2009) and explains how they affect the strategic innovation dimensions (strategic discovery and strategic execution) of the accelerated entrepreneurial teams.

The model measures even the impact of learning/associating in strategic innovation within entrepreneurial teams on three relevant outcomes: the innovation of value proposition (Chersbrugh & Rosenbloom, 2002; Teece, 2010; Ostwerwalder *et al.*, 2014) the elaboration of a shared strategic cognitive scheme among entrepreneurial team's members (Knight *et al.*, 1999; Ensley and Pearce, 2001), the improvement of business network (Lechner *et al.* (2005); Hoang and Antoncic, 2003). In the following the main findings of the empirical survey.

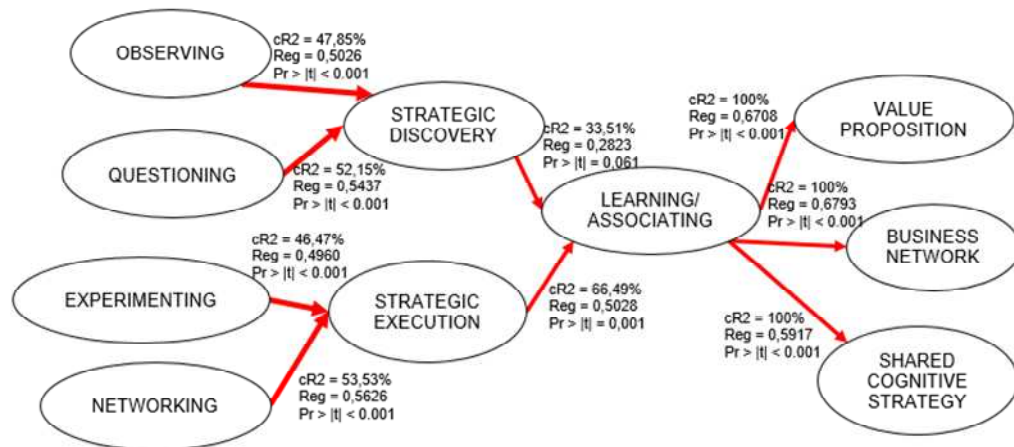


Figure 2: the SEM for new entrepreneurship value co-creation process. Findings.

As illustrated in the graph all the latent variables, exogenous and endogenous ones, are statistically significant. The lowest level of significance ($Pr > |t| < 0,061$) is related to “Strategic Discovery” variable. All the other latent variables have high level of statistical significance ($Pr > |t| < 0,001$). The main finding of the SEM is related to the “Learning” Variable. In fact, the impact ($cR2=66,49\%$) of “Strategic Execution” on “Learning” is almost twofold respect to the impact ($cR2=33,51\%$) of “Strategic Discovery”. It is confirmed a finding that in Innovation Warehouse the new entrepreneurship value co-creation process is driven by strategic execution advantage for start-ups rather than strategic discovery ones. The exogenous latent variable impacting more on Strategic Execution is “Networking” ($cR2=55,53\%$) followed by “Experimenting” ($cR2=46,47\%$). The exogenous latent variable impacting more on Strategic Discovery is “Questioning” ($cR2=52,15\%$) followed by “Observing” ($cR2=47,85\%$).

In terms of new entrepreneurship value co-creation outcomes $cR2$ is 100% and is useful to read the regression path coefficient. This latter is higher for “Value Proposition” and “Business Network” respect to “Shared Cognitive (Strategic) Scheme” (Regress about 0,67 vs 0,59). In the following some measures that confirms the content validity of the model. Goodness of fit = 0,6861, relative goodness of fit = 0.9056.

As the external model is reflexive for every latent variables, internal consistency has been verified: Cronbach's Alpha and Dillon Goldstein's Rho $> 0,80$ for each latent variables. Average Communality is $> 0,5$. Thus each latent variable, endogenous or exogenous ones, is internally unidimensional. The mono-factorial validity is confirmed for each latent variable, so every manifest variable of each latent group explain better its membership group.

They have been elaborated also the SEMs findings at group level (founded but not operating, early stage, later stage start-ups). The findings are not reported here.

5. Discussion

Innovation Warehouse was founded in 2010 as co-working accelerator and community for digital high-growth start-up businesses in London. The idea was brought to life by a group of entrepreneurs and angel investors with significant experience and record of accomplishment in working with start-ups. Every day, over 200 entrepreneurs, angels and mentors work together from IW Smithfield location. Some key figures about IW in Farringdon: over £35 million in funding raised for start-ups; 250 active investors; 300 accelerated companies.

Innovation Warehouse is organized around several value co-creation processes that helps accelerated firms succeed in their business. The empirical survey has demonstrated that Innovation Warehouse is a business accelerator ecosystem where start-ups search execution advantages more than strategic discovery ones. On the one hand, strategic execution need increases with maturity phase of start-up; this probably depends on the priority of entrepreneurial team to increase rapidly business performance in order to meet angel investors and shareholder returns. On the other hand, strategic discovery is relevant in the early stage of new entrepreneurship development, more precisely when the team has not clear yet its value proposition to deliver to the market; differently, it decreases in later stage start-ups. The learning inside Innovation Warehouse is the core value co-creation process. It affects mainly value proposition and business network definition, during early stage of new entrepreneurship creation, and business network and a shared cognitive strategy in later stage. The value co-creation is led by Innovation Warehouse initiatives and heavily depends on key organizational and inter-organizational processes. They nurture questioning, observing, experimenting and networking functional to learning and business exploration. The value co-creation process is also fostered by initiatives and collaborations that start spontaneously among start-ups members and IW organization and impact heavily on execution and business network exploitation, unexpectedly originated from the ecosystem.

6. Theoretical contribution

The paper mainly contributes to value co-creation literature in business acceleration (Lusch and Vargo, 2006; Korkman et al., 2010; Russo-Spena and Mele, 2012; Eriksson et al., 2014) clarifying the determinants and outcomes of learning for new entrepreneurship.

It demonstrates how Dyer's *et al.* (2009) "Innovator DNA" model identify action patterns that can be leveraged in business accelerator ecosystem in order to foster new entrepreneurship co-creation. The differential contribution identifies two multi block latent constructs (strategic discovery and strategic execution), not already existing in Dyer's *et al.* model, but impacting on the learning of business accelerator contexts.

The paper also contributes to the theory of network in new entrepreneurship context (Peprah, 2012; Setyawati, et al. 2011; Lechner et al., 2006). It demonstrates that in early stage of new entrepreneurship ventures, networking is an independent variable aiming to identify relationship inside the ecosystem. Also, it can be useful to explore and successfully bring the solution on the market. In later stage start-ups networking is a variable that depends on learning and aims to exploit business opportunities in the market improving commercial performances.

Finally, the paper contributes to the theory of value proposition design in new entrepreneurship (Teece, 2010; Ostwerwalder, et al. 2014). It explains that in early stage start-ups value proposition is an outcome of learning, whilst it decreases its positive impact in later stage ones.

The paper also shows that a shared strategic consensus (Knight *et al.* 1999) or a shared strategic cognition (Ensley and Pearce, 2001) is an outcome of learning in business accelerator ecosystem that requires longer time to be achieved and is mainly relevant for later stage start-ups.

7. Managerial implications and research limitations

The paper is a theoretical contribution on the effectiveness of innovator's DNA model adoption in business acceleration contexts. Moreover, it gives a managerial contribution to improve acceleration mechanisms for strategic innovation of new entrepreneurial teams. The paper suggest a differentiating relevance of value co-creation action patterns for early and later stage start-ups.

The single case study approach and the restricted borders of the business ecosystem analyzed represent the main limitations of the research, aimed to be overcome in the short future.

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HOW HUMAN RISK COULD LEAD TO VALUE DESTRUCTION IN SERVICES: AN EXPLORATORY STUDY ABOUT OCCUPATIONAL STRESS IN THE SWISS WEALTH MANAGEMENT SECTOR

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A service experience corresponds to a social process in which the “production” involves both a provider and a client. This production process relies on the well-being of them both to ensure proper value co-creation. We posit that the link between well-being and value co-creation can thus also be studied from the risk management perspective (i.e. “ill-being” and “value destruction”). We employed an exploratory approach to build new theory. The study focused on the Geneva wealth management service sector, which is in crisis. The results suggest that human risks influencing “job demands and resources” (JD-R model) lead to ill-being and value destruction.

1. Context

With a share of 27%, Switzerland is the global market leader in wealth management in terms of volume of business in cross-border private banking (SwissBanking, 2011). The Swiss banks specializing in wealth management are referred to as private banks. The Swiss wealth management sector has suffered from two major shocks in the past five years: the financial crisis and the end of Swiss banking secrecy. This pivotal period is thus very interesting to analyze, especially regarding the impacts of these changes on banking service operations. These events were accompanied by a sudden surcharge of enforced international regulations. As wealth management corresponds to a cross-border business, international regulations play a significant role in private banks' operations (controls, procedures, compliance, security, etc.). That is the case, for instance, of MiFID II (which is a directive on markets in financial instruments promulgated by the EU), the automatic exchange of information imposed by the OECD and all the specific national laws on tax evasion.

As with every service activity, human resources play a key role in the banking industry. In these hectic times, collaborators may have lost their bearings. Bank employees have to meet new constraints while meeting demanding customer expectations. They might not know how to deal with these new contexts. Moreover, complex and varied

regulations are difficult to standardize and automatize. Human mistakes are therefore a critical component of the banking process and are often visible to the clients involved in the service experience (Bowen; Schneider, 1985).

Human risks comprise the uncertainties and potential damage that are caused by people (Fragnière; Junod, 2010). Employees' own will and personal agendas may diverge from company strategies and incite them to put their own interests first (Crozier et Friedberg, 1977). Not only do collaborators create problems, but they also may not act correctly to recover from them. Human risks emerge when the behaviors and failures of the workforce weigh on the competitiveness and sustainability of the company (Fragnière *et al.*, 2010).

The objective of this paper is to investigate the human risk factors leading to higher levels of ill-being that may result in value destruction in the peculiar context of the changing banking environment in Switzerland. The research question that we want to address in this paper is the following: How could human risk lead to value destruction in services?

The authors of this paper conducted an exploratory survey with the help of their EMBA students in risk management (HES-SO) during the period from September 2013 to February 2014. We chose to undertake a qualitative study based on semi-structured interviews. We surveyed 35 employees of various Swiss financial institutions, occupying the full range of private banking key positions in Switzerland, such as customer relations manager, portfolio manager, compliance officer and risk manager. Our results showed disruption in human-based operations in private banks resulting in various forms of value destruction. Merging, outsourcing or suppression of activities, recruitment freezes and downsizing are the traditional answers to such disruption. Our research showed the emergence of various demonstrations of precisely human-related risks, such as lower service quality, the loss of decades of experience with the departure of employees and a significant increase in absenteeism and fraud. In brief, we observed that human risks are significant in the conducting of service operations in the context of Swiss private banks. We thus concluded that human risks, when they materialize, lead to ill-being and then value destruction. This finding still needs to be tested in subsequent quantitative research. Likewise, human risk mitigation methodologies have to be tested to prove their impact on the minimization of value destruction in the service sector.

This paper is organized as follows. In Section 2 we present a brief literature review essentially concentrating on the notions of human risks, occupational stress, job resources and demands exerting an impact on well-being. In Section 3 we explain the methodology based on semi-directed interviews, which was employed to understand the human risks contributing to ill-being in the Swiss wealth management sector. In Section 4 we present a synthesis of the results based on content analysis of the interviews. In Section 5 we discuss the main results and propose a new theoretical model to mitigate the human risks contributing to the ill-being of the actors involved in a given service experience. In Section 6 we conclude and indicate further research directions.

2. Literature review

2.1. Human risks in a service setting

Risks can be divided into seven categories of events that could damage the results of a company and hinder the achievement of its objectives: (1) internal fraud; (2) external fraud; (3) employment practices and workplace safety; (4) clients, products and business practices; (5) damage to physical assets; (6) business disruption and system failures; and (7) execution, delivery and process management (Bank of International Settlements, 2001). Among these categories, four are clearly related to employee behaviors (i.e. (1) internal fraud; (2) employment practices and workplace safety; (4) clients, products and business practices; and (7) execution, delivery and process management).

Human risks (or psychosocial risks) correspond to a subset of operational risks. These risks have been defined by the Basel Committee (Bank of International Settlements, 2001) as “the risk of direct and indirect loss resulting from inadequate or failed internal processes, people and systems or from external events.” Even though operational risks are considered to be mainly a risk of human origin, unfortunately no specific category is assigned to human risks.

Service companies create an environment that is favorable to the emergence of human risks. Mistakes are part of every service, as they are an “unavoidable feature of all human endeavors” (Boshoff, 1997). In the service context, companies have to handle mistakes and mitigate human risks, meaning that they should be able to prevent problems and recover from them. Moreover, rapid changes in today’s marketplace require improved monitoring of service organization factors to prevent the potential risks associated with this turbulence (Sauter; Murphy, 2004).

2.2. Occupational stress and front-line employees

Front-line employees in service companies occupy extremely stressful positions (Miller *et al.*, 1988). In the context of private banks, wealth managers have a direct and personal relationship with their clients. Working in a stressful environment increases the risk of suffering from physical illness and/or from psychological distress (Clarke; Cooper, 2004). These negative consequences are especially prevalent when work-induced stress is combined with tensions at home (Boles; Babin, 1996).

The scientific literature defines two distinctive job-related stresses (Fisher; Gitelson, 1983; Jackson; Schuler, 1985; Netemeyer *et al.*, 1990): role conflict and role ambiguity. Role conflict means that workers believe that they are not able to meet the job requirements or feel stretched between customers’ demands and management’s injunctions. Role ambiguity relates to the uncertainty surrounding job tasks (Boles; Babin, 1996).

Stress is not only negative, as it can also result in performance improvement (cf. Behrman; Perreault, 1984). In contrast, burnout (defined as a state of physical and emotional exhaustion) occurs only when stressors overwhelm a person’s coping resources (Lazarus; Folkman, 1984 cited in Singh, J., 2000). When employees feel that they are unable to bridge a gap with the requirements or expectations placed on

them, it may reduce their effectiveness at work and cause health trouble (Toderi *et al.*, 2015). Therefore, studying personal and organizational resources is crucial in the analysis of job-related stress.

Front-line employees are subject to moderate to high levels of burnout, as they may feel torn between the clients' demands and the organization's constraints and policies (Cordes; Dougherty, 1993). According to Singh *et al.* (1994), job burnout is a good indicator of the level of dysfunctional job-related stress. Another major issue regarding burnout is that it often affects the best personnel, namely the employees who are usually skillful and take the initiative (improvise) in the case of service failures (Pines *et al.*, 1981).

As a theoretical framework, we chose to study and build our research on the job demands–resources (JD-R) model (Demerouti *et al.*, 2001) and on its later development concerning work engagement, because it links stressors to performance (Bakker; Demerouti, 2008). This framework was a useful resource laying out the key concepts.

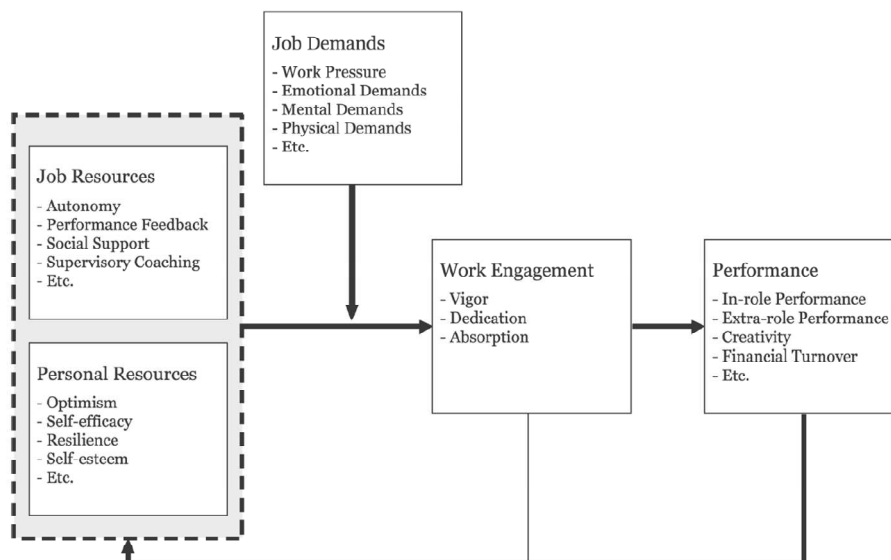


Figure 1: Job demands–resources model (Bakker; Demerouti, 2008, 218)

2.3. Job resources and job demands

As stated in the framework provided by the JD-R model (2008), job resources comprise factors such as autonomy, performance feedback, social support and supervisory coaching. In their model of burnout (2001, 2007), Bakker, Demerouti and their co-authors included rewards, skill variety, job security, learning opportunities, competence, job control and participation as job resources. Participatory approaches involving employees and employers have been applied to increase job control (Lindström, 1994).

Supervisors' behaviors have been found to influence a large variety of outcomes, such as job satisfaction, burnout, job neglect and their associated costs (Karimi *et al.*, 2014; Toderi *et al.*, 2015). Autonomy, defined as the supervisor understanding and acknowledging the employee's perspective, providing meaningful information, offering choices and encouraging self-initiative, is also associated with the style of

leadership. It promotes self-motivation, satisfaction and performance (Baard *et al.*, 2004), less absenteeism and better physical and psychological well-being (Blais; Brière, 1992 cited in Baard *et al.*, 2004). A negative link has been found between perceptions of destructive leadership style and employee well-being, as employees are more likely to suffer from depression, anxiety, emotional exhaustion and reduced enjoyment of their work (O'Donoghue *et al.*, 2016).

To obtain high employee involvement, the management must provide front-line collaborators with autonomy, authority and responsibility (Hart *et al.*, 1989). To deal with the inevitable service failures, banks should concede more autonomy. In particular, in complex situations employees should be able to conduct their own diagnosis (Karmarkar and Pitbladdo, 1995) and rely on their own judgment. However, service industrialization has left employees with little room for maneuver. The banking sector adds another layer of complexity, since service operations must be satisfying for the client and compliant with strict and extensive regulations at the same time. Moreover, due to the numerous banking scandals relayed by the press, employees are usually scared to bend the rules to provide the customer with an ad hoc solution. When finding a solution, the service provider has to work in a very emotional environment related to company aspects (e.g. layoffs) as well as to client issues (fear of being guilty of wrongdoing) (Pina e Cunha *et al.*, 2009).

In terms of impact, there is a positive relationship between job resources and work engagement measured as turnover intentions (Schaufeli; Bakker, 2004). A resourceful environment fosters employees' willingness to dedicate their efforts and abilities to performing well and achieving the objectives (Meijman; Mulder, 1998 cited in Bakker, A. B.; Demerouti, E., 2008). Job resources are also the most beneficial in maintaining work engagement under conditions of high job demands (Hakanen *et al.*, 2005).

In their various studies, Demerouti, Bakker and their co-authors identified various job demands, such as work pressure, physical workload, poor environmental conditions, demanding clients and time pressure. Some of the job demands are not the most relevant to service settings, as they are more related to physical labor. They also categorized demands into emotional, mental and physical demands. In our case we preferred to refer to more specific job demands that have been identified as influencing employees' well-being and ill-being.

Furthermore, decreasing role conflict and role ambiguity helps to increase job satisfaction (Barnes; Collier, 2013) and contributes to reducing stress reactions and health disturbances (Cooper; Torrington, 1979 cited in Lindström, K., 1994). These authors also found the service climate to have an impact on work engagement. The organizational climate, quantitative workload and insecurity (categorized as job resources) are indicators of perceived stress (Lindström, 1994). Organizational roles (which represent the expectations of an individual and of an organization) and the cultural context (defined as the history and values of the organization's culture) have an important impact on health outcomes (Lindström, 1994). Besides, technological, structural or social turbulence and change pressure can be a threat to work organization and personnel (Lindström, 1994).

2.4. Ill-being, the hidden site of work engagement

Ill-being within organizations can take different forms. Well-being involves subjective happiness and satisfaction measured through subjective symptoms (e.g. job satisfaction, perceived health), somatic symptoms (e.g. headaches, palpitations, dizziness, sleep disturbance) and psychological symptoms (e.g. fatigue, nervousness, depression, lack of energy) (Lindström, 1994). Engaged employees experience better health (Schaufeli; Bakker, 2004) and positive emotions (Cropanzano; Wright, 2001). Greater overall satisfaction with autonomy, competences and relatedness needs contribute to more positive attitudes and better well-being (Baard *et al.*, 2004).

In jobs with high demands and limited job resources, employees develop exhaustion and disengagement (or cynicism), which are the core dimensions of burnout (Bakker *et al.*, 2004; O'Donoghue *et al.*, 2016). The corresponding model is presented in Figure 2. Excessive workload is a predictor of burnout dimensions (García-Izquierdo; Ríos-Rísquez, 2012).

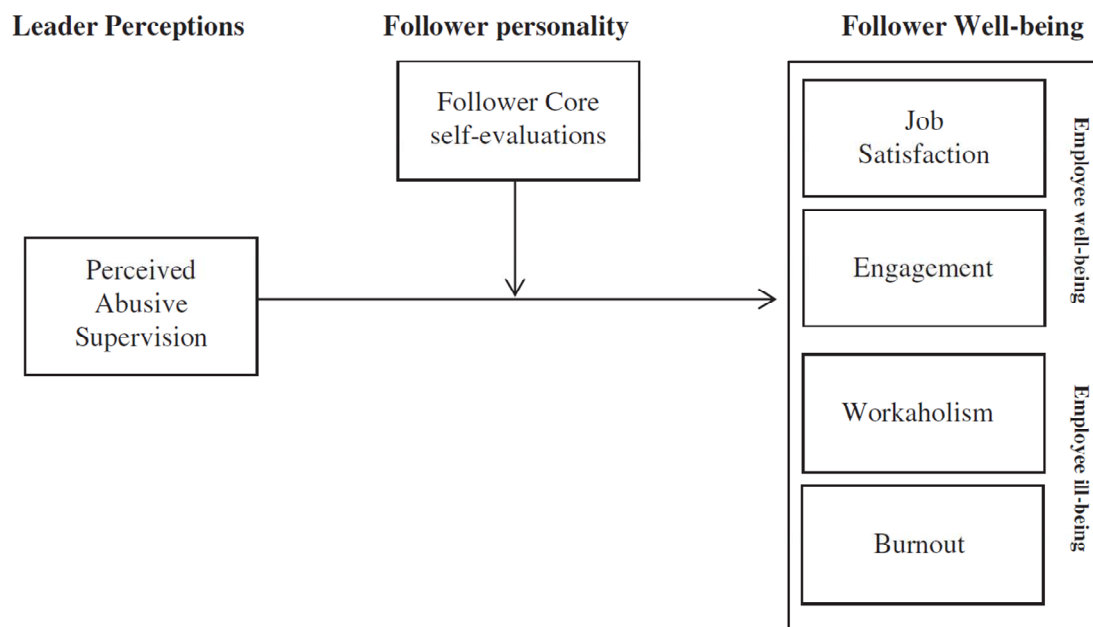


Figure 2: Research model developed by O'Donoghue et al. (2016) considering both employee well-being and employee ill-being

Bakker *et al.* (2004) defined exhaustion as an extreme form of fatigue due to intense strain caused by prolonged exposure to job stressors. Emotional exhaustion is the opposite of vigor (González-Romá *et al.*, 2006). It diminishes the available energy of an employee and leads to impairment of the efforts put into work (performance) (Singh *et al.*, 1994).

Disengagement refers to negative cynical attitudes and behaviors towards one's work in general (Bakker *et al.*, 2004). Cynicism is the opposite of dedication (González-Romá *et al.*, 2006). When organizations do not provide rewards or job resources, the consequence is withdrawal from work and reduced commitment as a

self-protection mechanism to prevent future frustration from not being rewarded or not reaching goals (Bakker *et al.*, 2004).

2.5. Value destruction, the hidden of performance

Bakker and Demerouti (2007) claimed that work engagement has a direct impact on performance measured in terms of in-role performance (i.e. meeting organizational objectives and effective functioning), extra-role performance (i.e. discretionary behaviors to promote the effective functioning of an organization, such as willingness to help colleagues), creativity and financial turnover.

Moreover, when suffering from burnout, employees are not prone to strive for changes in their situation and feel less confident in solving problems. As they feel exhausted, employees are not able to perform well because their energy resources are diminished (Bakker *et al.*, 2004). Burnout also leads to undesired behaviors such as personnel turnover and absenteeism (Bakker *et al.*, 2004).

Besides, a positive relationship has been observed between employee satisfaction and productivity, customer satisfaction and profitability and between work engagement and customer satisfaction and loyalty (Harter *et al.*, 2002). Other studies have found that work engagement is strongly related to creativity (Bakker *et al.*, 2006) and to higher financial returns (Xanthopoulou *et al.*, 2007).

To ensure value creation and avoid the risk of value destruction, human risk management has to be developed. In the professional auditing literature, factors inducing human risks have been identified. For instance, the corporate culture promotes informal policies based on the acceptance and sharing of key values (IIA, 2013). The enterprise culture may also lead employees to misbehave and reinforce illegal activities; for example, companies' history of corruption tends to make employees repeat inappropriate behaviors (Baucus; Near, 1991). In contrast, a corporate culture that fosters communication and trust between employees and managers, and promotes collaboration between people, reduces the emergence of human risks.

To study the relationships between human risks associated with inappropriate job resources and demands and ill-being, then leading to value destruction, we chose an inductive qualitative approach. The goal was to build new theory by identifying hypothetical relationships to be confirmed in subsequent research. The methodology used in our study is explained in the next section.

3. Methodology

This study reflects the philosophy of "interpretivism," which is the most appropriate for the scope of our research. Its main objective is to understand how occupational stress, as a special case of human risk, can become a source of service disruption within Swiss wealth management banks. Thus, a comprehensive and deep understanding of this issue is necessary to conduct data collection and address the research question effectively. Therefore, we believe that this inductive approach (Voss *et al.*, 2002) is the most suitable for our research.

As noted earlier, we followed an ethnographic research strategy. Saunders *et al.* (2011) stated:

Its purpose is to describe and explain the social world that the research subjects inhabit in the way in which they would describe and explain it. It is a very appropriate strategy in business, if the researcher wishes to gain insights about a particular context and better understand and interpret it from the perspectives of those involved.

This approach is well suited to understanding the perceived consequences of the deep structural changes in the Swiss private banking sector following the financial crisis and the end of Swiss banking secrecy.

The research process followed different steps (the process was not linear but rather iterative):

- We conducted a thorough literature review to determine the state of the art of research related to human risks in service experiences.
- Based on this literature review, we generated a priori hypotheses.
- We conducted a series of semi-directed interviews.
- The collected data were analyzed using content analysis (with the help of RQDA) based on codes and categories of codes from the literature review.
- We triangulated the results with focus groups as well as unstructured interviews.
- We developed a new theoretical framework by confirming or refuting our a priori hypotheses and by suggesting new variables to be integrated.

The sampling strategy was a purposive one. We conducted interviews until new knowledge was obtained. Consequently, the choice of respondent profiles was made when the interviews were underway and was thus often combined with a “snowball” approach.

Our survey was conducted among 35 people from several institutions during the period from September 2013 to February 2014. The profiles of the respondents corresponded to various positions occupied in the field of private banking in Switzerland. In particular, our convenience sample was composed of CFOs, financial risk managers, security managers, procurement managers, HR employees, asset managers, management assistants, portfolio managers, middle managers, back-office employees, compliance officers, operational risk managers and so on.

We designed a questionnaire with the goal of uncovering “meanings” related to the social phenomenon of ill-being (such as burnout) and the nature of risks contributing to it observed in the Swiss wealth management sector. We conducted semi-structured interviews with bank managers and employees and unstructured interviews with customers and employees. We also used secondary data from various professional publications and reports.

The semi-structured interviews were designed to provide the respondents with enough freedom to address the most important issues to them and to encourage them to share their experiences with the researcher, who would then either redirect

the interview to explore additional patterns or ask further questions to deepen the analysis. The structure was as follows. The analyst first met the respondents and asked for a few details of their education, professional path and experience. In this paper we specifically concentrate on the following four questions asked during our semi-directed interviews:

- 1) How do you feel about your job?
- 2) In your company have you observed any instance of human risk?
- 3) What was the evidence that revealed these cases of human risk?
- 4) In your opinion how are these issues going to evolve in the context of Swiss banks?

All the interviews were fully and faithfully transcribed. Through our literature review, the key factors and impacts of human risks were identified to constitute a list of codes. More specifically, we used the coding scheme presented in Figure 3. The coding scheme was thus established based on a new model adapted from both Bakker and Demerouti (2008) and O'Donoghue et al. (2016). In the model presented in Figure 3, we eliminated the construct "personal resources" (which belonged to Bakker et al., 2006 cited in Bakker and Demerouti, 2008), since we are dealing with enterprise-wide risk management and not with the psychology of individuals. We also replaced the notion of well-being with the notion of ill-being as defined by O'Donoghue et al. (2016).

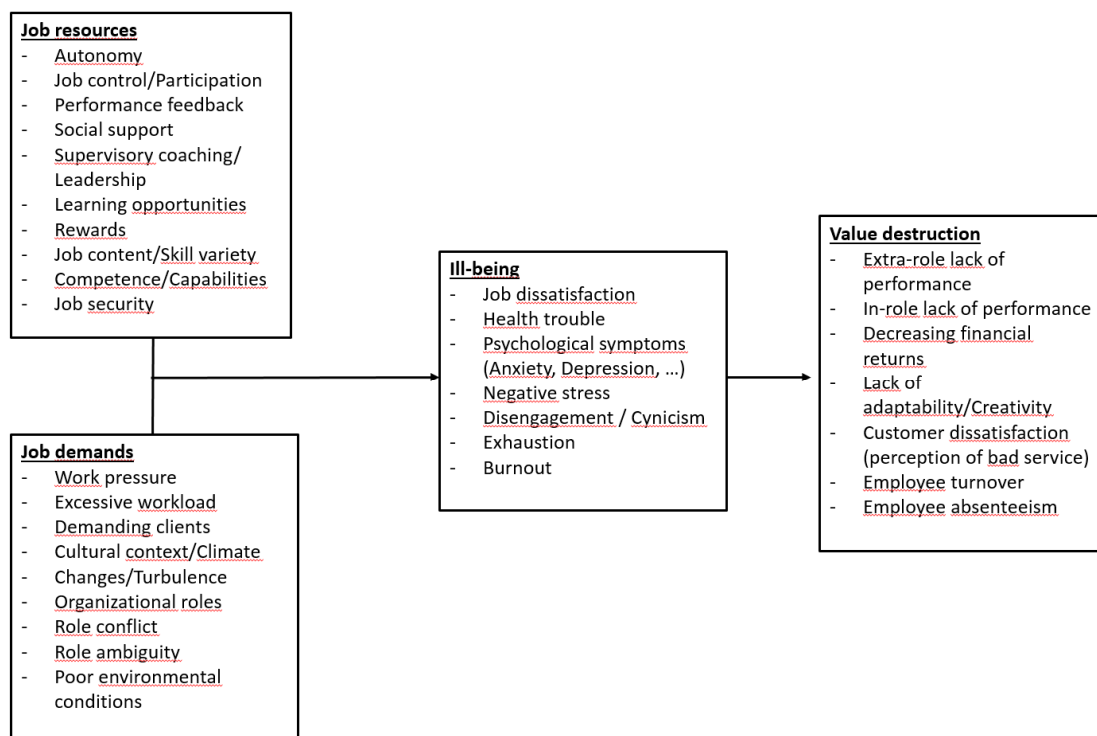


Figure 3: Revised model (based on Bakker; Demerouti, 2007 and Donoghue, 2016) used for coding purposes

These codes were used for content analysis. All the collected data were uploaded into the RQDA software (part of the open-source R software suite). The whole corpus was then coded. Relevant parts were associated with one or several codes. The

coding results were cross-checked by the authors to ensure better validity and reliability. All the code-related content was analyzed.

In the next section, we present the synthesis of the main results obtained from the interview transcripts.

4. Results

Our bank is like a steamer. We regularly increase the heat. We don't know when it's going to explode. But when it will, damages will be huge. (Interview 7 – private wealth advisor)

4.1. Job resources

All the dimensions of the job resources' category were mentioned throughout the discussions with the interviewees. The most prevalent issue by far was the role of the upper management. The respondents stressed the role of their managers by stating that they are the ones to instill values and directions and to create a good work climate. When things go wrong or when uncertainty increases, they should be the best defense and support. However, most of respondents complained about the fact that the managers do not even listen to them (e.g. "I don't agree to work for a slaver" – interview 15 – senior compliance officer). They felt that managers' behaviors were disrespectful (e.g. "Shut up was part of everyday vocabulary" – interview 3 – HR manager) and sometimes obviously damaging when using mobbing attitudes. Some of them abdicated their responsibilities and blamed their subordinates in the case of errors or poor performance.

Table 1: Job resources results – top issues

Job resources	# of codings	# of interviewees
Supervisory coaching/leadership	49	22
Social support	18	15
Job security	21	14
Rewards	17	12
Autonomy	21	10
Competence	13	10

Social support is crucial to survive such poor environmental conditions. These respondents demanded good relationships and continual communication among colleagues. However, employees no longer had time to talk and exchange opinions. There was no more collaboration and solidarity, just more competition.

This phenomenon could be explained partly by the fact that most of the respondents described measures of mass layoffs in their banks. These measures were taken

essentially against older employees, who were also the most experienced. The employees no longer felt protected (e.g. “in case of sick leave, the employees are fired as soon as the legal waiting period allows it” – interview 22 – risk manager). As a consequence, they live in fear of losing their jobs.

Employees accept working in a difficult environment if they feel that they receive something in return. However, the Swiss bank employees felt that they were not rewarded fairly and sufficiently considering the high-risk environment, their skills, their knowledge and their performance. In particular, the employees believed that the reward schemes were inappropriate and even toxic. Surprisingly, the bank employees did not complain about the decreasing wages or bonuses. They even thought that the reward systems might be overestimated and might lead to misbehaviors as they promote short-term thinking instead of continuity of jobs and of the company. Above all else, the respondents complained about the non-financial components of rewards. In particular, they suffered from a lack of recognition. Not only was there no sign of gratitude, there was also no perspective and no meaning, just discredit.

4.2. Job demands

When talking about their job and related human risks, the respondents explained what was so different in the industry today. They highlighted different contextual factors that might account for the emergence of human risks. Some of the job demands' dimensions were discussed far more than others. In contrast, the “demanding clients” dimension was not mentioned at all, as the respondents seemed to think that customer requests were fully legitimate.

Table 2: Job demands' results – top five issues

Job demands	# of codings	# of interviewees
Changes/turbulence	31	20
Culture/climate	41	19
Work pressure	44	18
Excessive workload	24	18
Poor environmental condition	15	11

One of the most recurring themes was the new legal framework. The respondents not only complained about the emergence of new rules; they also lamented the conflicting content and the process followed to impose new rules. Some of the new laws that were enforced in Switzerland were imposed by OECD countries that did not follow the same rules in states such as Delaware (US) or on the island of Guernsey (GB). This enforcement was perceived as unfair and as an unjustified display of power. The employees felt betrayed by the Swiss Government, as they thought that it did not fight back with adequate determination. These new laws have been rapidly translated into new policies and procedures that were perceived as inconsistent and irrelevant (e.g. “I feel oppressed by the legal framework. I have to deal with an unnecessary burden” – interview 5 – relationship manager).

Ongoing rapidly changing management, regulations, mergers and acquisitions are stress factors for the employees who have trouble fitting in that new world. (Interview 35 – director of stock exchange operations)

This profound change in the legal framework has shaken and weakened the whole industry. It has increased the competitive pressures among Swiss banks as well as other financial markets. Banks are seeking further savings and efficiencies (e.g. “We are in permanent and continuing reorganization since many years” – interview 18 – internal auditor). They are trying to standardize their operations, which seems to be incompatible with the very nature of private banking. Some of them have been bought up or merged. Many employees have been fired even though they were knowledgeable, efficient and well performing, which reinforced the feeling of unfairness (“The Swiss banking system is dehumanized” – interview 6 – head of wealth management). The employees felt that they have to work in a high-risk environment with nothing in return (“Employees have become money pump” – interview 30 – head of risk management; “One asks more without giving more. They milk the cash cow” – Interview 17 – legal and compliance officer).

4.3. Ill-being

It's like Foreign Legion. You come with your weapons and equipment. You don't care about your employer. Employees are like mercenaries. (Interview 9 – chief security officer)

In particular, the employees were suffering from a lack of respect and meaning. Even within a team, people did not collaborate. Daily survival in some places had become an individual struggle. Disengagement and cynicism were described using aggressive and belligerent words. Some employees (even described as “the enemy within” in interview 15 – senior compliance officer) were at war with their colleagues (“Individualism generates a toxic culture” – interview 10 – human risk manager) and even more so with the managers and executive boards (e.g. “Dissatisfied employees want their revenge” – interview 1 – relationship manager). There were no more relations of trust and loyalty.

Sadly, most forms of ill-being were strongly represented in our analysis. The only form of ill-being that was almost completely absent was workaholism (one coding). Alcoholism or overuse of drugs was more present as a derivative for supporting the working conditions (four interviewees mentioned it).

Table 3: Ill-being – top five issues

Ill-being	# of codings	# of interviewees
Disengagement/cynicism	39	21
Burnout	30	18
Exhaustion	21	14
Stress	21	13
Psychological symptoms	19	13

Stress was felt to be ever increasing and impossible to handle. “It had become palpable” (interview 29 – asset manager). For instance, a respondent saw a colleague “physically” falling to the ground (interview 5 – relationship manager). These difficult conditions led to a general feeling of physical and emotional exhaustion expressed in different terms such as lassitude, apathy, persistent fatigue or total exhaustion. The interviewees observed different types of symptoms ranging from depression (the most frequent), withdrawing into oneself, sudden mood changes, nervous breakdown, aggressiveness and sorrow to anxiety. “My colleague did not joke anymore, he was at the end of his rope, he had changed” (interview 7 – private wealth advisor).

4.4. Value destruction

In our theoretical model, we identified some types of value destruction. In our analysis, we added one more form that was not identified through our literature review. The most frequent form of value destruction in the context of the Swiss banking industry is fraud and data and money theft. Fraud and theft were more common than might be expected. For instance, a medium-sized bank had to deal with one huge case per year besides lesser damage in a number of others (interview 25 – business developer). According to our respondent, the number of fraud cases was increasing with the growth of employee dissatisfaction and disengagement. There was a phenomenon of “fraud by frustration” (interview 18 – internal auditor) or “active harmfulness” (interview 16 – risk manager).

Table 4: Value destruction – top five issues

Value destruction	# of codings	# of interviewees
Fraud/theft	67	27
In-role performance	46	25
Employee turnover	41	23
Employee absenteeism	27	14
Customer dissatisfaction/bad service	10	6

Corporate ill-being resulted in problems of turnover and employee absenteeism. When people suddenly left their occupation for another job or in the case of sick leave, they were usually not replaced. This meant that the work to be performed would be distributed among the remaining colleagues, creating an even larger

workload and more stress. When employees quit their job, the bank lost experienced people and all their knowledge and capabilities. “Generally, the best employees left first” (interview 22 – risk manager). All the explicit and tacit knowledge was a loss for the banks but also for the country, as some of them preferred to move to other countries “where there are still business opportunities” (interview 6 – head of wealth management). The available competences were also hurt by disengagement, as it resulted in more intentional and non-intentional errors and a lower quality of work. Very often employees chose not to comply with internal rules and procedures as doing so took too much valuable time and they had become less attentive.

All these aspects have a strong impact on customers. Throughout their interactions, employees’ frustration spilled over to the customers, who became depressed and unsatisfied (interviews 6 – head of wealth management – and 31 – portfolio manager). The customers felt as if they were being betrayed by the banks and their representatives, who were not sufficiently available (e.g. “How can you trust a bank when the person of contact is ever changing?” – interview 15 – senior compliance officer). They felt uncomfortable and they left for competitive banks located in foreign countries.

In the next session, we discuss the synthesis to build theory and provide a new model adapted from Bakker and Demerouti (2007).

5. Discussion

The main finding arising from the results of the field work is that we had not anticipated the importance of the “fraud” variable when considering the “value destruction” construct.

More precisely, the two main identified paths leading to value destruction are as follows:

1. Work pressure and work overload (as “job demands”) combined with bad leadership and a lack of social support (as “job resources”) lead to exhaustion, burnout and stress (as “ill-being”) and ultimately to employee turnover and absenteeism (as “value destruction”).
2. Changes and turbulence (as “job demands”) combined with a lack of job security and bad leadership (as “job resources”) lead to disengagement, cynicism and job dissatisfaction (as “ill-being”) and ultimately to fraud (as “value destruction”).

Consequently, it seems as if both cases correspond to vicious circles. Absenteeism and turnover increase stress and workload, since the remaining employees have to deal with far more. Similarly, fraud and related scandals increase turbulence. Indeed, banking crimes are often unpunished, and this contributes to more cynicism among the employees. The danger of such vicious circles is that specific cases that could have been prevented can end up having dramatic consequences. A few examples in the banking sector are massive layoffs, no more prospects for employees who are more than 50 years old, copycat suicides and so on. This discussion enables us to draw a new model, as presented in Figure 4.

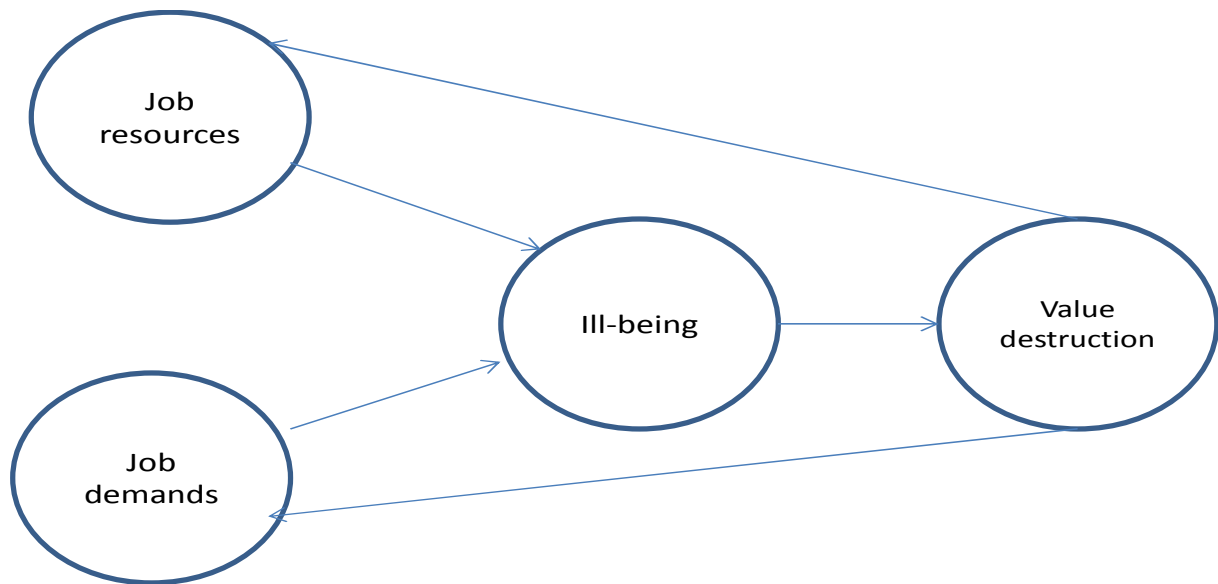


Figure 4: New adapted model in which “job resources and demands” lead to “ill-being” and then to “value destruction” with a loop towards “job resources and demands”

According to Wacker (1998), theory building is grounded on the four following components: a) definitions of terms and variables; b) a domain (i.e. the exact setting in which the theory can be applied); c) a set of relationships; and d) specific predictions. We then employ this outline to build some new theory.

Human resources play a key role in the banking industry. We assumed that in hectic times human-related risks, defined as potential damage caused by people, will increase and hinder value creation or even destroy value. Employees experiencing stressful situations may create problems and/or not act correctly as a result of disengagement. According to the JD-R model and further research, engagement and other well-being dimensions are the results of job-related demands and resources.

We studied the impact of changes in wealth management in Geneva (a city that is certainly the most known for this specific service sector) over the last years. We observed a conjunction of sudden and huge stress on both wealth managers and clients (loss of bank secrecy, profit margin reduction due to fierce competition and transparency regulation, foreign fiscal policy, etc.).

Improved well-being leads to better value (co-)creation. We studied the impact of job-related demands and resources on the opposite of well-being (i.e. ill-being) and on potential value destruction. Well-being in the service sector is typically affected by human risks taking place during the interaction between the service provider and the client. A stressed client and/or a stressed service provider can prevent value creation. Contagion is most likely to occur when employees are stressed, frustrated and dissatisfied. Stressful service interaction situations can be detected in advance and be properly mitigated if the stressors are correctly identified. Our model also adds this notion of a loop between the “value destruction” construct and the “job demand and resources” construct, leading to a model describing a vicious circle.

To prevent human risk from happening, actions can solely be taken at the micro-management level. This was raised by most of the respondents in our data sample. It means that there is a need for more proximity, direct communication as well as trust in human interactions. To avoid any contagion, one must handle these human risks

upstream. As it is advocated by risk management standards (e.g. COSO, ISO), it is better to address the causes at the origin of the risk rather than its consequences (“prevention is better than cure”). The JD-R model, as we have adapted it, could thus constitute a practical approach to addressing the risk more upstream directly at the levels of job demands and resources to prevent these vicious circles from occurring. Our results also highlighted the crucial role of managers in preventing (or reinforcing) human-related risks. For the predictions arising from the application of this model to be confirmed in reality, we need to test this model in subsequent research to make it really usable.

6. Conclusion

Switzerland is the global market leader in wealth management. The Swiss wealth management sector has suffered from two major shocks in the past years: the financial crisis and the end of Swiss banking secrecy. Following these shocks, new stringent international banking regulations have been enforced in a very short period of time. Their implementation has resulted in huge problems of work stress and burnout for the employees. Swiss bank employees used to live in a privileged environment providing high financial rewards, social status and job security. As the context changed, they feel that they have lost everything and have to cope with a hostile and even toxic work environment.

These changes associated with other dimensions of job resources and demands had a strong impact on employees’ well-being, or rather on its opposite, their ill-being. As the leadership was not able to deal properly with all these changes, but just reacted by laying off numbers of employees, especially the most experienced ones, the service climate changed and put even more pressure on unsecure employees. The symptoms of ill-being were varied, ranging from cynicism, burnout, exhaustion and stress to depression, among others. Ill employees reduced their engagement and displayed undesired behaviors. Above all, they could observe numerous cases of fraud and theft. Acts of value destruction would then reinforce stressors as part of a vicious circle.

Further research is needed to test and validate these relationships and their strength using quantitative surveys. We have already started to collect related quantitative data to analyze them and test this new model with statistical inferences. This model (human risks – value destruction loop) should also be tested in different contexts, as wealth management might display a specific culture linked to everyday contact with money and opportunities to steal from the assets to be managed.

From the perspective of risk management, the existing methodologies should be applied and adapted to check their effectiveness and to measure their impact. The results might call for the development of new methods that are better suited to human-related risks. In particular, more attention has to be devoted to human-related risks within service settings, as service production heavily involves humans of two kinds: providers and customers. Better service will rely on the well-being of all the actors involved in the delivery of the service experience. Further research might also specifically study the impact of these relationships on the value co-creation process.

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ICT AND NEW SERVICE EXPERIENCE IN ITALIAN INSURANCE INDUSTRY

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The aim of this paper is to discuss how the insurance industry has changed its way of conducting business in recent years by the role of ICT. The insurance industry has been adopting the latest Information Technology advances and exploiting the ICT applications in order to create value-adding networks, where, employees, partners and customers are the key providers of innovation. The work reports the examples of cases selected among the major insurance Italian companies (Generali) in order to highlight the valuable role of the “direct” service provider within the complex process of production and consumption of policy insurances and auxiliary services. The paper addresses the need for research on a particular service sector by indicating the unexplored issue of one-to-one marketing strategies adopted by the insurance industry in the era of modern Information Technology. The paper provides evidence of the enormous benefits that the adoption of new service experience can ensure to this sector in terms of customer satisfaction and, by implication, of competitive advantage in an ever-changing and volatile market.

Keywords: Innovation technology, Service Innovation, Insurance,

1. Introduction.

The Net and the Web have become an essential tool for all the business activities⁵². Starting from the “shop-window Websites” or those ones that are identical to the business brochures, today we find complex relations with the social networks and the social media.

The Web is one and it will be always the same as long as its protocols are the same and its technological structures are valid. It doesn't seem that HTML, HTTP, CSS, IP

⁵² The Web has been always the same for 20 years. When on March 13th, 1989 the baronet Sir Tim Berners-Lee, researcher at CERN, European Organization for Nuclear Research, wrote and submitted his proposal for the information system management, he showed that the information could be easily transferred on the Internet by using the hypertext. On September 30th, 2005 Tim O'Reilly (not to be confused with that Tim who invented the Web) decided to publish an article concerning the basic ideas of a Web new model. The article, headed "What Is Web 2.0 - Design Patterns and Business Models for the Next Generation of Software"⁵², compared some business practices on the Web to show deep differences between the current business model and the new possibilities of entrepreneurial development.

protocols and so on have been modified, yet. More simply, the chances of users – either citizens or consumers, either large, medium, small-sized companies or public management – have increased in order to build and run their activities on the Net.

Unfortunately, some people, who were disappointed with the 2.0 Web, have already set the 3.0 Web, as a representation of the Semantic Web.

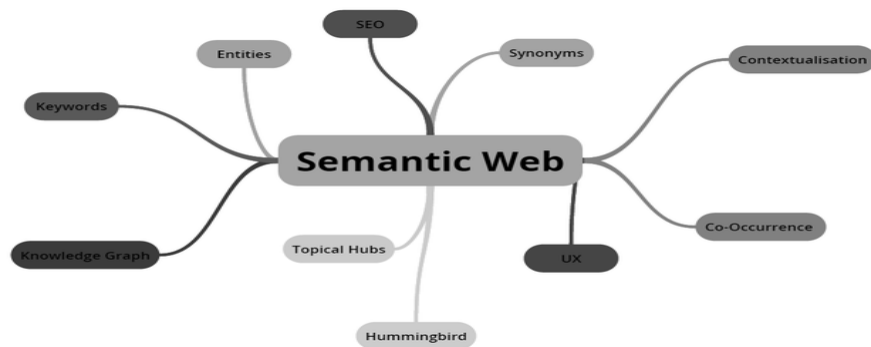


Figura 1 What is the Semantic Web

Source: <http://alwaysgro.com>

Besides, as the decimal numbers are running out, Tim O'Reilly together with John Battelle has introduced, the concept of the "Web Squared"⁵³. The Web building and the knowledge sharing can be possible thanks to the development and the use of some Web applications, that are carried out by the mash-up of existing applications. The chance of taking pieces of applications and existing services and of linking them each other, has completely disarticulated the market of computer programmers and coders and has supplied the companies with infinite chances of implementation.

The insurance companies that aim at being competitive are required to implement and monitor their cultural, technological and information activities.

2 Strategy to a technology implementation

The advantages of web 2.0 context can't be denied - agility, responsiveness, employee empowerment, improved sharing and collaboration. The 2.0 Web is based on some very simple concepts: the building of a Web content is much easier than before; there can be a total sharing and building of contents by several people; it is difficult, almost impossible, to remain anonymous on the Web; you can surf the Net thanks to a mobile device, too; whoever surfs the Net contributes to modify it despite he doesn't do anything special, surfing the Web is enough.

- The building of a Web content is much easier than before.

Until lately some programs, such as GoLive CyberStudio, were absolutely necessary and you also needed to learn and use the program and to know HTML. Today, it is

⁵³ Web Squared: Web 2.0 Five Years On By Tim O'Reilly and John Battelle Special Report Web2

sufficient to open a free account on Wordpress.com to get your own blog or a small Website in 5 minutes, without any code.

- There can be a total sharing and building of contents by several people

Wikipedia, Google Knol, YouTube or Google docs are some examples of how to build and share knowledge and information on the Web. It is sufficient to surf the Net in order to cooperate with friends, colleagues or unknown people.

– It is difficult, almost impossible, to remain anonymous on the Web.

Whatever device connects to the Net, it can be detected and the user can be traced. Concerning the social network, the companies must be clear. A company cannot chat on the Net without declaring its identity distinctly. The management of a clear and very good reputation on the Web is based also on the clearness of its own ideas and actions.

– You can surf the Net thanks to a mobile device, too.

Thanks to a mobile phone you can surf the Net, upload a video from YouTube, modify a profile on Facebook or LinkedIn, or a page on Wikipedia; send and receive e-mails.

- Whoever surfs the Net contributes to modify it despite he doesn't do anything special, surfing the Web is enough.

All the Websites - from the main Internet portals to the simple blogs - can carry out detailed analyses about the users surfing modalities, thanks to free and very powerful tools, such as Google Analytics. The users' surfing practices induce the sites managers to modify their contents and representations on the basis of their feedback.

The best definition of social media is by Niall Cook in his "Enterprise 2.0" , who states that the social media has got a wide meaning that includes both the practice and the final result of different pieces of information created on-line by those people who were previously media consumers.

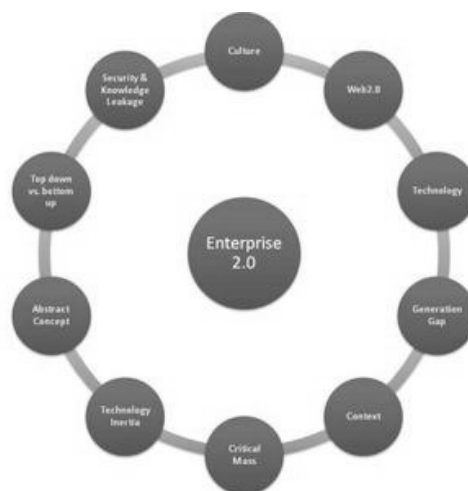


Figura 2 Enterprise 2.0 - 10 key questions

Source: BCS, The Chartered Institute for IT

The most intelligent and quickest companies have immediately understood that the users of social networks and social media could represent an incredible basin of potential customers. Today, it is not possible, of course, to communicate and to advertise in a traditional way. It is necessary to use the same communicating modalities as considered by the networks. The company listens to, introduces itself and, finally, chats clearly with its potential or actual customers.

The new culture of on-line communication: some insurance examples.

It is clear that new professional figures are needed for the online chats. Such figures can act only when the company has meant to change.

Some resistances still exist. During the Enterprise 2.0 conference held in Boston last June, 2009 - in a white paper - some results concerning some US companies have been taken into account. 52% of interviewees stated that the resistance to change .is the worst danger to the new approaches of companies towards new activities of online communication.

Nowadays, the company that aims at winning the challenge in Internet and on the Web must accept the change, more specifically it must: be clear; listen; be active; show a propositional attitude; collect its news, analyse them and interact. From an online research, insurers are starting to realize the value of social software to enhance open communications, highlighted above.



Figura 3 Social Software oder

Source: <http://socialmedia-institute.com/>

For example, in some companies podcasting has been recently experimented to distribute best practices and industry information within the sales organization, and the use of wikis as platforms has been explored to document IT standards and reference architectures.

Initial insurer investments in Web 2.0 technologies have become part of ongoing efforts to enhance IT portfolios by combining redundant and closed technology functions into meaningful business services. When designed correctly, these services are exposed directly to partners, distributors and customers over the Web, resulting in more-flexible and cost-effective interactions.

Case history: Generali⁵⁴

The Assicurazioni Generali Group with his entities in 34 different countries has always been a vanguard in modern distribution. Long before the Internet web spread out into the world, Generali was already operating some very successful direct sales initiatives using hi-tech solutions. CosmosDirekt (www.cosmosdirekt.com) had been established in 1982 – which was selling insurance products via telephone in Germany. A similar story applies to Genertel (www.genertel.it), which was founded in Italy in 1994 as the first call centre in the Italian financial industry. As soon as Internet became available also to the public both CosmosDirekt and Genertel opened their first web sites from which they were capable not only to provide information to the customers but also to allow each and every purchasing and after-sales operation at a distance in a self service mode.

Today CosmosDirekt is the market leader in directly sold life products not only in Germany but within continental Europe. Genertel is the Market Leader in Non-Life in Italy and has recently started selling life products via web also benefiting from the Cosmos experience. Several other initiatives of using the web in order to generate revenues and profits have recently started (e.g. Genertel Hungary, www.genertel.hu) or will start in the near future.

Using Internet as a real business generator, the Generali Group has already invested in several web 2.0 experiences on the web.

You can find below some examples of the Generali entities around the world:

Client-fotogallery “Galleria del futuro”, www.genertel.it (Genertel, Italy) 2007. The gallery of the future was an initiative conducted together with the new advertising campaign in 2007. Site visitors are asked to upload of themselves a picture and provide a 3-sentences description of the future they want (e.g. +technology- waste +love). All the visitors can vote and each month the most voted profile is published on the homepage. E-bay (Genertel, Italy), 2009. This time the customer should choose the price. So Genertel made an auction for a motor (MTPL) product on e-bay. The response was very strong and created a controversial discussion within the insurance industry on pricing

Vogliounavita, www.vogliounavita.it (Genertel, Italy), 2009. Customers can upload their vision within a photo and a reminder on a specific website. (I want a ...life). The goal is to create a community together with the creative Oliviero Toscani.

EuropeAssistance blog, blog.europassistance.it (Italy) 2005. The official corporate blog of Europe Assistance Italy, putting together topics of travels and safety and promoting EA initiatives.

TerraFemina, www.terrafemina.fr, (France) 2008. Partnership with the site Terra Femina, a women community website. Identify trends and issues linked to women

⁵⁴ Courtesy of: Giovanni Liverani, Direttore Servizio Operazioni Assicurative di Gruppo Assicurazioni Generali SpA

and their saving accounts. The goals were to use the interactive contents to attract surfers and get to know them and to let woman design their own product.

Kontsumous, www.kontsumous.fr (France) 2009. Another revolutionary concept: Hook up with your friends and buy together online your car insurance. For this you get K-points, which could be used for reducing the deductible in a case of accident

Wecarelife, www.wecarelife.at (Austria) 2009. The goal of this website was to create a community about leisure time activities (Holiday, Sports, health...) and to get to know better the community members. All Generali costumers are invited – and are having exclusive information on the site. In a second phase it is planned to co-design products via this website.

3. CONCLUSIONS

The insurance industry has been particularly slow to leverage collaborative technologies such as blogs, wikis and podcasts in the public domain. While these communication tools offer an opportunity to engage our customers, partners and shareholders in a direct and often more-personalized conversation, they can be perceived as a challenge to existing corporate communication controls and processes. While these technologies produce new data sets that can be used to create original and innovative services, they may contain sensitive and personal information that will require robust data security solutions. In addition, the use of collaborative technologies outside the walls of enterprises will require information protection and legal experts to ensure the security of intellectual property and other private information. Such a danger is highlighted also by the Italian responsible of Vittoria Assicurazioni, who hopes in a better system of control of e-mails and Internet services. In Italy, according to a responsible of Zurich Insurance, the available technologies are in a greater number than the ones that people can use. This cultural gap refers to the insurance companies, above all.

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INFINITY SOURCE OF INNOVATIVE SERVICE

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The present paper adopted two research methods: systematic literature review regarding to innovative services perception; and Innovative Service Providers survey demonstrating the need to identify the source from which services have their genesis process and then are provided as original idea. The analysis focuses on targeted organizations to which submitted questionnaire bring empirical data to the paper under advice of Kyoto Chamber of Commerce and Industry (KCCI). The findings here after reported call to the “re-evaluation” of the social dimension of co-creation of value as user/consumer’s decision “to participate” versus “not to participate” at the genesis of services be considered an infinity source of potential service.

1. Introduction

Every and any process is considered as a sequence of actions or steps taken in order to achieve a particular end in general. Here in particular to generate service that is brand new, original and that introduce changes is taken under consideration focusing on their respective creative source and origin.

Re-evaluating user/consumer’s decision on “participating” versus “non-participating” at the Genesis of innovative services – social dimension of co-creation of value – makes us inevitably questioning the follow: can we consider daily life activities an infinity source of potential service creation? In other words is that as soon as de future user decide to no longer do it on his own and waits for a service provider to take hand and do it for him the mark and step stone for a service to be created and be labeled as innovative through the economic activity it embodies.

Undeniable alternative perspectives shall then be taken when facing brand new services. Especially when using existing tools for identification, definition, classification, evaluation and so on in the service research field.

The essence idea of this paper regarding innovative service generating process appears here like obeying to context and conjuncture needs. And in simple way is approached this process by the angle of value co-creation by users’ deliberation on self-doing (or not) versus service provider make of users decision a business opportunity.

Market creation in service research under subjective definitions, well-being and value (co)creation faces here the think of non-predictive strategies origin. In the now-a-day complex and interconnected world it becomes progressively vibrant that actors rely on the exchange of applied skills and competences for their mutual value co-creation.

The networked and systemic nature of value co-creation has been widely recognized and investigated. However, less is known on how actors co-create individual and collective values, benefits and well-being. The new conceptualization of value needs to capture its multi-faceted dimensions and this paper goes on the belief to widening the knowledge from and through the source of service creation.

2. Research Methods: Design and Settings

After analyzing the concept supported by “Innovative Service” reference is taken to what could be questions nurturing a “multidimensional approach counting up the dynamism as well as the aspects of quality, reputation, social innovation and social value” of an “Innovative Service” provided by a company thanks to submitted questionnaires.

Participatory design impacts allow to develop means for active participation of stakeholders to realize meaningful service (choice to answer one need and not another). Also to analyze ethical and societal impacts of new applications in service system allows to analyze and clarify an effective adaptation process of service systems.

Thanks to Kyoto Chamber of Commerce and Industry (KCCI) direct and some already done contacts with targeted organizations only submitted questionnaire is possible as source of empirical data. To bring support data base of awards in service industry in Japan (nation level) is presented for information in field and type of innovation. Intentionally to picture innovative services development in the country.

Data collection for literature review

Based on traditional systematic review process, the following set criteria have been established:

- EBSCOhost as the research database;
- All chosen articles were published in English;
- All articles were from 2000;
- Keywords used were: service, innovative, source;
- Abstracts helped on final selection;
- Full reading of articles.

A total of 10 papers suggested by the database composed the dataset regarding to identify how has been services defined as innovative adjacent to the novelty determinant component identification allowing such definition.

Dataset analysis for literature review

Analyzing the dataset there are some considerations to take in account: fully dedicated papers to innovative service definition are “inexistent”; topics were of a multi-disciplinary nature but management predominance is easily noticed.

Results for literature review

Deepening the analysis it is possible to identify a lack of studies examining explicitly innovative services source matter. Furthermore the generating process of new services also suffers same scarcity.

Focus was about innovations *in* service often entitled as “innovation service”. And this takes us back to distinctions made for semantic matters.

However a brief and dual categorization allows ranging the read articles as follow:

- Innovation basis: all the literature measuring how innovative the service is.

AND

- Management basis: all the organizational structure support allowing the service to be innovative.

Data collection for/from survey

The objective is to find out the source of genesis process of the provided service as original idea.

Defining innovative service as coming from business opportunity depicted from users’ decision to allow third persons to “serve” them through the shape of economic activities.

Innovative service entities identified by Kyoto Chamber of Commerce and Industry (KCCI) on the magazine “Kyoto Creative Industry 2011-2014’.

Composant elements:

- Dependant variable: innovative service;
- Independent variable: kind of need; operational means;

3. Analysis: measurement and decomposition;

- Outcomes: point out skills, qualifications, organization, labor conditions

Dataset analysis for/from survey

Trajectories of learning in practice-based innovation shows that the organizational roles at play in sustainable innovation and innovation management motivates the seek for sustained (radically) new services in all sectors;

Sustaining of innovation as collaborative learning capability is still a black box – new theorizing and managerial frameworks needed (e.g. Grossman & Apaydin 2010).

What and with whom are the practitioners learning when are they co-create and sustain co-created value?

Results for/from survey

Basic learning trajectory of innovation (derived from data, inspired by theory of expansive learning – Engeström 1987) can be categorized in three phases:

Phase1: recognizing problem/opportunity: practice-based emergence and recognition of motive, relations and capabilities related to available opportunity for innovative solution;

Phase2: trialing, expanding: practical integration and configuration of innovation-related opportunities, relations and actions from multiple actors in local context;

Phase3: sustaining: adoption or transformation of successful solutions, models and practices/relations for sustaining, re-innovating and diffusing the new use value (innovation).

And the survey in this study will line up its analysis to the above.

3.1. Systematic Literature Review

Conceptual framework for innovative services analyses can take approaches based on indicators of performance: productivity and employment.

Service innovation as an engine for the economic growth risk of bias not captured by the traditional indicators of innovation. Service sector was seen as inconsistent with the rise of the service economy. Main characteristics of service product its intangibility and its co-production.

Models of innovation process in services unresolved issues relative to the definition of service output have contributed to the underestimation of the performance of service innovation in terms of productivity and employment. Theoretical inferences and pertinent application.

Service production is an action, or a treatment protocol, that leads to change of state, not the creation of a tangible good (Gallouj, 1998).

Early definitions of services were based on technical criteria derived from classical economists, Smith (1776) and Say (1803) view service as a product that is consumed in the instant of production; Singlemann (1974) and Fuchs (1968) take the notion of co-production as the interaction between consumer and producer in producing services; Stanback (1980) describes services as non-storable and non-transferable; Hill (1977) widened the definition “a change in the condition of a person, or a good belonging to some economic unit, which is brought about as a result of the activity of some other economic unit, with the prior agreement of the former person or economic unit”.

Gadrey (2000) brings “service triangle” that defines as process or a set of processing operations that are implemented through interactions without leading to the production of a good that can circulate in the economy independently of a medium (reality owned or used by consumer). A set of characteristics and competences reflecting

both the internal structure of products and external properties suggested by Gallouj and Weistein put the simultaneous mobilization of competences (provider and client) and technical characteristics (tangible or intangible).

Vargo and Lusch (2004) with service-dominant logic redress the model of exchange in marketing adding service provision: "...service is exchanged for service; all firms are service firms; all markets are centered on the exchange of service, and all economies and societies are service based." And the value co-creation is highlighted for the role of producer and consumer is reminded. Gronroos (2006) comparing service logic and good logic found service logic fits best the context of most goods-production business today (goods are resource functioning in a service-like process). Fisk et al. (1993) bring in the IHIP criteria: intangibility – impossible to be perceived physically, heterogeneity – variability of results when provided, inseparability – simultaneous provided and consumed and perishability – "not kept, stored for later utilization, resold, or returned" (Biege et al 2013).

Product and process innovation have blurred (Bitran & Pedrosa, 1998) lines between them once the important role of clients in service innovation based on feedback is source of incremental or bigger innovation. Thanks to these criteria information technology allows low levels of capital equipment used and considering services firms highly dependent on competences embedded in human capital as a key competitive factor and strategic element in the organization and delivery of service products (Sirilli & Evangelista, 1998).

Integrative approach is found to be the most promising and comprehensive theoretical perspective. Last two decades the aim is to generate more achievable policy implications for how innovation in the service sector should be discussed in order to reveal the vital role that innovation in services might play in modern economies.

3.2. Survey

Accepting that in the innovation process must be taken in account:

- Innovation capability (what do organisations do to structure and promote their innovation activities – and how able and ready they are)
- Linkages (by type of partner; more than just cooperation)
- Drivers and barriers to innovation (actors and factors)

Let's explore Innovation capability through related 'questions' to the:

- Innovation strategy
- Specific goals, targets for innovation activities
- Development department
- Activities organised in innovation projects
- Individuals charged with supporting the development and implementation of innovative ideas

- Procedures for reviewing/assessing innovative ideas for further development and implementation
- Regular evaluation of innovation strategy, innovation processes
- Systematic procedure for gathering external knowledge
- Part of staff work time explicitly devoted to innovation
- Innovation-related training/courses for management, staff
- Staff incentives for generating innovative ideas

Descriptive analysis

In the Kyoto Chamber of Commerce and Industry (KCCI) Creative Industry universe of 95 companies we took focus on Brand New Services group.

Questionnaires were sent after direct phone calls introducing the study.

Positive reactions allowed interpretations as following:

Moment of realization

Without exception all innovative provided service on study found their genesis moment on to the business person own in-need experience.

After deepening interest regarding to solution and identification of niche possibility creation stepping stone were taken and the business launched. Here is the aim of this study: business entities come to life by putting their attention to an ordinary experience generating a need calling out for a solution.

Quality parameters

Client satisfaction as top priority finds support on organize, operational, material and immaterial resources at their best requirements. All enquired organizations showed the Japanese Omotenashi⁵⁵ Culture (the art of hosting) aspect up to date in the exercise of the innovative service.

Feedback

The direct contact with users of the provided service is fully used to know how the need has been fulfilled. In regular basis or in more spreaded way all the organizations touch the subject of communication with all the taking parts to the activity and make use of the fruits to generate improvements or maybe find possibilities for brand new other services.

Collaborative Learning

⁵⁵ www.japantoday.com/category/.../view/the-business-of-omotenashi
“Omotenashi” is hard to define, but Japanese use it to describe what they believe is their unique approach to hospitality. “Omotenashi” involves the subjugation of self in service to a guest, without being “servile”.

Inwards and outwards options are simultaneously used by the service providers. Sharing, delegating, learning in an *ad hoc* created environments the innovation fever keep working for solutions.

4. Findings

To depict the source of “Innovative Services” providing an empowered insight supported by qualitative and multidimensional approach indicates the value co-creation by users’ deliberation on self-doing (or not) versus service provider make of users decision a business opportunity be clarified. Services and requirements of support under new approaches for such proof of identity.

Expected findings are for the paper and similar research an additional step on experimenting previously published “multidimensional approach” and own adaptability on supporting analyses of innovation process in (for) diverse service as the respective knowledge advances.

Factor combinations between inputs and corresponding outputs at multiple stages of a service delivery process.

Four requirements (Biege, 2013) for productivity measurement concept: Innovativeness – services new to the company differentiated from services new to the market; Internal output of a service process; Including interactive inputs that are not expressed by provider’s and customer’s inputs (time and cost); and Knowledge, competencies, and skills.

Experiences are the main goal of all the innovative organizations enquired.

Approaching the genesis process by the capacity organizations develop in catching up with users unrevealed need takes us back to long reflections regarding to created needs.

This study comes in the need of always keep an eye on the source of innovation in service. The back to the origin movement shall also put its light on service universe. Efforts understanding impacts and results from services shall be equalized towards understanding from where they’re coming. Users will always have needs that could perfectly be satisfied by their own means. Certainly limitations exist in the sense of individuality and privacy matters. But they can deliberate in contrary and allow service providers to take chance and make from such decision a business opportunity.

5. Discussion and conclusions

Specific characteristics of the nature and modes of organization of innovation in services (Gallouj & Savona, 2009) emphasizes the importance of service trajectories as the service output (immateriality, interactivity, and co-production). A focus on the non-technological and invisible innovation output (service-based: service customization, problem solving, new solutions, new methods, and new organizational structures). New typologies for innovation in services permitting indicators dedicated to services: ad-hoc innovation, new-expertise fields of innovation, and formalization in-

novation (Gadrey & Gallouj, 1998). Modes of organization like multi-unit, new combinations of services, and customers as co-producers are examples of organizational innovation identifiable as taxonomies.

Underestimated innovation in services by assimilation approach is contrasted by the reverse product lifecycle model (Barras, 1986) introducing the incremental process innovations. From this point evolutionary taxonomies emphasizes trajectories like supplier-dominated, scale-intensive, science-based, information intensive, and specialized suppliers. Here innovation systems and networks are important concepts when addressing service innovation.

The “wellbeing” contribution and “solving problem” offered by the provided service has more than primer social effect. Same for the employment economic one: the more the number of clients grows, the more employees will be needed to respond with service quality.

We hope to see more and more analyzing study cases adopting “multi-criteria and system dynamic perspectives” evaluation. This empowering evaluation of the evolution through the “Innovative Services” universe we now live in. Details can be revealed and handled by accurate tools as they’re caught by their mutating shapes in the ongoing generating new service process.

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INFLUENCE OF INSTITUTIONS IN RESOURCE INTEGRATION AND VALUE CREATION IN A MULTI-LEVEL CONTEXT OF SERVICE ECOSYSTEMS

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The main purpose of this research is to get a deeper understanding from an ecosystem perspective on a well-established specific empirical context, considering its multi-level (micro, meso and macro) interdependence, of how institutions and institutional arrangements influence actor's resource integration and value co-creation. This research allowed concluding that even in a well-established market it is possible to construct non bounded solutions through a service platform. Through this platform actors are able to create new contexts and scenarios from which an efficient solution is derived for value creation. Out of the constructed scenarios actors choose the solution that is the most efficient for value creation.

1. Introduction

The context in which a customer experience takes place influences the resources' integration and thus the value that is co-created. The context depends on each specific actor involved in the service experience, the unique network of other actors and resources he is connected to and the existing institutions and institutional arrangements. So, each actor's context determines the resources directly and indirectly drawn upon and leveraged.

This research is centred on value creation and the way resource integration contributes to that in a mass market specific empirical context. We assume that value co-creation takes place within service systems embedded in social systems. Thus, the groundwork to resource integration and value creation of actor's relational processes is given by the duality between structure and agency through practices. These mean routinized micro social units that allow us to understand how the world is perceived by actors who not only integrate resources in more than one system at the same time, but also perform several roles depending on how they are influenced both in time and space by different institutional orders (e.g. family, market, profession).

The main purpose of this research is to get a deeper understanding from an ecosystem perspective on a specific context, considering its multi-level (micro, meso and macro) interdependence, of how institutions and institutional arrangements influence actor's resource integration and value co-creation. Moreover, understand what the links between the different levels are and the way they work and influence

each other considering an institutional logic perspective where societal norms, beliefs and rules shape actor's behaviour.

2. Conceptual Framework

2.1. Service eco-systems and value-co-creation

In a networked society the dichotomous relationship supplier-customer must be seen as a global interaction between many actors (Gummesson, 2006). Vargo and Lusch (Vargo and Lusch, 2011) proposed a more generic designation to the constellation of relationships in business adopting the term "actor". The A2A (actor-to-actor) designation is consistent with the notion of market as an organized behavioural system. Considering that system is a bundle of dynamic and complex processes where co-creation of value happens during actors' interaction and, at the same time, jointly provides the context through which 'value' gains its collective and individual assessment. But networks are more than multiple relationships. They are open and dynamic systems where individuals, groups, organizations, firms and governments take actions, apply resources and work with others in mutual beneficial ways as service systems (Maglio and Spohrer, 2008) to co-create value (Nenonen and Storbacka, 2010). SD Logic has been broadening the perspective of marketing by zooming out the firm-customer perspective which can be noted in the rewritten FP9 ("All social and economic actors are resource integrators.") where a network structure for value creation is clearly eminent. The A2A approach implies that the resources needed for service provision, at least in part, may come from other actors. Furthermore, as Vargo and Lusch (Vargo and Lusch, 2015) suggest, it also implies a dynamic view of the network since the integration of the resources by the actors may change the nature of the network. Thus, the authors recommend a system orientation approach rather than a network understanding alone. In SD Logic those authors suggest the use of "service ecosystem" concept to identify those systems and defined it as "a relatively self-contained, self-adjusting system of resource-integrating actors connected by shared institutional arrangements and mutual value creation through service exchange" (Vargo and Lusch, 2015, 6). Vargo and Chandler (Chandler and Vargo, 2011) argue that service exchange is framed by the context. These authors conceptualized and proposed a multi-level (micro, meso and macro levels) approach of context in which service-for-service exchange occurs. The micro level of context (micro-context) is a reciprocal dyad where the exchange process is a direct service-for-service exchange that occurs between individual actors. The meso-context frames exchange as it occurs amongst dyads as triads. There is one actor directly serving other two which consequently are indirectly serving each other, so the service-for-service exchange in this case is indirect. In the macro-level, the context frames exchange among triads as ecosystems. At this level there are direct and indirect service-for-service exchanges in a context of a complex network. Additionally, the authors introduced the idea of a meta-context layer which represents the evolution (across levels, over time and through replication) of the three levels and frames the exchange among complex networks as service ecosystems. The SD Logic idea of value-in-context draws attention to how the co-creation of value is framed by the micro, meso and macro levels of interaction previously described (Akaka et al., 2013; Chandler and Vargo, 2011). Although similar to the service ecosystem concept, since it was also grounded in SD Logic, the service science concept of ser-

vice system defined by Maglio et al. as “a configuration of people, technologies, and other resources that interact with other service systems to create mutual value” (Maglio et al., 2009, 395) gives more emphasis to technology whereas the SD Logic one underlines more the role of institutions. The service ecosystem concept was introduced to emphasize that market interactions occur between any actors through the networks they belong to and are governed by norms, rules, meanings, symbols and practices that are the “rules of the game” (Vargo and Lusch, 2011). According to that concept of actor it is also possible to consider that no individual network has enough resources to ensure the co-creation process, which could lead us to a network-to-network conceptualization of relationships. Therefore, it is possible to consider that the co-creation process occurs at several levels.

Edvardsson et al. (Edvardsson et al., 2011) defend that value co-creation takes place within social systems and as such, value creation has the same meaning as value co-creation. In other words, service exchange and value perceptions occur in social systems where actors (companies, customers and others) have established their roles and positions. Under this perspective, value is seen as a social construction and therefore seen as value-in-social-context. In different occasions the same customer may perceive the same service differently depending on the social context under which it occurs. This draws the attention to the importance of social relations, collective norms and meanings in value creation.

2.2. Institutions and Institutional Arrangements

SD logic follows (North, 1994) about institutions considering these as “the humanly devised constraints that shape the human interaction” or in (Scott, 2001) approach, the devised rules norms, ideas, meanings and beliefs that constrain human action. Institutions, as the “rules of the game” in a society and the way they evolve affect the performance of economies over time and are the key to understand historical change. In SD logic institutions is one of the key to understand the structure and the functioning of service ecosystems, the others being Institutional arrangements and the process and role of institutionalization.

Institutional arrangements is not a consensual concept. Different schools of thought have different approaches to it (e.g. Blumstein, 1981; Scully, 1988). In Lusch and Vargo (Lusch and Vargo, 2014), the term applied was “logics” rather than “arrangements”. However, in more recent articles these authors started to use the later one (Vargo and Lusch, 2015). Institutional logics (Friedland and Alford, 1991) are socially constructed, historical patterns of cultural symbols and material practices by which individuals and organizations provide meaning to their daily activities (Thornton and Ocasio, 2008) and assuming institutional logics as analytical framework implies using the concept to analyse the interrelationships among institutions, individuals and organizations in social systems (Thornton et al., 2012). The emphasis in organizations as normative structures and how they can interpret and learn about opportunities and their associated payoffs is present in a circular way (North, 1994). This moves away from the view that institutions are shared by actors and the greater the number of these are embedded in the same “performing without thinking” the greater the potential to value co-creation is.

The majority of organizational studies appealing to institutions follow Webber’s approach in which organisational institutionalism is focused on institutional rules,

legitimacy and isomorphism (Meyer and Rowan, 1977). DiMaggio and Powell (DiMaggio and Powell, 1983) extended the concept of isomorphism where organizations play different roles (normative, coercive and mimetic) to other organizations but the focus is placed in organizational structure, sidelining the relational role of agency. Nonetheless, by mentioning organizational field as a “critical unit bridging the organizational and societal levels in the study of social and community change” (DiMaggio, 1986), DiMaggio embeds a relational component between the social actors and the presence of common institutional structures tightfitting a connection to practice approach near to the notion of Habitus in Bourdieu (Bourdieu, 1977) or the Giddens’s structuration theory (Giddens, 1984). More recently Thornton et al. (Thornton et al., 2012) advocate that the duality of agency and structure, institutions as material and symbolic, institutions as historically contingent and institutions at multiple level of analysis are the fundamental principles of the institutional logics perspective and as such they assume that the relationship between actors take place in social networks where institutions are ingrained (or embedded) (Granovetter, 1985).

Institutions, in SD logic “tooling kit”, are facilitators of value co-creation in service ecosystems where markets are only one of these. As institutionalized solutions, in the assemblage and reassemblage processes of society (Lusch and Vargo, 2014), through resource integration and service-for-service exchange nested and overlapping, those ecosystems are organized around shared purposes. By providing this bone structure, institutions and interdependent collections of institutions (institutional arrangements) are instrumental to cooperation, coordination and governance activities in resource integration processes, which lead us to the work of the governance of the commons (Ostrom, 1990) and political science.

In Kiser and Ostrom’s (Kiser and Ostrom, 2000) work on the effects of institutional arrangement on patterns of human behaviour and the resulting patterns of outcomes, these arrangements are considered the rules used by individuals for determining how individual actions will be aggregated into collective decisions in a community shared language rather than as parts of some external environment. Institutional changes do not have a direct and immediate impact in a decision rule. They only affect the shared understandings through which the choices are made within decision situations affected by the rules. In the framework presented by the authors, a micro institutional approach was used as it considers a unit of analysis that starts in the individual to explain individual behaviour and resulting aggregated outcomes. It is institutional because the major explanation comes through institutional arrangements that individuals use to act on the incentive systems of social order. However, the result of this combination is only perceived if the aggregation is considered. That is, the sets of patterns of human action and the results that occur in interdependent choice-making situations in everyday life experiences and practices of individuals interacting with one another through different institutional orders as markets, families and communities (e.g. clubs; neighbourhoods) or others.

Although the framework presented focuses the core of analysis at the individual decision maker (the operational level) which explains the world of actions, other levels must be considered as well. One of them is the collective choice level guided to the world of authoritative decision making and the other is the constitutional level, which explains the collective choice mechanisms. Consequently, it is in the connection of this “three worlds” that action must be understood, moving away from the rational neoclassical economist position where individuals make decision with perfect in-

formation about markets and resources or assuming that the individual possesses incomplete information about the decision situation (Simon, 1981).

In SD logic the assemblages and sub assemblages of resources occurring in society can be seen, for analytical purposes, at various levels of aggregation (Lusch and Vargo, 2014). This means that one activity at one level can only be understood by viewing from other levels as well. The individual and dyadic structures and activities are considered at micro level, whereas networks of operant and operand resources are at meso level and broader societal structures are at macro (Akaka et al., 2013). For that reason, it is in and across these levels that resource integration and co-creation process occurs in service-for-service exchanges and consequently those layers together constitute service and service ecosystems. But these service-for-service exchanges are contexts and these frame markets since exchange between actors can be considered within and among service ecosystems. DiMaggio and Powell (Dimaggio and Powell, 1983) see this process of exchange as institutionalization by which actors become attached to norms, values and roles in a given society. This process includes the maintenance and change of institutions in service ecosystems through interactive and recursive actions (Vargo et al., 2015) allowing changing contexts to be explored by actors in their co-creation progress.

Since the service action of an actor is temporally and spatially embedded in these multiple layers of complex networks, practices can be viewed as replications of rules and institutions temporarily supporting the exchange processes.

2.3. Innovation through Practices

There is no consensus in literature about the meaning of practices although some compromise can be achieved by stating that practices are arrays of human activity (Schatzki, 2001) in social everyday life. In Bourdieu (Bourdieu, 1990), structure, habitus and practices are key elements to understand how knowledge is constructed by interplay of agency and structure and this is done through the habitus, socialized norms and rules that guide behavior and thinking.

Similar approaches to practices were developed by Anthony Giddens (Giddens, 1984) in his “theory of structuration” or by Foucault (Foucault, 1998) in his work about ethics, where the relations between bodies and agency are analyzed. Arnould and Thompson (Arnould and Thompson, 2007) argue that practice theories are grounded in cultural approaches to understand action in symbolic structures of meaning. In the same flow, Reckwitz (Reckwitz, 2002) also assumes this cultural backbone but he moves way from those who focus the social in the mind of the individuals (Husserl perspective), or those who value signs, symbols and texts (e.g. semiotics perspective), or even those whose engagement is central to support relations and interaction between actors where meanings have been internalized in their minds outside structuration process (e.g. Habermas’s theory of communicative action).

We assume Reckwitz’s view where practice is a “routinized type of behavior which consists of several elements, interconnected to one another: forms of bodily activities, forms of mental activities, ‘things’ and their use, a background knowledge in the form of understanding, know-how, states of emotion and motivational knowledge”. By claiming practices as dialogical processes between structure and human activity provided by direct interaction as well as through institutions, SD logic authors also as-

sume the Reckvitz's prospect in which practices refer to 'ways of doing', embedded in the context and as so are contexts as well. This enlarges the unit of analysis to a totality that explains the systemic whole of value co-creation.

To SD logic view (Akaka et al., 2013), innovation can be conceptualized as the co-creation or collaborative recombination of practices that provide novel solutions for new or existing problems, where technology is only one of several resources (a dynamic one) to be integrated. This emphasizes the collaborative participation of actors and the role of institutions in innovation and market reformation in service ecosystems. This suggests that actor's interactions in ecosystems are influenced and also influence the (re)formation of institutions that constitute markets.

In traditional approaches to innovation the constitutive activities are usually divided into two main areas: technology/products/production/delivery (broadly with an operations function centric focus) and market/customer/distribution/communication (broadly with a marketing function centric focus). This separation of areas is rooted in the view that the customers are only static end-users that destroy the value added by providers in consumption processes. We pursue a perspective of innovation that is always present in any business interaction and requires the combination of future and past meanings of particular offering, where relational scenarios, real or imaginary ones, and value propositions connected to these offerings are embedded in roles, standards and social norms of markets and as so we adopt the SD logical view.

In this sense, the service ecosystem approach enlarges the meaning of innovation. Not only because resource integration and service exchange has the potential to change the nature of the system and the context for the next iteration of value creation, but also because it blends what is considered in traditional approaches the different phases of innovation (e.g. idea generation; design; implementation; use) in a continuing evolutionary process of business interactions and adaptations (backward and forward) guided by institutional arrangements and institutions. It is through these processes that institutionalization (i.e., maintenance, disruption and change) of integrative, normative, and representational practices, and ultimately innovation occurs (Akaka et al., 2013).

2.4. From Design Thinking to Innovation

Design thinking began to emerge outside design circles for about a decade and more recently became a subject of interest at different academic communities in business, technology, communication and entertainment. Underlying to this infatuation is the creative way of solving problems attached to design approaches where the symbolic and the cultural are core marks which allows breaking new ground in innovation and by such means rethinking how markets and/or its actors can be conceptualized in a society that moves from hierarchies to networks, from bureaucracies to multiskilling team work and from stuff exchange to share and collaborative economy with their fussy and fluid business environment. It is beyond the scope of this work to go deeper in design Thinking. However, some highlights must be presented.

Selin et al. (Selin et al., 2015) consider three positions about design thinking. The first one focuses on how designers do design and lead to the study of the nature of the design problems in depth which are considered ill structured. Some authors argued that design is about giving form and order to physical things (Alexander, 1964).

Others, emerging from scientific and computational methods post 2nd world war, near close to those developments such as operations research and operations management decision-making techniques, strongly advocate to base design on objectivity and rationality (Cross, 2001). Herbert Simon (Simon, 1981) in "The Sciences of the Artificial" presented another approach. He considered design as the knowledge that is in the domain of different professions such as engineering or management and not only in the designers' field. Focusing on decision-making models, he saw design as a rational set of procedures that respond to well defined problems. This author also discussed expanding design science to a "bounded rationality" as well as ill-defined problems. In the second flow of research (Buchanan, 1992) on concept about wicked problems in design thinking, the design scope is extended to a wide range of human complex problems particularly in technological areas. Four orders of design to work on: signs, things, actions and thoughts are considered towards problem solving. The third stream considered by Selin et al. (Selin et al., 2015) look for management and consultancy practitioners (e.g. IDEO) to demonstrate design thinking as a path to innovation and as an organizational resource that could be used as a loosely-structured organizational process to convert problems into opportunities. In this sense, design thinking is attached through innovation to the generation of entirely new concepts and its focus is on systems ecology (Martin, 2009).

Interesting to our work are some approaches by Buchanan (Buchanan, 1992) and Rylander's (Rylander, 2009) built on Dewey's work that do not distinguish between the designer and the world, or in other words, do not rely on the separation between knowing and world. Hatchuel (Hatchuel, 2001) coming from engineering fields and exploring the contribution of design in organizational theory argues that design is crucial to value co-creation. Building on Simon's work of bounded rationality, he moves away from the view that design is just a type of problem solving activity and albeit in his work problem solving is a moment in a design process, the contrary is not true ("a feline is not a particular cat, but the reverse is true"). For him, design involves the exploration of non-countable sets that are infinitely expandable, which pushes him away from Simon's rationality. His "expandable rationality", where problem-solving is only a moment within a design process and design problems are not knowable and evolve during the process, looks at the design both as an output and a resource of social interaction ("social interaction becomes both a resource and a designable area") where interactions can be conceptualized between different social actors and artifacts by social practices and institutions. This design problems and solutions that co-evolve with its environment and co-creators, facing uncertainly goal ambiguity, and isotropy in a never ended work was called effectuation logic (Sarasvathy et al., 2008) and was considered consistent with SD logic (Chen and Vargo, 2010) since the learning mechanisms necessary to the design processes are "embedded in the system and the system would be able to adjust agilely to be dynamically adaptive to the changes required by the revised design".

If we want to operationalize design thinking, we must look to design practices. Practice Theory (Reckwitz, 2002; Schatzki, 2001) shifts the unit of analysis away from a micro level or a macro one to an indeterminate level of analysis involving the macro, meso and micro levels through institutions and institutional arrangements at a nexus of minds, bodies, objects, discourses and knowledge that together constitute practices. According to Reckwitz (Reckwitz, 2002), practice is understood as a "routinized type of behavior which consists of several elements, interconnected to one another: forms of bodily activities, forms of mental activities, 'things' and their use, a back-

ground knowledge in the form of understanding, know-how, states of emotion and motivational knowledge”.

In (Kimbell, 2009) work about design as practice and designs in practice, she emphasizes three aspects to consider in design thinking debate. The first, highlighting (Orlikowski, 2000) study about how technologies are constituted in different ways by users’ practices which means that structures are not located in organization, or in technology, but are enacted by users in practice. Thus, design can be understood transcending the boundaries of the individual with their cognitive styles and she positions the design activities as distributed collaboratively across different actors and the artefacts with which they interact. For the second consideration, she reminded Reckwitz in “For practice theory, objects are necessary components of many practices, just as indispensable as bodily and mental activities. Carrying out a practice very often means using particular things in a certain way” and as so objects have a role in constituting creative and constructive practices. Finally, she stresses that knowledge is in the core of practice theory as a social accomplishment situated in the ongoing routines of bodily and mental activities and follow (Ryle, 1949) considerations about the “know how” and “know that” to state that knowledge is a two dimensional construction and practice support the interconnection between the two.

Based on these considerations, Kimbell (Kimbell, 2009) grasps two ideas about design. Design as practice, focused in what designers do and think, their shared, embodied and situated routines and artefacts they use, or in another way, how institutions and institutional arrangements impregnate the design work moving the unit of analysis from the individual or organizational skills and competence to a debate on how practices incorporate not only these aspects but essentially how they are embedded in the context where those practices exist and emerge. Two topics can evolve from this perspective.

Design thinking follows this approach and is far from the rational problem solving activity supported by Simon (Simon, 1981) and somehow only partially concerned with the Hatchuel’s “expandable rationality” (Hatchuel, 2001). Since design can be considered an activity performed collaboratively by different actors and not in exclusive by designers, we are all in one way or another design performers in our daily life practices. This does not mean that the role of designers fades away, but as others actors, they are beneficiaries and providers (for specific knowledge) in society.

The second idea of designs in practice emphasizes the emergent nature of design outcomes enacted in practices. Design is a never ended process, since the work of designers can be finished but the work of design is still not over. This leads us to consider that through the actors’ engagement in value of use of different value propositions over time and space, value scenarios (material, virtual or even in dreams) continue to be developed relationally. Design for the known can stop, but the design for the unknown is a never ending job.

This brings us to the role of scenario building presented in the design and design thinking. Scenarios can be seen as structured conceptual systems of equally plausible future contexts, often presented as narrative descriptions and system maps conceived for someone and for a purpose that serve as inputs for further work (Selin et al., 2015). We state that scenarios are always collaboratively developed in order to achieve experiential futures across widely different contexts or institutions. Blend scenario and design practices in an interactive progression to generate meaning in

interaction to get a refreshed sense of the everyday life (Simon, 2012) can be seen as repeated collaborative cycles never unfinished of framing and reframing ideas, prototyping and deploy of uses in resource integration processes for value creation.

3. Methodology

Given the nature of the phenomena under investigation and the research question posed “How institutions influence resource integration and value co-creation in a multi-level context conceptualization of a service ecosystem?”, a qualitative research approach was chosen. The setting chosen to study was multinational brand of a fast food restaurant chain with thousands of restaurants around the world and millions of customers. A case study was conducted to collect data sensitive to the context under analysis and semi-structured interviews were made to representatives of the service provider as well as to customers of the restaurant chain in order to grasp their stories through narratives. The customers were chosen randomly at the time the interviews were made. The semi-structured interviews allowed the respondents to tell their stories, to comprehend the meanings their actions have for them and the way the rules and norms affect their practices. Through actors’ stories it was possible to understand their perspective of the world reality. According to Boland (Boland Jr, 1986) the only way to understand how actors make sense of their activities is by asking them directly. As suggested by McColl-Kennedy (McColl-Kennedy et al., 2012) the activities carried out by customers are part of social practices that are undertaken within social systems. During these social practices customers are able to learn, adapt and take decisions in line with their socially constructed view of the world.

Additionally to the semi structure interviews, a set of observations in restaurants during customers’ practices were carried out. This allowed the researcher, without having any influence on customers’ behaviour, to obtain more information about their activities and interactions during social practices. The observations were also used as an input to the interviews in order to get from the respondents explanations about the meanings of some of the activities and behaviours previously observed. As argued by Helkulla, Kelleher and Pihlström (Helkkula et al., 2012) observations alone allow to identify practices but do not allow to understand the actors’ meanings of those practices. Thus, through the combination of these two methods (observations and semi structured interviews where actors were encouraged to tell their stories) it was also possible to better understand the institutions that were influencing customers’ social practices. Observation of service practices in the restaurant was also used to find patterns and triangulate results. Interpretative data analysis was subsequently performed.

Although interviews and observations were made until data saturation was obtained, this research has some limitations since it was performed in a specific context of social practices carried out in a fast food restaurant chain. Therefore, statistical generalization is not possible and analytical extrapolation to other contexts should be very carefully considered.

4. Findings and Discussion

Through the semi-structured interviews and observations made to the customers undertaking their practices in the restaurants, it was possible to capture the institutions that framed, enacted or constrained their actions during such practices. The institutions identified, shown in Table 1, are split in three levels (micro, meso and macro) to allow a better understanding on the interdependency between these levels of interactions. At the micro level it was considered the norms, rules and meanings that framed the resource integration and value creation in dyadic interactions between actors. At the meso level it was considered the set of institutions related to the restaurant chain company which has a network of operant and operand resources acting as an integrative entity. At the macro level the institutions established at national, regional or even global level that influenced the observed practices were considered.

Table 1 – Institutions framing practices in a fast food restaurant

Institutions		
Micro	Meso	Macro
<ul style="list-style-type: none"> - Way of socializing with their friends; - Way of interacting with restaurant staff (friendly and smiling employees); - Role assumed by each actor during the interactions with others; - Type of language used between young people; - Way children and kids interact with each other and with their parents; - Practical, "effortless" and fast way to have a meal in family; - Way kids interact with other kids in playground activities; - Kids interactions with resources available at the restaurants (playground, tablets and other resources); - Informal interaction between actors participating in celebrating events in the restaurant; - Type of interaction between actors invited and restaurant party entertainers; - More informal interactions with work colleagues promoted by the restaurant atmosphere are acceptable; - More informal interactions with restaurant staff are acceptable; - Being alone (eating, reading, listening to music or navigating in the internet) at these restaurant is seen as acceptable, "no judgments are made"; - More informal interactions with restaurant staff are acceptable; 	<ul style="list-style-type: none"> - Meaning of the restaurant brand for young people: nice, cool, trendy, relaxed atmosphere, American Way of Life associated with the principles of "life, liberty and the pursuit of happiness", food identification; - Meaning of the restaurant brand for families: relaxed and casual atmosphere, safe place to be at; - Meaning of the restaurant brand for parents: relaxed and casual atmosphere, safe place to be at, safe food, cleanliness - Meaning of the restaurant brand for kids: entertainment, fun, good food; - Less stringent rules for kids at the restaurant (e.g. more noise and restlessness of kids "allowed"); - Set of rules defined for celebration events (e.g. restaurant area allocated to the event, type of activities "allowed"); - Meaning of the restaurant brand for people using the restaurant for having a meal with work colleagues: informal atmosphere, fast, cleanliness; - Rules of conduct associated to the organization the work colleagues belong to; - Meaning of the restaurant brand for people using the restaurant for having a meal alone: Safe food, know what to expect (standardized procedures and food), affordable food, fast service, easily found and accessible; - Meaning of the restaurant brand for people using the restaurant for having a meal abroad: Safe food, know what to expect (standardized procedures and food), affordable food, kids normally enjoy it, fast service, easily found and accessible; 	<ul style="list-style-type: none"> - Social behaviour of young people in a restaurant; - Rules for eating in this restaurant (with no dishes nor cutlery); - Acceptable type of food for the occasion; - Dressing code which for this type of restaurants can go from street wear to business/informal; - Acceptable way of waiting to get served; - Cultural aspects of eating out related to its meaning for a family (e.g. spending time together, celebrating an event, a part of a bigger day event); - Social accepted way of spending time with kids and sometimes seen by parents as a reward to their children for something they did; - Social behaviour of kids and young people in such celebration events; - Cultural tradition of events such as birthday parties or end of a term in school; - More relaxed socializing behaviour with work colleagues; - Norms related to the behaviour in a restaurant with other people around; - Rules for eating in this restaurant (with no dishes nor cutlery), seen as informal and as an advantageous for travellers who might not feel comfortable with social rules established in the country their visiting;

When observing the rules and norms that enact or constrain the actors' behaviour in their practices it was possible to verify that in collective practices there is a common understanding and acceptance of some implicit rules by the actors participating in those practices. When a group of young people is eating together they talk and behave in a certain way, which is also framed and according to what is the accepted behaviour in this type of restaurants. On the other hand, when observing families in the restaurant it was possible to verify that there are some general rules of good manners (like for instance the kids' posture and the activities they were allowed to do while seated at the table) that parents were controlling but that, in a certain way, were more relaxed compared to what they would have been if they were eating in a more formal restaurant. The observations also allowed to verify that in this type of restaurants there are some norms, both explicit and implicit, and forms of interacting with other actors that are not normally seen in more traditional restaurants. For instance, it was possible to observe that several actors were dressing in shorts and flip flops as they were coming from or going to the beach. On the other hand, there were some other actors undertaking other practices while sharing the same physical space, but they were wearing business informal clothes. Moreover, the majority of the restaurant employees interacting with customers are quite young (under 25 years old) and they all wear casual uniforms which together promotes a more informal relationship with the customers, quite unique to this restaurant brand, that are not seen in other eating places. From a meso level interaction perspective it was possible to verify that restaurant staff and other resources (like tablets and Wi-Fi connection) made available by the provider, were prepared to be drawn upon by the customers and integrated in their own service systems. As an example, some customers were observed using the internet connection provided by the restaurant to use their social networks or to play online games with other actors. Additionally, this restaurant brand promotion of "the American way of life" conceives a freedom and pursuit of happiness meaning perceived by the customers that can actually be observed in several actors' behaviours reflected in the relaxed atmosphere, friendly restaurant employees' interactions with customers and available resources for having fun.

Considering the micro level of interactions it was possible to verify that the relationships maintained between actors at the restaurant belonging to same group of friends, family or not belonging to any group of physically present people at all, were framed by normal rules of conduct generally accepted in western societies. Nevertheless, the form of interactions between young people in a group was different from the form of interactions that occurred, for instance, amongst family members. Furthermore, even between the same types of groups some differences can be spotted, as some other factors like gender, age, social class and education can have some influence on it. Notwithstanding, the norms and rules implicitly associated in all these interactions respected the more general rules of behaviour accepted by that society. At a micro level the data suggest that the existing rules and norms that condition the actors' actions could be grouped in three typologies: Relationship rules; Space rules and Resource usage rules. The relationship rules integrate the accepted behaviour of socialization between actors and they can vary depending on with whom an actor is interacting and the role each one of them is playing in a certain situation. Space rules incorporate a local and a state dimension. The local dimension is related to where the experiences take place through exchange, normative and representational practices. Finally, the resource usage typology incorporates the ru-

les related to the available resources and the way these may be used. It is interesting to note that the rules and norms at the micro level can be characterized as flexible within a certain spectrum, adjustable or situational as they are adaptable to the situation and intrinsic to the actors. We argue that these characteristics allow actors to have an institutional framework from where they may combine the rules, in different institutional arrangements, depending on the practice they are carrying out. Answering the research questions posed, we believe that it is the typology of rules, mentioned above, that is common to all institutional arrangements that allow actors to “move” from one ecosystem to the other in order to integrate resources during their practices. This is depicted in Figure 1.

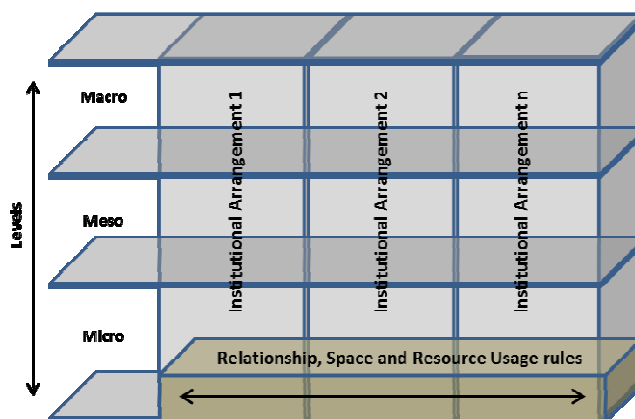


Figure 1 – Common typology of rules at micro level

When looking at the different levels of interactions identified during practices, the findings suggest that there is an interconnectedness between them. Depending on the practice actors are involved in, some institutions have more weight than others although those at a macro level are always present, whereas the institutions identified at the meso level were found to be more directly related to value proposition offered by the provider. Considering the institutions identified and the different practices carried out by the diverse actors, these findings suggest that the customers of these restaurants combine all these aspects in a solution that makes sense to them. In other words, they make their minds on how to participate and carry out certain practices so that value is created by considering several possibilities of available resources and institutions that may enact or constrain their actions. Despite the fact that in such restaurants several distinct practices were performed (e.g. from an actor eating alone until celebration of birthday party), different actors may undertake one specific practice in different ways depending on the configuration of resources he has available and is capable to integrate. These findings suggest that prior to the execution of a practice an actor makes his own scenarios about how, when, with what and with whom it can be done so that he can create the maximum value from it. This actor’s scenario construction is built collaboratively with other actors and, in the end, is what makes him act the way he does which is translated in his practices. We argue that actors make scenarios of possible solutions to get what they need considering the context of institutions and the configuration of resources available to integrate. Out of the constructed scenarios actors choose the solution that is the most efficient for value creation. We claim that even in a well-established market, such as the one of fast food restaurants, it is possible to construct non-bounded solutions through a service platform, in this case the restaurant itself. From

this platform formed with several ecosystems with different resources available, actors are able to create new contexts and scenarios from which an efficient solution will be derived for value creation. The evolving nature of scenarios is what makes the solution unbounded. It is interesting to note that even in a fast food restaurant setting where there is a strong trend to bounded solutions there is space for customers to innovate by creating new scenarios and with these, new solutions that allow value to be co-created. In this research it was possible to identify quite different solutions chosen by different customers for value creation. As an example, there were some customers eating alone whose interest was not to be disturbed by restaurant staff and to have a quick meal, whereas in the other extreme there were customers celebrating events such as birthdays, in which the integrated resources made available by the provider were quite different from the first case but the solution customers chose (not possible to foresee a priori, thus unbounded) emerged through interactions taken during such practice. Innovation occurs when new solutions that are built and continuously evolving form new contexts are found and accepted. When the former are adopted by actors, they may eventually become institutionalized practices. Taking this into consideration we argue that providers, even in well-established markets, may contribute for value co-creation by facilitating unbounding solutions. This may be achieved, or at least made easier, if provider's value propositions are adjusted and attractive for customers to adopt them in their scenario constructions and finally in the adopted solutions.

5. Conclusions

This research allowed concluding that even in a well-established market, such as the one of fast food restaurants, it is possible to construct non-bounded solutions through a service platform, in this case the restaurant itself. Through this platform, formed with several ecosystems with different resources available, actors are able to create new contexts and scenarios from which an efficient solution is derived for value creation. We claim that this is possible due to the typology of rules found that are common to all institutional arrangements which allow actors to "move" from one ecosystem to the other in order to integrate resources during their practices. We argue that actors make scenarios of possible solutions to get what they need considering the context of institutions and the configuration of resources available to integrate. Out of the constructed scenarios actors choose the solution that is the most efficient for value creation.

This empirical research brings together SD Logic, CCT and Practice Theory under which perspective social and cultural elements as well as other institutional arrangements were considered to analyse how different context levels are interconnected and affect an actor's service experience and value creation. By doing so, it addresses the call from several authors (Akaka et al., 2015; Chandler and Vargo, 2011; Vargo and Lusch, 2015) for empirical research that allows understanding of how value creation is influenced, in the multi-level context conceptualization by social and cultural aspects and particularly the role social structures play in resource integration processes. Moreover, it contributes to SD Logic by building on the idea of actors' scenarios construction that eventually determine practices undertaken by them and resources integration for value creation.

From a managerial point of view this research allows managers to better understand how each specific context, shared values, norms and beliefs can determine actor's resource integration and value creation so they can be better informed to suggest better value propositions to their customers. Additionally, we argue that it is also through the providers' construction of scenarios that they may determine their value propositions and the necessary resources. Moreover, providers may contribute for value co-creation by facilitating unbounding solutions.

Further research on scenarios construction under an SD Logic perspective in other contexts is needed. Likewise, it would also be interesting to study, in other sectors of well-established markets, how the intervenient actors make the coexistence of a dominant logic of bounded solutions with a totally distinct logic of making unbounded solutions possible.

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INTERNATIONALISATION THEORY PERSPECTIVE OF PRODUCT-SERVICE INNOVATION: THE GÖTHEBORG IV MODEL

CherylMarie Cordeiro

In firm internationalization theory, enterprise growth is evolutionary and an emergent bolstered by its innovative processes. In recognition of an existing Cartesian perspective of product and service as two distinct entities in product-centric MNEs as expressed by product managers during interviews as well as in the literary canon, the focus of this paper is to introduce an integral perspective of the product-service innovation processes in the form of the Götheborg IV (G4) model. Based on the assumption that the core activity of any enterprise is exchange, where the value of production is realized in the process of exchange, the G4 model is an applied linguistics perspective of the Uppsala model (UM) of internationalization / globalization that requires different types of knowledge, mapped on to a four-quadrant diagram. Key in the G4 model of product-service innovation is the illustration of the emergent, cyclic dialogic of the feedback loop as having an important role in product-service innovation. Within the four schools of thought in service innovation literature, this firm internationalising perspective of product-service innovation is most closely aligned with the synthesis school of thought. It follows the use of more recent expressions such as 'product-service systems' in the literature, and focuses effort in moving away from the Cartesian duo-coordinate single planed models in acknowledgement of the need to conceptualise and visualise the complexity and uncertainty in which innovative processes, likewise internationalization / globalization occur.

Key words: service innovation, Uppsala model, Götheborg IV model, product to service transition, product-service innovation, innovation processes, internationalization processes

1 Introduction

1.1 Problem Statement: the Cartesian Continuum between Product and Service

I was sitting in one division office of a large European multinational enterprise (MNE), speaking with a product manager, ŞL, who had more than thirty years of experience and specialized knowledge in the product. The MNE can be described as traditionally product-centric (Kindström & Kowalkowski 2014, Raddats & Burton 2011, Gopalani 2010), having part of its operations in manufacturing. As a product manager and in-

ventor, §L has followed the product (a hybrid of hardware and software) from launch through its different stages of evolution including those that required a complete overhaul of the software platform upon which the product runs:

“It is a mindset change from the component development, that is needed. With a mindset change, service will benefit. But things are changing. Now service is out there and it’s a business unit. Service is very important, and today we can somehow agree much more. Before, we were just servants, twenty years ago we were seen as serving, now we are a business generator. So we are somehow money. We create cash. So we try and say to the rest of the organisation, hey, this is what service can do! But we are still not completely in the mindset when we create our product. We don’t have to make some other business with the product. We have to make the business with the full system. You attract customers with the system, that is the thing! But we are not there yet.” – 2015 interview with §L, Product Manager in a product-centric European MNE.

Therein §L’s interview abstract is the outline of the problem statement in practice and in academia, of the current Cartesian conceptualization between product (goods) and service (add-on) in relation to the generating of enterprise growth and development (via product-service innovation) in a traditionally product-centric MNE. The research focus of this paper specifically addresses the dualistic Cartesian conceptualization between product and service as characterized in language in use in practice and academia.

Expressions in practice and in the literary canon tend to encourage a dualistic conceptualization that in its most dynamic form, results in a single-planned perspective of a continuum between product and service innovation processes towards a ‘servitisation of a product’⁵⁶ (Brax 2005, Oliva & Kallenberg 2003). A two-dimensional conceptualization between product and service development towards product-service

⁵⁶ There are several literature review articles published within the service innovation literature, outlining different schools of thought in service innovation research. Droege, Hildebrand and Forcada (2009) outline four schools of thought – technologist, assimilation, demarcation and synthesis – in which the basic assumptions in service innovation is revealed, where the authors have chosen to separate technologist and assimilation studies due to their different research focuses. Gallouj and Savona (2009) coming from mainly an economic theory perspective pursuing neo-Schumpeterian and post-Lancasterian proposes three frameworks – technologist / assimilation, service-oriented / differentiation and integrative / synthesizing. The technologist school of thought comes from the perspective of the dominant role technology plays in the innovation of services. The assimilation school of thought sees influence from literature on innovation in manufacturing technology being transposed to innovation in services. Limitations to both the technologist and assimilation perspectives include that there are non-technological aspects to service innovation to be considered. Demarcation or service-oriented perspective is derived from considering the characteristics of services and innovation in services. This perspective makes it difficult to generalize for services that result from manufacturing technological advancements. The synthesis / integrative approach tries to bring together the two former perspectives. The object of study here is the developing trend of convergence between manufactured goods and services. It is this view that is based on a new definition of a product, post-Lancasterian style (Gallouj & Savona 2009).

While the ideas in this paper follows literature from the field of international business studies and in particular firm internationalization theory, the idea of product-service innovation as emergent and as a process, if situated in the service innovation literature, shares closest parallel thoughts to the synthesis and integrative schools of thought. The Göteborg IV model (Cordeiro 2016) is based on integral worldview that potentially illustrates how all approaches towards product-service innovation in the service innovation literature can be situated in a knowledge-based four-quadrant model of firm internationalization theory, based on the Uppsala model of firm internationalisation where product-service innovation is a fundamental feature of firm operations in order for the firm to stay relevant and current.

The situating of the different approaches and frameworks in service innovation literature is not in this paper, explicitly situated / illustrated in the Göteborg IV model. Rather, this paper addresses product-service innovation from the perspective of international business studies, based on an emergent perspective of firm internationalisation.

innovation, where product-service can be seen as the foundation of the survival of continued trade for an MNE, hardly captures what is essentially an evolutionary process of enterprise growth (Phelps & Fuller 2016, Vahlne & Johanson 2013, Nachum & Song 2011).

While lexical categorizations are useful in their own contexts, inherent in language use is how once defined, it also tends to confine, so that it becomes difficult to conceptualize outside of what has already been defined. Table I illustrates the influence of the collocation in academic research of words with 'product' and 'service' in current literature, indicating the top 3 disciplines in which these terms are most used.

Table 1. Terms used in peer reviewed academic content that illustrate dichotomy in product / service research and conceptualization. *Some journals were classified across disciplines.

Term/s	Total retrieved, relevance sorted	*Discipline (top 3)	English published
"product innovation"	33,132	Business (21,578) Economics (9,403) Engineering (6,199)	32,587
"service innovation"	7,829	Business (3,724) Economics (1,988) Engineering (1,155)	7,714
"product-centric"	609	Business (376) Engineering (184) Economics (107)	608
"service-centric"	374	Business (122) Engineering (121) Computer Science (110)	371
"after sales service" / "post sales service"	5,598 / 709	Business (3,397 / 486) Engineering (1,419 / 205) Economics (1,402 / 153)	5,539 / 706
"servitization" / "servitisation"	550 / 102	Business (341 / 69) Engineering (213 / 54) Economics (122 / 24)	528 / 101
"product-service system"	1,112	Engineering (682) Business (326) Economics (223)	1,080

The terms were retrieved from peer reviewed academic content found across 57 disciplines, published in 62 languages. The top three languages with the greatest global influence in the academia include English, Spanish and French, although with some search terms, next highest number of publications were found (after English) to be published in German, Portuguese and Korean.

The retrieved terms are not exhaustive, but as examples of language in use, they lend an idea of the influence of the type of conceptualizations of 'product' and 'service' across different disciplines. 'After/post-sales' research can also be found as a distinct topic of research interest. Table I shows that there has indeed been more research focused on product-innovation, where product and service are perspectivised predominantly as two separate entities.

The observation of increasing incorporation of services into product sales renders the fairly recent term of use 'product-service system' (PSS). PSS has been found mostly in the past decade's literature, even if the idea had existed already in the late 1960s in the field of production management (Levitt 1972, Feigenbaum 1968).

The term 'product-service' illustrates the budding conceptual move towards a more integral perspective of a phenomenon that potentially paves future perspectives to be formed in studies of product-service innovation (compared with just product or service innovation) that bolsters the continued operations of an MNE.

But how can the dialogic of the processes of product-service innovation be captured conceptually beyond a Cartesian continuum in the context of firm internationalization?

To capture the context of uncertainty, complexity and web of business network within which MNEs operate, where the assumption is that MNEs need innovation and new knowledge to perpetuate, the Götheborg IV (G4) model (Cordeiro 2016), an applied linguistics in international business (IB) model, developed from the Uppsala model (UM) of internationalization / globalization (Johanson & Vahlne 1977, 2009) is introduced as a means towards an integrated perspective of product-service innovation.

1.2 Literature Review: Recognition of Need for an Integrated Model of Product-Service Innovation

Scholastic efforts in the 1970s and 1980s recognized that product and service were inherently intertwined concepts, even if it was undecided in which direction the influence went (product to service or service to product?) in terms of enterprise development (Bowen & Youngdahl 1998, Levitt 1972, 1976). By early to mid-2000s however, there was a distinct shift in practice and academic literature where product and service were conceptualized and researched as two different entities, much due to that organizations seemed to need different processes and structures in place in order to facilitate successful product- or service innovation. And in attempting to close / reconcile this conceptual distance, scholars have turned to various theories of the firm from the resource based view (RBV) of the firm (Fahy 1996, Penrose 1959), dynamic capabilities (Duijsters, McLaughlin, Fearon & Yang 2013, Kindström, Kowalkowski & Sandberg 2013), to transaction cost theory (Yigitbasioglu 2014) or a combination of the above frameworks (Kim, Song & Triche 2015, Peris Bonet, Peris-Ortiz, Gil-Pechuan 2010) in order to put forth a more comprehensive perspective of firm innovation processes. Professional and academic discourse revolved around 'transitioning' from products to services (Ferreira, Proença, Spencer & Cova 2013, Jacob & Ulaga 2008, Gebauer, Fleisch & Friedli 2005, Oliva & Kallenberg 2003), challenges in product to service providers (den Hertog, van der Aa & de Jong 2010, Martinez, Bastl, Kingston, & Evans 2010), servitisation (Visnjic Kastalli & Looy 2013, Baines, Lightfoot, Benedettini & Kay 2009) and deservitisation (Cusumano, Kahl & Suarez 2015, Gebauer & Kowalkowski 2012). Most research seem to continue to indicate an underlying Cartesian conceptualization and continuum of product and service.

There have however, been efforts by scholars to address this Cartesian perspective and the tendency towards dichotomizing product and service that might eventually become less helpful in understanding the evolutionary process of enterprise growth

and development. As such, scholars have called for a more reconciliatory approach. Scholastic effort has been put into excavating and surveying current literature (Gallouj & Savona 2010, 2009) and tracing the history of research on product-service innovation (Carlborg, Kindström, Kowalkowski 2014) in effort towards a multidimensional (Gago & Rubalcaba 2007), multidisciplinary perspective of product and service (Barcet 2010). A re-perspectivising of product to service transition was encouraged (Kowalkowski, Windahl, Kindström & Gebauer 2015, Droege, Hildebrand & Forcada 2009). This is however, not to say that scholars should / would do away with the distinction between product and service completely that might lead to what Stauss (2005) termed as a Pyrrhic victory as a consequence of a too broad encompassing of the concept of service.

In working towards a more holistic approach in conceptualizing product-service innovation in a product-centric organization, and in recognition that all elements of the firm's business model needs to be addressed when looking at product-service innovation (Carlborg, Kindström, Kowalkowski 2014), a business model perspective of service-innovation was formulated (Kindström and Kowalkowski 2014, Kindström, Kowalkowski & Sandberg 2013).

2 Theory & Method

2.1 Theoretical Framework: Evolutionary, Business Network Perspective of Product-Service Innovation

From the extant literature, it can be agreed that the continued success of a traditionally product-centric MNE in a context of interconnectivity enabled by digital technology and infrastructure depends upon its diverse grasping of knowledge. From understanding market complexities to indiscernible patterns of business network relationships, MNEs exist in a web interdependencies, not in the least with their very own subsidiaries, in order to co-create, innovate and perpetuate its global presence.

In this paper, an evolutionary, emergent perspective and model of product-service innovation that bolsters enterprise development is suggested as a means towards reconciling the Cartesian product-service dichotomy. The enterprise is viewed here as a business entity engaged primarily in exchange – not production – activities. (Vahlne & Ivarsson 2014, Vahlne & Johansson 2013, Johanson & Vahlne 1977, Alchian & Allen 1964). Product-service innovation in an MNE can be viewed as an iteratively cyclic emergent production process, of which its value is derived from exchange within a business network.

Implicit in the literature of the product to service conceptual continuum is that the continued success of the enterprise depends upon its ability to transition from one end to the other in this age of interconnectivity, moving from a material product transaction to service relationship based activities. The need for a mind-set change in the MNE, from product- to service-centric was also the main concern for product manager §L in the interview abstract. But from an evolutionary, business network perspective, anything that occurs, occurs within the context of a relationship. Even material transactions transpire on the foundations of trust relations built between actors.

Unfolding over time, innovation that leads to an MNE's continued global outreach has much to do with its dialogic processes that occur within its business network. Product-service innovation can be seen as one such dialogic process bolstered by new knowledge creation that occurs through exchanges along the meeting peripheries in an enterprise's network of interconnected relationships.

2.2 Data Collection

Data for this study comes from a collection of 56 long semi-structured interviews with product managers and top level managers of European founded MNEs that have a diversified portfolio of industries, of which 17 were the largest Swedish manufacturing MNEs (Vahlne & Ivarsson 2014, Cordeiro-Nilsson 2009). The UM (Fig. 1) was developed from empirical studies of Swedish MNEs for the purpose of explaining the internationalization process of the firm under conditions of uncertainty and bounded rationality. The two mechanisms of change include change by organizational learning from experience, and change through its commitment decisions. The internationalization process included the bi-directions of (i) increasing involvement of the firm in the individual foreign country, and (ii) successive establishment of operations in new countries (Johanson & Vahlne 1977:23). In a revised model of the UM, the MNE was also referred to as 'the firm as a whole', "in order to grow and improve on their effectiveness, multinational enterprises (MNEs) reconfigure their widely dispersed value chains and develop their coordination systems to make the different units specialize, integrate and operate towards the overall best for the firm as a whole." (Vahlne & Ivarsson 2014:227). The inherent bi-direction of internationalization in the UM thus indicated a need for a non-ambiguous use of the word 'firm'.

C. The Götheborg IV Model: an Applied Linguistics Perspective of the Uppsala Model of Internationalization / Globalization Processes

75% of the world's major languages contain the use of Subject, Verb, Object (Crystal 1990, 1977). Applying the perspective of the pronouns, I, We, It/ Its, (that indicates singular / plural, subjective / intersubjective, objective / interobjective), language is used in its meta-capacity in the study of an MNE's internationalizing / globalizing processes in two aspects. The first is to disambiguate the words 'enterprise' and 'firm' in the UM. The second is to uncover the knowledge zones in which these dialogic processes occur.

Applying a linguistics perspective to the UM processes, the G4 model makes explicit this bi-direction of internationalization / globalization by distinguishing between 'enterprise' and 'firm'. 'Enterprise' as referred to by the UM model, is denoted as H in the G4 model. Since an enterprise can contain an unknown number of units (denoted by n) within its network, the MNE or 'firm as a whole' is denoted as Hn . The 'firm', denoted by H1, is a singular example of a unit within the MNE, Hn . The business network in which both Hn and H1 exist is denoted as Hns .

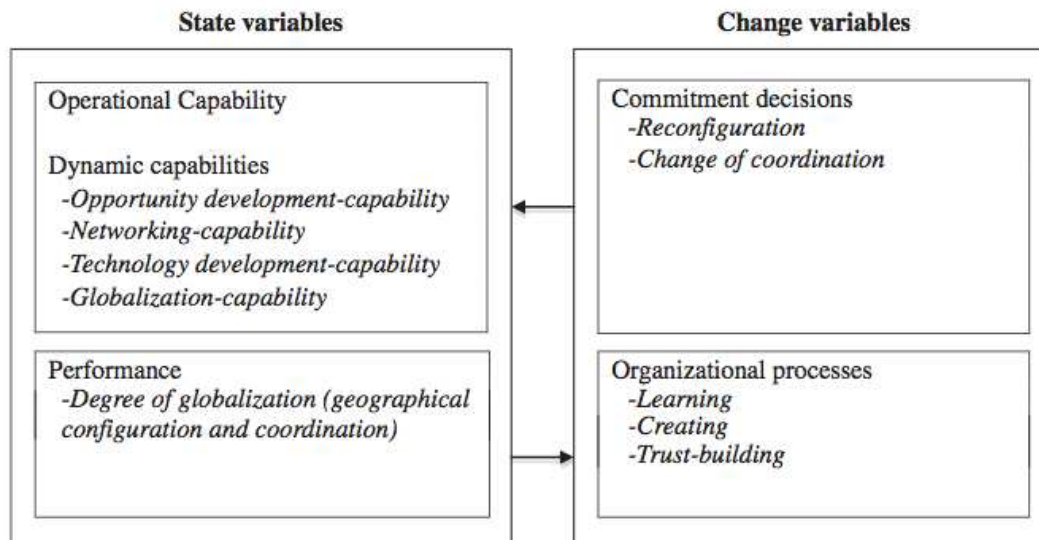


Figure 1. The Uppsala Model by Vahne & Ivarsson (2014:242)

The G4 model (Fig. 2) maps 4 different knowledge zones when theoretically explaining the dialogic relations that occur between the different units of the enterprise (intra-firm trade, Hn and H1) and of the enterprise in relation to its larger social collective context (inter-regional coordination, Hn, H1 and Hns). In this sense, Hn and H1 can be described as holons (i.e. “whole/part”) where each unit is a whole that is part of other wholes Hns that form an integral network of entities (Wilber 2006, Van de Ven 1986).

The context of uncertainty and change is likewise present for internationalization / globalization processes as that of product-service innovation processes, where the latter processes can be said to bolster the former and sustains the global outreach of an MNE. As such, a study of the product-service innovation processes would thus encompass a study of the interior and exterior perspectives of how these holons operate in a continuous dialogic, part-orchestrated, synchrony towards the sustained development of Hn in relation to its larger collective business network Hns.

The dialogic interaction that occurs in a constant state of flux between H1 to Hn, and Hn to its business network of Hns renders the UM differentiation between ‘state variables’ and ‘change variables’ weak. Different from the UM, the G4 model views all relations as evolving with time, so that the UM ‘state variables’ would also change through time. Time in the G4 model is thus not a zone of knowledge to be studied, but rather, time exists in the background fabric of the internationalization and globalization processes. Without time, there would be no internationalization / globalization processes.

Taking the firm and the enterprise as singular holons, labelled Hn for enterprise, and H1 for firm, the 8 perspectives rendered by the G4 model are derived mainly from the interior and exterior Hn and H1 perspectives of the internationalization / globalization processes, placed in four quadrants. Fig. 2 shows the knowledge zones and perspectives of the G4 model.

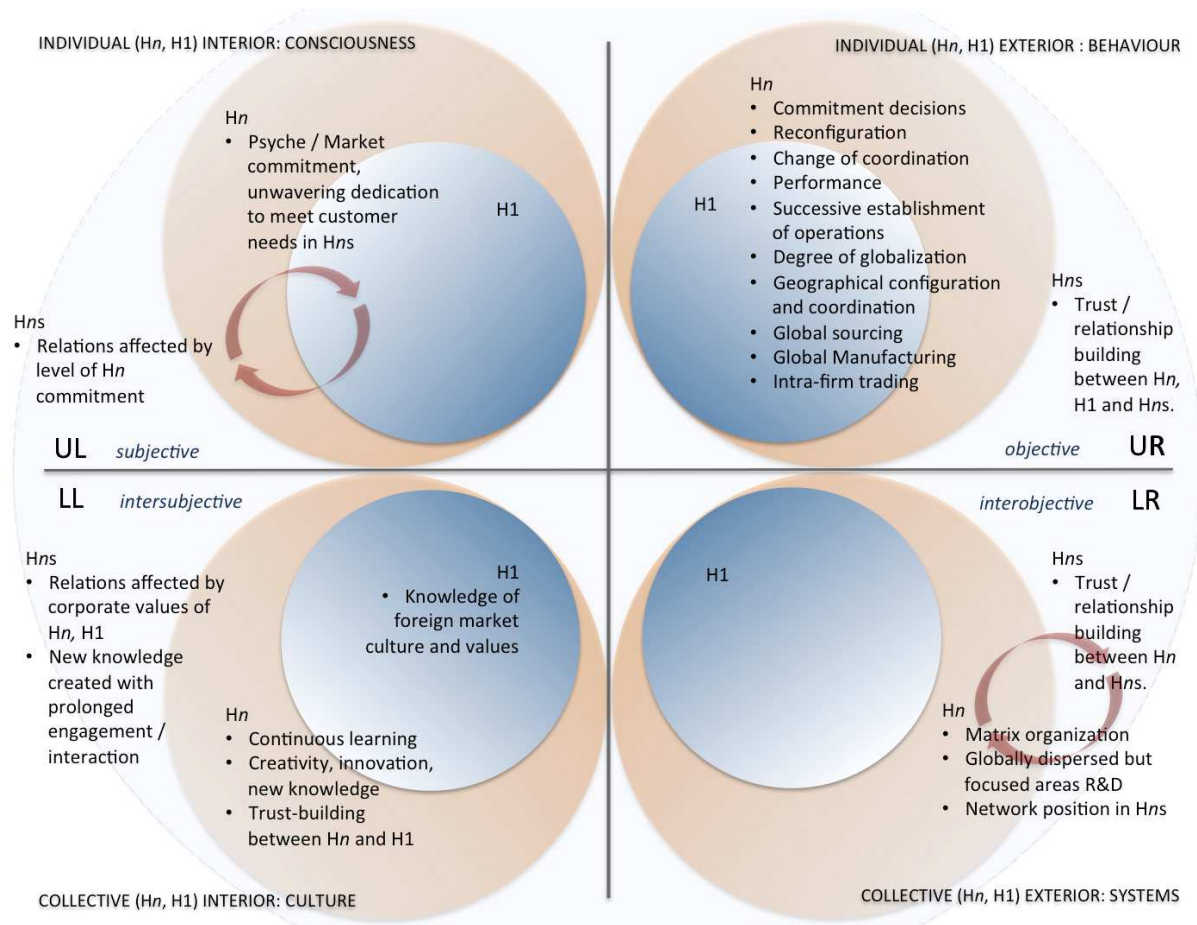


Fig. 2. The Göteborg IV model: an applied linguistics (I, We, It / Its) perspective of the Uppsala model of internationalization / globalization processes.

The Upper Left (UL, subjective) quadrant is the zone of Hn and H1 knowledge pertaining to the consciousness and ideology of the individual interiors of the enterprise and firm. This quadrant is where the 'Commitment' behind the 'Commitment decisions' thus enacted from the UM is represented in the G4 model. The Lower Left (LL, intersubjective) quadrant is the zone of knowledge of H1 and Hn pertaining to the collective interiors of enterprise and firm culture. These interior knowledge zones are then expressed in the exterior quadrants, the material actions of which can be observed exteriorly in behavior. The Upper Right (UR, objective) quadrant is the zone of H1 and Hn knowledge pertaining to individual exteriors of enterprise and firm behavior. The Lower Right (LR, interobjective) quadrant is the zone of H1 and Hn knowledge pertaining to collective exteriors of enterprise and firm structures and systems. The business network Hns is the largest holon or contextual fabric within which all enterprise Hn and firm H1 processes occur.

3 The Dialogic of Product-Service Innovation in the Gotheborg IV Model

3.1 Discussion

Due to the generically emergent manner of any innovation process that takes place within the context of uncertainty, continuous learning and exchange at all three levels of H_n , H_1 and H_{ns} , elements of the internationalizing / globalizing processes found in the UM and G4 model share similarities to core elements found in the literary canon on innovation processes and outcomes (Kindström & Kowalkowski 2014, Howells 2006, 2004, Koput 1997, Van de Ven 1986, Lodahl & Mitchell 1980). The G4 model in Fig. 3 shows an integral visualization of the dialogic of product-service innovation from the combined core elements of innovation and internationalization / globalization processes.

The quadrants cover all perspectives (*I, We, It / Its*) of the MNE in its business network, with all quadrant activities being interrelated and contextually co-dependent. Compared to the Cartesian continuum between product and service, that the innovation processes of the MNE are evolutionary and emergent in the context of its business network H_{ns} becomes evident in the G4 model, visualized by the product-service dialogic arrows in quadrants UL and LR. Even if only illustrated in the UL and LR quadrants, dialogic relations (similar to Koput's 1997 'feedback loops') occur in all quadrants and MNE activities as a matter of continuous intercourse at the different levels between H_n , H_1 and H_{ns} . In the process of innovation, activities of the MNE do not move in a sequential manner or along a continuum as such but rather, if the Cartesian continuum of product to service transition is to be used, then it should be viewed in a pattern of a dynamic spiral development towards its own maturity at differing levels of influence.

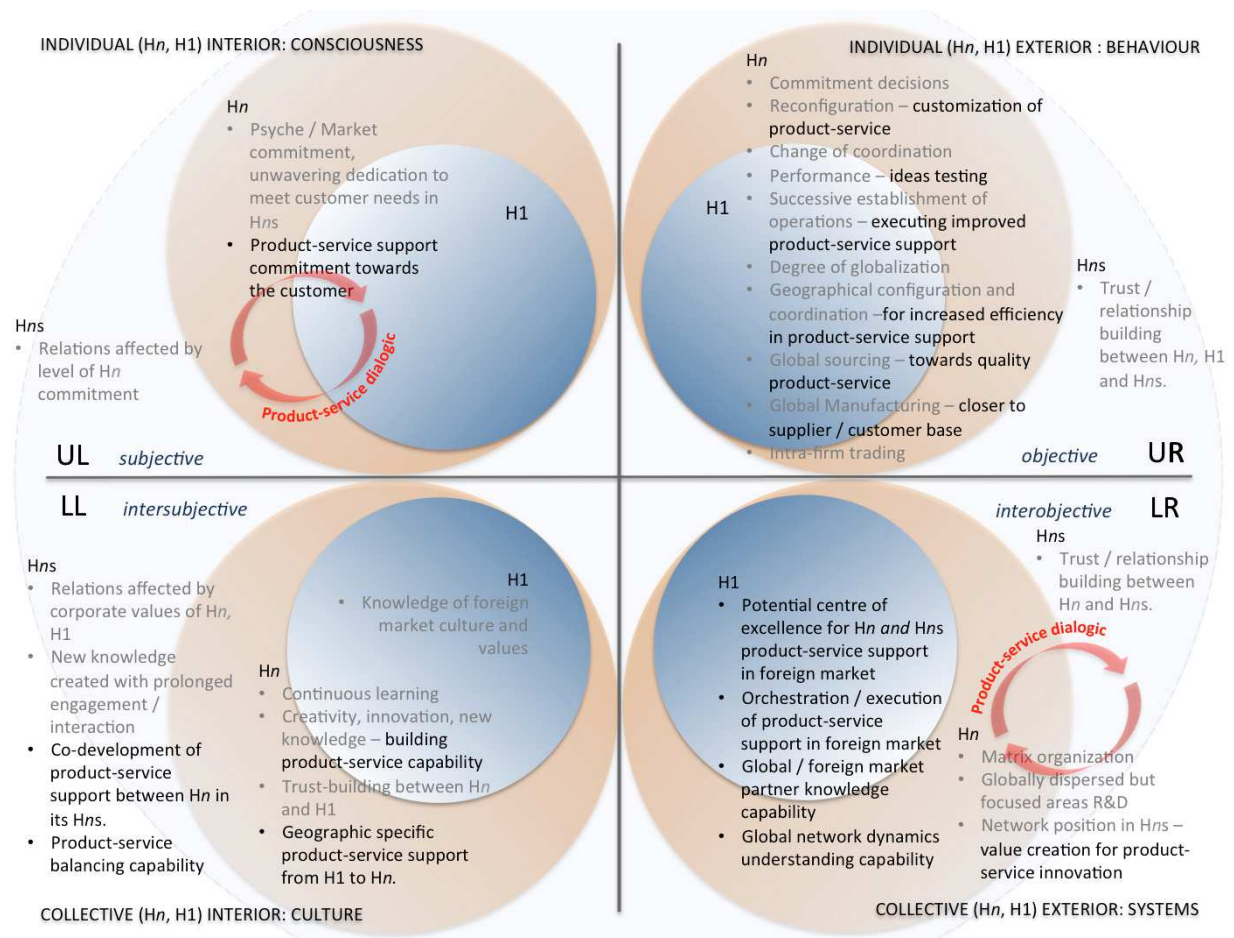


Figure 3. The Göteborg IV model: visualizing product-service dialogic and innovation processes from the perspective of applied linguistics. Perspectives of product-service innovation is in darker print in all quadrants, complementing elements from Fig. 2 of the internationalization / globalization processes.

4. Conclusion

In recognition of the perspective of a Cartesian continuum of ‘product’ and ‘service’ as two distinct entities in product-centric MNEs as expressed by product managers during interviews as well as in the literary canon, the focus of this paper is to introduce an integral perspective of the product-service innovation process in the form of the Göteborg IV (G4) model. Based on the assumption that the core activity of any enterprise is exchange, the value of production is realized in its exchange. It is the continuous activity of exchange that supports the development and growth of any enterprise. The processes of internationalization / globalization in enterprise development captured in the UM take place in the context of uncertainty, learning from experience and the creation of new knowledge bolstering innovation. In that sense, the processes of internationalization / globalization share core elements to innovation processes.

The G4 model is an applied linguistics perspective of the UM of internationalization / globalization. In the G4 model, the terms 'enterprise' and 'firm' were disambiguated, then pronouns were applied to unfold the various perspective of enterprise activities and processes. The four-quadrant, dialogic perspective illustrates how MNEs require different types of knowledge in order to support various enterprise processes and activities.

Key in the G4 model when applied to the conceptualization of product-service innovation processes is the illustration of the emergent, cyclic dialogic of the feedback loop as having an important role in product-service innovation. This perspective follows the use of more recent expressions such as 'product-service systems' (PSS) in the literature, and focuses effort in moving away from the Cartesian duo-coordinate single planed models in acknowledgement of the need to conceptualize and visualize the complexity and uncertainty in which innovative processes, likewise internationalization / globalization occur.

The G4 model is based on the business network perspective of rational internationalization / globalization dialogic processes. As such, its central elements can be used for prescriptive purposes when applied towards understanding the processes of product-service innovation.

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IT PROFESSIONAL SERVICES: MANAGING CUSTOMIZATION SERVICES IN THE HYBRID SOFTWARE BUSINESS

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The customization of software products to individual customers' needs has become a core business for the software industry. In customization projects, professional service firms (PSF) transform customer requirements into an IT solution based on an existing software product. Although existing research has studied the knowledge characteristics of software product and services along with software development and software business resources and capabilities, it still lacks consideration of the type of software customization service resources and capabilities that a PSF must develop and maintain to effectively deliver customization services. The study at hand aims to close this gap.

1. Introduction

Customizing software products to individual customers' needs has become a core business for the software industry (Cusumano, 2004). Initially a purely product-oriented business with licensing fees as the primary revenue source, the software business has evolved into a hybrid business with additional revenues from maintenance, consulting, and customization services. For instance, in 2007 more than 50% of IBM's total revenue was generated by its consulting services, including product implementation and support (Spohrer; Maglio, 2008). Accordingly, various scholars argue that the software business has been transformed from a pure product business to a pure service business (e.g., Cusumano, 2008).

Customizing software to customers' requirements is provided by either a software vendor or a third-party IT consulting firm, which allows both businesses to be classified as professional service firms (PSFs) (Malos; Campion, 2000). In customization projects, PSFs transform customer requirements into an IT solution based on an existing software product. From a knowledge perspective, this is an interactive process in which the customer and the PSF integrate their knowledge to arrive at a solution that fulfills the customer's needs (Ko et al., 2005). At the beginning of a customization project, the customer's knowledge, which might evolve to become knowledge possessed by the PSF, primarily pertains to its own needs, whereas the PSF's knowledge is primarily technical, that is, the PSF's knowledge pertains to how to address the customer's technical demands. During the process of customization, both types of knowledge must be integrated and embodied into a final IT solution. Be-

cause business knowledge is a form of market knowledge that positively affects a firm's innovative performance (De Luca et al., 2007), customer knowledge obtained through the delivery of customization services might lead to both software product and service innovation.

Although existing IS research has studied the knowledge characteristics of software product and services (e.g., Winkler et al., 2009) along with software development and software business resources and capabilities (e.g., Väyrynen, 2010), it still lacks consideration of the type of customization service resources and capabilities that a PSF must develop and maintain to effectively deliver customization services. Moreover, only few studies exist that address customization capabilities in relation to PSF performance. Therefore, the present study aims to identify the knowledge resources and distinctive capabilities underlying successful customization activities along with the impact of those resources and capabilities on the PSF's market and innovation performance. Our research questions are formulated as follows:

Which unique resources and distinctive capabilities must PSF develop to successfully deploy customized software solutions? How do these resources and capabilities contribute to a PSF's performance?

The remainder of this article is organized as follows: First, we provide an analysis of the existing literature on software product customization. Second, we discuss these results in the context of the resource-based view, our theoretical perspective for this study. Next, the underlying qualitative research approach, including data collection, analysis and results, is described. Finally, the identified results are discussed against the existing literature by reflecting the impact of capabilities on service provider innovation. The article concludes with a short summary of the study's contributions, implications for practice and theory and methodological limitations.

2. Conceptual Background

2.1. Software business in the IS literature

Following the approach introduced by Webster and Watson (2002), we conducted a preliminary analysis of the IS literature based on 65 IS articles, which revealed two streams of research focusing on software product customization. Whereas the first stream of research focuses on software delivery aspects and customization as methods of delivering a software product to a customer (inside-out), the second stream addresses customization from a development and customer integration perspective as a form of co-creation of value (outside-in). The following paragraphs briefly summarize the results of that literature analysis.

Not surprisingly, customization is a central topic in IS research. Researchers primarily focus on how software is delivered to customers in relation to distribution economics (Brocke et al., 2010; van Fenema et al., 2007; Weinmann et al., 2011). Packaged software, an incarnation of product software, has been one approach to addressing the challenges of customization in many of the articles in our review. For example, van Fenema et al. (2007) have described packaged software as a "ready-made mass product offering users a solution-based design process aimed at generic customer groups in a variety of industries and geographical areas." Chiasson and Green's

(2007) definition of packaged software has a more general focus; those authors argue that an important question in the field of packaged software design and consumption involves determining what software can and will do to support, change, and inhibit organizational practices.

Thus far, a considerable stream of research addresses the manner of distribution (i.e., the packaging) of product software and regards customization in an “after-production” sense. Because this perspective arises out of a logic in which a product is first produced and then distributed, it corresponds to the earlier-introduced inside-out perspective of customization in IS.

Another stream of research in the IS literature addresses the development side of software and in particular, customer integration during the development process. For example, Piller et al. (2004) state that “in mass customization, customers are integrated into value creation by defining, configuring, designing, matching, or modifying their individual solution out of a list of options and pre-defined components”. In a similar vein, Xin and Levina (2008) argue that clients not only customize software to their needs but also change organizational practices to fit software products.

Additionally, there is research that has focused on tailoring software development methods. For instance, Fitzgerald et al. (2006) argue that factors such as organizational issues, distributed teams, and the existence of legacy systems require different or changed development methods. In a similar vein, Slaughter et al. (2006) describe the strategy and process fit as important to the development process. From their point of view, process customization or tailoring is important to fit the needs of specific organizations or projects. This involves adapting, particularizing, or selecting certain software processes.

In summary, a considerable stream of research addresses customization as a form of the co-creation of value and thus supports our notion of a distinctly outside-in perspective on customization in IS. As discussed, the IS literature has paid attention to customization as a way not only to realize economies of scales by adopting a “make one, sell many” approach (inside-out) but also to integrate customers into the innovation process (outside-in). Surprisingly, the combination of both perspectives has somewhat been neglected by the IS research. With respect to customization as it is understood in practice, that is, the service of customizing large-business software in the B2B context, customers provide knowledge in their areas of expertise and their requirements in multiple iterations. Thus, customers complement their vendors’ knowledge at the technological and market levels not only at a distinct point in time but also continuously. Because it is demanding to frequently receive formulated requirements, vendors in customization scenarios must develop particular resources and capabilities to be able to successfully deploy customization services. However, as our review shows, reciprocal knowledge flows derived from the combination of outside-in and inside-out views and their effects on PSFs’ innovation activities are largely neglected within the IS literature pertaining to customization.

2.2. Theoretical background

The resource-based view (RBV) of the firm, a dominant approach to modern strategic management, has been identified as the theoretical foundation for addressing our initial research questions. This perspective explains how competitive advantage is achieved and can be sustained over time (Barney, 1991; Peteraf, 1993; Prahalad;

Hamel, 1990). As a complement to other existing theoretical frameworks, the RBV focuses on firms' internal organization instead of their exploitation of market power (Porter, 1979). Firms primarily achieve competitive advantage by developing and deploying resources and capabilities (Amit; Schoemaker, 1993). In particular, firms are represented as bundles of tangible and intangible resources, which are heterogeneously distributed across firms (Mahoney; Pandian, 1992; Wernerfeld, 1984). Based on these assumptions, competitive advantage is achieved by acquiring, implementing, and maintaining resources and capabilities that cannot easily be duplicated by competing firms (Barney, 1991).

Within the RBV, knowledge has been identified as one of the most important firm resources (Spender, 1996; Grant, 1996). Knowledge defines a firm's capacity to efficiently convert input into valuable output (Nelson; Sidney, 1982). Following this line of thinking, scholars argue that accumulating and protecting valuable knowledge is a key task in strategic management (Barney, 1991; Wernerfeld, 1984; Teece et al., 1997; Eisenhardt; Martin 2000). Accordingly, researchers have focused their attention on how to organize, generate and exploit knowledge efficiently (Nickerson; Zenger, 2004). In this process, scholars have sought to develop what is called a knowledge-based view (KBV) or theory of the firm (Conner, 1991; Grant, 1996; Spender, 1996; Prahalad; Hamel, 1990). Although regarded an extension of the RBV rather than as a separate theory, the KBV of the firm has found wide application in both conceptual and empirical studies (Eisenhardt; Santos, 2002).

Resources and capabilities are central concepts of both the RBV and the KBV. In both streams of research, scholars have provided a variety of definitions for those terms. For instance, a firm's resources can include skills (Grant, 1991) and strategic assets (Amit; Schoemaker, 1993). Capabilities are defined as value-creating strategies and competences (Prahalad; Hamel, 1990). This proliferation of key terms has been identified a problem for researchers who take a resource-based perspective. To simplify the interpretation of this theory, we clarify the definitions of terms relevant to this study by characterizing resources as the productive assets owned by a firm and capabilities as what a firm can do. In particular, drawing on Amit and Schoemaker's (1993) work, we define a firm's resources as "the stock of available factors owned or controlled by a firm" and capabilities as "a firm's capability to deploy its resources".

In line with the streams of research set forth above, our study is specifically interested in two issues: First, what unique resources and capabilities do firms need to successfully provide software solutions? Second, how do these capabilities contribute to knowledge exploration and exploitation in innovation activities?

3. Research approach

3.1. Research site and data collection

Our study followed an exploratory approach adapted from Ulaga and Reinartz (2011). Data for the study at hand were collected through twenty-two semi-structured interviews with key informants of PSF and customer organizations in the business-to-business software development/implementation industry. More specifically, we conducted thirteen interviews at PSF firms and nine interviews at customer firms.

Table 1: Interview participants on provider side

No.	Firm Industry/Product	Size	Revenue	Individual Position	Age	Tenure (in years)
1	Mechanical engineering software individualization	110	€18 m	CEO	39	5
2	Software for health care administration	80	€15 m	SM	37	3
3	Information management software	N.A.	N.A.	CTO	41	11
4	Email marketing	30	€4.5 m	CEO	49	8
5	Software for service firms (leasing)	30	N.A.	CEO	54	16
6	Software for health care administration	8,600*	€400 m	CEO	47	23
7	Solution provider for business intelligence	40	N.A.	CEO/CTO	40	6
8	Software for service firms (car retailer)	50	€6 m	MD	33	8
9	Monitoring and workflow systems	>80	€10 m	CEO	50*	7
10	Monitoring and workflow systems	>80	€10 m	CTO	40*	12
11	Social platform applications	15	N.A.	CTO	31	3
12	Document management and system integration software	25	N.A.	MD	37*	11
13	Software development consultant	1	N.A.	Entrepreneur	42	25

CEO—Chief executive officer; CMO—Chief marketing officer; CTO—Chief technology officer; MD—Managing director; SM—Senior manager; DM—Department manager
*Estimated; **Figures pertain to holdings

Table 2: Interview participants on customer side

No.	Firm			Individual	
	Industry/Product	Size	Revenue	Position	Age
1	Telecommunication services	70	€450 m**	PM	35
2	Utility company	400	€320 m	CTO	51
3	Book retailer/library services	N.A.	N.A.	MD	55
4	Financial services/banking	>100,000	€33 bn	PM	37
5	IT service provider, aviation industry	26,500	€4 bn	PM	42
6	IT service provider, aviation industry	26,500	€4 bn	PM	40
7	IT service provider, aviation industry	26,500	€4bn	DEV	37
8	Special-purpose machinery	230	€18 m	MD	45*
9	Software reseller	65	N.A.	DEV	28

CEO— Chief executive officer; CMO—Chief marketing officer; CTO—Chief technology officer; MD—Managing director; SM—Senior manager; DM—Department manager; *Age estimated; **Figures pertain to holding

In general, our research approach followed the interview guidelines developed by Myers and Newman (2007). The interviews aimed at gathering an in-depth understanding of customization experiences from a vendor and a customer perspective. Informants on both sides included individuals with several years of experience in customization projects, such as CEOs, CTOs, senior developers/consultants and department heads, identified via the snowball method.

The interviews were semi-structured to focus on the participants' experiences of customization services and customer integration and innovation topics, from both the PSF and customer perspectives. During the interviews, the informants were encouraged to talk freely about their real-life experiences in customization projects. As an "ice-breaking" opening question, the informants were asked about their job positions and how long they had been working for their companies. Next, we asked the participants to talk about products and/or services that had been adapted to customer needs and how customers were involved in and integrated into those customization services. Finally, the participants were asked to report their views on the capabilities needed to provide customer solutions.

3.2. Data analysis and interpretation

The informants' interviews were transcribed. Next, computer-assisted qualitative data analysis software (CAQDAS) was used to identify recurrent themes and to provide a coding scheme. The analysis followed a grounded theory approach (Corbin; Strauss, 1998) and steps outlined in Saldaña (2009), including three coding cycles: initial or open coding, axial coding and selective coding. The aim of the analysis was to detect variations and similarities in how informants experience customization services and the influence of those services on provider innovation activities.

During the first coding cycle, two researchers read and re-read the transcribed interviews to gain an understanding of each participant's experience of customization projects and used initial and open coding to "remain open to all possible theoretical directions by your reading of the data" (Charmaz, 2006).

The second cycle aimed to strategically reassemble data that were split during the initial coding process. Here, the researchers' aim was not to look for specific words or statements, but to relate categories to subcategories and to specify each category's properties and dimensions. Axial coding was used to fulfill that objective (Corbin; Strauss, 1998).

The final coding cycle was theoretical or selective coding, as described by Corbin and Strauss (1998). This coding cycle aimed to integrate and synthesize the categories from the previous analysis to create a theoretical perspective on customization and integrate it into the overall research framework. The quotations provided in the next section are the most representative of the emergent theme.

4. Research results and interpretation

Following the described grounded theory approach, this study identified four unique resources and six distinctive capabilities. Figure 1 integrates the identified resources and distinctive capabilities into an overall research framework.

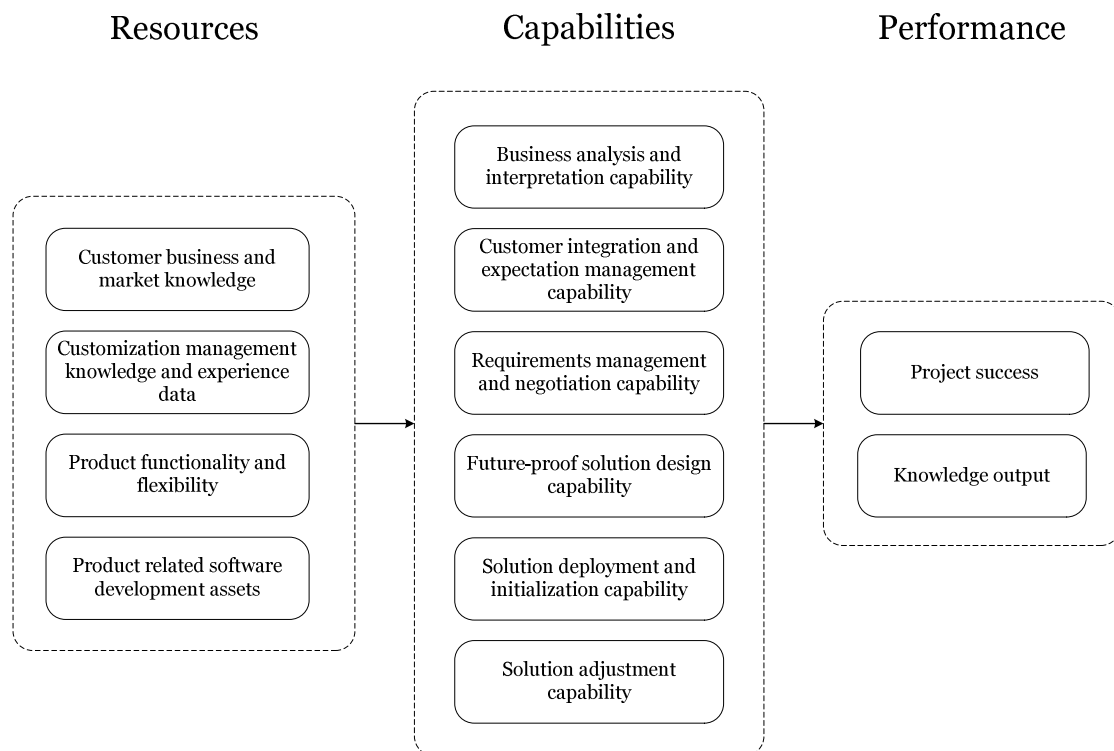


Fig.1 Resulting overall framework

4.1. Unique resources

A firm's resources are the stock of available factors that it owns or controls and converts into products and services using a wide range of firm assets and bonding mechanisms (Amit; Schoemaker, 1993). This study focuses on which of these resources may be the most critical to and useful for deploying software product customization. The interviews revealed four of those unique resources, which are summarized in table 3.

Table 3: Summary of resource definitions and examples

Unique re-sources	Definition	Example
Customer business and market knowledge	The stock of resources invested in a firm's understanding of recent developments and needs in potential customers' businesses and provider markets.	Knowledge of competing and complementary products and legal requirements.
Customization management knowledge and experience data	The stock of service data collected throughout a firm's history of completed or ongoing customization projects.	Service data from issue tracking or project management systems.
Product functionality and flexibility	The stock of business functionalities already implemented into a software product and the flexibility supported by a solution provider.	Specific and general business functions and configuration mechanisms
Product-related software development assets	The stock of resources invested in a firm's software development infrastructure.	Software development infrastructure and employees with software development skills and experience

Customer business and market knowledge. This term refers to the stock of resources invested in a firm's understanding of recent developments and needs in potential customers' businesses and provider markets. Customer business knowledge identifies and defines customer value. For instance, an interview participant from the industrial machine industry explained the benefits of using a software solution for managing full-service contracts and the expected return on investment, highlighting the following:

"It is this customer value that we can commercialize!" (Solution provider, No. 5.)

Our coding results suggest that identifying customer value includes knowledge of the core businesses of existing and potential customers, including their existing business requirements and ongoing product and service innovations, vendor-customer relationships, legal developments, and regional differences in their areas. Market knowledge, however, focuses on developments in the service providers' market. It is important for identifying market opportunities and includes knowledge of developments in new or existing complementary and competitive products and services, innovations in software implementation methods and technologies, and innovations in hardware and software infrastructure.

Customization management knowledge and experience data. This refers to the stock of service data collected through a firm's history of completed or ongoing customization projects. Customization management knowledge refers to standardized customization delivery processes, project templates and best practices, and different customization approaches. As a document management solution provider explained:

"Projects are evaluated upfront and categorized as either standard or innovative. Standard projects involve professional services. Innovative projects involve the software development department because a higher degree of innovation is needed. Usually those projects are accompanied by a market analysis. Those innovative projects are initiated by customers who ask for pilot projects or prototypes." (Solution provider, No. 12.)

Our interviews revealed that most service providers offer at least two types of customization approaches, which follow either a sequential, waterfall-like process or an agile, prototype-oriented process. Customization experience data refer to experiences of customization projects for specific existing customers and explicit service information stored in IS, such as ticket systems or project management software.

Product functionality and flexibility. This term refers to the stock of business functionalities already implemented in a software product and the flexibility supported by a service provider. This third unique resource aims to describe what several service providers described as “the (product) standard”. For software product customization, this is the existing product’s functionality and flexibility. As an interview participant from a utility company explained:

“For me, customization means adapting a standard software product to my actual needs. For instance, usually a software product has some type of database with standard input fields. However, it is also possible to add new fields that are important for my organization but which nobody else needs. [...] The next level of customization is adaptation of the business processes supported by a software product. However, in this case, vendor-provided consulting services are more and more important.” (Customer, No. 2.)

This resource refers to a product’s existing business and technical functionalities to support general and anonymous market needs along with the ability to change those functionalities according to a customer’s specific requirements. Although a product’s existing functionality is important for realizing standard customization services, flexibility is necessary to react to customer-specific requirements or innovative customization projects. These aspects are contradictory, but they are crucial for successful customization delivery.

Product-related software development assets. This term refers to the stock of resources invested in a firm’s software development infrastructure. From a technical point of view, several techniques or types of customization activities exist. Customization can be accomplished either by configuring one (often monolithic) application through setting database switches or changing configuration files or by parameterizing several software modules to build the desired solution. Furthermore, customization can be accomplished by extension programming. Particularly in complex and/or innovative customization projects, a product’s existing functionality is often not sufficient to fulfill the customer’s needs, and a software product can provide rich development functionalities and support. In such cases, solution providers need product-related software development know-how and related assets to ensure support services and product update security. For instance, as an interview participant from the mechanical engineering industry explained:

“Our industrial services are not products in the original sense of the word. We develop customer-oriented, customer-specific individual software solutions. Our projects always include a solution process. Our software products are prestructured and predeveloped tools provided by Siemens, SPS Software or S7. Each of these tools is a [third-party] standard product that we use as the basis for an individual solution.” (Solution provider, No. 1.)

4.2. Distinctive capabilities

Capabilities are defined as a firm's capacity to deploy resources. They are usually used in combination, based on organizational processes, to accomplish the desired goal. Therefore, they can be characterized as information-based, tangible and intangible processes that are firm specific and developed over time through complex interactions among a firm's resources (Amit; Schoemaker, 1993). Furthermore, according to Day (1994), distinctive capabilities are those that must be superior if a business is to outperform its competition. The interviews revealed six of those distinctive capabilities, as summarized in table 4.

Table 4: Summary of capabilities, definitions, examples and linkage between resources and capabilities

Distinctive capabilities	Definition	Primary resources
Business analysis and interpretation capability	Business analysis and interpretation capability refers to a service provider's capacity to analyze a customer's business needs, interpret them based on existing customer business and market knowledge and reflect those needs against supported business functionality and flexibility in an existing software product.	Customer business and market knowledge; product functionality and flexibility
Customer integration and expectation management capability	Customer integration and expectation management capability refers to a provider's ability to integrate customers into the customization process and to manage customer expectations to successfully meet defined goals.	Customization management knowledge and experience data
Requirements management and negotiation capability	Requirements management and negotiation capability refers to a provider's ability to manage customer requirements during a customization project. This includes gathering, prioritizing and managing the state of customer requirements as along with negotiating conflicting requirements.	Product functionality and flexibility; customization management knowledge and experience data;
Future-proof solution design capability	Future-proof solution design capability refers to a provider's capacity to design a future-proof software solution based on a product's functionalities and a specific customer's needs.	Customization management knowledge and experience data; product-related software development assets
Solution deployment and initialization capability	Solution deployment and initialization capability refers to a provider's ability to deploy a developed solution to a customer and initialize that solution with respect to the existing IT landscape or formerly used (legacy) systems.	Product-related software development assets
Solution adjustment capability	Solution adjustment capability refers to a provider's ability to adjust a deployed software solution according to changed requirements during and after the initial implementation.	Product functionality and flexibility

Business analysis and interpretation capability. Business analysis and interpretation capabilities refers to a service provider's ability to analyze a customer's business needs, interpret them based on existing customer business and market knowledge,

and reflect those needs against supported business functionality and flexibility in an existing software product. For instance, as an interview participant from the mechanical engineering industry explained:

“Our problem is not to provide software. Our problem is to understand the machines that need to be automated. How do they work? What are their technical processes? Imagine a rolling line that produces filled chocolate: the sheath must be cast, centrifuged, and cooled. Finally, the chocolate must be filled in. Once we understand how this works, we can start thinking about software.” (Solution provider, No. 1.)

According to our interview analysis, this ability includes but is not limited to the following capacities on the provider side: (1) adapting to a customer’s way of thinking; (2) anticipating future solution usage (and requirements); (3) identifying and communicating optimization potentials when working on the customer side; and (4) actively presenting new product features to customers. The underlying primary resources for this capability are customer business and market knowledge and product functionality and flexibility.

Customer integration and expectation management. This term refers to a provider’s ability to integrate customers into the customization service and to manage customer expectations to successfully meet defined (and undefined) goals. One important aspect of customer integration is to earn a customer’s trust. As the CEO in the email marketing software business explained:

“Our consultants and project managers need to earn the customer’s trust to be able to do their jobs. This is essential for customization services. If our consultants make promises, they have to keep them.” (Solution provider, No. 4.)

This capability also includes tasks such as (1) identifying key users and integrating them early and continuously; (2) leading customers through complex situations; (3) explicating customer expectations to reduce the risk of unsatisfying service outcomes; and (4) managing the PSF’s reputation during a customization service to increase the firm’s chances of being retained for follow-up projects. Although capabilities usually draw on a number of different resources, the underlying primary resources here are customization management knowledge and experience data.

Requirements management and negotiation capability. This term refers to a provider’s capacity to manage customer requirements during a customization project, including gathering, prioritizing and managing the state of customer requirements, along with negotiating conflicting requirements. We therefore define requirements management and negotiation capabilities as a service provider’s capacity to harvest requirements from—partially incomplete—sketches of customers’ business needs and to negotiate unexpected (and conflicting) requirements to provide an optimum customer solution based on the functionality of existing products. For instance, channeling customer input is one important aspect of requirements management. As a CEO from the email marketing software industry explained:

“Some customers flood you with trivialities. Others are more professional. Depending on that, we organize interface structures for channeling customer input.” (Solution provider, No. 4.)

According to our interviewees, this capability includes (1) anticipating future usage scenarios related to customer and product development; (2) professionally handling

unexpected customer requests; (3) fostering a commitment to customer requests; and (4) using IT systems to store and track customer requests. The underlying primary resources for this capability are product functionality and flexibility, customization management knowledge and experience data.

Future-proof solution design. This term refers to a provider's capacity to design a future-proof software solution based on product functionalities and a specific customer's needs. For instance, rebuilding interfaces of existing legacy systems might facilitate a customer's transformation from one solution to another. As a CEO of a monitoring software company explained:

"If our system has to replace a legacy system, we might start by rebuilding known interfaces or processes to provide a solid foundation for future developments." (Solution provider, No. 9.)

According to our interview analysis, this capacity also includes activities such as (1) integrating customers into the design phase, (2) respecting customers' experiences with legacy systems; (3) setting up a flexible design process (due to the non-sequential nature of customization services); and (4) managing the non-technical aspects of product customization. Because using existing templates from former projects can be considered a best practice, the underlying resources for this capacity are customization management assets and customization experience data.

Solution deployment and initialization. This term refers to a solution provider's capacity to deploy a designed solution to a customer and to initialize that solution by migrating data from existing sources to provide a useful system. According to our interview results, this capability includes (1) providing customers with all of the information (and competences) needed to use deployed solutions (e.g., training, support, documentation); (2) migrating data from different sources to initialize solutions; (3) having a capacity to integrate a solution into an existing IT landscape; and (4) resolving potential conflicts with third-party systems (e.g., firewalls, drivers, virus scanners) on the customer side. Data migration in particular was mentioned as an important capacity. Service providers often develop their own tools to facilitate customer migration to their systems. As an SM from the health care industry explained:

"We are in a very good position in regard to data migration. Our conversion tools are able to integrate data from the most important products of our rivals." (Solution provider, No. 2.)

The underlying resources for this capability are product functionalities and flexibility, along with product-related software development assets.

Solution adjustment capability. This term refers to a provider's capacity to adjust a deployed solution according to upcoming requirements both during and after the initial implementation. Customers expect service providers to handle post-implementation requests:

"Exactly! We must actively develop the best possible solution for the customer in consultation with the customer. It is important to discuss upcoming (customer) ideas during the implementation process. One cannot expect to deliver a specification and six months after the product is developed, all of the user documentation have been written, every business case has been covered and all users have been trained. That is not what we expect." (Customer, No. 6.)

According to our interview analysis, this capability includes capacities on the provider side, such as (1) providing workarounds for requirements that have not yet been implemented into the solution; (2) providing internal training to consultants and developers that support customer solutions; (3) providing user support, particularly when a delivered solution requires process changes in the customer's organization; and (4) storing and tracking customer requests. The underlying resources in this case are the provider's customization management knowledge and experience data.

4.3. Product customization resources and PSF performance

As described above, our interview analysis revealed four unique resources and six distinctive capabilities used and applied by PSFs in software product customization. However, how those resources and capabilities contribute to a PSF's market and innovation performance remains to be discussed. Our results indicate that a PSF's financial performance is influenced by the success of individual customization projects. Project success, in turn, is related to customer satisfaction. However, in addition to these two project- and firm-level success factors, generating knowledge output for services or product innovation is a similarly important success factor, according to almost all of the interviewees who represented PSFs. The following interview excerpt highlights how essential project success and knowledge output are and how closely interlinked they are in customers' perceptions of PSFs:

"Customization includes customer satisfaction, but there is also an economic component. As a company, we need to generate revenue, we need to retain our employees and we need to invest in the next generation of our software product. This is a huge investment for us. Therefore, it is also good market research. We have to be sure about our developments." (Solution provider, No. 12.)

From a project perspective, a successful software product customization project deploys a PSF's existing customer business and market knowledge to provide an individual solution that enhances customer value in a way that the customer is willing to pay for. In this context, customization management knowledge and experience data, along with existing product functionality and flexibility, are used to provide individual solutions as efficiently as possible to more than one customer. Finally, with respect to customer satisfaction, software-related development assets are used to provide even more individual functionality, which is not included into the product. By using defined best practices or project templates for similar types of customization activities, PSFs thereby try to optimize their performance.

"We use these standard mechanisms [project templates/best practices] in almost all of our customer projects. Those projects in which we cannot use them are more prototypical projects in which the development department is much more involved. Those projects often have the potential for product development." (Solution provider, No. 6.)

As previously indicated, commercial output is not the only customization project output that defines a PSF's performance. Generating knowledge that is used for service or product innovations is similarly important. PSFs use customization projects to identify or generate new customer business and market knowledge and integrate that knowledge into their existing knowledge bases. In a similar vein, PSFs use their experiences in customization activities to generate or enhance best practices to provide more efficient service to customers. Furthermore, knowledge from customization pro-

jects is transferred to the ongoing development of a PSF's product functionality or flexibility and thereby enhances service opportunities, among others. Finally, knowledge from customization projects can lead to the integration of new technologies into a PSF's product-related software development assessment. However, our results also show that customization projects do not provide all of the knowledge needed for PSFs' innovation. Rather, they are a trigger for identifying fields for deeper knowledge exploration, for instance, product management. As an interview participant from the health care industry described, requirement impulses from customization projects are integrated in product management:

"We have our product management specialists. Those people are not necessarily programmers, but they know what is happening in the market and they are in close contact with medical personnel and partners. They collect requirements and discuss them with the development leader in charge, who then writes concepts and specification." (Solution provider, No. 6.)

Initially, we defined capabilities as a firm's capacity to deploy resources (cf. Amit and Schoemaker, 1993). The results from our analysis demonstrate that in customization projects, resources are not only deployed from PSFs to their customers to generate project success but also from customers to PSFs. The following section describes the various capabilities' influence on resource deployment and provides a topology of product customization capabilities.

4.4. A typology of software product customization capabilities

According to Day (1994), it is not possible to enumerate all of a firm's capabilities because they are rooted "in the realities of its competitive market, past commitments, and anticipated requirements". However, certain types of capabilities can be recognized in all types of businesses. Corresponding to the core processes of creating economic value, these capability types are as follows: outside in, spanning, and inside out. Building on Day's (1994) introduction, this typology of capabilities has been applied to several contexts, such as market-driven organizations (Day 1994), IS capabilities (Wade and Hulland 2004), open innovation functions (Enkel et al. 2009), and the absorptive capacity of IS (Roberts et al. 2012).

First, outside-in capabilities are outward facing. They place an emphasis on anticipating customer requirements, creating durable customer relationships, and understanding competitors (e.g., market responsiveness, managing external relationships). Thus, outside-in capabilities facilitate a firm's capacity to identify knowledge (Wade and Hulland 2004). According to our prior analysis, business analysis and interpretation capabilities, along with customer integration and expectation management capabilities, can be related to this type of capability. In customization projects, both capabilities are responsible for identifying and integrating customer knowledge into the customization process.

Second, inside-out capabilities are inwardly focused. They are deployed from inside a firm in response to customer requirements and opportunities (e.g., technological or organizational development). Thus, inside-out capabilities increase a firm's knowledge application capability (Wade and Hulland 2004). Successful (and even unsuccessful) implementation and adjustment of customer-specific software solutions strengthen a firm's knowledge application capacity. Therefore, solution deployment and adjustment capabilities can be closely related to inside-out capabilities.

Finally, spanning capabilities integrate a firm's inside-out and outside-in capabilities. They involve both internal and external analysis, are needed to gain a better understanding of how new external knowledge relates to what organizational members already know (e.g., managing IS/business partnerships, IS management and planning) (Wade and Hulland 2004). Requirement management and negotiation, along with future-proof solution design capabilities, involve knowledge integrated from identified outside-in capabilities and exploited in the inside-out capabilities of software product customization. We therefore relate the requirements of management and negotiation and future-proof solution design capability to spanning capabilities. Figure 2 illustrates the relationship between customization capabilities and generic types of capabilities.

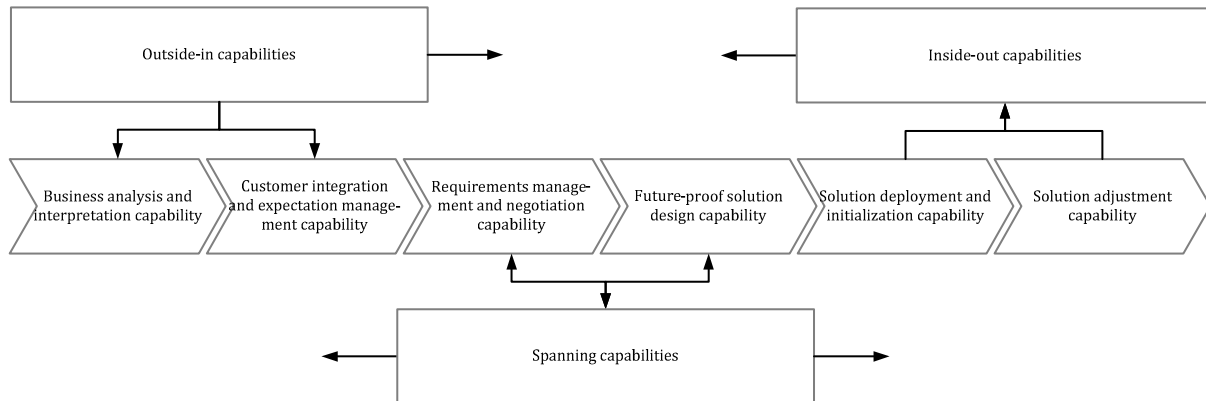


Fig. 2 Software product customization capabilities related to generic capability types

5. Conclusion

We have investigated what service-providing software firms must do to successfully deploy customer-specific software solutions and what influence these requirements have on those firms' innovation activities. Our findings help to better understand how solution providers can organize customization activities more professionally and realize benefits in their innovation activities.

Our first contribution was to identify six distinctive capabilities that PSFs must develop to deploy customer solutions. Our focus was on generating a list of distinctive capabilities that reflected the technical specificities of customization deployment. Drawing on an RBV that includes knowledge as the most important resource (Eisenhardt and Santos 2002), we additionally identified four unique resources that help solution providers to leverage these capabilities. Adapting Ulaga and Reinartz's (2011) approach, we then developed a comprehensive framework that integrates capabilities and resources in a consistent manner to explain success in software product customization activities. Second, we applied Day's (1994) typology of innovation capabilities to characterize the knowledge transfer of distinctive capabilities and to propose their effect on innovation activities within firms. Specifically, we analyzed how the identified capabilities foster outside in, spanning, and inside-out knowledge transfer along the deployment value creation chain. Our findings lead to several implications for theory and practice.

5.1. Implications for theory and practice

Our study offers at least three new important implications for academic inquiries in service-oriented information systems research. First, most previous studies have taken a limited view of customization from the perspective of customer firms. Our study investigated customization activities from the service provider's perspective. We highlighted six distinctive capabilities for customization service deployment and identified unique properties and dimensions for each of them. Furthermore, we connected those capabilities to four underlying, unique customization resources. Second, previous studies have focused on customization either as a way to deliver a product or as a form of value co-creation. By applying Day's (1994) typology of innovation capabilities to our results, we combined those perspectives. Outlining the predominant type of innovation for each identified capability, we provide a deeper understanding of the reciprocal nature of customization services. Third, customization projects provide continuous interfaces for knowledge exchange between customers and solution providers. Thus far, the IS research has taken the outside-in perspective on this knowledge exchange and left the inside-out perspective mostly to disciplines such as general management or software development. However, to regard software product customization from a service perspective requires the consideration of both views to respect the reciprocal nature of knowledge exchange in the services context. Our overall framework of (knowledge) resources and capabilities is a starting point for further investigation in that area.

From a managerial perspective, our findings provide insight into the factors that drive success in software product customization and their relationship to service provider innovation activities. Our study identifies four unique resources and six distinctive capabilities that customization-providing firms must recognize, secure, and grow if they wish to succeed in customization services and benefit from those services in their innovation activities. Henceforth, managers can use our framework as a guideline for how to change their existing customization practices and as a starting point for defining customization service benchmarks.

5.2. Limitations and next steps

As is the case for any research project, choosing a specific research method creates some limitations that might offer avenues for further research. For this explorative and qualitative study, the natural next step would be an empirical validation of the proposed relationships. Furthermore, future research should investigate customization resources and capabilities more deeply by triangulating solution providers and customer perceptions with data gathered from product-developing firms. This extension would provide an interesting contrast by differentiating between service- and product-development-related innovative activities in software product customization. Although these limitations must be kept in mind, we hope to provide new insights for both practitioners and academics.

The next steps for this working paper will be to relate our qualitative findings to the existing literature in more detail, to identify detailed effects of customization capabilities on service and product innovations and to provide a more detailed analysis of our findings' implications for theory (e.g., on existing RBV or KBV contributions) and practice.

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LEAN HEALTHCARE MAY ENDANGER SUSTAINABLE PERFORMANCE IMPROVEMENT, IF SERVICE DOMINANT LOGIC APPROACH IS EXCLUDED

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This study shows how public healthcare can improve cost-efficiency, effectiveness and accessibility by modelling operation and introducing new management practices, such as lean management. The specialised hospital improved performance from 18% to 98% in 2007-2010 when a lead-time of referrals was used as an indicator. However, car manufacturing origin, closed system based lean's capability to provide sustainable advantage within 'loosely coupled' system of public specialised healthcare is limited, if lexicon is not elaborated, and if multi-level open system and service dominant logic approach is ignored.

1. Introduction

The study has been carried out in the Children's Castle Hospital specialized in children and youth with neurological and mental disorders. Petäjä and Mertsola (2013) criticise the current trend in children healthcare services; the authors identify shortages e.g. in terms of accessibility, equality and in competence of service providers due to healthcare insurance system that has directed into excellent private pediatric services but atrophy of public know-how.

As a manifestation of renewal and change endeavor Finnish public hospitals and primary care have also implemented lean management interventions (Tiirinki, et al. 2016) following the management trend (Brandao de Souza, 2009, Mazzocato et al. 2010, Andersen et al. 2014). Lean healthcare continues a cost-efficiency paradigm that was introduced to public sector in a form of New Public Sector (NPM) that aimed to improve public sector by importing practices from private sector (Pollit; Bouckaert, 2011). An analogy to NPM's and lean management's ability to produce sustainable adaptability can be drawn from Japanese economy, which flourished in 1980s due to an implementation of lean.

Womack et al. (1996) elaborated Lean philosophy by condensing Lean to five core principles where a core value must to be defined by a customer, an identification of precise value stream for each product, a pull-based production which refers to cus-

tomers order before production starts and an elimination of all sort of waste (*muda* in Japanese). In this view organizations' functions consist of processes.

Thus Lean management emphasizes efficiency, effectiveness, cost cuts, customer-driven processes, quality in terms of reduction of errors, incremental improvements (*kaizen*) and improved employees' motivation and customer satisfaction and loyalty (Womack et al. 1990).

Some countries have adopted a strategy to promote Lean via major institutional actors, such Institute for Healthcare Improvement in the US, and the Institution for Innovation and Improvement and the NHS Confederation in the UK have promoted Lean implementation in healthcare sector (Womack; Miller, 2005, Westwood et al. 2007). The changes include e.g. advanced accessibility, reduced queuing times, cost cuts, generation of shared understanding, collaboration and incremental improvements (Kaplan et al. 2014; Mazzocato et al. 2011). Machado and Leitner (2010) identify three categories in the present Lean healthcare literature; Lean philosophy wherein the ultimate goal is waste elimination, Lean as toolkit, and Lean as an "instruction manual" and a gradually preceding change program (Machado; Leitner, 2010).

Lean interventions have been carried out in divergent healthcare contexts, but lean implementation programs usually cover only a limited scope instead of organization wide application (Mazzocato et al. 2010) exposing an organization at risk of partial optimization. Lean is a management philosophy where employee-driven, incremental innovations are fully capitalised, the aspect which is mostly ignored in public sector's lean literature (Radnor et al. 2006).

As a manifestation of renewal and change endeavor Finnish 72% public hospitals and primary care have implemented at least one lean management interventions and 84% of nonexisting previous knowledge of lean consider lean interventions (Tiirinki, et al. 2016). The results follow management trend that can be seen almost all over Western hospitals (Brandao de Souza, 2009, Mazzocato et al. 2010). In Finnish public hospitals and primary care the main motivation for Lean implementation is to improve cost-efficiency whereas less development activity is focus care service quality and patient satisfaction (Tiirinki, et al. 2016). However, although the informants accentuate financial savings 90% of the informants reveal that "there were no data available concerning financial savings, -----, 35% there were no information available with regard to the level of financial investment in healthcare organisations."

An early adaption of lean can also signify good management practices and a capability to rapidly implement new management techniques as Bloom et al. (2011) suggest. Bloom et al. (2011) show with remarkable international data, how well managed organisations are early adaptors of new management practises e.g. lean. Bloom et al. (2011) show with international data of 10 000 international organisations how good management practices correlate with better outcomes in terms of performance capability. In comparison, USA origin companies are well managed except publicly owned organisations and owner managed companies.

However, firstly, although Bloom et al. (2011) reveal a correlation between good management practises, their work focuses on a present picture and giving only a little attention to a renewal ability in general, and especially, in public service sector. Secondly, public organisations' capability to perform is dependent on contextual factors where public organisations form a 'loosely coupled' system that seminal theorists, such as Pfeffer and Salancik (2003), describe as reciprocity, weak relationships, ties and links.

Radnor et al. (2012) criticise that lean interventions are mostly dedicated only to some limited techniques, such as 'kaizen blitz' which enable only limited and localised performance improvements. Thus interventions lack a holistic approach, which can induce a partial optimization (Mazzocato et al. 2010), and emphasis on technical aspect and process-centered view can deteriorate sociotechnical perspective of work decreasing work motivation by standardizing knowledge work (Dosten et al. 2009), whereas the patient flow approach with cost reduction goal may deflate users' wellbeing (Brandao De Souza, 2009). A "customer pull"-concept can be problematic in healthcare if healthcare service provision is left for market forces that may medicalize human challenges and other circumstances. According to Mann (2009) a social aspects have to be seen as an essential element of lean in order to achieve sustainability.

1.1. Environment

Finnish government is planning a major social and health reform that aims to restructure the healthcare funding and service provision. The ongoing restructuring project continues previous administrative level reforms, such as a *law of statutory care guarantee* that came into effect in 2005 and aims at healthcare service improvement in terms of accessibility. The law guarantees an access e.g. to first aid and acute care regardless of a place of residence. In the case of the special healthcare the law sets down definite instructions concerning time limits, especially related to a treatment of children and adolescence with mental disorders; children and adolescence have to be examined and evaluated by a specialist in six weeks. A treatment has to be provided within 90 days in a case of a need of the treatment is perceived. Despite the reforms patients' satisfaction has been declining, indicates a 14-year follow-up questionnaire study carried out in Finland (Raivio, et al. 2014).

This study suggests that healthcare providers can be able to expand and capitalize external resources embedded in social ecosystem and in social networks by relying on *social capital*. Social capital refers to resource pools embedded within social relationships as "*resources for social action*" (Nahapiet; Ghosal, 1998), which urge for co-operation and thus constructs a core concept for "*the understanding of institutional dynamics, innovation and value creation*" (Nahapiet; Ghosal, 1998).

1.2. Porous organisations with external resources

The public service providers have limited incentives to monitor and measure service performance. Although the service providers have limited means for that one reason is that the public hospitals confront a *soft budget-constrain* (Kornai, 1989). The concept refers to situations where the relationship between earnings and expenses is flexible since excess expenses are covered by some other institution, or supplementary budget as in the case of public hospitals, and the decision making is based on expectations of financial support from an external actor. Thus budget constraints in the context have been imaginary. However, in several special healthcare service units, the demand exceeds the supply, which may lead the service provide to neglect investments into service process quality improvement in the user value chain.

Mutual learning, knowledge creation, and transference are crucial competences in present dynamic environment wherein organization cannot draw only from their internal resources and competences (Vargo; Lusch, 2004a; Nonaka; Takeuchi, 1995; Grönroos, 2009) but need to extend to external resources provided by users, networks and social ecosystem. Bloom et al. (2011) link education with good management practices, but unfortunately the research is only focused on education level of managers and workforce, whereas several studies on service innovation promote more dynamic aspect of learning, such as learning with employers, customers, networks and external partners (Nonaka; Takeuchi, 1995; Bessant, 2014; Hipp, 2010). Neglecting this broader aspect of learning endangers sustainable renewal and innovations.

1.3. Service innovation approach in public services

Tangible, industrial innovations may overshadow an epoch-making nature of service innovations. Companies, such as Google, Amazon, Airbnb, Facebook, PayPal represent examples of major service innovations wherein the outcomes are not fruits of R&D departments or research centers but focus on changes in processes, and on how services are provided. Sundgo and Fuglsang (2002) identify two main classes of external factors influencing on innovation: 1) trajectories, such as technological, social or institutional and 2) critical actors, such as politicians and shareholders.

Toivonen (2010) analyses three types of innovations concluding that the first type of innovation, 'innovation as independent project' where innovative activity is an intentional endeavor, planned in advance and a remarkable part of the project is executed *before* a new or improved service is launched into the markets. In terms of rapid application innovative action is carried out *intentionally, but parallel* with daily practice (Toivonen, 2010). The third type of innovation, practice driven innovation, originates from identified practical dilemma and a solution to it either as an *ad hoc innovation*, as Gallouj and Weinstein (1997) have suggested or *bricolage* (e.g. Garud; Karnoe, 2003; Fuglsang, 2011). However, in terms of ad hoc innovation Toivonen questions the original definition claiming that it was unable to make a distinction between an innovation and other tailor made solution. However, in the

sequential works Gallouj (2002), the model was elaborated and re-defined. Accordingly, ad hoc innovation includes expertise and interrelated components that can be applied to new situations, although the solution itself cannot. This kind of innovation cannot be carried out independently or preplanned, conversely, it can only be identified as an innovation *a posteriori* (Gallouj, 2002), as Toivonen (2010) states.

The service dominant logic of marketing (Vargo; Lusch, 2004a) has been revising and is already an established view of marketing discipline, however, it is newly arriving to a public sphere aiming at service improvement by incremental or radical innovations (Vargo; Lusch, 2004a). The most salient trait in this view is how it condenses a capability to explicitly engage a customer knowledge as a stake in service or goods production, either during a creation process or afterwards during an utilisation of service or goods, thus e.g. Porche stands for service (not services) of manufacturing organisation that are traded to other service intertwined with organisation's core competences, skills and knowledge. According to this radical statement all economies are service economies.

The service-centered view of marketing promotes an ongoing learning process which endeavours for improving a capitalisation of operand resources, organisation's core competences, processes, and skills and knowledge, of both the service provider and the service user. Ultimately, all transactions can be derived from knowledge change. Vargo and Lusch (2004a) claim rightly that the connection between a skilled labour or a professional and their customers has been interrupted by monetarisation and microspecialisation. The distance is even longer in public sector where the link between costs and service production is opaque for providers. The definition is applicable to nonprofit public repudiate the primary nature of tangibles, operand resources, of classic economists, and building on Bastiat (1860) and over hundred years later, as Shostack (1977) who accentuate that value in embedded in services goods can provide, such as a car can provide transportation service. Services, as Vargo and Lusch (2004a) state in their prominent article, are *"the application of specialized competences (knowledge and skills) through deeds, processes, and performances for the benefit of another entity or the entity itself"*.

In this framework a concept of resources draws from resource-bases-view promoted by Penrose (1959) and Zimmerman (1951) who states *"resources are not they become"*, catching a core of resource classification into *operand resources*, referring e.g. to tangibles and is equivalent in classical economic theory and *operand resources*, that are dynamic, renewable and enable the capitalization of tangible and limited resources (Constantin; Lusch, 2004). The more recent approach to resources, the service dominant logic argues for primary nature of operand resources, which modify is a relationship with customers and a conception of exchange (Vargo; Lusch, 2004a). Consequently, Vargo and Lusch argue (2004a) *"goods are not the common denominator of exchange; the common denominator is the application of specialized knowledge, mental skills, and, to a lesser extent, physical labor"*. Capabilities are a matter of exchange, either through schooling or intertwined in goods. This approach is consistent with a definition of Scott's (1998) concept of *technology*, which he defines as a process where *"energy is applied to the transformation of materials, as a mechanism for transforming inputs into outputs"*.

Scott clarifies that “*technology of an organization is often embedded in part in machines and mechanical equipment, but also comprises the technical knowledge and skills of participants*”.

Process and operant resources management are dependent on information flows; both internal and between organization and its stakeholders, thus creating a core of service dominant logic and including all kind of organisations, Vargo and Lusch (2004a) argue. This approach promotes a concept of organisation-wide marketing, where organisations are seen as a marketing communication platform including all aspect of operations thus supporting information flows and instead of seeing a service user as a target of persuasion as in the traditional marketing view, the service-centered view perceives users as co-producers of value, involved in continuous value production (Vargo; Lusch, 2004a).

In more recent works (2006, 2008) the authors have elaborated a lexicon replacing co-producer with co-creator and thus referring to intangible results of co-operation. In this terminology *service* (singular) instead of *services* (plural) is aimed to capture the process where resources are capitalised for the benefit another (Vargo; Lusch, 2004b, 2006).

The traditional concept of marketing involves persuasion, whereas a concept of communication permits ‘*inter action*’, an opportunity to have an influence in relays. Gustafsson et al. (2011) show how three dimensions of communication (frequency, direction and content) are related to incremental innovations, whereas in terms of radical innovations frequency is positively related but content negatively. According to this study, communication is beneficial when an organisation’s object is to map customers/users latent needs but customer involvement can be detrimental if the organisation pursues radical, technological innovation.

2. Methods

This study is carried out in The Children’s Castle Hospital in Southern Finland. The Children’s Hospital is a part of the hospital district of Helsinki and Uusimaa. The Children’s Castle Hospital, which provides care in psychiatric clinics and wards. The hospital stands for the pediatric neurology and child psychiatry care. It belongs to the Helsinki University Central Hospital. The Children’s Castle belongs to a profit center that includes four other clinic groups: pediatric, children surgery, gynecological diseases and obstetric. The services are carried out through four main processes, three of them have a clinical consultant in charge.

Since child psychiatry is not very appealing, the hospital has difficulties in hiring senior hospital medical officers. Despite the Care Guarantee Act the Children’s Hospital was unable to provide services within the time limits. Due to the deviation from the Act, an executive of medical staff appointed a change team in 2007. The major intervention program was launched in the beginning of 2008 and various incremental service innovations have been carried out ever since.

This single case study addresses the change in performance as the result of the intervention. According to Yin (1994, 2014), the case study research method is

applicable in situations when a researcher seeks answers to how and why questions, and when study concerns phenomena that evolves on contemporary bases, and where *“the boundaries between phenomenon and context are not clearly evident”*. The design is also applicable when researchers cannot interfere or intervene in the organization studied. A single case study is also recommended when the phenomenon is unique, crucial, rare or current (Yin, 2014). The study design follows a model suggested Cohen et al. (2002) for social sciences where a researcher *“attempts to map out, or explain more fully, the richness and complexity of human behavior by studying it from more than one standpoint and, in so doing, by making use of both quantitative and qualitative research”* (Cohen et al. 2002). Instead of basing the research on the dichotomy of induction or deduction, it draws from abduction. Morgan (2007) defines abduction as a process where a researcher, *“moves back and forth between induction and deduction”*. The relationship to research process can be seen as ‘intersubjective’ instead of either subjective or objective (Morgan, 2007). In terms of ‘contextual’ and ‘generalized’ the author advocates the third way *“where inductive results from a qualitative approach can serve as inputs to the deductive goals of a quantitative approach, and vice versa”* and accentuates a research approach wherein learning in one context can be transferred to other surroundings (Morgan, 2007).

Data draws from several sources (Yin, 2014) and includes archive material, journals and eleven in-depth recorded and graphically transcribed elite interviews in the actor network: a manager in a pediatric outpatient unit providing specialised care, a manager in child health unit, an executive medical director of the hospital, an executive medical director of a unit, a manager of municipal family clinic, a consultant of children’s therapeutic services, a director of municipal family and social services, a consultant of family clinic, a senior registrar of pediatric psychiatry of local outpatient clinic, a senior registrar of acute care and a head nurse.

The term ‘elite’ refers here to a professional elite and figure-heads who have significant decision-making opportunities and influence in a studied organization. The professional elite interviews are feasible when the interviews aim to gather information concerning processes or practices (Alastalo, Åkerman, 2010). The eleven interviewed informants represent persons who hold management or mid-management position. The thematic, and semi-structured interviews were carried out with open-ended questions that allowed more freedom for interviewees to define the scope of their answers, describe their views on the change process. **The data** of this study covers the period from the end of 2007 until 2013. The data collection began after the change intervention was launched. Thus, the launching stage and its background is based on archives and interviews. The interview questions were sent to the respondents before the interview thus providing an opportunity to focus on the themes. The questions used in the interviews were based on management literature and tested before going to a field. All interviews were transcribed and anonymised. The interviews were carried out in a researcher group of two.

The study follows American tradition of qualitative research, which enables a combination of quantitative and qualitative data in order to connect findings to the context and conceive a studied phenomena. Thus quantitative data concerns historical performance sequentially and the outcomes of the intervention are compared

within the case, whereas interviews enable a creation of more profound and deeper understanding. The analyses method followed the analyses protocol proposed by Miles; Huberman; Saldaña (2014).

3. Results and findings

The archives concerning improved effectiveness and efficiency improvement suggests time order between a Lean intervention service performance improvement. Data shows the improved accessibility both with a capability to handle referrals in less than 90 days and with number of treated patients thus suggesting to 'civic performance' (Djellal; Gallouj, 2008). Before the lead-time of referrals in 90 days was 18%, but the lead-time of referrals was improving every year, and in 2010 it researched 98% in 90 days.

However, we need to regard these preliminary results cautiously, due to great difficulty in isolating dependent and independent variable from other possible intervening factors, such incremental innovations, and application of other new management and HR-practices.

In order to clarify the picture, the interviews were analysed. The interviews support preunderstanding of a correlation between good management practices and a performance improvement (Bloom, et al. 2011) but also an open system approach based on incremental service innovations, which enables a capitalisation of the resources in the actor network, and a provision of new and moving therapeutic models. As a new model of operations seven treatment processes were implemented: an initial evaluation in pediatric psychiatric and acute care, affective syndroms and anxiety disorders, neuropsychiatric and conduct disorders, a general hospital psychiatric, toddlers' phyciatry, pediatric forensic psychiatry, and an evolution of therapeutic treatments and guidance. Thus the hub organization benefitted from the structuring and modelling, whereas the actors in the network were in a phase of a 'bounded rationality' in decision making. The informants welcomed the indicators to monitor treatment results and performance, whereas for personnel it stood for an unfamiliar cultural change. All managers accentuated a need for a transparency and reviewed e-calenders as an opportunity to e.g. preplan the resource allocation to cover all treatment sessions.

The management also changed operational methods. Before the management intervention one child or adolescence and his/her family was involved in a long treatment process where at least six months was spent in examinations, after queing one year to a ward. In the new model treatment processes started immediately or during an examination and a number of treatments were limited and decided beforehand.

However, although the archive documents contain descriptions of change management, they can be read as a manifesto and as an emblem of change in vision and strategy.

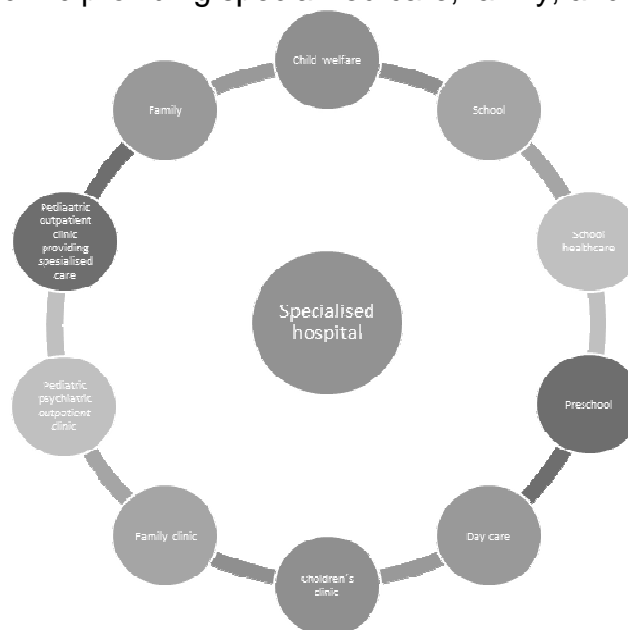
Qualitative data reveals Lean-inspired endeavours for cost-cuts, efficiency, effectiveness, measuring and monitoring performance, a clarification of objectives in terms of operation, cutting waste by standarisations and structuring care processes that has improved accessibility (from e.g. three years to light 1-3 interventions), which

promotes a value of equality. The finding support earlier studies (e.g. Kaplan; Patterson, 2008; Mazzocato et al. 201).

The concept of 'customer-pull' is complicated in the context. As one informant described: *"children are patients, but parents are not patients, they are customers. Everybody who wants to bring a matter to our attentions is a customer, some organization, social service, a school, a day care... Sometimes families or children have least willingness to share matters with us."*

The figure below clarifies the actor network and highlights, why 'customer-pull' is challenging in the context, and why lean may narrow a scope, and if health-related, contextual issues are not considered, such as recession, immigration, and alcohol consumption.

Actors from a right top to downward: a school, a school healthcare, a preschool, daycare, children's clinic, a family clinic, health centre, a pediatric outpatient clinic, a pediatric outpatient clinic providing specialised care, family, and child welfare.



The intervention targeted to modify care process so that the primary supporters, such as families, schools, day care etc. could cope better with children with mental disorders. However, as the figure illustrates, due to complex actor network, and a relative independence of actors, co-operational challenges, professional barriers concerning e.g. teaching style, interruptions in information flows between actors. E.g. one informant describes, "how there is always a peak in certain times of a year when schools get tired of demanding kids, and want to send them to the ward". This statement reveals the complex multidependency in the actor network, and the challenges of co-creation. Service dominant logic approach was most prominently highlighted in the co-operation and co-creation within professionals, and other organisations, however several informants accentuated the view of involving 'customers' or 'patients' to co-creation problem. Neither was this approach easy in the context due to e.g. lack of common goals between actors, thus supporting the proposition of 'loosely coupled' system.

4. Discussion, research limitations and future research

The study shows that Lean healthcare provides techniques and tools for healthcare management aiming at cost efficiency, effectiveness and service quality improvement e.g. in terms of accessibility, and thus Lean continues the previous path of New Public Management. However, as shown, the complexity of actor network creates barriers for simple process modifications. The study also illustrates the multidimensionality and how complex a 'demand' can be.

The findings of this explorative study provide a starting point for further research but cannot be generalized to a wider population. However, the literature would benefit if the further research would scope to employees' perspective during lean intervention and especially on employee-driven innovation aspect which is essential in the lean philosophy.

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LEVEL OF SMARTNESS IN URBAN CONTEXTS: OPEN ISSUES IN MEASUREMENT

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The aim of the paper is to identify the main issues in the measurement of the level of smartness in urban contexts, starting from the conceptualisation of smartness, the delineation of the different dimensions of smartness and the review of the measurement models. This process of analysis allows the proposal of a model to measure the level of smartness that is illustrated through the application to an empirical context, namely the city of Naples, highlighting the open issues related to the selection criteria and the collection of data.

1. Introduction

The development of urban areas and the growing number of people living in cities are recent issues that increase the attention on the initiatives for the improvement of citizens' quality of life (UN-Habitat, 2016). These initiatives are favoured by the recent progress of technologies, especially so called smart technologies related to the concept of Future Internet (FI) and its paradigm of Internet of Things (IoT). The use of smart technologies that allows the interconnections among objects and between them and people through the use of applications (Atzori, 2010) is helping city management to improve the level of smartness of their cities.

The deployment of IoT in urban contexts to increase smartness is widely debated by scholars belonging to different fields of research (Hernández-Muñoz *et al.*, 2011; Schaffers *et al.*, 2011; Scuotto *et al.*, 2016) and it has also been more and more related to a conceptualisation of technologies as instruments to enhance people participation in urban life, satisfy citizens' needs and find sustainable solutions to urban life problems (Bulu, 2014; Vanolo, 2016).

The integration of technology, people and sustainability – economic, social and environmental sustainability – is exactly the main aim of smartness in urban contexts and it is related to the concept of smart cities, concerning the development of innovative services to improve citizens' quality of life (Caragliu *et al.*, 2011; Schaffers *et al.*, 2011). The smart city concept emerged at the beginning of the XXI century as the result of an evolution (D'Auria *et al.*, 2014) started in the '90s with a focus on technologies (Hudson-Smith; Dodge, 1997; Ishida; Isbister, 2000) that moved towards the integration of information and communication technologies (ICTs) and sustainability (Schaffers *et al.*, 2011; Bifulco *et al.*, 2016). The concept of smartness is also strictly

related to the service-dominant logic (Vargo; Lusch, 2004) and service system (Maglio; Sphorer, 2008) studies focusing on the integration of resources, the interoperability of services, and the co-creation of value by citizens.

Despite the wide interest on smart cities, there are few contributions in literature aiming at the measurement of how the different initiatives implemented in urban contexts can help to reach smartness, as the main studies have been conducted by consulting firms or supranational agencies. So, the aim of this paper is to identify the elements that compose the concept of smartness and analyse the models developed in order to propose a new model to measure the level of smartness and illustrate it (Sigelkow, 2007) through the application to the empirical context of the city of Naples.

2. Conceptualization of smartness

2.1. Dimensions of smartness

The concept of smartness as the integration of technology, people and institution (Nam; Pardo, 2011) for the development of sustainable activities in urban contexts (Caragliu *et al.*, 2011; Bifulco *et al.*, 2016) can be related to practical actions aiming at the implementation of innovative solutions in the different fields composing a urban contexts – so called dimensions or *drivers* – that allow the identification and the following measurement of the level of smartness reached in cities (Bifulco *et al.*, 2014b). These dimensions have been identified by both scholars and other important actors, such as national and supranational agencies and ICT firms (or industry players).

The most used dimensions of smartness in the analysed literature and reports are those developed by Vienna University of Technology (TU Wien), in collaboration with the University of Ljubljana and the Technical University of Delft (Giffinger *et al.*, 2007), namely:

1. smart economy
2. smart people
3. smart governance
4. smart mobility
5. smart environment
6. smart living.

With regard to the smart economy, this dimension refers to the competitiveness of a city concerning the innovative spirit, the support to entrepreneurship, the economic image and the trademarks, the level of production, the flexibility of the labour market, the presence on the international market and the ability to change the economic vocation. The second dimension, namely the smart people, groups the human and social capital of citizens with the inclination towards creativity and flexibility, the level of professional qualification, the activities of lifelong learning, the openness to ethnic plurality and social integration and the participation of citizens in social life. The smart

governance is related to the notion of participation already mentioned in smart people, but in this dimension it is conceived more as an involvement of citizens in the decision making process of city management and in the co-creation of public services, in order to develop a transparent governance and a strategic vision of policies. This dimension is linked to both the e-governance perspective, i.e. the use of technology to support more democratic bottom-up policies, and the concept of open governance, which provides the direct access to information to citizens and businesses, thanks to the spread of open data. The fourth dimension, the smart mobility, refers to the local and international accessibility and the development of sustainable, innovative and secure transport systems. The smart environment is closely related to the mobility for its consideration of the pollution, but it also takes into account the different environmental conditions that make a city attractive, the protection and preservation of green areas and the sustainable management of natural resources. Finally, the sixth dimension, namely the smart living identifies the different aspects of quality of life, such as facilities for culture and education, health and urban security and the development of tourism.

This framework (Giffinger *et al.*, 2007) considered ICT as an important feature concerning only the dimension of smart mobility, while the following studies, including the European Parliament report on smart cities (EU, 2014; Bifulco *et al.*, 2016), have stressed that technology represent an across-the-border factor – as institutional and human factors – that is important for the development of innovative and sustainable services in all the six dimensions of smartness.

The six dimensions identified by Giffinger *et al.* (2007) and updated by the European Union (EU, 2014), have been also used in literature, both by consulting firms and national agencies. Among the contributions by scholars, Lombardi (2011) has started her study from the six dimensions of Giffinger *et al.* (2007), but she has selected only five dimensions, namely smart governance, smart human capital in relation to people, smart environment, smart living and smart economy. These dimensions have been related to the each of the elements composing the model known as the Quadruple Helix (Carayannis & Campbell, 2010) – i.e. universities, industry, government and civil society – in order to assess the EU policy visions on smart cities for 2050. The four policies are those identified by the “Urban Europe program - joint Programme Initiatives” and concern four types of smart cities, namely connected city, entrepreneurial city, pioneer city, liveable city. Lombardi (2011) has used the elements of the Quadruple Helix to analyse the peculiarities of the four types of smart cities and the outcome of the investigation has shown that the entrepreneurial city, focused on competitiveness and smart economy, is the one giving the high priority to universities, industry, government and civil society.

Another study based on the model of Giffinger *et al.* (2007) is the research conducted by Boscacci *et al.* (2014), in which the six dimensions of smartness are used to measure the urban attractiveness of the 103 Italian provinces (NUTS 3, 2011) with the selection of the housing market to evaluate the attractiveness. The results show that smart living, smart people and smart economy are the main dimensions to be exploited to increase the level of attractiveness of a city, strictly related to a high employment rate, the location of universities and research centres, the specialization in technological and innovative activities and the significant presence of tourists.

The success of the six-dimensional model of Giffinger *et al.* (2007) can be identified also in other studies and research conducted outside the scientific literature, such as

reports and official documents released by supranational and national institutions, as the EU and Forum PA. The EU has recently conducted a survey on the smart projects developed by the Member States (EU, 2014) using the six dimensions of smartness. The study starts with the analysis of 468 cities with a population of more than 100,000 inhabitants, then it selects the 240 cities conducting projects on one dimension of smartness; going deeper the study analyses the 37 cities with projects in advanced stages of smartness and, finally, it focuses on 6 best practices – i.e. Amsterdam, Helsinki, Barcelona, Copenhagen, Manchester and Vienna – selected thanks to their high number of initiatives concerning one or more dimensions of smartness.

Looking at the national level, the model of the six dimensions of smartness has been used by Forum PA (2012, 2013, 2014, 2015) to realise the so called “ICity Rate”, namely the ranking of the Italian provinces with the highest level of smartness that is released every year during the event “Smart City Exhibition”. The last two editions have presented two peculiarities, as the ICity Rate 2014 has distinguished between standard and smart factors along the six dimensions, while the ICity Rate 2015 has added a seventh dimension of smartness, the smart legality, that focuses on the influence of the slowness of trials, the construction of unauthorized building and the organized crime.

The analysis of the different contributions on the dimensions of smartness has also allowed to identify some research that are not based on the model developed by Giffinger *et al.* (2007), but they are developed around the identification of several factors that local authorities can use to improve the urban quality of life. These studies have been conducted by different consulting firms, both in Europe and in Italy, such as IDC Research, Between and ABB-The European House Ambrosetti.

At European level, it is interesting to highlight the study conducted in 2011 and 2012 by IDC Research on the smartness of the Spanish cities, through the analysis of five dimensions of smartness: smart government, smart buildings, smart mobility, smart energy and environment, smart services. Furthermore, these five dimensions of smartness have been integrated with the analysis of three “enabling forces”, namely people, economy and ICTs, leading to the delineation of a set of eight “smartness building blocks” used to conduct the study and realise the ranking.

In Italy, the interest on smartness is confirmed by two other studies. The first, the “Smart City Index”, has been conducted in 2013 and 2014 by the consulting firm Between that has clustered the dimensions of smartness in two main approaches: the “green” approach with the four dimensions of alternative mobility, natural resources, energy efficiency and renewable energy; the “digital” approach with the five dimensions of smart health, smart education, smart mobility, smart government and broad band; moreover, this approach has been enlarged with three additional dimensions in 2014, namely smart cultures and travel, smart urban security, smart justice. The second study on smartness has been carried out in 2012 by ABB-The European House Ambrosetti which has identified three dimensions of smartness that city management can lever on to offer innovative and sustainable services to its citizens, namely mobility, resource management and quality of city life.

2.2. Models of measurement

The description of the different dimensions of smartness is related to the identification of the factors composing each dimension and, moreover, the selection of the indicators that can be used to measure each factors. The analysis of these items has been conducted through a review of the different measurement models, highlighting the selection criteria of the cities analysed and the factors of each dimension.

The most popular classification of the dimensions of smartness developed by Giffinger *et al.* (2007) is related to the measurement of the level of smartness reached by the European cities; in details, the selection criteria have been expanded over time, leading to the release of two different types of ranking, the first ones concerning European medium-sized cities (2007, 2013, 2014), and the other one that analyses the large cities (2015). The selection of the medium-sized cities is based on four criteria, namely the number of citizens between 100,000 and 500,000 inhabitants, the presence of at least one university in order to assure the analysis of cities with a high level of knowledge creation, the catchment area less than 1,500 inhabitants to avoid urban centres dominated by larger cities, finally the participation of the cities in the PLEEC project (Planning for Energy Efficient Cities). Otherwise, the selection of the large European cities is based on a population between 300,000 and 1,000,000 inhabitants, together with the presence of the cities in the Urban Audit database and the availability of more than 80% of indicators. The online report with all the information about the selection of the factors and the different indicators is available only for the research conducted in 2007 on the medium-sized city – 31 factors and 74 indicators – while the following rankings are not released as report, but the information about the selected factors can be viewed from the official site (www.smart-cities.eu). In details, in 2013 the factors decreased from 31 to 28, while the different indicators increased in number to reach 82 indicators and a similar process occurred in 2014 with 28 factors and 81 indicators, showing a reducing number of factors especially within the dimension of smart people.

This six-dimensional model was also used to develop an annual ranking – since 2012 – called “Smart Cities Wheel” released by the American Society FastCompany and, in particular, created by Body Cohen for FastCo.Exist to measure the level of smartness both globally and through a ranking divided by geographic regions (i.e. Europe, North America, Latin America, Asia-Pacific). The measurement model identifies three factors for each of the six dimensions of smartness and the different indicators per factor are calculated by collecting both public data and, starting from 2013, also primary data obtained by gathering information from the participation of the selected cities to a survey. In addition, in 2014, Body Cohen has established an advisory board composed of four experts of smartness – Rick Robinson of IBM, Pilar Conesa Director of the Smart City Expo, Jesse Berst founder of Smart Cities Council and Esteve Almirall director of the Centre for Innovation ESADE business school at Barcelona – to help him refine the details of the model; this collaboration has allowed the selection of 62 indicators instead of 28 among a wide range of 400 potential indicators, but the following survey has allowed to gain data only from 11 out of 120 selected cities.

Furthermore, the six-dimensional model by Giffinger *et al.* (2007) has also been used in the national context, thanks to the research conducted by ForumPA that has developed the ranking of smartness in Italy, the “ICity Rate”, through the analysis of the 106 Italian provinces every year since 2012. For each of the six dimensions of

smartness ForumPA has identified the corresponding indicators that have been increased over time from 89 in 2012 to 95 in 2013 and, finally, 106 indicators used both in 2014 and in 2015. The increase of indicators from 2012 to 2013 occurred due to the relationship among ForumPA, some key players in Italy who hold public data (ISTAT, ANCI, UNIONCAMERE) and other associations of civic participation (Openpolis and ActionAID).

As stated above, there are other research that have not used the six dimensions of smartness identified by Giffinger *et al.* (2007), but they have identified different dimensions with the resulting creation of whether a narrower model – IDC Research and ABB-The European House Ambrosetti – or a wider one, as it happened for Between. The first of the two narrower measurement models has been developed by IDC Research to analyze 44 Spanish cities with a population of 150,000 inhabitants and it has been conducted through the identification of 23 factors and 94 indicators, but there are no details of this information. The other narrower model, created by ABB-The European House Ambrosetti, has been constructed with three dimensions of smartness, 3 factors and 3 indicators and it has been applied to measure the level of smartness of the 13 most populated Italian cities, namely Bari, Bologna, Bolzano, Florence, Genoa, Milan, Naples, Palermo, Rome, Turin, Trieste, Venice, Verona. On the other hand, the wider measurement model is the ranking released by Between with the support of the Agency for a Digital Italy (AgID – Agenzia per l'Italia Digitale); in 2014 this model has been used to achieve a ranking of smartness among the 116 Italian provincial capitals through the analysis of twelve dimensions of smartness and 422 indicators. In 2016 the “Smart City Index”, always with the support of AgID, has been committed to another consulting firm, Ernest & Young, that has structured it in a different way (EY, 2016); the dimensions of smartness have been substituted with four layers –infrastructure, sensors, service delivery platform, applications and services – and two areas of analysis – smart citizens and liveability of the city, vision and strategy – with a total amount of 470 indicators.

3. Proposal of a model for measuring smartness

The analysis of the different measurement models, their evolution over time and the corresponding dimensions of smartness have been useful to identify the most recurring factors and indicators used to measure the level of smartness. This review has allowed to select the model developed by Giffinger *et al.* (2007) as the basis for the proposed model because it is the first model developed, the most frequently mentioned in both literature and in reports and research on smart cities, and it has a long life as it has been conducted along the years and it is still used. The need to create a new model is related to the lacks of the focus on the context of analysis as the model by Giffinger *et al.* is based on the availability of public data collected at the European or national level with no consideration of the different data produced by cities or other territorial levels.

The main change that has been made to the model in relation to the number of the smartness indicators has concerned the acceptance of the suggestions of the EU (EU, 2014) with the elimination of the indicator “ICT infrastructure availability” from the dimension of smart mobility as the use of technologies in smart contexts occurs within all the dimensions of smartness and it's not limited to transport and sustainable mobility. The other adjustments have been made through the integration within the

essential structure of the model of additional indicators all along the six dimensions of smartness. These indicators have been selected and taken from the other measurement models analysed in the review, in details from the “Smart Cities Wheel”, “iCity Rate” and “Smart City Index”, and they are related to all the six dimensions of smartness (tab. 1):

- smart economy with the indicators of the number of international congresses, the number of innovative start-ups born in the city and the number of handicraft firms;
- within smart people it has been highlighted the importance of the Internet for citizens, through the indicators on the percentage of households who have domestic access and the percentage of citizens over 6 years who use Internet at least one day a week;
- within smart governance, in order to emphasize the role of ICT and Internet technologies in the development of innovative services and openness and transparency of administrative procedures, we have added the indicators on the number of wifi hotspots located in the municipality, the presence of an open data portal and the number of mobile applications using open data, the use of environmental planning instruments, the number of followers on official social networks, the percentage of communication channels and the use of forms of social reporting;
- smart mobility indicators concerning the number of services offering real-time information, the number of columns to charge electric vehicles and the number of available electric bikes and cars for inhabitants, the extension in kmq of the bike paths and the number of areas regulated by limited traffic zones;
- within smart environment, in order to underline the importance of green spaces and environmental protection, we have added the indicators of the proportion of green spaces on the municipal area, the share of recycling and the proportion of energy produced through renewable sources;
- smart living, including cultural activities that improve citizens' quality of life, with indicators on the percentage of investments in culture by the city management compared to the total investments, the number of PCs available in schools, the presence of different communication channels for cultural and touristic information and the presence of the librarian and museum online systems.

Table 1. The proposed model

DIMENSION	FACTOR	INDICATOR
smart economy (competitiveness)	innovative spirit	R&D expenditure in % of GDP
		employment rate in knowledge-intensive sectors
		n° patent applications
		n° start up
	entrepreneurship	self-employment rate
		n° new business registered
		n° handicraft firms
	economic image and trademarks	importance as decision-making centre (HQ etc.)
	productivity	GDP per employed person
	flexibility of labour market	proportion in part-time employment
international embeddedness	companies with HQ in the city quoted on national stock market	
	air transport of passengers	
	air transport of freight	
	n° international congress	
smart people (human and social capital)	level of qualification	importance as knowledge centre (top research centres/universities, etc.)
		population qualified at levels 5-6 ISCED
		foreign language skills
	affinity to life long learning	book loans per resident
		participation in life-long-learning
		participation in language courses
	social and ethnic plurality	share of foreigners
		share of nationals born abroad
	flexibility	perception of getting a new job
	creativity	share of people working in creative industries
cosmopolitanism/open-mindedness	voters turnout at local elections	
	immigration-friendly environment	
	knowledge about the EU	
participation in public life	participation in voluntary work	
use of Internet	% families with Internet connection	
	% people +6years old using Internet at least once a week	
smart governance (participation)	participation in decision-making	city representatives per resident
		political activity of inhabitants
		importance of politics for inhabitants
		share of female city representatives
		share of environmental planning instruments
	public and social services	expenditure of the municipal per resident in public and social services
		share of children in day care
	transparent governance	satisfaction with quality of schools
		n° wifi hotspot per kmq
		satisfaction with transparency of bureaucracy
satisfaction with fight against corruption		
n° followers per 100 inhabitants		
smart mobility (sustainable mobility)	local accessibility	% communication channels
		% forms of social reporting
		use of open data
	international accessibility	n° app created thanks to open data
		public transport network per inhabitant
sustainable, innovative and safe transport systems	satisfaction with access to public transport	
	satisfaction with quality of public transport	
	n° public transport offering real-time information	
	international accessibility	
	green mobility share (non-motorized individual traffic)	
	traffic safety	
	use of economical cars	
	kmq of areas regulated by limited traffic zones	
kmq of bike paths		
n° columns to charge electric vehicles		
n° bikes for bike sharing per inhabitant		
n° cars for car sharing per inhabitant		

Source: Authors' elaboration from Giffinger *et al.* (2007), FastCo.Exist (2013, 2014), ForumPA (2012-2015), Between (2013, 2014), EY (2016)

DIMENSION	FACTOR	INDICATOR
smart environment (natural resources)	attractivity of natural conditions	sunshine hours
		green space share
		share of green spaces on the municipal area
	pollution	summer smog (Ozon)
		particulate matter
		fatal chronic lower respiratory diseases per inhabitant
	environmental protection	individual efforts on protecting nature
		opinion on nature protection
		share of recycling
	sustainable resource management	efficient use of water
		use (kWh) of domestic electricity per inhabitant
		% energy produced through renewable sources
smart living (quality of life)	cultural facilities	cinema attendance per inhabitant
		museums visits per inhabitant
		theatre attendance per inhabitant
		% investments in culture by city management
		n° channels for cultural and touristic information (portals, SN, Apps)
		librarian and museum online systems
		life expectancy
	health conditions	hospital beds per inhabitant
		doctors per inhabitant
		satisfaction with quality of health system
	individual safety	crime rate
		death rate by assault
		satisfaction with personal safety
	housing quality	share of housing fulfilling minimal standards
		average living area per inhabitant
		satisfaction with personal housing situation
	education facilities	students per inhabitant
		satisfaction with access to educational system
		satisfaction with quality of educational system
		n° pc per 100 students
	touristic attractivity	touristic importance as tourist location (overnights, sights)
		overnights per year per resident
	social cohesion	perception on personal risk of poverty
		poverty rate

Source: Authors' elaboration from Giffinger *et al.* (2007), FastCo.Exist (2013, 2014), ForumPA (2012-2015), Between (2013, 2014), EY (2016)

The different indicators identified in the proposed model have been empirically illustrated with the evidences emerged from the context of analysis (Siggelkow, 2007), namely the city of Naples. This choice is related to the selection criteria of the measurement model by Giffinger *et al.* (2007), as Naples is the location of three universities and different research centres and it has 989,111 inhabitants (ISTAT - City of Naples, 2015) as a large European city.

The model has been applied to Naples through the collection secondary data gathered from the analysis of two main official documents, namely the Report Urbes 2015 on equitable and sustainable well-being in cities released by the Italian National Institute of Statistics in collaboration with the City of Naples and the National Council for Economics and Labour (ISTAT, 2015) and by the Bulletin of Statistics (Municipality of Naples, 2014) developed by the statistical office of the city. Other secondary data, especially those related to smart economy, have been collected using the online databases of the Chambers of Commerce.

On the basis of the availability of data, the exemplification of the model shows the presence of all the six dimensions of smartness, but a significant reduction in the number of indicators from the proposed 99 to 28, as can be seen from the following table (tab. 2).

Table 2. The available data for the city of Naples

DIMENSION	INDICATOR	SOURCE	DATA	YEAR
smart economy (competitiveness)	employment rate in knowledge-intensive sectors	ISTAT - Report Urbes, 2015	5,5	2011
	n° patent applications	ISTAT - Report Urbes, 2015	16	2009
	n° start up	database startup.registroimprese.it	149	2016
	n° new business registered	infocamere.it - 2015	20.157	2015
	n° handicraft firms	infocamere.it - 2015	28.592	2015
smart people (human and social capital)	air transport of passengers	Municipality of Naples - Bulletin of Statistics, 2014	24.874	2014
	population qualified at levels 5-6 ISCED	Municipality of Naples - Bulletin of Statistics, 2014	116.328	2011
	book loans per resident	Municipality of Naples - Bulletin of Statistics, 2014	5.240	2014
	share of foreigners	Municipality of Naples - Bulletin of Statistics, 2014	31.496	2011
	voters turnout at local elections	ISTAT - Report Urbes, 2015	52,2	2009
	% families with Internet connection	ISTAT - Report Urbes, 2015	44,1	2011
smart governance (partecipation)	share of female city representatives	ISTAT - Report Urbes, 2015	9,6	2012
	share of children in day care	Municipality of Naples - Bulletin of Statistics, 2014	2.109	2014
	% forms of social reporting	ISTAT - Report Urbes, 2015	50,0	2011
smart mobility (sustainable mobility)	public transport network per inhabitant	ISTAT - Report Urbes, 2015	3.310	2012
	n° public transport offering real-time information	ISTAT - Report Urbes, 2015	3	2012
	use of economical cars	ISTAT - Report Urbes, 2015	305,4	2013
	kmq of areas regulated by limited traffic zones	comune.napoli.it	1,2	2016
smart environment (natural resources)	kmq of bike paths	ISTAT - Report Urbes, 2015	13,4	2013
	green space share	ISTAT - Report Urbes, 2015	12,4	2013
	share of green spaces on the municipal area	ISTAT - Report Urbes, 2015	34,2	2014
	particulate matter	Municipality of Naples - Bulletin of Statistics, 2014	27,5	2014
	share of recycling	Municipality of Naples - Bulletin of Statistics, 2014	22%	2014
	efficient use of water	Municipality of Naples - Bulletin of Statistics, 2014	42,9%	2014
smart living (quality of life)	use (kWh) of domestic electricity per inhabitant	Municipality of Naples - Bulletin of Statistics, 2014	920,9	2014
	crime rate	ISTAT - Report Urbes, 2015	350,8	2012
	death rate by assault	ISTAT - Report Urbes, 2015	3,5	2012
	share of housing fulfilling minimal standards	ISTAT - Report Urbes, 2015	131,3	2011

Source: Authors' elaboration

As presented in the table above, the retrieved data for the measurement of the indicators are different from each other, so we have proceeded to standardize the values, following both the analysis conducted by Giffinger *et al.* (2007) and the suggestions of the Organization for Cooperation and Economic Development (OECD, 2008) to develop composite indices, i.e. standardisation or z-score: $Z = (x - \mu) / \sigma$.

This methodology for the construction of composite indicators allows to convert different indicators to a common scale with a mean of zero and standard deviation of one. The indicators with extreme values have a greater effect on the composite indicator (OECD, 2008), but this methodology is useful for the consideration of the heterogeneity within groups and it has a high sensitivity towards changes (Giffinger *et al.*, 2007). So, the use of the standardisation has allowed us to compare the different indicators and calculate the level of smartness for each of the six dimensions, as shown in Table 3.

Table 3. The illustration of the model for the city of Naples

DIMENSION	INDICATOR	VALUE	
smart economy (competitiveness)	employment rate in knowledge-intensive sectors	-0,360	0,972
	n° patent applications	-0,359	
	n° start up	-0,354	
	n° new business registered	0,495	
	n° handicraft firms	0,853	
	air transport of passengers	0,696	
smart people (human and social capital)	population qualified at levels 5-6 ISCED	4,667	4,812
	book loans per resident	-0,135	
	share of foreigners	1,000	
	voters turnout at local elections	-0,359	
	% families with Internet connection	-0,360	
smart governance (partecipation)	share of female city representatives	-0,360	-0,988
	share of children in day care	-0,270	
	% forms of social reporting	-0,358	
smart mobility (sustainable mobility)	public transport network per inhabitant	-0,219	-1,644
	n° public transport offering real-time information	-0,360	
	use of economical cars	-0,347	
	kmq of areas regulated by limited traffic zones	-0,362	
	kmq of bike paths	-0,359	
smart environment (natural resources)	green space share	-0,359	-2,117
	share of green spaces on the municipal area	-0,358	
	particulate matter	-0,359	
	share of recycling	-0,360	
	efficient use of water	-0,360	
	use (kWh) of domestic electricity per inhabitant	-0,321	
smart living (quality of life)	crime rate	-0,345	-1,059
	death rate by assault	-0,360	
	share of housing fulfilling minimal standards	-0,354	

Source: Authors' elaboration

The analysis of the achieved results allows to identify the most important dimensions of smartness for the city of Naples: only two of the six dimensions reach positive values, namely smart economy and smart people. The competitiveness in Naples has a good level of smartness with a value that approximates to 1 and it is mainly linked to both the factor "entrepreneurship" with the indicators of the number of new businesses registered at the Chamber of Commerce and the number of active handicraft firms in the area, and the factor "international embeddedness" with the indicator on the air transport of passengers. The second positive level of smartness is related to the human and social capital and it is mainly connected to both the high level of citizens' qualification, namely those who possess a degree and the respect of the ethnic and social diversity with the indicator on the number of foreign residents in the city.

The other four dimensions present a negative level of smartness, especially with regard to the smart environment and smart mobility, which reflects the real and most obvious problems of the city of Naples. In fact, there are still few results in the share of recycling, the high-density housing in comparison with the presence of green spaces and the inefficient consumption and waste of energy and water. Sustainable mobility is another weak point and a dimension of smartness to lever on in order to improve local public transport, take advantage of IoT technologies to provide real-time information for citizens and increase the use of alternative forms of mobility.

4. Implication and Conclusion

The review of the different models for the measurement of the level of smartness has allowed the identification of the main factors and indicators for the proposal of a model; this model has been empirically illustrated with the evidences emerged from the analysis of the city of Naples, even if the achieved results have some limitations related to the availability of data to measure the smartness.

However, the results are aligned with the latest smart ranking developed at the national level to measure the smartness of the Italian provinces, including Naples, that show low score of the indicators related to the natural resource management, namely recycling, the level of pollution, the dispersion in the water supply network and the availability of green space (Between, 2014; ForumPA, 2015). However, these national ranking take into account the metropolitan area of the cities and in the case of Naples this area has 3,127,390 inhabitants, instead of the 989,111 who lives in the municipality (ISTAT, 2015); this choice of areas delimitation is related also to the availability of a greater amount of data that are more often aggregated at the level of provinces.

The only ranking of smartness that considers the city of Naples, following the extension of the municipality, is the ranking realised in 2015 by Giffinger *et al.* (www.smartcities.eu) on the larger European cities with populations between 300,000 and 1,000,000 inhabitants. The comparison of the results between our proposed model and Giffinger *et al.* ranking has showed that the latter has no positive results for the city of Naples with negative values for all the dimensions of smartness and, in detail, the scores below zero are calculated for 87 out of 90 indicators.

All these inconsistencies among the different ranking and the corresponding models are mainly related to the urban area taken as a basis for the analysis, to the methodology used to measure the values, and to the process of collecting and using data that are not always specified, represent the open issues emerged from this research that should be examined in depth in order to provide a clearer scenario of the measurement models of smartness.

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MARKET DYNAMICS: A COMPLEX ADAPTIVE SYSTEM VIEW

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The worldwide economy is characterized by several aspects of complexity regarding the non-linear interactions between the actors, the evolution in trends, the amount and type of sharable information and the possible scenarios to face. This evolving situation creates dynamism in markets that is not simple to interpret, analyse and predict. For this reason, system theories are useful, particularly the complex adaptive system (CAS) theory. In this conceptual paper we analyse the configuration and management of organizations intended as CASs and we attempt to underline the interpretation of some market relationships, partnerships, competition, innovations and evolutions, comparing the CAS features in market dynamics.

1. Introduction

The aim of this conceptual paper is to contribute to the new trends in the research on markets and market dynamics from the complex adaptive system perspective. Different researchers in the international context are studying new approaches to markets from a multitude of perspectives, thinking that a new theory on markets could be written taking into consideration the recent evolutions of value concepts, resource exchange and integration and turbulence in the relationships among actors interacting in contexts strongly related to macro- and micro-economic variables.

It is not simple to contribute to the development of new theories, and the aim of this work is to contribute some insights that will be useful in building thoughts and reflections for future research, considering that the theory on the complex adaptive system is probably a useful approach to understanding how actors' interactions in markets could be the first step in emerging markets and in market dynamics. Many authors are working on new logics and conducting studies of markets' definition (Araujo et al., 2010; Kjellberg; Helgesson, 2007; Storbacka; Nenonen, 2011a; Storbacka et al., 2008; Vargo et al., 2008; Vargo; Lusch, 2011), considering new paradigms of actors' interaction and underlining the relevance of resources' integration stimulating the emerging value.

After the presentation of markets and market dynamics, the work presents the complex adaptive system (CAS) approach in brief, seeking the elements that are useful for understanding the market dynamics and the connections with change and adapta-

tion. It is possible to propose an emerging hypothesis in which the CAS characteristics are useful for giving meaning to some specific behaviours of the actors in the emerging market dynamics.

2. Markets and dynamics

In the economics literature markets have been seen as mechanisms for price formation in given structures in which actors simply compete for positions. Several authors have criticized the lack of studies on markets in the marketing literature (Araujo et al., 2008; Buzzell, 1999; Ellis et al., 2010; Vargo, 2007; Venkatesh et al., 2006) and the adoption of definitions from economics (Venkatesh et al., 2006). For several years the marketing discipline has approached the dynamics of markets only with process models, such as the product life cycle (Gardner, 1987; Levitt, 1965; Utterback; Abernathy, 1975), to explain market change and the socio-cognitive model of product market dynamics (Rosa et al., 1999).

In recent years a broader view has begun to emerge that perceives markets as emergent social phenomena (Araujo et al., 2010; Kjellberg; Helgesson, 2007; Storbacka; Nenonen, 2011b; Vargo; Lusch, 2011), focusing on the opportunities for co-creation both with customers and with suppliers. The logic of value started in marketing with the goods-dominant (G-D) logic, which defined markets around products and value exchange. According to the G-D logic, companies add value (throughout the value chain) to the “product” that they produce; this value is then “distributed” to the customers, who “destroy” it in their consumption process. More recently, there has been an evolution of the value logic with the service-dominant (S-D) logic (Normann, 2001; Vargo; Lusch, 2004), which assumes that value is created by the customers when integrating resources (“use value”) (Vargo; Lusch, 2008a) and that the goal of a provider is to mobilize customers to create value for themselves (Grönroos, 2008). S-D logic proposes to redefine the neoclassical view of markets as places where demand and supply meet and reach equilibrium (Arnould, 2008; Vargo 2007) built around the notion of exchange value (Lusch; Vargo, 2006; Vargo; Lusch, 2008b) in favour of a new theory of markets as places where firms deploy and integrate operand and operand resources to co-create value in networks of social relationships (Granovetter, 1992; Krippner et al., 2004), incorporating both exchange value and use value (Grönroos, 2008; Venkatesh et al., 2006). In accordance with this view, marketing scholars have affirmed that a market should be viewed as a business ecosystem (system of systems), because market actors can be considered as systems “effectively depending on the resources of others to survive” (Vargo et al., 2008). Storbacka et al. (2008) proposed to describe the resource integration aspect of markets through the configurational approach (Meyer et al., 1993; Miller, 1996) by viewing markets as configurations of interdependent elements that are perpetually evolving with the aim of creating harmony and consonance (Normann, 2001). The interactions between market actors in a market configuration can be seen as market practices (Andersson et al., 2008; Kjellberg; Helgesson, 2006), which are defined as routine, micro-level interactions between multiple actors seeking to create value for themselves and others (Araujo et al., 2010; Schau et al., 2009). When an actor introduces new resources or new ideas into the market configuration, influencing the market practices (Anderson et al., 2008) and disrupting the consonance, the markets evolve in a perpetual reciprocal process to recover the harmony (Storbacka; Ne-

nenen, 2011a). This results in a multiplicity of co-existing market versions (Kjellberg; Helgesson, 2006).

Nenonen et al. (2014) argued that markets are characterized by varying degrees of plasticity, defined as the capacity to take form (fluidity) and retain form (stability). This definition means that markets can be moulded, to varying degrees, in terms of their shapes and functions and that they are able, to varying degrees, to retain such changes in their various properties even after the moulding effort ceases (Nenonen et al., 2014). According to this definition, all markets can be considered to be plastic, even though their degree of plasticity can change, and the interplay between fluidity and stability can help us to understand the market dynamics in more detail.

We can conclude that the marketing literature trends consider markets to be socially constructed (Granovetter, 1992; Kjellberg et al., 2012) and, hence, malleable and subject to multiple change efforts, making it difficult to identify the markets' elements and their boundaries and to study their dynamics, which are constantly evolving under the influence of manifold factors. These considerations lead us to believe that markets are complex configurations and, therefore, studies on complexity, particularly those on complex adaptive systems, are useful for their understanding, as discussed below.

3. Complex adaptive systems: management insights

Complex adaptive systems (CASs) are systems that are able to analyse the changes in the external environment (Begun et al., 2003) and to adapt to them. The basic elements of a CAS are agents, meaning semi-autonomous units that are able to valorize their own available resources and to evolve over time by developing model and personal behaviour (Dooley, 1997). Each agent has its own objectives and behaviours based on physical, psychological or social rules rather than on the system dynamics (Rouse, 2008). Different agents belonging to the same system have a common goal represented by the maximization of the value proposition in the market in which they want to operate, and, even when their aims and behaviours are in conflict, they raise their level of tolerance to adapt to the others and achieve the goal.

The various actors (agents, components) of the CAS are connected to each other by complex relationships and very difficult interactions (Eoyang; Berkas, 1999); they continuously interact, replicate and combine themselves within the system to adapt to the continuous variations in the external environment (Holland, 1992). The high level of connectivity that characterizes CASs enables the creation of a dynamic network of agents that are constantly communicating and interacting (Coleman, 1999; Kelly, 1994; Lissack, 1999; McKelvey; Maguire, 1999; Waldrop, 1992). Each actor has different resources, skills and competencies that are integrated to determine the evolution of the system. It is the people's unique knowledge, skills and organizational competence that make service systems adaptive to and sustainable with the changing market environment (Spohrer et al., 2007). The capacity of adaptability allows these agents to differentiate themselves and to "learn" (Gell-Mann, 2002).

The most important actors for the evolution of the system are those with more resources, who are able to influence the achievement of the CAS's shared purpose (Vargo; Lusch, 2008a).

CASs are everywhere, including stock markets, human bodies, organs and cells, trees and hospitals (Begun et al., 2003). Examples of a CAS can be found among economies, ecologies, weather, traffic, social organizations and cultures (Gell-Mann, 1994).

From the CAS studies we assume that:

- Organizations can be systems;
- Many systems are complex but not all are adaptive;
- CAS are finalized, robust and fitting;
- Organizations intended as CASs are immersed in an evolving pattern;
- The survival of a system implies the persistence of its identity, which does not exclude change.

In the last years, different authors in the management literature have compared CASs with other forms of elements' interactions, such as systems and networks, looking for similarities, particularly in the scientific research fields of service science (Maglio; Spohrer, 2008) and SD logic (Vargo; Lusch, 2010).

Actually, given that the marketing literature trends consider markets as networks of social relationships between interdependent elements that increase the density of resources and capabilities, the theoretical framework of CASs may also be used to define trends and unifying models in the market structure, defining emerging new theories about markets themselves. As mentioned before, there is an intriguing debate on the emerging market theory, and the connection with the CAS approach is emerging in the value co-creation logic (Storbacka; Nenonen, 2011a).

4. The CAS approach in market dynamics

To identify the CAS vision of the markets, some key words defining – with different meanings – CASs and markets emerge from a literature analysis regarding the new approaches to the market definition.

Regarding the CAS approach and the market definition, we are able to compare the use of these words, and it is possible to find analogies between the two concepts. This could be the first step in showing some interesting cues that are useful in one or more ways for explaining better the meaning behind the concepts of markets and CASs.

Table 1. Key words comparing CASs and markets

Key words	Markets	CAS
Adaptability	○	○
Plasticity	○	○
Marketness	○	---
Complexity of the system	○	○
Resource integration	○	○
Finality/purpose	○	○
Value creation	○	○
Survival	---	○
System	○	○

The presence of each characteristic in markets and CASs is not always clear, and the relevance of each depends on the sensibilities of the observer analysing the phenomenon. Because of the high degree of variability in the nature of each phenomenon, it is not simple to capture the clear characteristics of the entities called markets or CASs. Initially it is possible to ascertain that in CASs the characteristics of plasticity (Nenonen et al., 2014) in general are identifiable in markets' behaviour; vice versa, the *marketness* (Storbacka et al., 2011a) could be traceable only in some CASs. In particular, plasticity is the ability to take and retain form (Nenonen et al., 2014); in fact, CASs can be moulded to varying degrees in terms of their shapes and functions to adapt to the changes in the external environment, and they are able to retain such changes in their various properties even after the moulding effort ceases.

Marketness could be a market feature but could belong to CASs in particular situations. With respect to marketness, Storbacka and Nenonen (2011a) stated that, in a situation of high marketness, the market configuration is established and accepted, the core elements reinforce each other, there are market practices that increase the fit and the resource integration is effective. In a situation of low marketness, there is a poor fit between the possible core elements of the market. The density of resources is low, little value is co-created and the market actors are engaged in market creation activities and in influencing other actors in the market (potential customers, providers and competitors) so that they start to view the suggested market configuration as an attractive source of resources for their value creation. In that way it is possible to think that CAS behaviour could reflect that characteristic.

Some difficulties emerge in markets and CASs as "systems". It is possible to sustain that markets could be a particular shape of CASs and, in particular, a CAS could be a general framework that is useful for understanding specific situations based on relations and interactions. It is possible to find some aspects in CASs, but this depends on the perspective of analysis and outlook. Surely a CAS is a system, but it is not easy to observe every system characteristic in a market. The systemic characteristic,

in any case, is useful in helping the observer to study the dynamics of the markets, because, from the systemic side, it is more efficient to analyse the relevance of the interactions when looking for the dynamics of relationships over time. In a system it is not always necessary to identify the government body but to have a common (and shared) purpose that is useful for giving meaning to the interactions. A CAS could be interpreted as “something that emerges” within the final purpose of the actors inside the CAS, because their activity/life could be strongly connected with the CAS and there is the necessity to survive inside it. The situation is not the same for a market, because the goal of each actor within it is not always linked with the survival of the market. Vice versa, the final purpose of a market could be the survival of actors that could have an independent life inside and outside the market.

In the case of “survival”, for example, it is possible to sustain the emergence of a general behaviour of a system that is searching for specific finality to survive over time and that extends beyond the specific reality and belongs to more general systems. It is probable that the nature of “emerging” of markets, caused by the will of actors to integrate their resources, it is at the base of the irrelevance of survival for a market as a system. Thinking that the markets generate the merging of different actors – with different individual purposes – to integrate resources, probably at the general level, markets could also disappear when the actors are satisfied and no actor has to integrate resources. At the same time, the individual actors reorganize themselves, looking for the emergence of other markets; the real necessity of “survival” probably belongs to the systems in which each subsystem/agent/actor is part of a whole and the whole, during time, will be a system when each element contributes to its survival. The characteristic of survival could surely be pursued by a decision maker. The decision maker – *a government body* – has the necessity to lead the system toward survival, and for this reason, because the market has no government body, it does not have survival as its first goal. The CAS also has no real government body, but the emerging leadership identifies some guidelines recognized by the agents in the system and the feature of adaptability contributes to the emerging necessity of survival. It is possible to adapt to changes if the actors believe that belonging to the system is necessary and vital for them. In a CAS the adaptability is the first characteristic that joins the agents together around the final and shared purpose of belonging to the system; in a market it is the convenience (or satisfaction) of resource integration, and for this reason the agents in the market have no necessity to achieve market survival because they have other purposes based on convenience or individual satisfaction.

A CAS emerges from the interaction of actors, because a final purpose emerges and is shared between the actors. A CAS could survive thanks to the actors’ engagement, but the situation is not the same for markets, in which actors interact only in pursuing convenience or satisfaction or in having the goal to exploit the resource integration. We could assume that a CAS could exist without a market, but a market never exists with the interest of actors to integrate resources.

It is possible to underline the relevance of complexity in markets and CASs. In particular, the relevance of complexity is present in both the frameworks, because it is not always simple to predict the future or solve problems in a quantitative way. Actors do not always have an instruction manual for managing operations and decision making. Hence, we think that the complexity approach is useful for understanding the difficulties in relationships and interactions created by the difficulties in interacting with exact predictions and with casual results; probabilistic methods are not always

straightforward to use and predict. For this reason, the actors could manage the complexity using soft skills. Using the CAS framework directly for the markets, it is possible to interpret the complexity, the adaptability, the concept of a system and the “role of purpose” in CASs and markets by interpreting markets’ definition and characteristics in the literature. The goal in the table below is to explain how the complex adaptive system framework is useful for reorganizing the different definitions of markets and their characteristics, in particular moving toward the relevance of interactions in market dynamics (Table 2).

Table 2. Comparing the CAS features in market dynamics

	Complex Adaptive Systems	Markets
About Complexity	<ul style="list-style-type: none"> • A CAS includes a dense pattern of interacting elements • Change can be continuous or discontinuous • CASs are dynamic, massively entangled, emergent and robust • Relationships in CASs are complicated and enmeshed or “massively entangled” 	<ul style="list-style-type: none"> • Markets are complex because of the difficulty of predicting evolution • Markets can be viewed as configurations of actors engaging in market practices (unpredictability) • Agency and performativity: the role of each actor in the market depends on the position of the actor in the network
About Adaptability	<ul style="list-style-type: none"> • CASs may be sensitive to certain small changes in initial conditions, they are characterized by their dynamic state and they exhibit emergent or self-organizing behaviour • The means of assessing performance is fit with the environment; CASs can effectively adapt to a wide range of environmental changes, giving them “amazing resilience” • Three fundamental processes can be identified in CASs: variation, interaction and selection • Broadly, a service system (Spohrer et al., 2007) or service world (Bryson et al., 2004) is a CAS of people and technologies working together to create value • It is the people’s unique knowledge, skills and organizational competence that make service systems adaptive to and sustainable with the changing market environment (Spohrer et al., 2007) 	<ul style="list-style-type: none"> • Market multiplicity: multiple understanding of what any market constitute • Market plasticity: the ability to take and retain form • The actors in the markets act to increase the density of resources • Markets: a space where actors integrate resources to co-create value • The equifinality emerges from the interaction among normalizing, exchange and representational of markets practices – in that case it is possible to consider the “emerging” of equifinality. If the equifinality emerges, it is probably latent or not well defined ex ante
Emerging System in Features	<ul style="list-style-type: none"> • (CASs) are omnipresent, including stock markets, human bodies, organs and cells, trees and hospitals (Begun, Zimmerman and Dooley, 2003) • The basic elements of a CAS are agents • The purpose of the whole emerges over time from the interacting purposes of the parts • Decisions are made by dialogue among parties • Subsystems are massively entangled and participate in each other • Components interact as free agents • Interactions are generative • CASs are characterized by a high level of connectivity 	<ul style="list-style-type: none"> • It is not simple to identify a market as a system; some considerations are probably needed, and the focus of the analysis has to be related to the interactions and to the emerging equifinality • The actors in the markets have equifinality; through this they achieve the goal of strengthening the density of resources • A market is a business ecosystem (system of systems) • A market actor is a system that “depends on the resources of others to survive” (concept of sub-systems) • Market practices: interactions among actors in the markets’ routines
Purpose	<ul style="list-style-type: none"> • Value creation for the system through the interaction between the agents 	<ul style="list-style-type: none"> • Value creation of the agents/actors through resource integration; the market emerges from the resource integration and the nature of the market is determined by the natures of the actors in the integration

5. CAS as middleware between change and adaptation in markets

Today everything can change. Changes can occur in the offer of a product, its range, models, methods of supply, production, promotion and collaboration and in the logic

with which to run a business, to adapt to the times and technology and to meet cultures and traditions. Changes can take place in functions, processes, roles, laws, purposes, structures, boundaries, relationships, visions and framework conditions. Organizations can change because others change or they can change to anticipate change in others.

In system studies a change may be a structural element that affects the processes of production and the use of the offer or those relationships that are the basis of the strategies of collaboration and allow the identification of the specifics of the market or those system-spanning ones pertaining to the constraints of entrepreneurial action in each context. Changes can have an exogenous nature and be related to the subjects or conditions that revolve around the subject observed, defined more or less properly top-down; alternatively, they can have an internal configuration resented of the surrounding situations but nonetheless be presented bottom-up; and finally they may be a combined multi-source result (Golinelli, 2002). The concept of change is also related to the need to maintain over time a state of dynamic balance, which can result from rational actions (considering rationality as a function of the use that is made of perception) or intuition (understood as more impulsive effects) and which takes into account a phenomenal reality or is not only subjective, because those who choose to change or are forced to do so by special circumstances or otherwise cannot be considered to have an interactive relationship with its over-reference systems. The socio-economic change also tries to keep all the elements homeostatically balanced over time and adaptable to changing contingencies (Barile et al., 2012b; Barile et al., 2013). Organizations change because they are part of a larger system and interrelated, a kind of eco-system, which suggests with mature expectations of action to react the previous situation for a different future, in accordance with a logic of co-evolution (Parente; Petrone, 2010). Organizations do not change to modify their identity but to try to stabilize it in time, and, given the interest in managing this type of change, the need arises to learn to interpret the surrounding environment and its complexity to understand how, when and why to change. Organizations can change mildly, in a radical way, temporarily or permanently, they can change to check other roads to success and they can change not to fail. Organizations can change to fix an error or to renew, they can change following a deliberate plan (Watzlawick, 1976) or they can change spontaneously.

Organizations change because today they have more information than in the past or because the perspective of investigation of the phenomena observed or the perception of them has changed; in this sense the change is intended as a cognitive redefinition of the experience, and change can therefore be considered to be a function of learning. Any influence of the elements' movement or a change in a component of an organization (as a system) contributes to a change of the system in its entirety (Watzlawick et al., 1974).

There are various forms of change, as the logic and philosophies underlying the actions of editing, configurable as changes, differ. In particular, with reference to the objectives of the modern enterprise, we report that there is a link between the willingness/ability to sustain its offer and the real possibility of maintaining stable market positions over time, even in the long run; the ability to capitalize on its distinctive resources is the key to the success of an entrepreneurial organization (Pels; Polese, 2010).

From service research we know that every transaction is service-based and any kind of exchange is carried out in the sense of reciprocal satisfaction and a result of the win-win logic and the achieving of durable solutions offered. Market suppliers and providers tend to propose new ideas and tools to involve interested users in the process of delivering and fruition in an attempt to capture their needs, wants and conveniences from the use of the products exchanged (value in use). In markets the value depends on the personal perception of users as subjective judges of the quality delivered by providers; in service this comes from the ability to transfer the right information to each other and from the straightness of their relations. Relationships in services are thus influenced by the service logic. The willingness to satisfy the target (and to maintain the market share) actually leads to a considerable amount of adaptive operations made by the actors involved (Barile et al., 2014; Wieland et al., 2012). The same applies to value co-creation. When an external change occurs, organizations try to modify the characteristics of their products, distribution channels, partnerships, production processes, marketing strategies and so on.

In general, the changing context conditions characterizing the competitive arena today require of all socio-economic actors an important adjustment capacity, which stimulates modern business organizations to plan and manage appropriate adaptation strategies; it is in this context that change can be understood as an attempt by organizations to preserve their identity over time (Barile et al., 2012a). The aim to make the value proposition sustainable and therefore to be more competitive can only be achieved if organizations are able to understand and anticipate the evolution of the surrounding contingencies, still trying to exploit the specific distinctive features in an attempt to respond adequately to the changing needs of the market (Napoleitano; Carrubbo, 2010). Therefore, the ability to defend the value of their offer, trying to adapt to contingencies, does not necessarily imply disrupting their way of thinking and acting; it rather means updating appropriately in response to changing needs and perceptions through a different concept of supply of fruition and production (Barile et al., 2013). The ability to respond to specific market needs or to try to create new ones arises as a more effective intermediate solution in terms of sustainability, and for this reason the ability to change is at the base of the whole activity of an actor in a context. Surely the connection with the market is especially strong because only actors that are able to change can survive in a CAS and participate in market dynamics.

6. Final remarks

Behind this kind of conceptual paper, it is possible to find many managerial implications, because the theories are applicable to different contexts and conditions. In particular, understanding markets could be a necessary ability for managers, companies and common people who day by day are thinking of markets' definition or attempting to explain how resource integration works. It is not necessary to manage a high level of competences or knowledge of finance to understand markets if people are able to understand that some market dynamics are unpredictable and that the necessity to adapt to the modifications, transformations and turbulence of the resource integration process is only the first step on a difficult path to manage, at first, with the consciousness that unpredictability is the core of the problem. It is not possible to predict, directly, the future of adaptive systems, but it could be useful to increase the knowl-

edge about them, recognizing the system dynamics and relationships between actors and encouraging the perceptions in relationships and dynamics. To this end, this work shows how the CAS framework could be useful for studying market definitions and for gaining a better understanding of the evolution of its dynamics, focusing on some future topics such as the market complexity, adaptability, system features and purpose. By comparing the CAS features in market dynamics, some interesting elements that integrate the definitions of markets actually present in the marketing literature emerge: markets are complex configurations because their evolution is unpredictable; markets have the ability to adapt to changes through their plasticity (the ability to take and retain form); and markets are systems in which the actors have equifinality and the shared purpose of resource integration.

The view of the market as a CAS leads us to reflect on the questions of whether markets are able to learn and then to evolve in a sequence of events and how this form of adaptation is functional to their development. The environment, which develops and consolidates the context of each specific system, is able to affect the daily strategies undertaken and pursued, valuing or debasing attitudes and the ability to survive in the long term of all the systems, including markets. Their ability to maintain their position is correlated with their ability to steal signals, to anticipate the future, to adapt resources to necessity and to adapt to the changing conditions.

With regard to further research in this area, the previous suggestions are made for possible examination by future studies: namely the identification of the key resources and the consequent supra-systems' hierarchy to finalize viable behaviour in markets as complex adaptive systems and models and strategies enabling their iterative adaptive behaviour.

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MARKETS AS EVOLVING INSTITUTIONAL PROBLEM-SOLUTION CONFIGURATIONS

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The purpose of this work-in-progress paper is to further the understanding of how markets function and evolve. We do so by elaborating and extending the recent conceptualization of markets as institutionalized solutions of value cocreation proposed by service-dominant (S-D) logic. To better understand how markets as institutionalized solutions evolve, we draw on literature that connects institutional change to the process of framing. We contribute by theorizing how micro-level changes – i.e. organization-specific differences in framing of e.g. a resource or a role – can become amplified and result in macro-level transformation such as market evolution. We develop a theoretical framework describing how markets as institutionalized solutions evolve as actors use institutional complexity – the existence of multiple institutional arrangements and the corresponding patterns of value cocreation – to create alternative frames to interpret situations and guide individual action and then diffuse the novel frames with the help of different types of frame alignment processes. We also describe how we plan to complement our theoretical inquiry with empirical research that we have recently begun.

1. Introduction

“Hopefully, future marketing scholars and practitioners will devise and use more realistic concepts to analyze the functioning and evolution of markets” (Buzzell, 1999, p. 61).

A market is a central abstraction for all business research. Markets provide the essential arenas for firms and other actors to conduct exchange and as consumers, we all regularly participate in markets. Hence, markets should be at the heart of theory development in academic marketing (Arndt, 1979; Venkatesh & Peñaloza, 2006). For a while, the *market* did constitute the starting point for theory development for the early marketing theorists (see e.g. Alderson & Cox, 1948; Sissors, 1966). However, during the evolution of the discipline, markets faded from the center stage of theorizing into an undistinguished background (Araujo & Kjellberg, 2009), causing Venkatesh, Penaloza, and Firat (2006, p. 252) to note that “paradoxically, the term market is everywhere and nowhere in our literature”.

Recently, there has been a wave of publications signaling a renewed interest of markets in marketing (Araujo, 2007; Diaz Ruiz, 2012; Kjellberg & Helgesson, 2007). Some of this development (see e.g. Mele, Pels, & Storbacka, 2014; Peñaloza & Venkatesh, 2006; Vargo, 2007; Venkatesh & Peñaloza, 2006) is closely connected to the emergence of the alternative, service-based understanding of value creation – service-dominant (S-D) logic. S-D logic proposes that *service* – the application of resources for the benefit of others (Vargo and Lusch 2004) – is a central concept in understanding all exchange and the resulting cocreation of value (Lusch and Vargo 2014). This inherently relational and customer-oriented worldview offers a stark comparison to the firm-centric profit maximization logic dominating mainstream marketing thought. The core implication of a service-based understanding of value creation is that no actor creates value alone; value is always cocreated among many actors in the ongoing reciprocal service exchange (Lusch and Vargo 2014, Vargo and Lusch 2004). Exchange enables actors to specialize and enhance their advantageous individual abilities, but at the same time makes them more dependent on exchange with others for their specialized skills (Ridley, 2011; Vargo and Lusch, 2004). This results in systemic dependencies and interdependencies among individuals and groups resulting in complex exchange systems (Chandler and Vargo, 2011; Vargo and Lusch, 2011). This networked view of value cocreation is encapsulated in the concept of service ecosystem, which draws attention to the central role of institutions (i.e., formal rules, social norms, and cultural meanings) in coordinating exchange and the resulting value cocreation (Vargo and Akaka 2012; Vargo and Lusch 2011, 2016).

S-D logic and its service ecosystems perspective also change the way that markets can be conceptualized. Instead of the conventional way of seeing markets as groups of consumers or locations for competition, S-D logic conceptualizes markets as institutionalized – shared and generally agreed upon – solutions of value cocreation within service ecosystems (Lusch & Vargo, 2014; Vargo & Lusch, 2016). For example, consider how personal transportation is solved through a four-wheeled metal box including a steering wheel, a combustion engine and many other components. In addition to the car, this value cocreation solution also includes numerous rules and laws related to driving, the knowledge of these rules and ability to drive, a road system, fueling station network etc.

Conceptualizing markets as institutionalized solutions implies that the evolution of markets can be explained as a process of institutional change. The purpose of this paper is to extend this emerging S-D logic conceptualization of markets by drawing on literature that connects institutional change to the process of framing (e.g. Benford & Snow, 2000; Gray, Purdy, & Ansari, 2015; Snow, Rochford Jr, Worden, & Benford, 1986; Werner & Cornelissen, 2014). We contribute by theorizing how micro-level changes – i.e. actor-specific differences in framing – become amplified and result in macro-level transformations, in our case market evolution. We do this by developing a theoretical framework describing how markets as institutionalized solutions evolve as actors use institutional complexity – the existence of multiple institutional arrangements and the corresponding patterns of value cocreation (Sitaloppi, Koskela-Huotari, & Vargo, 2016) – to create alternative frames to interpret situations and guide action and then diffuse the transformed frames with the help of different types of frame alignment processes.

The rest of the paper is organized as follows: after the introduction, we first present the service ecosystems perspective on markets as institutionalized solutions of value cocreation and how it differs from the conventional product-market conceptualization.

Second, we review literature of institutional change as a framing process and introduce different types of processes for frame development and alignment identified in the previous literature. Third, we describe how empirical research that we have recently begun will complement the theoretical inquiry.

2. Service ecosystems perspective on markets

Although, the market is a central abstraction for all business research, currently, markets seldom receive detailed discussion or analysis in either economics (Lie, 1997) or marketing (Araujo, Finch, & Kjellberg, 2010; Vargo, 2007). Conventionally in marketing, the concept of market is defined in a very narrow way referring generically to demand or more specifically to a group of consumers that desires a particular good or service (Samli & Bahn, 1992; Sissors, 1966). Hence, defining a market requires the specification of a generic class or subclass of products such as the smart phone market or the car market (Sissors, 1966). This strong focus on existing offerings (mainly products), instead of the underlying problems (e.g. consumer needs) the products are designed to solve was criticized already by Levitt (1960) in his famous "Marketing Myopia" article. He argued that firms often see themselves producing and selling products, when what the customers actually seek to buy are solutions and experiences, rather than the products per se. For this reasons a firm might fail to see the alternative opportunities for serving its customers and other will take its place.

Even when markets are defined slightly more broadly e.g. as sites of competition or spaces for exchange, the studies about market transformation and evolution are especially rare. This is partly due to the fact that in (neoclassical) economics the market is seen as a pre-existing regularity that is mainly used to explain other things (Aspers, 2011) and mainstream marketing inherited this conceptualization from economics (see e.g. Arndt, 1979; Mele et al., 2014). This static conceptualization was further sedimented as the managerial turn during the sixties and the rise of consumer behavior in the early seventies, made marketing more largely focused on firms and consumers, not markets (Shaw & Jones, 2005). In one of the rare exceptions, Buzzell (1999, p. 61) states: "hopefully, future marketing scholars and practitioners will devise and use more realistic concepts to analyze the functioning and evolution of markets" and urges more research in the area.

We argue that adopting a service ecosystems perspective on markets answers to this call and has the ability to over-come several limitations of the traditional approaches. Recently S-D logic has increasingly moved toward a systemic understanding of value cocreation and exchange (see e.g. Lusch & Vargo, 2014; Vargo & Lusch, 2011; Wieland, Polese, Vargo, & Lusch, 2012). This more dynamic and complex conceptualization is captured with the term service ecosystem defined as "relatively self-contained, self-adjusting systems of resource-integrating actors connected by shared institutional arrangements and mutual value creation through service exchange" (Vargo and Lusch 2016, p. 10). Hence, in service ecosystems, actors are connected not only by reciprocal service exchange but also by institutions (Lusch & Vargo, 2014). These institutions are shared norms, values, and meanings that enable and constrain actors' actions (Scott, 2014). As "rules of the game" (North, 1990), they provide shortcuts for coordination and decision-making in the face of limited computational abilities, or bounded rationality (Simon, 1996), of humans. A defining characteristic of institutions is their enduring and often taken-for-granted nature, which

makes them appear almost as “objective” structures of social reality (Berger and Luckman 1966, Giddens 1984). Individual institutions are connected with each other forming institutional arrangements, i.e. assemblages of interrelated institutions that act as the coordination mechanisms of value cocreation within service ecosystems.

An increasing number of studies has recently identified institutions as the key constructs for understanding markets and their dynamics (e.g. Dolbec & Fischer, 2015; Ertimur & Coskuner-Balli, 2015). S-D logic shares this view (Vargo & Lusch, 2016; Vargo, Wieland, & Akaka, 2015) and describes markets as “institutionalized solutions” (Lusch & Vargo, 2014, p. 25). This means that markets are conceptualized as consisting of relatively durable and repetitive, i.e., institutionalized, resource integration and value cocreation practices (Vargo & Lusch, 2016) and that well-established markets can be thought of as socially constructed solutions nested or embedded within a particular service ecosystem (Lusch & Vargo, 2014). Although, institutional arrangements guide and coordinate actors’ practices and interactions in service ecosystems (Vargo & Lusch, 2016), the description of markets as “institutionalized solutions” should not, however, be confused with the view of seeing markets as static entities. Instead, actors are able to conduct institutional work that changes institutions and transforms markets (Vargo et al., 2015).

The S-D logic conceptualization of markets as institutionalized solutions is somewhat aligned with Rosa, Porac, Runser-Spanjol, and Saxon (1999) suggestion that markets are “knowledge structures” that are shared by producers and consumers. Resembling the process of institutionalization (Berger & Luckmann, 1967), they argue that initially, these knowledge structures are unstable and incomplete, but over time, they stabilize and come to be generally accepted. By analyzing market stories related to the development of the “minivan” product category in the U.S. automobile industry during the 1980s, Rosa et al. (1999) show the gradual emergence of a consensus regarding the essential features and product membership of the minivan category as both the consumer and supplier perceptions evolve.

Viewing markets as institutionalized solutions should not, however, be confused with the product-based market thinking, i.e. defining a market based on a single product. The concept of value cocreation solution implies the acknowledgement of a much broader set of elements and relationships. While the analysis of what traditionally would be thought as the “car market”, would as a ‘product-market’ include only the group of consumers desiring a car and the seller(s) of cars, the service ecosystems perspective on the same phenomenon would also include the numerous meanings, rules and laws related to driving, the knowledge of these rules and ability to drive, a road system, fueling station networks etc. In other words, the perspective broadens and shifts from the characteristics and behaviors of a focal product and two types of actors to a network of actors and other of elements (e.g. resources, roles and meanings) and the underlying institutional arrangements and corresponding patterns of value cocreation. To better understand how markets as institutionalized solutions of value cocreation evolve, we draw on institutional theory connecting institutional change with the notion of framing in the next chapter.

3. Market evolution as a process of framing

The basic premise of institutional theory is that in social conduct, actors tend to institutionalize certain practices for solving problems, which together with the associated rules, values and meanings provide stability and meaning to social life (Scott, 2014). As stated earlier, S-D logic and its service ecosystems perspective argue that markets can be seen as such shared and generally agreed upon institutionalized solutions of value cocreation within service ecosystems (Lusch & Vargo, 2014). In other words, a market is an institution or in more detail an institutional arrangement – an assemblage of interrelated institutions – that guide the way value is cocreated.

While institutional theory traditionally has mainly focused on the formation and persistence of institutional arrangements (see e.g. DiMaggio & Powell, 1983), more and more research has recently sought to understand their change (see e.g. Dacin, Goodstein, & Scott, 2002; Zietsma & McKnight, 2009). One approach to conceptualize how institutional arrangements change is to view it through the process of framing that we draw on here (Gehman, Lounsbury, & Greenwood, 2016; Gray et al., 2015; Werner & Cornelissen, 2014). In his seminal work, Goffman (1974, p. 21) defines frames as “frameworks or schemata of interpretation” that shape attention and guide action. The concept of frame has been particularly well developed in the social movements literature. Benford and Snow (2000: 614) argue that “frames help to render events or occurrences meaningful and thereby function to organize experience and guide action”. According to this view, social situations can be framed in alternative ways and different frames carry different rationales for action (Werner & Cornelissen, 2014). Hence, a skillful reframing can act as the basis for institutional change (Benford & Snow, 2000).

Previous research has identified several different processes through which frames change. Benford and Snow (2000) list four strategic framing processes, originally conceptualized as “frame alignment processes” by Snow et al. (1986). These processes are considered deliberative and goal-driven, i.e. the frames are developed to achieve a specific purpose such as recruiting new members, mobilizing adherents and acquiring resources (Benford & Snow, 2000). These processes are:

- Frame bridging: the linking of two or more ideologically congruent but previously unconnected frames regarding an issue or problem which creates a new frame
- Frame amplification: invigorating and emphasizing specific cultural values and beliefs that are a part of a frame which amplifies the overall impact of the frame.
- Frame extension: enlarging a frame’s reach whereby activists and movements “extend the boundaries of their primary framework so as to encompass interests or points of view that are incidental to its primary objectives but of considerable salience to potential adherents” (Snow et al., 1986, p. 472).
- Frame transformation: which seemingly refers to a counterfactual framing and to “changing old understandings and meanings and/or generating new ones” (Benford & Snow, 2000, p. 625).

Recently, Werner and Cornelissen (2014) have proposed two alternative categories of framing tactics to address the general lack of detailed knowledge about the discursive tactics that actors use when they aim to mobilize and align actors and groups in a field and build common ground for institutional change. According to them actors through discourse make alternative conceptualizations of an institution into being through:

- Frame shifting: a tactic that involves specific forms of disjunctive and counterfactual language, which is a tactic where individual actors query the institutionalized cognitive schema in a field and articulate and promote an alternative frame that marks the contrast with the prior cognitive understanding.
- Frame blending involves conjunctive language and analogies through which actors discursively iterate between or integrate cognitive schemas in a field, including bridging between past schemas as part of a proposed novel schematization. Table 1 summarizes and illustrates the framing processes discussed above.

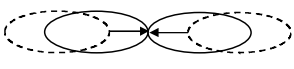
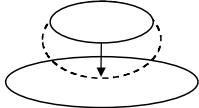
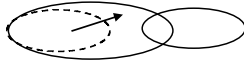
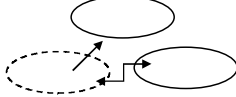
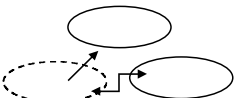
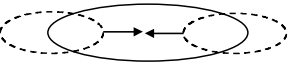
Framing processes (associated with frame evolution)	Description	Illustration
Frame bridging	Linking of two or more ideologically congruent but previously unconnected frames	
Frame amplification	Invigorating and emphasizing specific cultural values and beliefs as part of a frame	
Frame extension	Enlarging a frame's reach	
Frame transformation	Challenging old understandings and meanings and/or generating new ones	
Frame shifting	Semantic re-writing that through contrasting reorganizes existing information and conventions associated with a schema into that of a new frame	
Frame blending	The discursive combination of two separate schemas that share some abstract structure which results a blend that has new emergent properties and logic	

Table 1. Framing processes associated with frame evolution.

Based on the basic dynamics of all the different framing processes, it can be concluded that for reframing to occur in the micro-level actors need to have multiple framings, i.e. diverse institutional arrangements have to coexist, and these need to interact with each other. Recent work in S-D logic suggests that such institutional

complexity is inherent to service ecosystems (Koskela-Huotari & Vargo, 2016; Lusch & Vargo, 2014; Siltaloppi et al., 2016). This is due to the fact that actors in service ecosystems are simultaneously embedded and influenced by several institutional arrangements (Siltaloppi et al., 2016). In other words, service ecosystems can be seen to be composed of multiple 'levels' of institutional arrangements (Koskela-Huotari & Vargo, 2016), such as industrial-level and organizational-level. The differences of these institutional arrangements reduce the taken-for-grantedness of institutionalized solutions and allow actors to change the value cocreation solutions constituting markets by using various different framing processes aimed for creating alternative frames and diffusing these frames as presented in the preliminary framework of market evolution (see Figure 1).

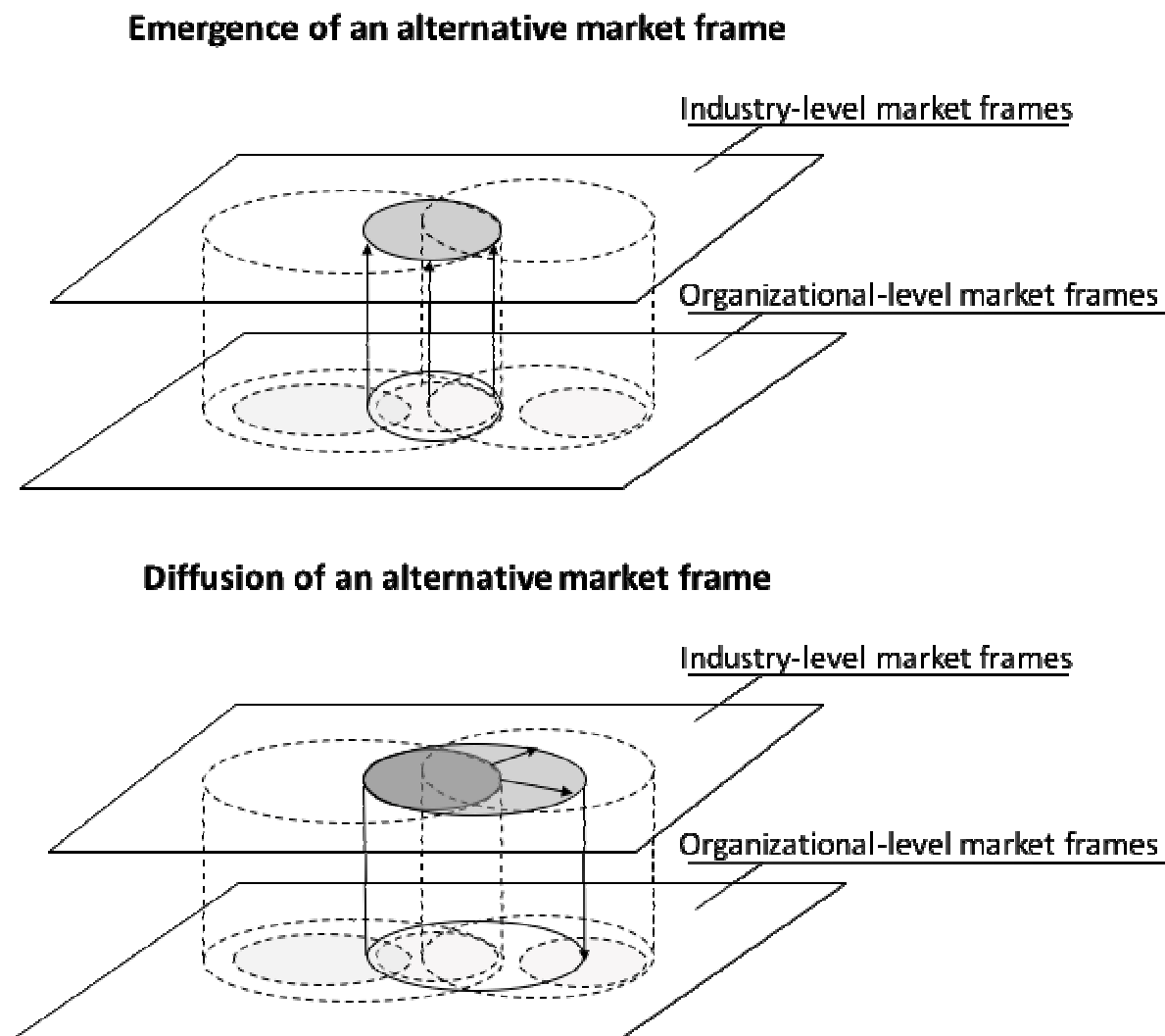


Figure 1. Preliminary framework of market evolution as a framing process.

4. Conclusions and plans future research

In this paper, we extend the emerging conceptualization of markets as institutionalized solutions of value cocreation proposed by service-dominant (S-D) logic. To bet-

ter understand how markets as institutionalized solutions evolve, we draw on literature that connects institutional change to the process of framing. We contribute by theorizing how micro-level changes – i.e. organization-specific differences in framing – can become amplified and result in macro-level transformation such as market evolution. We do this by developing a theoretical framework describing how markets as institutionalized solutions evolve as actors use institutional complexity – the existence of multiple institutional arrangements and the corresponding patterns of value cocreation – to create alternative frames to interpret situations and guide individual action and then diffuse the novel frames with the help of different types of frame alignment processes.

To further understand the framing processes related to market evolution and develop our framework, we are currently conducting a case study about the on-going transformation of the banking market in Serbia. We are particularly focusing on the ‘emergence’ of an online bank Telenor Banka and their revolutionary banking application and the influence it has had on the broader market. Telenor Banka started its operation in September 10, 2014 and is the first “online only” bank in Serbia. As a subsidiary of Norwegian telecommunication company Telenor, Telenor Banka is based on knowledge about business in both telecommunication and banking markets. Building on these experiences and knowledge, the organization adopted by Telenor Banka was different from the established banks in Serbia which are organized in a traditional way with much of the business revolving around face-to-face meetings over the counter between personnel and customers in authentic bank offices and with very little online presence. The online logic that Telenor Banka applied to the Serbian bank market made it very successful and it rapidly took market shares from the traditional banks. It recently received the AmCham Serbia award for Innovation and it was named the best customer-centric banking solution by Bobsguide, a leading portal for financial technology. Part of the business success was due to the high online presence of the Serbian population and the fact that Telenor was established as a trusted company in the Serbian Telecom market. As an effect of the success, Telenor Banka changed the Serbian bank market and is therefore a good case to focus on in order to study how markets evolve from the service ecosystems perspective.

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MINTZBERG'S STRATEGY CONTINUUM: A SERVICE SCIENCE PERSPECTIVE

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The purpose of this theoretical paper is to view Henry Mintzberg's 'Strategic Continuum' in a service science perspective. The continuum represents 10 schools of thoughts for strategy formation, with the 'Prescriptive schools' at one extreme and the 'Descriptive Schools' at the other extreme. Naveed Yazdani strengthens the 'Strategic Continuum' by providing philosophical and theoretical underpinnings. The paper attempts to provide a 'Service Science' perspective of 'Strategic Continuum' by placing abstractions, dominant logics and the nature of resources on the continuum. In the end paper proposes a number of propositions for future researchers.

Key Words: *Strategic Continuum, Prescriptive Schools of Thought, Descriptive School of Thought, Abstractions, Goods Dominant Logic, Service Dominant Logic, Operand Resources, Operant Resources.*

1. Introduction

Service science is the study of service systems, aiming to create a basis for systematic service innovation, it combines organization and human understanding with business and technological understanding to categorize and explain the many types of service systems that exist as well as how service systems interact and evolve to co-create value. According to Maglio & Sphrer, Service Systems are the value-co-creation of; People, Technology, Value proposition and Shared information. The purpose of this paper is to strengthen and align the Mintzberg's Strategic Continuum in a service science perspective.

Henry Mintzberg et al. (1998) wrote a book, *Strategy Safari: A Guided Tour through the Wilds of Strategic Management*, before entering the wilds of strategy safari they quote an ancient Sufi tale "The Blind Men and the Elephant"

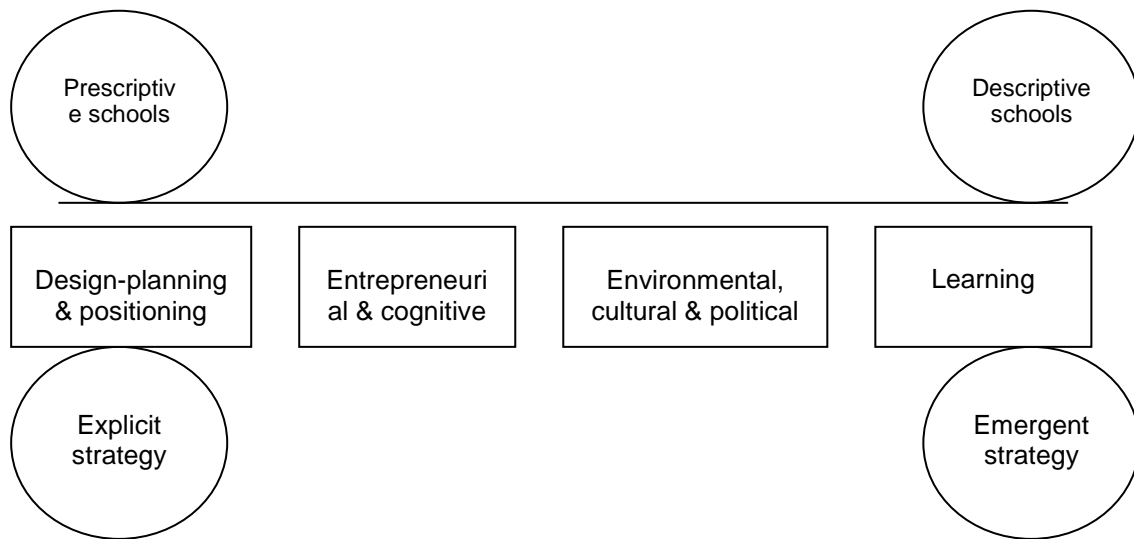
According to Mintzberg et al. (1998, p.3) "*We (the strategy makers) are blind people and strategy formation is our elephant. Since no one has had the vision to see the entire beast, everyone has grabbed hold of some part or the other part and railed on in utter ignorance about the rest. We certainly do not get an elephant by adding its parts. An elephant is more than that. Yet to comprehend the whole we also need to understand the parts*"

Based on their study of large body of literature on strategic management they presented ten schools of thought. They then further categorize into three: first category is 'Descriptive' (six schools) describing how strategies get formulated, second category is 'Prescriptive' (3 schools) concerned with prescribing the ideal strategies, and the third category is 'Configuration School' which is the combination of previous two categories, integrating; strategy making process, organizational structures, their contents and contexts. A review of two categories of strategy schools is given below:

2. Descriptive Schools

According to these schools the process of strategy formation and implementation goes side by side. The strategy formation is not a one man or one group job, but it involves the consent of people from different area of expertise, while the strategy making and implementing goes simultaneously. The focus is not only on process but also on contents and context. Keeping in mind the environmental turbulence strategy is kept flexible so that necessary changes can be made as the organization learns from the actions of implementation. The leadership plays a vital role in managing collective organizational learning during the process of strategy formation and implementation; Strategies are based on the learning from past patterns that become plans for future as the organization learns. Internal/external power and politics shape the strategy, strategy do not appears as fully formed but in an emergent form, which has ability to grows and evolve according to the collective learning of the members of the organization. Environmental changes plays a vital role in shaping the strategy as the major strategic intent of organization is to respond to its external environment.

Organizations sharing similar ideas, combines their efforts in order to counter environmental forces. Strategies based on Descriptive Schools are difficult to articulate, instead they exists in the minds of strategist in a form of long term vision, instead of formal planning and analysis strategy is based on the past experiences and intuitions of the strategists. The role of leader is to promote the vision to the organizational members and to make them remain focused. Figure 1 shows the integration of ten schools of thought on a 'Strategic Continuum', with descriptive schools at one extreme and prescriptive school at the other extreme:



3. Prescriptive Schools

According to these schools, strategists formally learn the process of strategy making, and they are the only strategy makers in the organization. The main focus of strategists is on the process of strategy making rather the context and contents of strategy. The implementation of strategy is only possible after the strategy is fully formulated, and once the strategy is formulated then can be communicated across the organization in an articulated form. The CEO is usually the one who formulated strategy and then employees implement it according to the outlines, programs, budgets and goals. The process of strategy formation involves market and industry analysis and a number of related calculations. Strategy may not be unique but select from a limited number of available options regarding different market positions.

3.1 Philosophical and Theoretical Underpinnings

Naveed Yazdani (2010) strengthens the Mintzberg's 'Strategic Continuum', by providing the philosophical and theoretical underpinnings.

Philosophical support

According to McAuley et.al (2007), any scientific achievement is based on the philosophical assumptions about epistemology and ontology. Organizational theory is mainly based on 'Positivism', which assumes realist ontology and objective epistemology, this stance is referred as 'modernistic stance'. On the other hand 'postmodernists' are the proponents of subjective epistemology and they favor subjective ontology against the realist ontology of critical theorists.

Theoretical Support

Miles and Snow (1987) conducted a study on the relationships between strategy-making processes and their effects on organizational performance:

Defenders: this type of organizations hold; centralized authority, low employee empowerment, close supervision, cost minimization and efficiency focus. Similar to *defenders*, is the Porter's strategy of 'Low Cost Leadership'; which focuses on very limited employee empowerment, unlimited centralized authority, cost minimization, efficiency, SOPs, and close supervision.

Prospectors: this type of organizations are mainly concerned with; learning, decentralized authority, employee empowerment and a lot of research work. *Prospectors* are similar to Porter's strategy of 'Differentiation' which is focus on learning, innovation, creativity, risk taking and a horizontal structure.

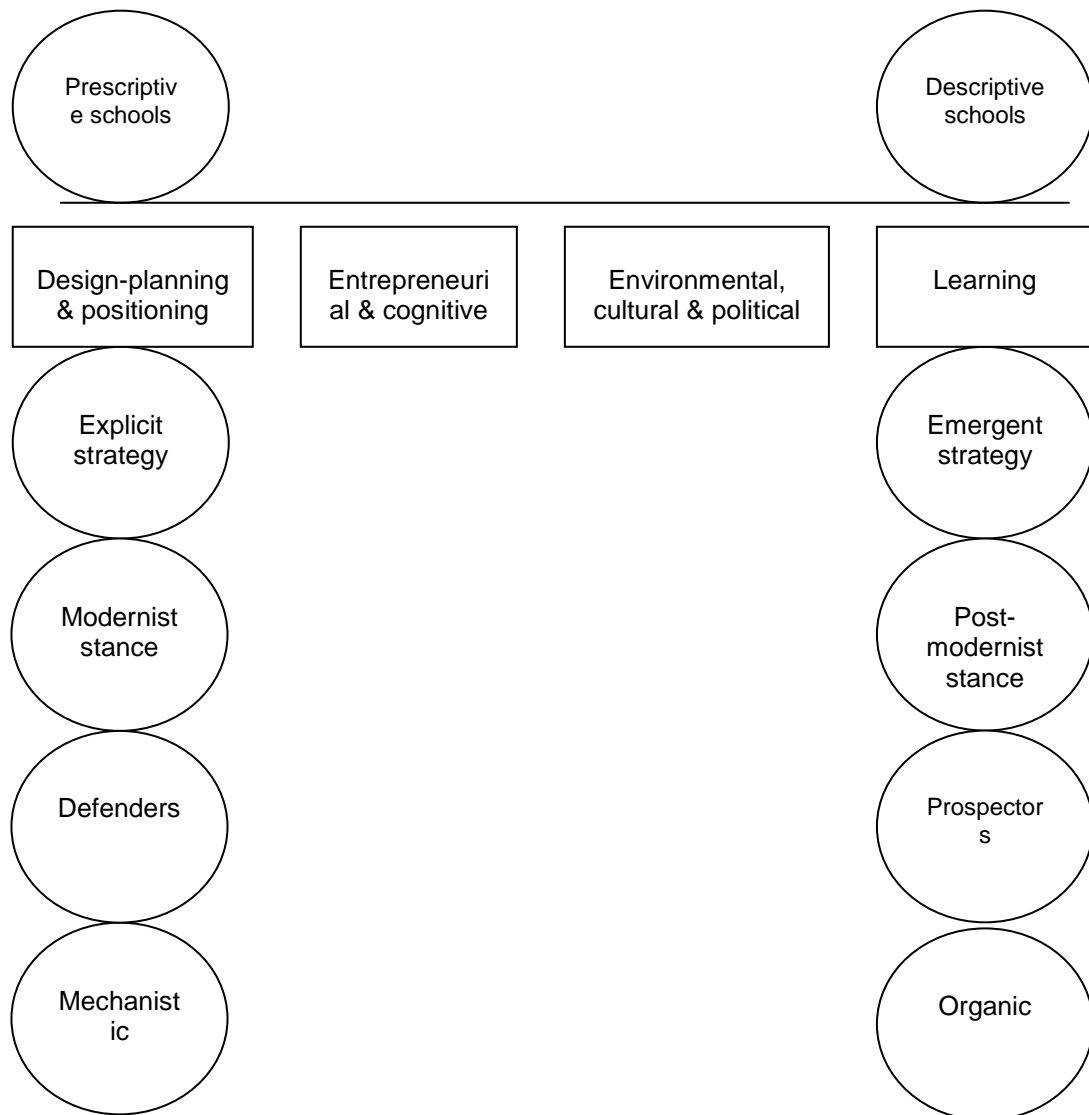
Mechanistic Structures: it basically reflects a machine like structure of an organization with:

- Strictly defined authority with many rules.
- Centralized control of knowledge and tasks.
- Vertical communication.
- Rigidly defined tasks.
- Tasks divided into specialized parts.

Organic Structure: it reflects an organ like structure of an organization which has an ability to grow;

- Authority is not strictly defined, and only few rules are to be followed.
- Decentralized control of knowledge and tasks.
- Horizontal communication.
- Tasks are not rigidly defined, and can be redefined on the basis of teamwork.
- Employee contributes in the mutual tasks of the department.

Figure 2, after the philosophical and theoretical underpinning by Naveed Yazdani, the resultant continuum is shown below:



4. Service Science Perspective

4.1 Abstractions

Abstractions are considered as such a powerful tool that help scientists see unity in diversity and measure the world, it allows seemingly different things to be compared, and allows one phenomenon to be explained in terms of another better understood or simpler phenomenon. The right abstraction provides language that helps people communicate, reason, and take action. Abstractions are not the phenomena but they create language that enables people to communicate and create shared worldviews.

The *19th century* was the era of industrial revolution and the basic and most powerful abstractions at that time were; mass, work, and power. The *20th century* was the era of information revolution which was built on mathematical abstractions; binary digits or bit, binary coding and algorithmic complexities. The emerging revolution in busi-

ness and economics for *21st century* is based on a new worldview, Service dominant logic (S-D logic), and on a new basic abstraction, "Service System". Many sorts of things can be viewed as service systems like: people, corporations, foundations, non-governmental organizations, non-profit, government agencies, departments in an organization, cities, nations or even families can reasonably viewed as service systems.

Service Systems are the value-co-creation of People, Technology, Value proposition and Shared information. The smallest service system centers on an individual as he or she interact with others, and the largest service system comprises the global economy. Entities with in service systems exchange competence along at least four dimensions: Information sharing, Work sharing, Risk sharing, & Goods sharing. The philosophical foundation of service science is based in the Service dominant logic, as S-D logic provides the right perspective, vocabulary, and assumptions on which we can build the theory of Service systems, on the other hand the patterns of service system provides the basic theoretical constructs for service science.

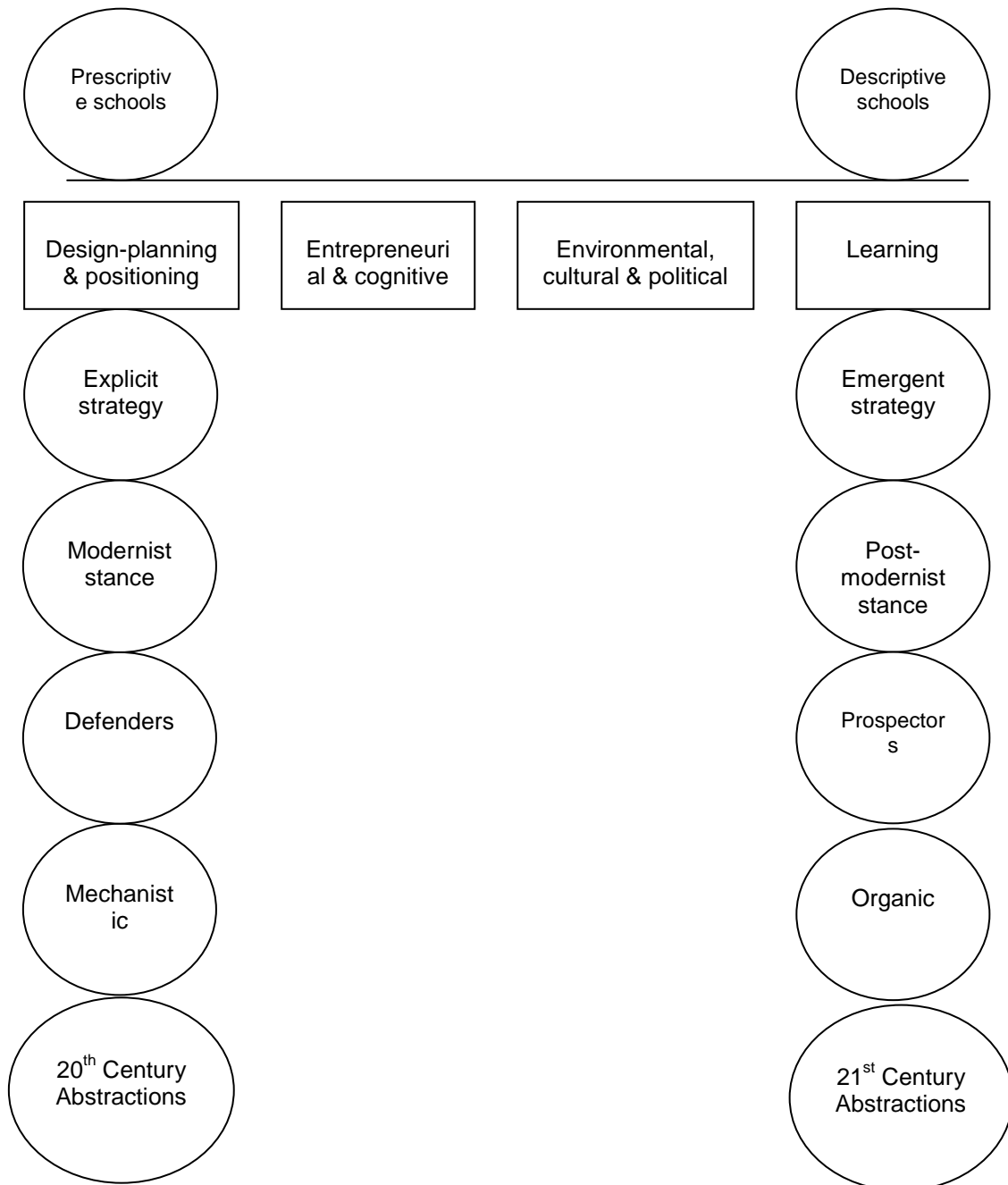


Figure **below**, shows the placement of abstractions on the strategic continuum.

4.2 Goods Dominant Logic (GD-L) Vs. Service Dominant Logic (SD-L)

According to Vargo and Lusch (2004), SD logic is a service-centered alternative to the traditional GD logic paradigm. This alternative dominant logic help in understanding value creation and economic exchange that have been considered as a

philosophical foundation for the development of service science (Maglio et al., 2007). The core idea of SD logic is 'Service', which according to Vargo&Luseh (2004) is;

"The application of competences for the benefit of others"

There are two orientations of 'service'; first one is based on the traditional view of economic exchange which focuses on goods for the purpose of value creation, with 'services' as special type of intangible product or as add-ons. According to Vargo and Lucsh (2004) this orientation is basically 'Goods Dominant Logic'. On the other hand 'Service Dominant Logic' treat 'Service' in its own right without focusing on goods, and when goods are involved they act as service provision vehicle.

Goods Dominant Logic

This logic views economic exchange in terms of production and distribution of physical units of output, and the value is created during design and manufacturing process (Vargo and Lucsh, 2004). Basically in GD-L the physical output is manufactured separately and with any consent of consumer, these physical units of output can stored. The main focus of GD-L is to maximize the efficiency of the operations. In GD-L 'services' are considered as output that is 'intangible' in nature 'perishable', 'heterogeneous' and 'inseparable' (Berry, Parasuraman and Zeithaml, 1985).

Foundation of GD-L

GD-L is basically rooted in economic philosophy and economic science, which are based on the work of Smith (1776). The political economic view of Smith was based on the ideas of 'Division of Labor' and 'Efficiency maximization'. Smith's initially established the idea of 'Real Value' or 'Value in Use' but he was unable to rationalize this idea as his motive was to maximize the wealth of England and at that time only physical goods could be exported for the purpose of wealth generation, so Smith shifted his focus from 'Value in Use' to 'Value in Exchange'.

Service Dominant Logic

S-D logic provides an alternative perspective in order to study the phenomena of economic exchange, which is based on the Smith's initial proposition of 'Real Value' or 'Value in Use'. According to the service centered view economic exchange is the process in which different people interact and use their specialized knowledge for the benefits of other. SD logic uses the term 'Service' (singular) instead of GD logic's term 'Services' (plural). The focus of SD logic is on 'Operant Resources' (knowledge & Skills/intangible), instead of GD logic's 'Operand Resources' (tangible/physical).

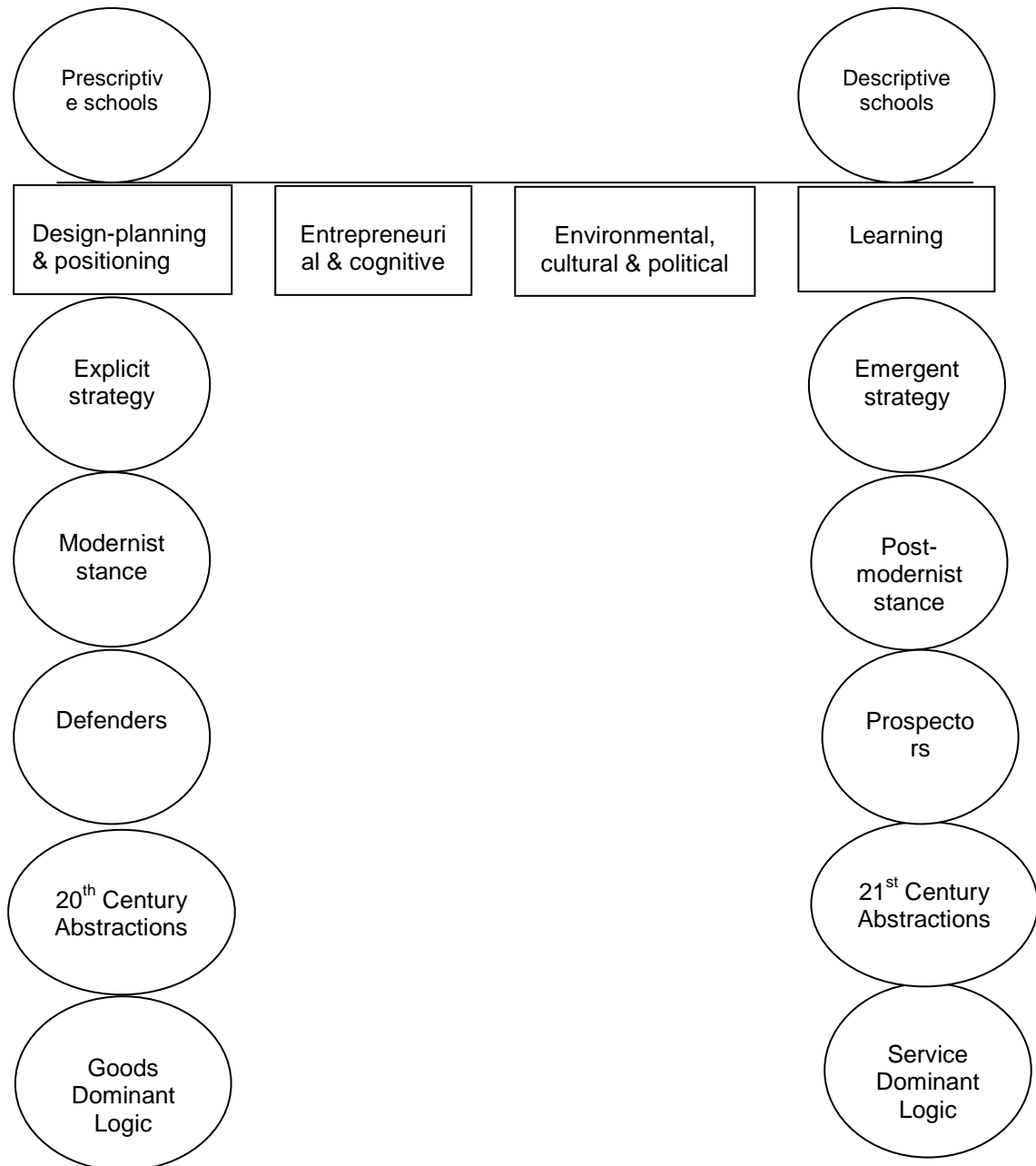
Foundation of SD-L

SD logic is based on ten foundational premises, which is further categorized in four axioms:

1. **(Axiom1) Service** is the fundamental **basis** of exchange.
2. Indirect exchange masks the fundamental **basis** of exchange.
3. Goods are distribution mechanism for service provision.
4. **Operant resources** are the fundamental source of competitive advantage.
5. All economies are **service** economies.

6. **(Axiom2)** The customer is the **co-creator** of value.
7. The enterprise **cannot deliver value, but** only offer value propositions.
8. A service-centered view is **inherently** customer oriented and rational.
9. **(Axiom3)** All social and economic actors are resource integrators.
10. **(Axiom4)** Value is always uniquely and phenomenologically determined by the beneficiary.

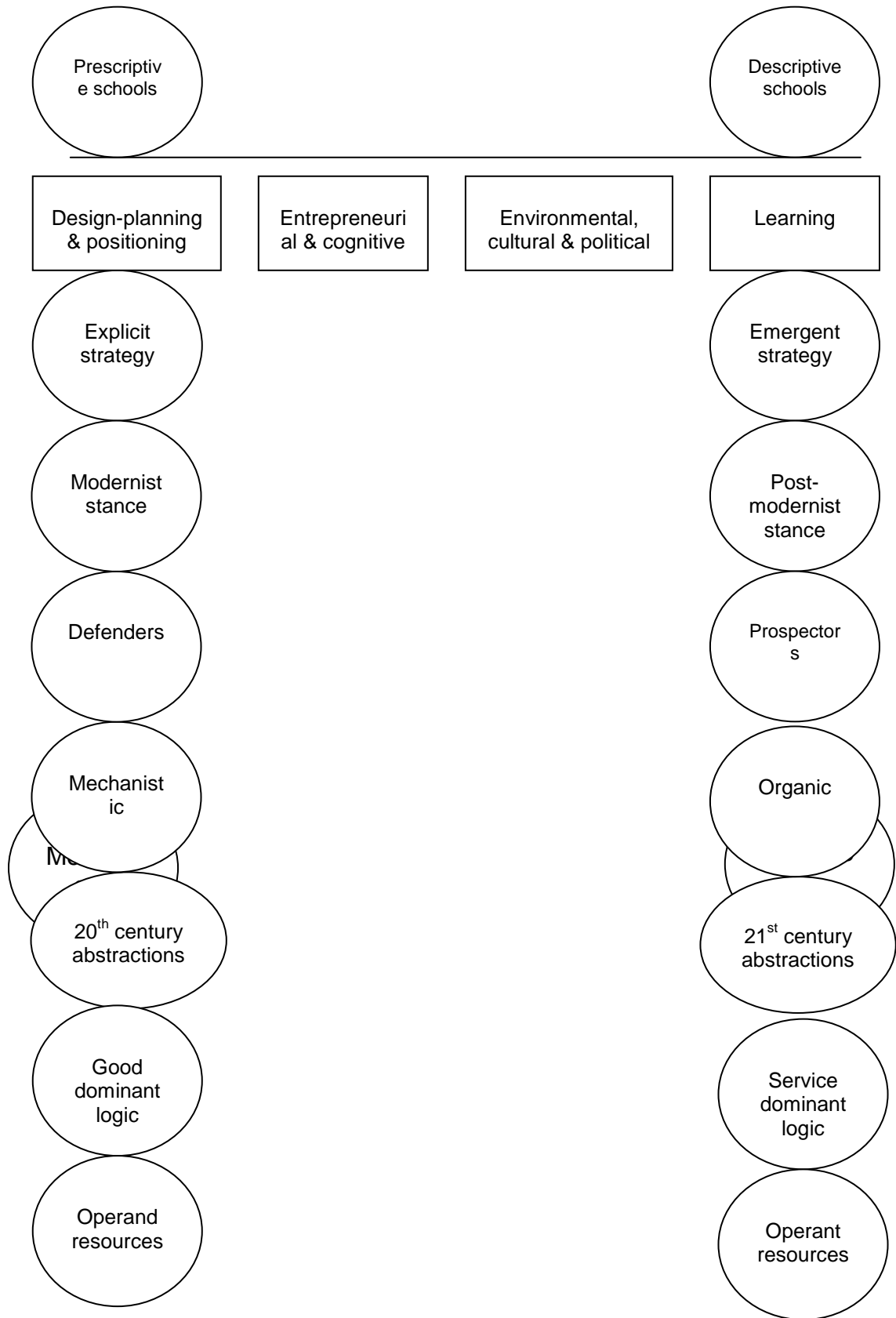
Figure 4, shows the placement of SD logic and GD logic on strategic continuum



Resources: the table below highlights the difference between operand and operant resources.

Operand Resources	Operant Resources
Tangible in nature	Intangible in nature
Can be stored	Cannot be stored
Involves physical output	Involves knowledge and skill
Based on the idea of value-in-exchange	Based on the idea of value-in-use
Focus is on efficiency	Focus is on effectiveness

Figure in the following, shows the placement of resources on strategic continuum



On the basis of discussion above paper propose following proposition:

- **Propositions 1a:** *Prescriptive School of strategizing is more consistent with '20th Century Abstractions'.*
- **Propositions 1b:** *Prescriptive School of strategizing is more consistent with 'Goods Dominant Logic'.*
- **Propositions 1c:** *Prescriptive School of strategizing is more consistent with 'Operand Resources'.*
- **Propositions 2a:** *Descriptive Schools of strategizing is more consistent with '21st Century Abstractions'.*
- **Propositions 2b:** *Descriptive school of strategizing is more consistent with 'Service Dominant Logic'.*
- **Propositions 2c:** *Descriptive School of strategizing is more consistent with 'Operand Resources'.*

5. Concluding Remarks

The implication of service science in strategic management, identifies the importance of highly knowledge intensive activities within the organization. IBM's transformation from manufacturing/goods-dominant logic to service-dominant logic, involves knowledge intensive activities, and according to IBM increasing competences (Knowledge & Skills) is the key to improvement and innovation. The placement of 'Abstractions', 'Dominant Logics' and 'Nature of Resources' on the Mintzberg's strategic continuum, on one hand can help strategist in the formation of a 'Service Strategy', on the other hand it can help service scientists in aligning organizations in service science perspective.

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MULTIPLE CORRESPONDENCE AND CLUSTER ANALYSES FOR AN IN-DEPTH LITERATURE REVIEW ON SERVITIZATION

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In this work we investigate literature on the relevant phenomenon of servitization, conceived as the evolution of the offering from a simply material product to a bundle often called “product-service system” (PSS). Literature on servitization is rich but also composite and quite heterogeneous as authors adopt different perspectives, have different research objectives and often use a variety of terms while referring to the same thing. Thus we aim to systematize literature through a content analysis. Results from multiple correspondence and cluster analyses are briefly illustrated.

1. An initial literature review

One of the most important phenomena of modern economy is *servitization*, conceived as the evolution of the offering from a simply material product to a bundle called “product-service system” (PSS) (Vandermerwe; Rada, 1988; Goedkoop et al., 1999; Baines et al., 2007).

Tukker (2004) identifies eight types of PSSs which can be placed along a continuum running from ‘pure product’ to ‘pure service’ by which it is possible to extend progressively the existent firm business providing services (Gebauer et al., 2011; Kowalkowski et al., 2013).

Servitization is not a recent concept, as Vandermerwe and Rada conceptualized it for the first time in 1988, but it has been extensively investigated only in the last decade, by scholars belonging to different research mainstreams.

A literature review was carried out in order to identify the different mainstreams. The papers of each mainstream are characterized by a common group of main authors, specific aims and same denomination of the phenomenon.

The first mainstream identified can be named *PSS-Servitization* (Vandermerwe; Rada, 1988; Goedkoop et al., 1999; Mont, 2002; Baines et al., 2007; Neely, 2008; Baines et al., 2013). The papers belonging to this mainstream adopt the seminal definition of servitization given by Vandermerwe and Rada (1988) and Goedkoop et al. (1999), conceiving the phenomenon as a transition along a continuum which goes from the offering of pure products to that of pure services (Tukker, 2004). The PSS-Servitization mainstream has two main features. First some authors are only

interested in the servitization ability of improving the environmental sustainability omitting the managerial and economic aspects of the phenomenon. Second, many scholars, coming from the operations studies, focus on the operative aspects of servitization.

Going to the second mainstream, here called *Service Strategy*, it consists of works that conceive servitization as a strategy option by which firms can expand their business providing services as well (Gebauer et al., 2005; Gebauer et al., 2011; Kowalkowski et al., 2013). The main interest of the authors, who do not even use an ad hoc term to name the phenomenon, is to identify the types of strategy that firms can adopt to differentiate themselves and to beat the competitors.

The third mainstream is named *Integrated Solutions*. In this mainstream scholars focus on the capital goods firms, which are specialized in creating solutions strictly tailored on customer needs (Davies, 2004; Brady et al., 2005; Windahl and Lakemond, 2006). The solution, generally called Complex Product System (CoPS), is based on an elaborate network of agents, where the customer is a key actor (Davies, 2004). The works of this mainstreams aim to identify the main competences of the focal firm that are necessary to manage the complex network.

The last mainstream is the *SD-Logic* that stems from the marketing studies (Pawar et al., 2009).

It is based on the work of Vargo and Lusch (2004), who propose a new logic of economic transactions not more based on goods but on services, entailing that the consumer exchanges to acquire services and acts as a co-producer for the firm (Vargo; Lusch, 2006; Lusch et al., 2007).

As a consequence, literature on servitization is rich but also composite and quite heterogeneous as authors adopt different perspectives, have different research objectives and often use a variety of names while referring to the same thing.

There is not a unique definition nor a shared name for the phenomenon, while existing literature reviews do not agree about the number and the types of literature mainstreams.

At the moment the works do not attempt to identify possible shared elements in this fragmented literature.

Considering the state-of-art, this work aims firstly at systematizing literature in order to bring to light common dimensions followed by scholars when dealing with servitization despite their original mainstreams.

By using the aforementioned common latent dimensions, we propose a new classification of papers dealing with servitization.

2. Methodology

The literature analysis was carried out through the content analysis technique, which allows to reduce a phenomenon in a set of defined categories, facilitating its analysis and interpretation (Harwood; Garry, 2003). The technique used in this work is called

content analysis “as inquiry” according to the partition of Losito (1996), thus considering extra linguistic meanings.

We sampled 89 international journal articles (see Appendix) searching for the following keywords in the journal databases EBSCO, Emerald, JStore, Science Direct and Discovery: servitization, servitisation, product-service systems, PSS, service strategies, after sale services, sd-logic, service dominant logic, integrated solutions, product-service bundle, and service infusion.

From an initial study of the literature, we created a concept map identifying of the main dimensions of the phenomenon:

- Paper features, referring to the main characteristics of each paper (year of publication; methodology adopted by the authors for each article, which can be empirical or theoretical; approach adopted, which can be qualitative or quantitative; geographical area of authors’ affiliations);
- Triggers, i.e., the drivers of servitization (financial, political or ethical);
- Managerial insights, regarding the managerial aspects investigated by scholars (general organization which refers to firms’ intra-organizational factors such as capabilities, culture, strategies; management of the supply chain; firm-customer relationship; process design; financial impact of servitization; management of human resources), and the papers’ managerial implications, i.e., contributions given to the management of servitization (frameworks, i.e., theoretical systematizations of the phenomenon; tools to sustain the implementation of servitization inside the firm; guidance, advice on how to support the implementation of the servitization).

These dimensions guided the formation of the analysis form by which the papers were interviewed.

Univariate and bivariate analyses were carried out in order to explore the main features of the sample.

Then, multiple correspondence analysis was used to reach the first aim of the work, identifying the latent dimensions characterizing literature.

Finally, a cluster analysis was carried out to create new cataloguing of the articles.

All analyses were performed by using the SPAD software.

3. Results from Correspondence Analysis and Cluster Analysis

The multiple correspondence analysis brought to light three latent dimensions followed by authors when studying servitization.

Two are related to the choice of the *methodology, which can be empirical or theoretical*, and the *research approach, qualitative or quantitative*, used in the articles.

The third dimension is linked to the *managerial insights of the works, which can be more strategic or more operative*.

Basing on these elements, four different clusters composing servitization literature were identified:

- *Strategic-Qualitative cluster*. This cluster is the most numerous and is made up of empirical works that adopt a qualitative research approach. Articles show a strategic attitude as they focus on the intra-organizational enhancing factors and propose advice on how to support the implementation of the servitization;
- *Financial cluster*. This cluster groups articles which focus on the financial results of servitized firms drawing upon a quantitative research approach;
- *Pragmatic cluster*. This cluster consists of articles that mainly study the design process of product-service systems and propose tools to servitize as managerial implication. Thus it is characterized by a strong operative attitude;
- *Theoretical cluster*. This cluster consists of theoretical articles proposing frameworks as managerial implication; most of them are seminal works, as well papers focusing on the management of customer relationship.

4. Clusters and Mainstreams

In order to make a comparison between identified clusters and the mainstreams illustrated in section 1, stemming from a traditional activity of literature review, we performed a bivariate analysis. Table 1 shows the relationship between clusters and mainstreams.

Table 1 Clusters and Mainstreams

Cluster	PSS-Servitization	Integrated Solutions	Service Strategy	SD-Logic	Others	Total
Strategic-Qualitative	54%	15%	24%	0	7%	100
Financial	64%	9%	27%	0	0	100
Pragmatic	100%	0	0	0	0	100
Theoretical	70%	0	0	30%	0	100

As shown in table 1 all the mainstreams, except for the SD-Logic, tend to be situated in the first and most numerous cluster, representing the prevailing research perspective adopted by scholars when dealing with the phenomenon of servitization, despite the mainstreams and research communities authors belong to.

Also the Financial cluster consists of articles belonging to the same three mainstreams, thus suggesting another, though less diffused, shared way to study servitization among the mainstreams.

On the contrary, the Pragmatic cluster is made up only of articles ascribable to one mainstream, the PSS-Servitization. Thus only a specific group of scholars shows the aim of facing the practical aspects of servitization.

Finally the Theoretical cluster is the only one that groups papers belonging to the niche SD-Logic together with those of the PSS-Servitization mainstream.

The PSS-Servitization mainstream confirms to be the most various mainstream, as its articles are in all the four identified clusters.

It is also interesting to observe that the articles of the Integrated Solutions and Service Strategy mainstreams are grouped in the Strategic-Qualitative and Financial clusters. This datum expresses an affinity between the two mainstreams dealing with servitization, as authors tend to follow common dimensions when studying the phenomenon.

Finally, the SD-Logic, which can be considered a niche theoretical proposal, is the only mainstream that belongs entirely to the one cluster, the Theoretical, differently from the Integrated Solutions and Service Strategy mainstreams.

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MUNICIPAL SERVICES IN THE FRAMEWORK OF LA21: A COMPARISON BETWEEN NORWAY AND SPAIN

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The objective of this paper is to compare the behaviour of Norwegian and Spanish municipalities and find differences and similarities with respect to some goals included in the Local Agenda 21. Specifically, we will study the commitment of those municipalities that adhered to LA21 to environmental expenses and citizen participation.

In accordance with the difference in differences methodology, we will compare the experimental group (municipalities that adhered to LA21) in each country with the control group (municipalities that did not adhere to LA21) in two different years. The Norwegian sample, with 428 municipalities, covers the whole population of the country, while the Spanish sample has 1,273 municipalities that represent 80.66% of the national population.

Estimated models present positive and statistically significant impact of LA21 on municipal expenses in environmental programs, especially in those related with waste management and renovation. These positive results appear concentrated in Norwegian small towns and in the medium-sized and large Spanish municipalities.

1. Introduction

The Agenda 21 document is different from the other three documents adopted in 1992 at the Earth Summit, because it is a plan of action. The implementation of the LA21 locally makes it possible to design intervention strategies for sustainability based on cooperation between governments and social partners. It is a strategic plan with the intention that the cities and municipalities assume their share of responsibility for the mobilisation of the citizens. Thus, local populations would participate in the effective management of the territory and the promotion of fair and long-lasting scenarios from the environmental, social, and economic points of view.

Regarding the management of collective proposals and problems related to legitimacy of governmental interventions, the sustainable development model boosts the value of participatory democracy, moving a large part of the role to citizens at the local level (Brunet Estarellas, Almeida García, & Coll López, 2005). The Local Agenda 21 (LA21) meets these objectives and, therefore, is currently one of the main instruments of management and intervention in favour of sustainable development («Euro-

pean Sustainable Cities Platform - AALBORG +10 2004», s. f.). In Spain, the endorsement of LA21 by local governments has been particularly strong. In 2010 the full list of signatories to the Aalborg Charter included 2,838 participants, 1,237 of them being Spanish municipalities.

Nevertheless, there have been several studies that have questioned the authenticity of political commitment towards meeting the objectives of sustainable development by local governments that have adhered to the Local Agenda 21. Thus, the idea is to link environmental expenditure with the political commitment of local governments to achieve the goals set by the LA21.

In addition, in Spain most of the projects considered examples of good practice are linked to relevant initial investments (Federación Española de Municipios y Provincias-FEMP & Observatorio de la Sostenibilidad en España-OSE, 2013). This circumstance makes it reasonable to link the political commitment to the variable "environmental expenditure".

In Norway, in many areas of environmental policy, in particular regarding pollution and waste, some progress can be noted. To mention but one example, it is good news that the part of household waste which is recycled has increased from close to zero to some 40 percent over the last 15 years. The bad news, however, is that within the same period of time household waste per person has increased by more than 50 per cent, and the trend is projected to increase over the next decade.

Furthermore, with respect to sustainable development, increasing conflicts of interests over the use of land and natural resources in this country must be faced, and the public system to safeguard long-term public interests in land-use planning, including environmental protection, is definitely weaker today than it was 10 years ago, mainly due to the impact of private interests and market forces.

Norway aims to be a leading nation in the study of sustainable development issues and to improve the interface between research and decision making— yet rationality in policy-making and implementation seems to be an illusive goal.

The environmental policy integration refers to the integration of environmental concerns into other policy areas. Norway made an early start with policies for environmental policy integration. However, the implementation of Environmental Policy Integration initiatives has been slow and piecemeal. In the opinion of some authors, due to the weakness of the horizontal dimension of the integration policy, the ambition of Agenda 21: "to harmonise the various sectoral economic, social and environmental policies and plans" has been broadly neglected (Eivind Hovden and Solveig Torjus-sen, 2002).

Regarding the implementation of Local Agenda 21, aspects of the Norwegian system of governance lead to very divergent results in different types of municipalities. By the year 2000, 117 out of Norway's 435 municipalities had removed the position of environmental officer entirely, while 134 municipalities had either reduced its scope of responsibility, or merged it with another position (Trygve Bjørnæs and Ingrid T. Norland, 2002).

The objective of this paper is to compare the behaviour of Norwegian and Spanish municipalities and find differences and similarities with respect to some goals included in the Local Agenda 21. Specifically, we will study the commitment of those

municipalities that adhered to LA21 to environmental expenses and citizen participation.

Several specific objectives help to disclose in detail those inter-country differences and similarities, regarding the behaviour of municipalities in the control group (non LA21 municipalities) and the experimental group (LA21 municipalities):

- Expenditure in general expenses related to environment
- General environmental expenses plus expenditure in water and waste programs
- Expenditure in environmental programs related to water
- Expenditure in environmental programs related to waste and renovation
- Citizen participation in local elections (voter turnout)

The research questions addressed in this paper are the following:

- Do the municipalities that adhered to the LA21 devote more budgetary resources to environmental expenditures?
- Do the municipalities that adhered to the LA21 present a greater voter turnout?
- Is the population size of municipalities a differential factor for the behaviour of local governments?

We did not find answers to these questions in the empirical literature on the assessment of LA21 experiences. Thus, in order to respond to these questions, we will solve five econometric models by means of the technique known as Difference-in-Differences (DiD) (time-constant differences and time-trends differences between treatment and control groups) that refer to each country and then we will compare the obtained results. In accordance with the difference in differences methodology, we will compare the experimental group (municipalities that adhered to LA21) in each country with the control group (municipalities that did not adhere to LA21), in two different years 2002 and 2012.

The differential contributions of this work can be summarised in the following aspects:

- The dependent variable is the environmental expenditure, understood from the perspective of the functional classification of municipal budgets.
- The methodology implemented for measuring the impact of public policies is DiD.
- Municipal entities are utilised as the unit of analysis.

The following section describes the development of the LA21 in Europe. In this section we will also present a brief presentation of the main issues found in the literature about LA21 in Spain and Norway. The methodology section specifies the hypotheses tested, the temporal and geographical scopes of the work, the data sources, and the treatment of these data for the selection of the final sample. Then, in the results section we will present our findings, differentiating them in accordance with the popula-

tion size of municipalities. The analyses, independently carried out for each country by means of the econometric models (DiD), will be exhibited in several comparative tables. We close the work with a conclusions section, where the results referring to the hypotheses posed in the methodology section are discussed. Work constraints and major implications for local politics are also included in that section. Finally, we also discuss further research lines in the future, to complement this study.

2. Local governments and environmental management (Local Agenda 21 and Aalborg Charter)

The commitment, adopted at the Rio Summit in 1992, to promote sustainable development was reflected in four documents:

- The Declaration of Principles.
- WHO Framework, Convention on Climate Change.
- The Convention on Biodiversity.
- Agenda 21.

Agenda 21 consists of 4 sections developed into 40 chapters, in which the following issues are addressed: social and economic dimensions, conservation and management of resources for development, strengthening the role of major groups and means of implementation. The basis for action, objectives, activities and means of implementation for approval of the Local Agenda 21 are set out in chapter 28 of the third section (Initiatives of local authorities in support of Agenda 21).

When it was adopted in 1992 at the Earth Summit, Agenda 21 was meant to be “a programme of action for sustainable development worldwide”. Furthermore, as stated in its introduction, it had the ambition of being “a comprehensive blueprint for action to be taken globally, from now into the twenty-first century”. The ambition was high, and so were the stated goals of the Agenda: to improve the living standards of those in need; to better manage and protect the ecosystem; and to bring about a more prosperous future for all.

Since the Rio Conference, a timetable for implementation of Agenda 21 has been designed. That schedule included an advisory process at the beginning to encourage cooperation between local authorities at an international level. The first target stated that in 1996 local authorities of each country would have carried out the initial consultative process with their populations to agree on Agenda 21 at the local level.

The International Council for Local Environmental Initiatives (ICLEI), which prompted the First European Conference on Sustainable Cities & Towns, held in the Danish city of Aalborg in 1994 at the request of the European Commission, played a decisive role in the process of intermediation between international organisations and local authorities. At this Conference, the Aalborg Charter (Charter of European Cities and Municipalities for Sustainability) was adopted. The signature and adhesion to the Charter by local administrations is identified as the first step in the process of implementing LA21.

The 'Aalborg Charter' (Brunet Estarellas et al., 2005)(1994) is an urban environment sustainability initiative approved by the participants at the first European Conference on Sustainable Cities & Towns in Aalborg, Denmark. It was inspired by the Rio Earth Summit's Local Agenda 21 plan, and was developed to contribute to the European Union's Environmental Action Programme, 'Towards Sustainability'.

The Charter is based on the consensus of individuals, municipalities, NGOs, national and international organisations, and scientific bodies. There are three related parts to the Charter:

- Part 1 is a consensus declaration of European sustainable cities and towns towards sustainability.
- Part 2 relates to the creation of the European Sustainable Cities & Towns Campaign.
- Part 3 is a declaration of intent that local governments will seek to engage in Local Agenda 21 processes.

The conference in Aalborg (1994) was followed by others, such as those held in Lisbon (1996), Turku (1998), Sofia (1998), Seville (1999) and The Hague (1999), which addressed the need to strengthen participatory structures in the development of the LA21 at the regional level.

The XXI century started with additional conferences– Hannover (Germany) 2000, Aalborg (Denmark) 2004, Seville (Spain) 2007, Dunkerque (France) 2010, Geneva (Switzerland) 2013, Bilbao (Spain) 2016. Gathering over 1000 participants from local governments and a variety of other actors across Europe, the European Conference on Sustainable Cities & Towns remains the largest European event for local sustainability. All conferences have been co-organised by ICLEI, together with the respective host cities and a Conference Preparatory Committee.

At the Third European Conference on Sustainable Cities held in the German city of Hannover in 2000, the need to standardise and regulate the different initiatives and give administrative support was raised. In this sense, the presentation of an initiative of systematic monitoring by defining specific standards or sustainability indicators was one of the major contributions of this conference. The final agreement stressed the need to establish and develop regional networks that enable greater cooperation, exchange of experiences and dissemination of good practices, while ensuring greater economic and technical coverage of the various governments. Regarding this last point, the European institutions are encouraged to approve subsidies and grants under the Structural Funds scheme, subject to the existence of a sustainable development plan.

In the late nineties, 650 regional and local authorities from 32 European countries had achieved a commitment to local sustainability by joining the Aalborg Charter. In 2010 the number of local authorities that had signed the Aalborg Charter amounted to 2,838.

Ten years after the release of the Aalborg Charter, the participants of the 4th European Conference on Sustainable Cities & Towns in Aalborg, Denmark 2004 (Aalborg+10) adopted the Aalborg Commitments– a list of 50 qualitative objectives organised into 10 themes: Governance, Local management towards sustainability, Natural common goods, Responsible consumption and lifestyle choices, Planning

and design, Better mobility, Less traffic, Local action for health, Vibrant and sustainable local economy, Social equity and justice, and Local to global.

Local stories about the achievements in these 10 themes can be accessed at the sustainable cities webpage at <http://www.sustainablecities.eu/local-stories/actionforhealth/>.

The move from Charter to Commitments signified a new, more structured and ambitious approach. To be signed by the political representative, the document requires the signatory to comply with time-bound milestones. Each local government is asked to produce a baseline review within a year of signature, conduct a participatory target-setting process, and arrive at a set of individual local targets addressing all 10 themes within two years, as well as to commit to regular monitoring reviews.

Agenda 21 recognises nine major groups of civil society and stipulates the need for new forms of participation at all levels, to enable a broad-based engagement of all economic and social sectors for bringing about sustainable development. The Major Groups are Business and Industry, Children and Youth, Farmers, Indigenous Peoples, Local Authorities, NGOs, Scientific and Technological Community, Women, and Workers and Trade Unions. In this work, we will focus our interest on Local Authorities.

As in 1994 with the organisation in June 2004 of the European Conference on Sustainable Towns (Aalborg + 10), the city of Aalborg again became the capital of the local movement for sustainability. The Conference assessed the existence of a large, active and aggressive local movement in favour of a more sustainable model of development, as well as the significant increase in the number of cities and municipalities that held to the Aalborg Charter. However, the success achieved over the past ten years has been devalued, because it was found that adherence to the Charter of Aalborg sometimes did not mean more than just an institutional declaration of good intentions, without anything definite or any action plan having been implemented (Brunet Estarellas et al., 2005). This last idea inspires the basis for comparison between Spanish and Norwegian municipalities in the present work, in which the correspondence between the adherence to LA21 by local governments and the economic and budgetary support to sustainable projects will be verified.

In Spain, the Sustainable Development Strategy was introduced by the Government in June 2000 and included the commitment to promote a new model of integration and balancing of economic, social development and environmental protection in the long term. However, there was a lot of criticism from certain political parties concerning the general nature of the document, the lack of budgetary measures necessary for momentum as well as a framework of broad and representative social participation, and the absence of goals, commitments, priorities and specific deadlines. Given the discontent with the Spanish Sustainable Development Strategy, some regional governments drafted their plans or strategies for sustainable development. In short, in Spain 'LA21 has become the symbol that presumes to include everything that is done at the local level to convert the overall design of sustainability into operational reality' (Font & Subirats, 2000).

In Norway, with the Norwegian Prime Minister Gro Harlem Brundtland as chair of the World Commission on Environment and Development, the country became an early mover in politics for sustainable development. The pursuit of sustainable development goals has been expressed in several national policy documents, though it was

not until 2002 that Norway adopted an explicit 'National Strategy for Sustainable Development'. This was followed up by a 'National Action Plan for Sustainable Development' in 2003. Neither of these initiatives was actively implemented. The article presents and assesses strategic SD initiatives from 1989 to the present day. The Norwegian sustainable development profile is 'long on promise' and 'short on delivery', and one major reason for this is the influence of a booming petroleum economy on distributional politics. An exceptional growth in public revenues due to oil and gas fosters intense political competition over the dispensation of economic and welfare benefits— both between political parties and within governing coalitions— and undermines the 'political will' to pursue the sustainable development agenda (Lafferty, Knudsen, & Larsen, 2007).

Most works studying the development of LA21 in different geographical environments focus on analysing the implementation strategies of the Agenda at the local level. Sustainability as defined by the Brundtland Commission is an ambitious policy target. Environmental, economic, social, and institutional criteria are all considered to be of equal importance. Because of this complexity, the first step of a Local Agenda 21 process should be to develop a vision of a sustainable society based on indicators to measure the progress (Valentin & Spangenberg, 2000). This panel of indicators has not been published in Spain, so we cannot focus our comparative analysis on real outcomes achieved.

Regarding the support given by LA21 to involvement of citizens and stakeholders, specialised literature offers contradictory views. For instance, Adolfsson (2002) studied four small- to medium-sized municipalities in the southeast of Sweden. The study shows that the LA21 processes have instigated many new ideas, brought fields together and introduced new subjects into the municipal realm. It also confirms that there are signs of extended dialogue and public influence, especially where citizens are directly involved. LA21 does not seem to have much influence on the type of natural resources protected, but on how the resources are dealt with. New stakeholders within and outside the municipal organisation have been identified through the LA21 processes, and more comprehensive ways of solving problems as well as a positive climate for testing new ideas have been created. In these respects, LA21 has been and will be a significant support for the development of appropriate natural resource management at the local level. Thus Adolfsson's study confirms that LA21 promotes a broad participation of the different agents in environmental management. In recent years we have found other works in a similar vein [(Foh Lee, K., 2001), (Robert Rutherford, Robert A. Blackburn, & Laura J. Spence, 2000), (Eckerberg & Forsberg, 1998), (Agger, 2010)].

A realistic counterpoint to the official monitoring and assessment of LA21 has been offered by Lafferty & Eckerberg (2013). These authors highlighted the problems of assessment and clearly set out the policy stages necessary for more effective attainment of Local Agenda 21 objectives.

Another widely explored perspective for the LA21 analysis is focused on the measurement of sustainable development outcomes anticipated by the Agenda [(Poveda & Lipsett, 2011), (Thomas, 2010)]. Thomas pointed out that the literature-based review demonstrates the richness of this engagement and that, while there is enough information about the range of engagement, there is little evidence to indicate the effectiveness of these policies. The assessment process implies the existence of tools, instruments, processes, and methodologies to measure performance in a con-

sistent manner with respect to pre-established standards, guidelines, factors, or other criteria. Sustainability assessment practitioners have developed an increasing variety of tools. Thomas's paper discusses a range of fundamental approaches, as well as specific and integrated strategies for sustainability assessment, as the foundation of a new rating system being developed for large industrial projects. In this line of research we also found several recent papers [(Devuyst, 1999), (Haapio & Viitaniemi, 2008), (Lawrence, 1997), (Nijkamp & Pepping, 1998), (Papadopoulos & Giama, 2009), (Cole & Valdebenito, 2013)].

Regarding the disparities observed in LA21 outcomes, the characteristics of the social organisation used by European municipalities to develop Local Agenda 21, as well as their political structures, have been analysed in 97 European towns subscribing to the Aalborg Charter (Lorenzo & Sánchez, 2009). The results pointed to the importance of organisational structure, but only a limited effect of the political structure is observed.

Hess and Winner (2007) summarised some case studies and recommended local government action in favour of environmental sustainability. In their opinion there are many opportunities for financially constrained cities for development of 'just sustainability' projects with minimal financial commitments. They can do so by rechanneling the purchasing decisions of public agencies, building partnerships with community organisations and developing the small business sector.

The study "Sustainable Development in the 21st century" (2012) offers a detailed ("realistic") review of progress in implementation of Agenda 21 from an international perspective. It reveals how various chapters of Agenda 21 have progressed at different paces. Success in Agenda 21 has been highly variable. Despite being a comprehensive plan to deliver sustainable development, implementation has not always been systemic. For example, Agenda 21 has stimulated a much stronger notion of participation in decision making. This important role of non-governmental actors is being affirmed at all levels of government, international law and international governance. Although Agenda 21 has acquired wide acceptance among nation states, its implementation remains far from universal or effective. Progress has been uneven, and despite some elements of good practice, most Agenda 21 outcomes have still not been achieved.

Nevertheless, regarding our main interest in this work, Local Agenda 21 has been one of the most extensive follow-up programmes to United Nations Conference on Environment and Development (UNCED) and is widely cited as an unprecedented success in linking global goals to local action. Many local authorities around the world have adopted some kind of policy or undertaken activities for sustainable development, either as a main priority or as a crosscutting issue. The progress so far does not mean that the work is over, but rather that there is potential to build further on the success. Multi-level governance is needed, as well as increased integration between local authorities and multi-stakeholders in their communities (Stakeholder Forum for a Sustainable Future, 2012).

The Local Authorities' Self-Assessment of Local Agenda 21 (LASALA) project, which conducted a Europe-wide research programme into the European LA 21 initiative, demonstrates the significant levels of commitment to the LA 21 process among European local governments and some notable achievements in sustainable development policies within a very short space of time. Although there is still a long way to

go, the LASALA research indicates that LA 21 is an effective policy vehicle for encouraging and supporting sustainable development initiatives at the local level in Europe (EVANS & THEOBALD, 2003). In a European perspective, the introduction of LA21 to cities can be considered a success story, but these activities are not distributed equally in Europe (Joas, M. & Grönholm, B, 2004).

Regarding the assessment of the degree of implementation of LA21 in Spain, several recently published studies provide a complete picture of the situation [(Font & Subirats, 2000), (Hernández Aja, Agustín, 2003), (Echebarria, Barrutia, & Aguado, 2004), (Moralejo, Legarreta, & Miguel, 2007), (Hidalgo, 2008), (Martínez & Rosende, 2011), (Observatorio de la Sostenibilidad, 2014), (Jiménez Herrero, Luis M., 2008)].

Regarding the adoption of Local Agenda 21, Barrutia and Echebarria (2011) proposed a measurement model to test the case of a specific region, the Basque Country. Research results showed that the embrace of LA21 by local governments is explained by internal characteristics of local governments and factors associated with the local government's environment and is fostered, fundamentally, by higher levels of government that can create connected or networking processes. The most relevant external factors are associated with the concept of co-creation. They proposed that, to achieve generalised diffusion of LA21, co-creation in networks, instead of networks in general, should be emphasised.

Concerning the environmental expenditure, we would like to remark about the work by Aguado and Echebarria (2004) in which, by simple correspondence analysis, they analyse the situation that relates to the Spanish regions (Autonomous Communities, AACC) concerning budgetary expenditure intended for various environmental items. This work has some points in common with ours, since it uses the perspective of environmental expenditure. In fact, this work raises some doubts about the coherence between the political commitment to the Charter of Aalborg and Towns Campaign and European Cities for Sustainable Development and the actual implementation of local strategies for sustainable development economic support.

Independently of the LA21 implementation, parallel experiences in policy decentralisation have been proved in Norway. The government in Norway transferred considerable powers in nature conservation management to local governments, hoping to facilitate a wider local involvement in conservation policy. Decentralisation has proven to be a success in welfare policy but is rather controversial in environmental policy. Conservation policy differs from welfare policy, as the first is marked by conflicting goals and interests between local and central governments. Some empirical studies show that local councils redefine national policy and implement management practices in a manner more attuned to local needs and interests (Falleth & Hovik, 2009). In 2009, the Norwegian Parliament decided to initiate a reform of the governance of protected areas. The reform establishes more than 40 local management boards with extensive decision-making authority over much of Norway's protected areas. The boards have management authority over clusters of national parks, protected landscapes, and nature reserves. The reform was initiated in a situation of considerable conflict regarding protected areas, and implementation studies anticipate that the reform is likely to reduce conflict levels and increase the importance given to local user interests (Fauchald & Gulbrandsen, 2012).

Though Norway is usually considered a pioneer with respect to sustainable development, analyses have shown that this has not been the case with respect to Local

Agenda 21. Still, Norwegian municipalities have strengthened their institutional capacity with respect to environmental policy, and have thereby strengthened their ability to follow up on the recommendations in Agenda 21. However, initially, it is the local environmental problems that have received the most attention rather than global environmental and development problems. Aall (2000) thinks that national environmental policy in Norway seems to be reluctant to face the global problems, leaving the municipalities with the great challenge of being the 'engine' in steaming up Norwegian environmental politics, and he raises some doubts as to whether the growing number of Local Agenda 21 initiatives in Norway will in fact adopt the global perspectives outlined by the Brundtland report and Agenda 21, or just keep on with a 'business as usual' environmental policy approach.

Norwegian experiences on local environmental policy, Local Agenda 21 (LA21), local climate change mitigation (CCM) and local climate change adaptation (CCA) were compared, and conclusions pointed out that local CCA-like mainstream local environmental policy, unlike that of LA21 and local CCM, is exclusively framed in a local context and lacks the normative impetus for local action that LA21 and local CCM have had (Aall, 2012).

3. Methodology

In this work, we will try to verify the following hypotheses:

- The municipalities that adhere to the Local Agenda 21 devote more budgetary resources to expenditure functions related to the environment.
- The municipalities that adhere to the Local Agenda 21 promote greater citizen participation.
- The size of municipalities' population allows for differentiation of particular patterns of behaviour in Spanish and Norwegian municipalities that adhere to the Local Agenda 21.

Since we have replicated similar analyses in Spanish and Norwegian municipalities, we are going to describe both samples individually.

Regarding the Spanish sample, the temporal scope covers the period 2002-2012. The geographic scope, before the application of the exclusion criteria, covers 100% of the Spanish national territory.

The analytical work of this article is based on a database of our own construction, in which we have combined the data from the final budgets for 2002 and 2012 and the population of each municipality for the years studied.

Regarding the budget, data have been obtained from the website of the Ministry of Finance and Public Administration (<http://serviciosweb.meh.es/apps/EntidadesLocales/>). It is important to note that there was a change in the accounting rules of local governments that generated a difference in content of programs of environmental expenditure between 2002 and 2010. Since 2010, the accounting methodology has been homogeneous.

In accordance with the Order of September 20, 1989, by which the structure of the budgets of local authorities is regulated, we have identified two spending sub-functions for the year 2002:

4. Community Welfare

It includes all costs relating to activities and services aimed at improving the quality of life in general.

It will be charged with costs derivatives maintenance, upkeep and operation of the services of treatment, supply and distribution of water; collection, disposal or treatment of waste; street cleaning; office of consumer information; protecting and improving the environment; cemeteries and burial services; slaughterhouses; markets; fairs and exhibitions, etc.

The sub-functions typified include:

4.4.1 Treatment, supply and distribution of water.

4.4.2 Waste collection and street cleaning.

For this work, the variable environmental expenditure in 2002 is the sum of the costs incurred by the municipalities in the sub-functions 441 and 442.

After 2010, a new sub-function was included in the functional classification of local budgets, the 17th policy "Environment". This policy is present in budgets subsequent to 2010 (Order EHA / 3565/2008, of December 3, in which the structure of the budgets of local authorities is approved). The 17th policy includes four programs:

170. General administration of the environment.

171. Parks and gardens.

172. Protecting and improving the environment.

179. Other activities related to the environment.

Thus, in 2012 we included the 17th policy "Environment" and three additional programs which were incorporated into the 16th policy "Community welfare":

161. Sanitation, supply and distribution of water.

162. Collection, disposal and treatment of waste.

163. Street cleaning.

Nevertheless, because the programs do not indicate the specific content of the expenses included in each program, to simplify the analysis, we used aggregate spending data as variable in analysis for the years 2002 and 2012 as well.

Therefore, the concept of environmental expenditure is taken from the functional classification of municipal budgets, by reference to the sum of the sub-functions 441 and 442 for 2002 and the whole policy no.17 plus the programs 161, 162, and 163 in 2012.

In total, a database has been designed with 11,857 records corresponding to those of local authorities that are in the budget database of the years 2002 and 2012. From this whole, a sample of 1,273 municipalities has been selected. To obtain this sample, we applied the following exclusion criteria on the whole of those of local authorities:

- Municipalities without environmental expenditure in 2002
- Municipalities without environmental expenditure in 2012
- Local government entities without associated population (Other municipalities: Councils, Commonwealths, Counties, etc.)

Of these 1,273 municipalities that collected environmental cost in their budgets, the experimental group is initially composed of 161 Spanish municipalities that in 2002 had adhered to the AL21⁵⁷. Finally, after we applied the exclusion criteria, 1,273 municipalities, of which 143 belong to the experimental group (LA21) and the remaining 1,130 to the control group, were included in our study sample.

Regarding the Norwegian sample, the temporal scope covers the period 1999-2013. The analysis here focuses on longer-term effects. The first measurement is taken around the time of the "Fredrikstad-Declaration". 61 percent of all the municipalities signed the agreement in 1998. The second measurement occurs fourteen years later, except for turnout which is measured at the local elections in 2011.

The geographic scope covers 100% of the Norwegian municipalities. No exclusion criteria have been applied.

The analytical work of this article is based on a database of our own construction, in which we have combined the data from the final budgets for 1999 and 2013 and the population of each municipality for the years studied.

The Norwegian database also underwent some statistical and functional changes in the definition of variables in 2000:

- Environment: Gross expenditure devoted to environmental measures and administration of those for the period 1991-2000 and to physical planning, cultural heritage and environmental measures for the period 2001-2013.
- Renovation: Gross expenditure devoted to collection and treatment of waste for the period 1982-2000 and collection and treatment of waste + water for the period 2001-2013.
- Water: Gross expenditure devoted to water and waterworks for the period 1982-2000 and production and supply of water for the period 2001-2013.

⁵⁷ Data obtained from the study of Hernández Aja, A. (2003). According to this study, 409 municipalities had signed the Aalborg Charter by 2002. 189 municipalities confirmed their commitment to the Aalborg Charter in a survey. 143 of them appear in our database with environmental costs in their budgets.

Table 1 provides information on the coverage of both samples with respect to the whole, in terms of number of municipalities, population and environmental expenditures.

Table 1: Samples' Characteristics

	No. Municipalities	No. Inhabitants	M1 Expend.	M2 Expend.	M3 Expend.	M4 Expend.	Voter Turnout
Norway							
1999	428	4,478,497	285,650	5,170,810	2,150,980	2,734,180	62.95
Non LA21	166	823,114	60,370	863,700	377,190	426,140	63.99
MS/L	56	588,971	22,890	551,370	251,840	276,640	60.14
S	110	234,143	37,480	312,330	125,350	149,500	65.95
LA21	262	3,655,383	225,280	4,307,110	1,773,790	2,308,040	62.29
MS/L	154	3,374,739	173,600	3,949,840	1,662,380	2,113,860	59.78
S	108	280,644	51,680	357,270	111,410	194,180	65.88
2013	428	5,109,056	5,531,750	24,759,617	4,799,236	14,428,631	66.17
Non LA21	166	887,525	980,657	4,422,379	960,164	2,481,558	67.14
MS/L	56	662,663	651,106	3,017,418	643,273	1,723,039	64.32
S	110	224,862	329,551	1,404,961	316,891	758,519	68.58
LA21	262	4,221,531	4,551,093	20,337,238	3,839,072	11,947,073	65.56
MS/L	162	3,979,346	4,098,685	18,594,764	3,508,056	10,988,023	63.70
S	100	242,185	452,408	1,742,474	331,016	959,050	68.56
Spain							
2002	1273	31,931,391	2,839,357,851	2,839,357,851	770,658,560	2,068,699,291	54.58
Non LA21	1130	16,819,579	1,352,919,098	1,352,919,098	444,637,993	908,281,104	55.47
MS/L	501	14,469,959	1,173,778,447	1,173,778,447	357,592,886	816,185,562	50.34
S	629	2,349,620	179,140,650	179,140,650	87,045,108	92,095,543	59.58
LA21	143	15,111,812	1,486,438,753	1,486,438,753	326,020,566	1,160,418,187	47.57
MS/L	135	15,083,372	1,483,232,627	1,483,232,627	325,059,233	1,158,173,394	46.74
S	8	28,440	3,206,126	3,206,126	961,333	2,244,793	61.50
2012	1273	36,169,893	1,293,248,077	6,052,526,029	863,538,357	3,895,739,595	51.25
Non LA21	1130	19,700,568	588,066,873	2,977,055,462	511,321,828	1,877,666,761	52.18
MS/L	501	16,805,888	517,978,946	2,608,540,908	413,697,420	1,676,864,542	48.45
S	629	2,894,680	70,087,927	368,514,555	97,624,408	200,802,219	55.17
LA21	143	16,469,325	705,181,204	3,075,470,567	352,216,529	2,018,072,834	43.91
MS/L	135	16,434,197	704,327,273	3,068,568,619	350,987,442	2,013,253,904	43.15
S	8	35,128	853,931	6,901,948	1,229,087	4,818,930	56.77
MS/L: Medium-Sized and Large Municipalities			S: Small Municipalities				

The coverage of the Norwegian sample is 100% in terms of territorial coverage and population. The population included in the experimental group represents 82% and 83% of the national population in 1999 and 2013 respectively.

The coverage of the Spanish sample is around 81% and 77% in terms of population in 2002 and 2012 respectively. The experimental group in Spain represents 47% and 46% of population included in the sample in the years 2002 and 2012.

Apart from the usual variables (G and T) characteristic of all DiD models, the five models built for this work include two control variables:

- Total budget expenditure (final budget)
- Population

For the treatment of data and application of statistical techniques, software packages, SPSS (Statistical Package for Social Sciences), SAS (Statistical Analysis Software) and Eviews 8 have been used.

The specific concepts included in the dependent variables of all econometric models, for the initial and final periods, are displayed in Table 2.

Table 2: Definition of dependent variables

MODEL	COUNTRY	T=0	T=1
Model 1	Spain	4.4.1 Treatment, supply and distribution of water. 4.4.2 Waste collection and street cleaning	170. General administration of the environment. 171. Parks and gardens. 172. Protecting and improving the environment.
	Norway	Environmental measures and administration	Physical planning, cultural heritage and environmental measures
Model 2	Spain	4.4.1 Treatment, supply and distribution of water. 4.4.2 Waste collection and street cleaning	170. General administration of the environment. 171. Parks and gardens. 172. Protecting and improving the environment. 179. Other activities related to the environment. 161. Sanitation, supply and distribution of water. 162. Collection, disposal and treatment of waste. 163. Street cleaning.
	Norway	- Environmental measures and administration - Expenditure devoted to collection and treatment of waste - Expenditure devoted to water and waterworks	- Physical planning, cultural heritage and environmental measures - Collection and treatment of waste + water - Production and supply of water
Model 3	Spain	4.4.1 Treatment, supply and distribution of water.	161. Sanitation, supply and distribution of water.
	Norway	- Expenditure devoted to water and waterworks	- Production and supply of water
Model 4	Spain	4.4.2 Waste collection and street cleaning	162. Collection, disposal and treatment of waste. 163. Street cleaning.
	Norway	- Expenditure devoted to collection and treatment of waste	- Collection and treatment of waste + water
Model 5	Spain	Turnout as percentage of total eligible voters recorded in the censuses at the municipal elections	Turnout as percentage of total eligible voters recorded in the censuses at the municipal elections
	Norway	Turnout as percentage of total eligible voters recorded in the censuses at the municipal elections	Turnout as percentage of total eligible voters recorded in the censuses at the municipal elections

Difference in Differences treatment effects (DiD) have been widely used when the evaluation of a given intervention entails the collection of panel data or repeated cross sections. DiD integrates the advances of the fixed effects estimators with the causal inference analysis, when unobserved events or characteristics confound the interpretations (Angrist, J.D. and Pischke, J., 2009).

Despite the existence of other plausible methods based on the availability of observational data for quasi-experimental causal inference— i.e., matching methods, in-

strumental variable, regression discontinuity– DiD estimations offer an alternative, reaching the unconfoundedness by controlling for unobserved characteristics and combining them with observed or complementary information. Additionally, the DiD is a flexible form of causal inference, because it can be combined with some other procedures, such as the Kernel Propensity Score and the quintile regression (Villa, 2012).

For econometric assessment, the impact of the Local Agenda 21 on spending, the next base regression is used (Pérez López, C. & Moral Arce, I., 2015):

$$Y = a_0 + a_1G + a_2T + a_3G*T + b_1X_1 + b_2X_2 + e \quad [1]$$

Y is the environmental expenditure.

G is the dummy variable that distinguishes the group (treatment or control).

T is the dummy variable defining the baseline and the end-line.

G x T is the interaction between the dummy variables G and T; its estimated coefficient is the value a_3 , statistical of difference in differences, which is that which assesses the impact of LA21 spending on sustainability.

X_1 is a control variable corresponding to Total Budget.

X_2 is a control variable corresponding to Population.

e represents the error term.

Thus, the final budgets of the two years of comparison and the population of the municipalities of the sample have also been included as independent variables, along with the dummy variables referred to above, in the estimates.

Because we included a control variable concerning the population in the model, we utilised absolute values, and non per capita values, in all estimates.

In order to know if population size of municipalities introduces a differential impact of LA21 on environmental expenditure and citizen participation, we have solved all models for the whole sample and for two segmented sub-samples. This segmentation distinguishes between two groups– small and medium-sized or large municipalities. We used the median population to classify every municipality into one of these two groups.

5. Results

The first model tries to evaluate the impact of LA21 on general environmental expenditures. Results of this model are presented in Table 3.

Table 3: Model 1 General Environmental Expenditures

	M1 Environment					
	Norway			Spain		
	Coefficient	T	Sig (p value)	Coefficient	T	Sig (p value)
Intercept	296.119	1.177	0.240	-627501.615	-4.134	0.000
After(1) vs before (0)	-802.455	-2.278	0.023	-822775.825	-3.876	0.000
LA21 (1) vs non-LA21(0)	351.546	1.083	0.279	-1200583.66	-2.601	0.009
Interaction term	-298.929	-0.660	0.509	-3750181.92	-5.865	0.000

	M1 Environment in Small Municipalities					
	Norway			Spain		
	Coefficient	T	Sig (p value)	Coefficient	T	Sig (p value)
Intercept	577.001	2.267	0.024	106397.056	7.763	0.000
After(1) vs before (0)	-1118.603	-2.895	0.004	-237788.970	-16.820	0.000
LA21 (1) vs non-LA21(0)	215.188	0.954	0.340	67377.696	0.767	0.443
Interaction term	659.108	2.065	0.040	-183077.904	-1.475	0.141

	M1 Environment in medium-sized or large municipalities					
	Norway			Spain		
	Coefficient	T	Sig (p value)	Coefficient	T	Sig (p value)
Intercept	330.351	0.579	0.563	-1316203.37	-4.119	0.000
After(1) vs before (0)	-1720.346	-2.171	0.030	-1538374.98	-3.475	0.001
LA21 (1) vs non-LA21(0)	477.443	0.716	0.474	-884787.486	-1.277	0.202
Interaction term	-485.499	-0.527	0.598	-3174924.56	-3.279	0.001

This model offers negative and statistically significant values for T variable in both countries. The interaction term coefficient is statistically significant for small Norwegian municipalities and for large Spanish municipalities, although in Spanish municipalities the sign is negative. Nevertheless, Spanish data are really dissimilar in between the origin and the end of the period of analysis, so the results of this model are not very reliable regarding Spanish municipalities.

Model 2 reflects the most comprehensive perspective regarding the impact of LA21 on environmental expenses. The dependent variable used in this model includes the general environmental expenditures, as well as those related to water and waste/renovation.

After running the model for the whole sample, we only obtained positive and statistically significant impact for Spanish municipalities. But, when the model was solved for large and small towns independently, the results reveal a very uneven impact of LA21 on the environmental expenses in every town size group and in every country.

Positive and statistically significant impacts are concentrated in small Norwegian municipalities and in large Spanish municipalities.

Table 4: Model 2 Total Environmental Expenditures

	M2 Environment, water and waste					
	Norway			Spain		
	Coefficient	T	Sig (p value)	Coefficient	T	Sig (p value)
Intercept	-9.979	-0.007	0.995	590540.334	-4.951	0.000
After(1) vs before (0)	811.503	0.389	0.697	683650.632	4.099	0.000
LA21 (1) vs non-LA21(0)	830.333	0.432	0.666	-3674992.736	-10.133	0.000
Interaction term	2772.317	1.034	0.301	3773199.252	7.509	0.000

	M2 Environment, water and waste in Small Municipalities					
	Norway			Spain		
	Coefficient	T	Sig (p value)	Coefficient	T	Sig (p value)
Intercept	1081.241	1.494	0.136	-204538.973	-8.976	0.000
After(1) vs before (0)	-2697.556	-2.455	0.014	128630.202	5.472	0.000
LA21 (1) vs non-LA21(0)	195.059	0.304	0.761	-6772.268	-0.046	0.963
Interaction term	1797.981	1.981	0.048	1432.273	0.007	0.994

	M2 Environment, water and waste in medium-sized or large municipalities					
	Norway			Spain		
	Coefficient	T	Sig (p value)	Coefficient	T	Sig (p value)
Intercept	-686.890	-0.188	0.851	-1046140.074	-4.114	0.000
After(1) vs before (0)	1261.506	0.248	0.804	1410976.035	4.006	0.000
LA21 (1) vs non-LA21(0)	1890.817	0.443	0.658	-3501188.998	-6.350	0.000
Interaction term	2649.655	0.449	0.654	3332154.305	4.325	0.000

Models 3 and 4 estimate the impact of LA21 on water and waste expenses independently considered. Model 3 does not confirm a positive impact of LA21 on water expenditures at all. However, Model 4 offers the most positive data regarding the impact of LA21 on waste expenses. This model gives similar results to that obtained with Model 2 but, in addition, confirms a positive impact for the full sample of Norwegian municipalities.

Table 5: Model 3 Water Expenditures

	M3 Water					
	Norway			Spain		
	Coefficient	T	Sig (p value)	Coefficient	T	Sig (p value)
Intercept	381.956	0.628	0.530	25613.442	0.456	0.649
After(1) vs before (0)	1011.036	1.187	0.235	6582.780	0.084	0.933
LA21 (1) vs non-LA21(0)	724.300	0.922	0.357	-311020.930	-1.821	0.069
Interaction term	-201.664	-0.184	0.854	72430.411	0.306	0.760

	M3 Water in Small Municipalities					
	Norway			Spain		
	Coefficient	T	Sig (p value)	Coefficient	T	Sig (p value)
Intercept	303.448	1.407	0.160	16061.143	1.265	0.206
After(1) vs before (0)	-373.112	-1.139	0.255	-26296.999	-2.007	0.045
LA21 (1) vs non-LA21(0)	-271.803	-1.422	0.156	-48924.744	-0.601	0.548
Interaction term	155.866	0.576	0.565	-23241.492	-0.202	0.840

	M3 Water in medium-sized or large municipalities					
	Norway			Spain		
	Coefficient	T	Sig (p value)	Coefficient	T	Sig (p value)
Intercept	732.481	0.488	0.625	-5866.144	-0.049	0.961
After(1) vs before (0)	1494.308	0.718	0.473	18520.078	0.111	0.911
LA21 (1) vs non-LA21(0)	1363.268	0.779	0.436	-309336.003	-1.187	0.235
Interaction term	-1051.232	-0.435	0.664	70284.837	0.193	0.847

Table 6: Model 4 Waste Expenditures

	M4 Waste					
	Norway			Spain		
	Coefficient	T	Sig (p value)	Coefficient	T	Sig (p value)
Intercept	-688.055	-0.681	0.496	-622015.976	-6.218	0.000
After(1) vs before (0)	602.923	0.426	0.670	398396.998	2.848	0.004
LA21 (1) vs non-LA21(0)	-245.514	-0.188	0.851	-2332425.309	-7.669	0.000
Interaction term	3272.911	1.800	0.072	2036610.375	4.833	0.000

	M4 Waste in Small Municipalities					
	Norway			Spain		
	Coefficient	T	Sig (p value)	Coefficient	T	Sig (p value)
Intercept	200.792	0.436	0.663	-139096.133	-9.784	0.000
After(1) vs before (0)	-1205.841	-1.723	0.086	71918.132	4.904	0.000
LA21 (1) vs non-LA21(0)	251.673	0.616	0.538	61842.275	0.679	0.497
Interaction term	983.007	1.700	0.090	55080.897	0.428	0.669

	M4 Waste in medium-sized or large municipalities					
	Norway			Spain		
	Coefficient	T	Sig (p value)	Coefficient	T	Sig (p value)
Intercept	-1749.722	-0.704	0.482	-1117960.265	-5.237	0.000
After(1) vs before (0)	1487.544	0.432	0.666	844160.595	2.855	0.004
LA21 (1) vs non-LA21(0)	50.107	0.017	0.986	-2081481.891	-4.496	0.000
Interaction term	4186.385	1.045	0.297	1770230.275	2.737	0.006

Finally, Model 5 does not evaluate the impact of LA21 on environmental expenditures but on citizen participation. As we did not have specific data about the real participation of citizens in participatory processes related to environmental management at a local level, we used the voter turnout in local elections as a proxy variable.

Table 7: Model 5 Voter Turnout

	M5 Voter Turnout					
	Norway			Spain		
	Coefficient	T	Sig (p value)	Coefficient	T	Sig (p value)
Intercept	63.372	149.132	0.000	-18.019	-0.110	0.912
After(1) vs before (0)	2.830	4.685	0.000	-172.318	-0.755	0.450
LA21 (1) vs non-LA21(0)	-1.612	-2.895	0.004	-1284.513	-2.594	0.010
Interaction term	0.169	0.218	0.828	-1562.953	-2.278	0.023

	M5 Voter Turnout in Small Municipalities					
	Norway			Spain		
	Coefficient	T	Sig (p value)	Coefficient	T	Sig (p value)
Intercept	71.351	89.171	0.000	448.381	14.365	0.000
After(1) vs before (0)	1.717	1.413	0.158	-132.001	-4.116	0.000
LA21 (1) vs non-LA21(0)	1.029	1.494	0.136	-18.435	-0.093	0.926
Interaction term	-0.242	-0.241	0.810	74.065	0.264	0.792

	M5 Voter Turnout in medium-sized or large municipalities					
	Norway			Spain		
	Coefficient	T	Sig (p value)	Coefficient	T	Sig (p value)
Intercept	60.365	113.193	0.000	-516.268	-1.487	0.137
After(1) vs before (0)	3.940	5.324	0.000	-169.312	-0.352	0.725
LA21 (1) vs non-LA21(0)	-0.629	-1.011	0.313	-1004.470	-1.334	0.182
Interaction term	-0.016	-0.019	0.985	-1607.971	-1.528	0.127

The results obtained reject the theoretically positive impact of LA21 on citizen participation in both countries. The whole sample resolution of the model for Spanish municipalities gives a negative, though statistically significant, impact. Thus, it seems that those Spanish municipalities that adhered to LA21 present higher probability of showing lower citizen participation.

6. Conclusions

In this section we will go over the research questions, objectives, and assumptions stated in the introduction and methodology sections. First we formulated three research questions:

- Do the municipalities that adhered to the LA21 devote more budgetary resources to environmental expenditures?
- Do the municipalities that adhered to the LA21 present a greater voter turnout?
- Is the population size of municipalities a differential factor for the behaviour of local governments?

The literature review carried out in the introduction section has confirmed the relevance of those questions and the lack of response in the specialised economic literature.

In accordance with these issues, the main objective of this paper is to compare the behaviour of Norwegian and Spanish municipalities and find differences and similarities with respect to some goals included in the Local Agenda 21.

Five specific objectives have enabled, at the operational level, the concrete formulation of our main goal, thus helping to disclose in detail those inter-country differences and similarities regarding the behaviour of municipalities in the control group (non LA21 municipalities) and the experimental group (LA21 municipalities):

- Expenditure in general expenses related to environment
- General environmental expenses plus expenditure in water and waste programs
- Expenditure in environmental programs related to water
- Expenditure in environmental programs related to waste and renovation
- Citizen participation in local elections (voter turnout)

And finally, these objectives took shape in three hypotheses that we intended to verify by means of the econometric models:

1. The municipalities that adhere to the Local Agenda 21 devote more budgetary resources to expenditure functions related to the environment.
2. The municipalities that adhere to the Local Agenda 21 promote greater citizen participation.
3. The size of municipalities' population allows for differentiation of particular patterns of behaviour in Spanish and Norwegian municipalities that adhere to the Local Agenda 21.

Our results confirmed two of these original hypotheses. First, the results from Model 2 clearly show that, in a broad sense, the municipalities that adhered to the Local Agenda 21 devoted more budgetary resources to expenditure functions related to the environment in both countries. Second, although this hypothesis was only partially confirmed, the population size of the municipalities did exert a significant influence on the evolution of environmental expenditure. Nonetheless, this hypothesis is fully confirmed for a specific type of environmental expenditure, the waste expenses. Model 4 ratifies the positive impact of LA21 on waste expenses in both countries. The strongest causal relationships were found in small Norwegian towns and in large Spanish municipalities. Thus, hypotheses 1 and 3 were confirmed by means of the Models 2 and 4.

Nevertheless, Model 5 negated the positive impact of LA21 on citizen participation, so it became impossible to confirm hypothesis number 2. This result ratifies some critical papers that questioned the success of LA21 in promoting citizen participation and emphasised the disparities among municipalities and the influence of organisational aspects.

Some methodological limitations of this study should be noted, although in our opinion, in no case did these limitations question the validity of the results:

- The change in the Spanish accounting methodology of local authorities causes a break in the time series of environmental spending. The Norwegian database is also influenced by the statistical change in the functional content of environmental programs of expenditure in 2000. However, since this circumstance affects all municipalities, we consider that this does not invalidate or limit the effectiveness of the DiD analysis that was carried out. The model compares the experimental group with a control group subject to identical conditions, except for the adherence to the LA21.
- Most Spanish municipalities that adhered to the LA21 are large or medium-sized towns, so the low number of municipalities included in the group of small towns restricts the representativeness of analyses based on that group.
- Time-periods of analysis are not exactly the same for Spain and Norway, although they are similar. While in Spain we studied the period 2002-2012, in Norway we used the years 1999 and 2013 as initial point and end-line respectively. The differences in the beginning were motivated by the start of national plans supporting LA21 (Fredrikstad-Declaration in Norway, 1998; the Sustainable Development Strategy in Spain, 2000). Despite the difference, the time-period in both countries is long enough to carry out an analysis focused on long-term effects.
- With this approach we are ignoring the issue of efficiency in spending.

Regardless of these limitations, we consider it appropriate to clarify that the aim of this paper is not to evaluate the success of local governments in implementing Local Agenda 21. We simply try to verify the causal relationship between LA21 adherence and environmental spending. For that reason, other determinant variables for environmental spending have not been included in the econometric models. The control variables included in the models aim to eliminate the bias exerted by the largest municipalities.

As for the policy implications, it should be noted that increasing budgetary allocations for environmental expenditure in a period of economic crisis and budgetary constraints, especially in Spain, implies a high commitment to the objectives of Agenda 21 in terms of promoting a model of sustainable development. Our work shows that, in the municipalities adhering to the LA21, this effort has been even greater. However, we must not forget that the environmental commitment has also meant an additional way for recovery of the role and legitimacy of local governments. In this sense, it is expected that the economic recovery will accentuate the effect of the innovation process in managing local governments. This should be reflected in a higher intensity of environmental spending in the coming years.

This research focuses only on the environmental expenses covered with decentralised budgets of local governments, so it does not show the whole picture. Obviously, upper tiers of governments at regional or national levels play an important, sometimes decisive, role in the whole environmental expenditure, but only local governments are the subject of interest in this particular study.

The first line of progress in this investigation will be marked by the extension of the temporal scope. Once we have outlined the methodological aspects, it is relatively easy to enlarge the database by adding new data from recent years as soon as they are available. In this way, a longer period of analysis will help to consolidate the results obtained.

The second line of investigation derived from this work will focus on the replication of these analyses with dependent variables that reflect real outcomes of LA21 environmental programs. The combination of expenditure and outcomes will allow us to widen the scope of the analysis by including the efficiency analysis of environmental expenses.

Finally, we finish by emphasising that Models 2 and 4 showed the most reliable and consistent results. Both models present positive and statistically significant impact of LA21 on municipal expenses in environmental programs, especially in those related with waste management and renovation. These positive results appear concentrated in Norwegian small towns and in the medium-sized and large Spanish municipalities. Thus, we see that the political commitment, expressed by the Spanish and Norwegian municipalities in signing the Aalborg Charter and adhering to the LA21, is supported with increased resources for environmental programs.

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NARRATIVES ON VALUE EXPERIENCE THROUGH ACTIVITIES OF AN INDIVIDUAL'S WELL-BEING

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The purpose of this paper is to explore individuals' activities related to their own well-being and how these activities are linked to individuals' value experiences while improving their well-being. To address a need to move away from a service firm's viewpoint, the authors adopt the customer-dominant (C-D) logic perspective of services. The analysis of individuals' narratives reveals core, related and other activities following the idea of C-D logic, and a framework for value experience of three different types of individuals namely 'Want to do', 'Need for motivation' and 'Have to do'. Theoretical and practical implications to service marketing suggest to shift the focus from a service firm's view to individuals' lives and processes, and to provide a fresh view to the role of individuals to control their value experiences through activities.

1. Introduction

Experience in services has become a central interest for researchers and managers. To gain a better understanding of individuals' experiences is now even more complex due to rapidly changing service contexts, individuals' dynamic expectations and their greater control related to their experiences (Ostrom et al., 2015). Even though an individual perceived experience has been defined as subjective and contextual (Schembri, 2006; Palmer, 2010), the research has been largely conducted from a service firm's or a service's point of view (e.g. Meyer; Schwager, 2007; Verhoef, 2009; Vargo; Lusch, 2008). Just recently, a need for more individual-centric (McColl-Kennedy et al., 2015) and activity-based (Mickelsson, 2013; Åkesson et al., 2014) view to experience has been emphasized. In this paper, we adopt a customer-dominant logic perspective (Heinonen et al., 2010) to investigate individuals' activities related to their own well-being and how these activities are linked to individuals' value experiences while they try to achieve goals in improving their well-being. This customer-centric approach proposes a new view to individuals' role in service and addresses a broader understanding of individuals' lives, activities and experiences (Heinonen et al., 2010, 2013). Our study recognizes individuals as active participants to orchestrate their experiences that are originated from their activities (Heinonen et al., 2010).

Experience in service research has been studied from different perspectives, mainly from service (e.g. Galetzka et al., 2006; Chandler; Lusch, 2015), customer (e.g. Carù; Cova, 2003; Verhoef et al., 2009; Pareigis et al., 2012) and value (e.g. Vargo;

Lusch, 2008; Helkkula et al., 2012) perspective. Recently, a novel approach to experience, the concept of service co-creation experience, has been suggested (e.g. Carù; Cova, 2015; Jaakkola et al., 2015). Even though there has been several aspects to experience, it is still seen created or controlled by a service firm (Tynan et al., 2014). Here, it is assumed that the customer experiences the service in the way that is anticipated by the service firm. In this paper, we take a practical view to experience in individuals' daily life settings, and define value experience as individuals perceived experiences originated from activities that are performed by individuals in the context of their well-being. Although extensive discussion on experience has been going on within service marketing research, little empirical evidence has been accumulated about customers' experiences related to activities and interactions (Åkesson et al., 2014).

We recognize activities as central part of individuals' experiences, but it is not always very clear what is meant by individuals' activities. Service studies tend to illustrate activities carried out by customers as interaction between a service firm and its customers often from a service firm's viewpoint (Mickelsson, 2013). And experience has been considered as an outcome of interaction in a service process in a certain context (Edvardsson et al., 2005). However, a customer-centric perspective goes beyond this interaction-focused view, and highlights individuals' independently performed activities in a specific context of life, where activities are partly visible but may also be invisible to service firms (Heinonen et al., 2010; Medberg; Heinonen, 2014). For example, informational, relational, organizational and technological categories of activities have been suggested to result memorable experiences (Åkesson et al., 2014). Instead, our study in the context of individuals' well-being focuses on activities that individuals conduct in daily life as they manage their well-being.

Our study will focus on an individual's active role orchestrating their activities and experiences in the context of their well-being. It aims to provide a better understanding of how individuals' activities and experiences could be linked in value formation process of their well-being. We define well-being as individuals' own opinion of their physical and mental condition at work and off-duty. Research evidence shows a strong relationship between individuals' subjective well-being, and physical as well as mental health (Dolan et al., 2008). Through the achieved understanding we intend to identify different levels of individuals' activities and define different elements of value experience related to these activities in the chosen context of the individual's well-being. The final goal is to analyse 25 – 30 individuals' narratives in order to reach the research goals. At this initial phase of the research we have written narratives from five individuals and narrative conversations with another five individuals.

The rest of this paper is organized as follows: First, we provide an overview to value experience in customer-dominant logic. And second, we view the concept of customer activity from customer-dominant logic perspective. We then define and discuss our framework for individual activity and value experience related to individuals' well-being. Next, we present our empirical study and findings of individuals' activities and elements of value experience. And finally, we discuss theoretical and managerial implications as well as limitations and future research.

2. Value experience in customer-dominant logic

It has been emphasized that individuals should have a more active role in services (Vargo et al., 2008; Payne et al., 2008). Customer-dominant logic places genuinely the individual in the center, and emphasizes a broader understanding of individuals' lives, activities and experiences, in which services are embedded, rather than focusing on services and providers as such (Heinonen et al., 2010). The customer focused perspective suggests that the customer's understanding of the service is different from the service provider's. Customer-dominant logic does not argue that a service firm's role should be eliminated, but rather suggests that value emerges as a service provider through a service becomes embedded in the customer's context, activities and experiences (Heinonen et al., 2010, 2013).

Value experience in a customer focused perspective is considered as something that individuals orchestrate themselves and that arises within their own activities (Heinonen et al., 2010). Thus, it is implied that individuals have an active role when creating their experiences in different contexts of their lives, and their own interpretation influences the experience related to service use.

Value emerges in the individual's activities when they use services, and so service firms become involved in individuals' everyday life settings in a visible way. But mostly, value emerges beyond the control of a service firm and so might be invisible to the firm (Heinonen et al., 2010). Thus, value is not created only in visible interaction between a service firm and a service user: Some of interactions are hidden from the service firm, but still happen in the service user's life, and therefore, value formation occurs rather than value is only actively created (Heinonen et al., 2010, 2013). In addition to visible form of interaction, customer-dominant logic introduces *the concept of presence* as a new aspect to value formation, which 'shifts the focus from value formed by interactions to the value of offerings that customers experience as present in their lives' (Heinonen; Strandvik, 2015, p. 479). They point out that the concept of presence provides service firms an opportunity to be present in individuals' lives in a broader meaning than just to manage visible interaction.

3. Customer activities in customer-dominant logic

Interaction between customers and service firms has been a central concept in service marketing. However, a customer-dominant view to services recognizes that interaction is only a part of individuals' activities in value formation, and instead of focusing only on interaction, activities reflect the way individuals live their lives and behave in their specific life context (Heinonen et al., 2010, 2013). Customer activity in a broader meaning has been suggested to involve individuals' independent activities including interaction as a part of it (Mickelsson, 2013). His definition follows a customer-dominant perspective to identify customer activity as separate patterns of behaviour that are controlled by individuals themselves.

When Heinonen et al. (2010) introduced the customer-dominant logic perspective to services, they suggested three different types of activities and experiences that influence how value emerges to individuals: *Core activities and experiences* are those directly connected to service use, while *related* as well as *other activities and experi-*

ences influence individuals' value formation, but are invisible to service firms. Heinonen et al. (2010) very clearly argue that individuals' all activities and experiences should be focused on, yet the exact meaning of related and other activities and experiences remains unclear and there is a call for further research in this area.

Individuals perform and combine activities to support their value formation processes and orchestrate their value experiences (Mickelsson, 2013). In order to emphasize a service firm's role related to activities and experiences a customer-dominant logic suggests that service firms should have a broader view on individuals' goals and intentions than just on interaction. In that sense presence of a service firm moves the focus from value emerging in interaction to value experience that is present in individuals' life settings (Heinonen; Strandvik, 2015). So, it is less relevant for a service firm to attempt to control the visible interactions, but instead to be present in individuals' lives in a profitable way.

4. Framework for value experience and individual activity in the context of well-being

We construct in this paper a framework modified from Heinonen et al. (2010) for value experience and individual activity in the context of well-being. In the customer-dominant logic perspective service firms become involved in individuals' activities and processes, instead of attempting to get individuals involve service firms' processes (Heinonen et al., 2010). The focus is on individuals and how they embed service in their life contexts, for that reason we examine activities and experiences from individuals' viewpoint in the context of their well-being.

When Heinonen et al. (2010) first introduced the framework for customer-dominant logic and Heinonen; Strandvik (2015) later completed it, they needed to include all the relevant elements into it to show the overall view to customer-centric logic. For simplicity they illustrated one customer and one provider in their framework. Based on the fact that the customer-dominant logic stresses the meaning of context in individuals' lives, we take a slightly different view, a contextual view to individuals' activities and experiences. So, we examine one context in the individual's life, and activities and experiences in this context. This means that more than one service may be involved depending on how individuals allow service firms to participate in their activities and experiences.

Core activities and experiences. Core activities are those independently orchestrated by individuals and instantly related to their use of services in the specific life context (Heinonen et al., 2010, 2015). From service centred viewpoint these activities would be identified solely as visible interaction between a service firm and its customers (Payne et al., 2008). Whereas from an individual centred perspective service firms should not concentrate only on visible activities, but also on individuals' intentions and goals considering their well-being (Heinonen et al., 2010, 2015). In that sense, core activities are not necessarily visible to service firms, instead more easily to be recognized by them (Mickelsson, 2013).

Related activities and experiences. Heinonen et al. (2010, 2015) suggest that there are activities in individuals' life context that are invisible to service firms, and yet they are part of the same value formation process as core activities. Presence refers to

ability of a service firm to be present in individuals' life context (Heinonen et al., 2015). It indicates that being present and providing support to individuals regarding their well-being, service firms should observe individuals' related activities. These activities may be concerning interaction with other service firms, information searching or communicating about life context (Mickelsson, 2013). In addition, we also consider related activities as activities concerning individuals' well-being that they perform independently not always including services in these activities.

Other activities and experiences. These activities are not directly involved in individuals' value formation, but they are required to enable individuals' core and related activities (Heinonen et al., 2010). For example, other activities may be needed when individuals purchase equipment for exercising.

Individual profiles. Customer activities in service form patterns that can be used for creating customer profiles (Mickelsson, 2013). Customer groups with different activity blends provides a good understanding of a service firm's position and ability to support individuals in the context of well-being.

Next, we will apply this framework in our empirical study of individuals' activities and experiences in the context of their well-being.

5. Methodology

We adopt narrative approach to examine individuals' experience of value related to their well-being. Narrative approach is an appropriate research strategy in this study, since narrative provides a way to make sense of happenings and to organize experiences in the individuals' life settings of managing their well-being (Riessman, 2008). Narrative is defined as different forms of discourse like making meaning through an experience and understanding actions as a whole over time (Chase, 2011). Narratives reveal how individuals construct past, present and anticipated future experiences by using systems of signs, numbers, words and pictures (Helkkula; Pihlström, 2010).

Narratives are important means for individuals to make their experiences meaningful (Shankar et al., 2001). But narratives are not a direct route to individuals' experiences, because narratives are about individuals and imply how storytelling activities are embedded in their contexts (De Fina, 2009; Bamberg, 2012). Through interpretation of narratives stories are able to reveal the experiences and the reality of the phenomenon (Spector-Mersel, 2010).

Narrative researchers emphasize widely the potential of narrative inquiry within qualitative research methods, but also suggest that narrative as a research approach involves issues to be concerned such as the interviewee-interviewer relationship, ethics and narratives interpretations (Chase, 2011). A researcher's position and ethics are indeed relevant especially concerning as sensitive and complex issue as individuals' well-being. Thus, it is extremely important that participants of the study feel free to tell their stories according to their own judgement without any pressure placed on them.

Data collection

Source of data. This study is an initial phase of a PhD research to achieve preliminary understanding of the research phenomenon. To address the research aims, we focused on 10 voluntary individuals interested in their well-being at work and off duty (Table 1). In this study, individuals were employees of a large public hospital representing supportive services in a health care organization. The employer provides some well-being services to employees in order to support them in improving and maintaining well-being at work. The individuals for this study were selected based on two criteria: First, they had to have performed an energy test to indicate their own energy level. Second, individuals needed to be volunteer to participate and tell their stories about own well-being.

Data consisted of written narratives and narrative conversations about an individual's views and experiences of one's own well-being. We asked individuals to tell stories about interests, beliefs and challenges concerning their well-being, and the role of well-being services on their daily life contexts.

Table 1. Summary of the data in this study.

Written stories	Five stories
Individuals	The age of individuals were between 46 – 55 years. They were all females.
Stories	The average length of stories were 286 words (53, 184, 226, 348, 623 words / each).
Services	Digital well-being services used by the individuals: An individual's level of daily energy (Energy Test); Physiology and heart-beat analytics (First Beat); Body composition analyser (Inbody); Activity tracker (Polar). Face-to-face training sessions the individuals participated in: Rehabilitation services, Pilates
Narrative conversations	Three conversations
Individuals	<i>Conversation 1:</i> Two females at age of 39 and 42 <i>Conversation 2:</i> Two females at age of 35 and 57 <i>Conversation 3:</i> One female at age of 41
Conversations	The length of conversations: <i>Conversation 1:</i> 5 min 20 sec <i>Conversation 2:</i> 4 min 58 sec <i>Conversation 3:</i> 9 min 51 sec
Services	Digital well-being services used by the individuals: An individual's level of daily energy (Energy Test). Face-to-face training sessions the individuals participated in: Gym training, Yoga and Mindfulness

Characteristics of the narratives. We gathered two sets of data. The first set of data included five written stories. The average length of the written stories was 286 words, the length varied considerably from 53 to 623 words. The author responsible for data collection gave instructions personally to each individual, and afterwards, sent written

instructions to each of them by email. We received the written stories between 13 May and 2 June in 2016. The second set of data involved three separate narrative conversations with five individuals. The brief conversations were conducted just after training sessions to get the first impressions from the individuals while they were actually doing an exercise. Two conversations took place in pairs after a gym training session and lasted about five minutes, and the third one lasted about 10 minutes after a mindfulness session. The conversations were implemented between 19 May and 24 June in 2016. The conversations were transcribed, and both written stories and narrative conversations were saved to Word documents.

Data analysis

When conducting the analysis of narratives we concentrated primarily on the content what the stories communicated rather than exactly how the narratives were structured. We searched for core, related and other activities that the individuals had performed related to their well-being, and experiences that emerged when they had conducted the activities and used well-being services. We adopted thematic analysis to analyse the data. Even though with a relatively small amount of data, we used NVivo 10 software for coding the stories in order to ensure also the analysis of the forthcoming data. We formed categories based on the three levels of individual activities and how these activities could be connected to their well-being. For the framework, we coded the data considering value experiences related to activities and well-being services. The coding process was implemented by the first author, who also formed preliminary categories and sorted the items into these categories. Then, both of the authors discussed the identified categories and items included in them, and illustration for the framework.

6. Empirical findings

Individual activity

Based on our data analysis we identified individuals' activities related to their well-being in all the three activity categories (Table 2). Some of the individuals had been focusing on improving their well-being for a longer period of time, while others were just beginners. It seemed that they had become interested in taking care of themselves after a crisis like getting know of a too high blood pressure or cholesterol levels, or after a test of physical condition that showed a clear need for improving their physical condition. The preliminary findings revealed that individuals were first of all engaged in taking care of their well-being rather than being loyal to specific well-being services.

Core activities. Within the category of core activities we identified four different activities. Well-being services used by participants were mostly tests for monitoring the state of their physical condition, one of them used an activity tracker for continuous monitoring. All the individuals had performed an energy test that indicated how many hours and minutes per one day they had energy to live their lives. It seemed that the energy test results motivated them to actually take actions considering their well-being regardless whether the result showed a higher or lower energy level. So, visualisation regarding individuals' state of well-being seemed to be an effective way to get individuals to perform activities related to their well-being.

Related activities. We found several related activities. We could recognize that individuals performed activities independently related to their own well-being without involving any well-being services. They all emphasized the importance of improving their well-being through conducting many different activities, but only few services were involved to support their intentions.

Other activities. We were able to identify one activity that was as other activity in nature. The activity was a rehabilitation training for the individual's back and legs.

Table 2. Summary of activity categories.

Activity category	Activity
Core activity	Energy testing Gym training; Kettlebell training; Mindfulness
Related activity	Cycling; Swimming; Jogging; Walking; Skiing Pilates; Stretching; Gymnastics; Yoga Way to work by walking or cycling; Walking with a pet Gardening; Cleaning at home Reading; Watching television; Movies; Theatre; Surfing in the Internet Food; Eating in restaurant Healthy sleeping Participating in non-profit associations Travelling
Other activity	Participating in rehabilitation at work (occupational health)

An empirically elaborated framework for individual activity and value experience in the context of well-being

Based on the analysis of written narratives and narrative conversations we introduce our framework related to individual activity and value experience (Table 3). We could define three types of individuals based on how they performed activities and experienced value related to own well-being. We call them 'Want to do' –, 'Need for motivation' – and 'Have to do' –types. In the framework, we identified several elements of value experience that were mostly different from each other in the three groups, but there were also some elements that we found to be the same in two or all the three groups.

'Want to do'. It seemed to be a dominating element of value experience for individuals in this group to adopt a wide view to their well-being. They took care of themselves regarding their physical and mental condition. Even though they seemed to be enthusiastic towards their well-being, still their attitude was quite relaxed to well-being and life as whole.

"I walk to work and it takes about 40 – 45 minutes. It's a good way to 'empty my head' while walking. My brains get oxygen and my mind feels bright, even a bad wheather does not make a difference." ... "For the first thing in the morning I do a 15 minutes exercise to get my body awake. This spring I have participated in bodypump-exercising, it's a really good exercise

taking place right after a workday." ... "I have started jogging after a break of many years, it's fun and feels good." (Person 5)

"But while exercising and following a diet, you also need to remember to relax, a balance between exercise and rest is important." ... "Family, friends, movies, theatre, good food and travelling are things that get me feeling good" ... "And what is important, a positive attitude to life helps a lot." (Person 3)

We found that individuals actively gathered knowledge of well-being from books and lectures. However, they were quite precise of what they actually adapted of that knowledge and how they implemented it into the present situation in life.

"Learning (about a healthy lifestyle) is something that has helped me to get in this good condition still at my age." (Person 3)

"What is important to me in my own well-being is that I can accept myself as I'm and do something that I enjoy and what is meaningful to me. I no more care what other people think or say about what I should do or not do." (Person 5)

It seemed that 'Want to do' –type of individuals conducted a wide variety of core activities on daily basis. Related activities were mostly individuals' independent activities, quite few well-being services were involved.

'Need for motivation'. We found partly same elements for value experience in this second group as we did in the first group. The most obvious element different in this group compared to the first group was the need for external motivation.

"Years ago I participated in a peer group at my workplace to manage my bodyweight. We reported our weight in the Internet. Reporting the bodyweight regularly motivated me in managing my bodyweight." ... "In the year before last year at our workplace, we had a system for reporting our exercises. Documenting and a possibility to get a prize motivated me." (Person 4)

In this group, we noticed that performed core and related activities were frequent but not necessarily conducted on daily basis. Measuring and visualization of realised activities were important to individuals' value experience.

'Have to do'. Even though individuals in the third group conducted a minimum amount of activities regarding their well-being, they still considered well-being as an important issue in their lives. This appeared to be partly because of the current situation of their lives and partly because of unwillingness to invest extra time and effort into own well-being. Elements of value experience seemed to consist of relevant core and related activities with as well benefits as possible.

"It's important for me to have a good energy and to feel alive, to keep a good physical and mental condition." ... "When I'm tired I don't exercise so much. So, in that case I easily neglect myself." (Person 1)

"I exercise now and then, I ride a bike in summer time. I stretch my back and legs daily." ... "For stretching I've got instructions from occupational health professionals." (Person 2)

For individuals in 'Have to do' –group it seemed that a basic interest in own well-being existed, but individuals had challenges to put their intentions into actual activities. Individuals needed at least some external control, in some cases the control came from health care professionals.

Table 3. A preliminary framework for individual activity and value experience in the context of well-being.

Individual type	Activity	Source of value experience	Elements of value experience
'Want to do'	Activities on daily basis Activities from every activity category Very versatile pattern of activities	Internal	Inspire to manage one's well-being as whole Independent attitude towards one's well-being Importance of continuity Importance of versatility Importance of balance in life Positive attitude towards life Positive attitude towards future
'Need for motivation'	Frequent activities Visualization of activities Versatile pattern of activities	Internal / external	Importance of one's well-being Independent attitude towards one's well-being Importance of external motivation or a prize Social aspect as comparison with others
'Have to do'	Infrequent activities Control of activities from external actors Only few different activities	External	Importance of one's well-being Importance of external control Focus on implementation

7. Discussion

Activities and value experiences related to individuals' well-being were examined. This study applied a customer-dominant logic approach (Heinonen et al., 2010) and emphasised an individual's perspective to activities and value experience, instead of focusing on service or service firm domain. We could identify core, related and other activities following the idea of the customer-dominant logic perspective (Heinonen et al., 2010, 2013; Heinonen; Strandvik, 2015). We also suggested a framework for value experiences where we outlined elements of value experience from three different types of individuals. We named the types as 'Want to do', 'Need for motivation' and 'Have to do'.

This study contributes to the service marketing by highlighting the need to shift the focus from a service firm's view to individuals' lives and processes by adopting a customer-dominant logic perspective by Heinonen et al. (2010) in the context of individuals' well-being. Focusing strongly on individuals' perspective we address the call for customer-centric (Brown, 2007; Heinonen et al., 2010, 2013) or consumer-centric

(Anker et al., 2015) view to services. This paper examines activities that individuals perform in order to create and orchestrate value experience. The findings address the need to understand individuals' activities beyond the interaction between a service firm and individuals. Related activities in the context of individuals' well-being show that individuals independently perform activities when they try to reach the goals to improve their well-being. These invisible activities to service firms conducted by individuals have been emphasized as well in other studies in marketing (e.g. Mickelsson, 2013; Medberg; Heinonen, 2014; Posignon et al., 2015). So, the findings indicate the active role of individuals and the role of service firms to support individuals' value experience creation (e.g. Grönroos, 2006, 2008; Grönroos; Voima, 2012).

Figure 1 summarizes, as an example, a preunderstanding of individual activities and experiences in this study. Experience perceived by individuals is context-related (Carù; Cova, 2003; Verhoef et al., 2009). This study focuses on one context of individuals' lives and processes, which enables to view more than one service firm involving in individuals' processes. This is a different view from Heinonen et al. (2010, 2013) and Heinonen and Strandvik (2015). In Figure 1, it is illuminated that three different well-being services provided by three service firms are involved in an individual's life. Interaction concerning each of these services may have different intense. And each of the three service firms may have a different intention and capability to be present in an individual's life and processes.

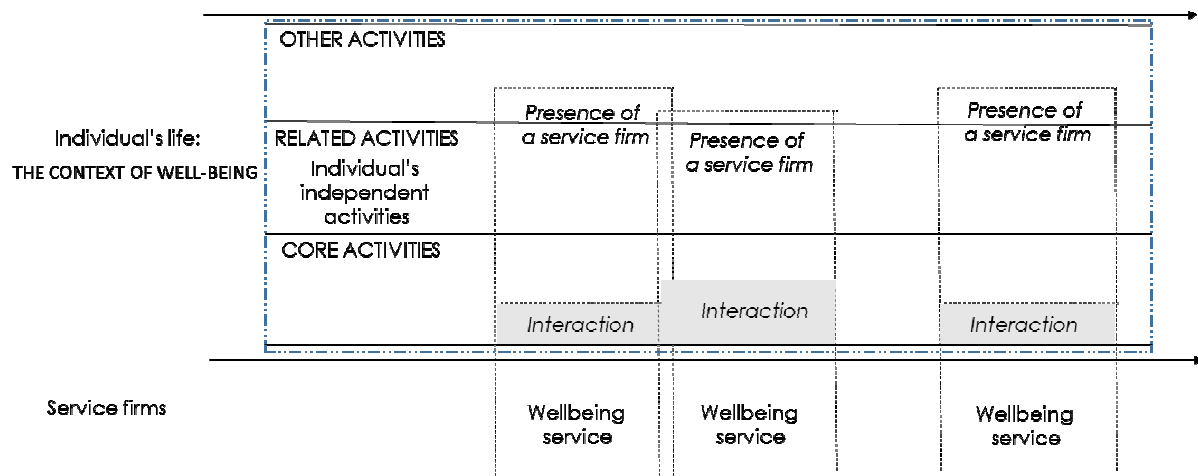


Figure 1. Levels of individual activity modified from Heinonen et al. (2010).

We contribute to the ongoing dialogue in service marketing research by revealing a fresh view to the roles of individuals to control their value experiences through activities. Our study identifies elements for value experience that are interpreted from individuals' point of view. In order to gain a profound understanding of experiences related to individuals' well-being, individuals' greater role in orchestrating their experiences is emphasized (Ostrom et al., 2015). This study clearly shows that individuals' value experience goes beyond the traditional dyadic view between a service firm and individuals (MaColl-Kennedy et al., 2015).

Methodologically we suggest that narrative is an appropriate approach to service research in the context of individuals' well-being. Narrative approach allows individuals

to tell their own stories related to a certain context of their life (Czarniawska, 2004). Narratives seem to provide a way to make sense of activities and to organize experiences in the individuals' life settings when managing their well-being.

Managerial implications

Our study suggests that service firms need to be aware of the active role of individuals when individuals orchestrate their own value experiences related to well-being. Service firms should not depend on their assessment of individuals' value experiences, but instead try to learn how individuals manage their well-being and orchestrate experiences through their own activities. It seemed that individuals who were women at their fifties' in this study, were very interested in improving their well-being and engaged in many activities to reach their goals. But instead of searching for support from well-being services, they mostly performed activities independently. So, to realize this business potential service firms need to find profitable ways to be present in individuals' everyday life and to participate in individuals' value formation processes.

The customer focused approach enables service firms to have a larger role individuals' life context of well-being and not only provide value propositions from their own point of view. In that case service firms have a more intense possibility to engage customers and individuals with their business and services. From the managerial point of view, the importance of direct and indirect interaction need to be highlighted to support the customers' fulfillment of value experience.

Adopting a customer-focused perspective as a leading idea of business service firms need to consider customer focus as a strategic issue, not only something that concerns marketing activities. In that case, the relevant question for service firms is not what a firm can offer and provide to individuals, but rather how a service firm can help individuals to achieve their objectives in managing well-being. Front-stage employees in service firms should have skills to work according to individual focused strategy and be able to enhance positive experience for individuals. While in back-stage operations service firms need to combine business and technological competences with customer focused strategy.

Limitations of the study and future research

This study is an initial phase of a PhD research for achieving a preliminary understanding of activities and value experiences related to individuals' well-being. So, we acknowledge several limitations in this study. We wanted to emphasize individuals' perspective. However, there are others, like service firms as well as individuals' family members and friends, in individuals' networks that influence individuals' value formation processes, activities and experiences. We only examined one context in individuals' lives. This study among other studies on individuals' subjective value experiences in a specific context of life will not provide generally consistent findings but rather the findings deepen our understanding related to individuals' subjective view to value experiences in their specific context. At this point of the research process we only searched for activities and elements related to value experiences rather than tried to identify linkages between them. The empirical evidence of the study is based on relatively small amount of data from individuals working in the same workplace, and showed only a female aspect to well-being.

The next steps of our future research will be to explore further individual activities and value experience in the context of individuals' well-being and identify linkages

between activities and experiences. Moreover, we aim to gain a more profound understanding of individuals' value formation processes related to their well-being and how services could be embedded in these processes.

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NEW TRENDS FOR SERVICE ECO-SYSTEMS ANALYSIS, A 'SUSTAINABLE' APPROACH. IMPLICATIONS FOR DESTINATION MANAGEMENT

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This paper aims at combining literature on service ecosystems and sustainability in order to deal with the emerging conceptualization of sustainable service ecosystems. To reach this goal, a literature review on both sustainability and service ecosystem, and the analysis of these two topics in tourism-based and destination management literature has been conducted. Following the results of literature review, a theoretical multi-level model of a tourism-based sustainable service eco-system has been provided. The model consists of meta-, macro-, meso-, and micro-level in order to highlight the way each of the actors shaping these levels can affect the sustainability of a service ecosystem. The result of our research paves the way for further investigation, both on the theoretical and on the empirical side.

Keywords: *Service eco-system, Sustainability, Destination management, Sustainable service ecosystem, Multi-level*

1. Introduction

Service Research deals with value co-creation processes within and between different entities that can be considered as systems. Recent advancements in the main theoretical approaches to service call for a more inclusive view, able to represent the interactions and transactions among a several different entities or actors aimed at creating value as well as fostering systems survival. This view roots on the so-called service system, a complex and composed set of interactions among people, organizations, and technologies (Spohrer et al., 2007), and on a service ecosystem approach (Vargo et al, 2010), the study of systems of service systems; in other words the multi-level analysis of value co-creation processes. Following the service ecosystem perspective, this study deeply investigates a peculiar service area: the tourism industry. To this end, the analysis has been also focused on the recent solicitations coming from the organizations that, operating in today's ever changing contexts, are asked to play a more active and conscious role. These solicitations deal with the assumptions of a 'responsibilities' set directly related to sustainability. Therefore, the conceptual challenge of this study is a better understanding of what does sustainability means in service ecosystems. In particular, it aims to offer a broader view on the shifting from an 'egonomy' to an economy, according to which the definition of strategic plans and paths within systems (service ecosystems) should include several and complex dimensions (economic, social, and environmental).

Starting from the analysis of service eco-systems and their most recent advancements, this paper offers a sustainable interpretation of them, comparing the potential of two different research paths: the sustainable service eco-systems and the service eco-systems oriented at sustainability. Afterwards, tourism has been investigated according to a sustainable eco-system perspective, being one of the most representative industry that can be analysed merging sustainability and service issues.

Finally, a theoretical model, coherent with the multiple service eco-system levels (micro, meso, and macro) embedded in the most inclusive meta-level, has been shaped and applied to tourism.

2. New trends in service eco-systems analysis, a 'sustainable' approach

The complex and dynamic nature of the current socio-economic context calls for the definition of a theoretical framework for a better understanding of "value co-creation and systems (re)formation" (Vargo; Akaka, 2012).

To this end, a holistic approach could support a better comprehension of the dynamic and systemic nature of all the exchanges occurring among actors, which can be summarized in their ability to mutually share and integrate resources and service provision in order to create value for themselves and others (Wieland et al., 2012).

The relevance of service provision, conceived as a dynamic and mutual exchange and characterized by systems characteristics, has been declined into several theoretical and scientific approaches that refer to Service Dominant Logic (SDL), Service Science (SS), and to Service Science, Management, Engineering and Design (SSMED).

The above-mentioned theoretical approaches strictly relay to Service Research and put the service at the core of their conceptualization, giving a great emphasis to value creation and to the interactions and exchanges on which it roots.

According to SD Logic, service represents the application of operand (tangible and static) and operant (intangible and dynamic) resources aimed at value co-creation. In terms of resources, service can be seen as a series of activities in which different types of resources (employees, physical resources, goods, systems of service providers) are used in interaction with the customer, in order to solve a problem or satisfy a need (Grönroos, 2006).

The concept of service, considered as the basic unit of all the exchanges, is fundamental in the shifting from the traditional Goods Dominant Logic, according to which services (plural) were seen only as the intangible components of tangible goods (Vargo; Lusch, 2004; 2006; 2010) to Service Dominant logic. This perspective mainly roots on ten foundational premises (Vargo; Lusch, 2008), which put service at the core of all the interactions and transactions, being the element that allows the participation of all the parties directly or indirectly involved in value creation processes.

Going beyond the previous definition, Service Science looks at service as strictly related to the value that can be added thanks to customers' direct involvement (Lusch

et al., 2007). In other words, a service arises from “the application of resources for the benefit of another” (Spohrer et al., 2008,1).

Last but not least, Service Science, Management, Engineering and Design (SSMED) has provided a further definition of service, conceived as a system of interacting and interdependent parts, involving people, technologies and business activities (Maglio et al., 2006; Maglio; Spohrer, 2008; Demirkan et al., 2011). According to this perspective, the “it is all about service” (Vargo; Lusch, 2004, 2008) approach implies the abandonment of the traditional producer-consumer separation in favour of an ‘actor to actor’ logic (Wieland et al, 2012). This logic led actors to create value within complex systems that Service Science defines “service systems” (Maglio; Spohrer, 2008), and SD logic “service ecosystems” (Vargo; Lusch, 2011).

One of the main characteristics of a service system is its dynamic configuration of resources in value co-creation processes, including people, organizations, shared information, and technologies, which are internally and externally connected to other service systems by specific value propositions (Spohrer et al., 2007). This definition implies that “the smallest service system centres on an individual as he or she interacts with others, and the largest service system comprises the global economy. [...] Every service system is both a provider and a client of service that is connected by value proposition in value chains, value networks, or value-creating systems.” (Maglio; Spohrer, 2008,18). Consequently, every service system, through its life, experiences “a sequence of interaction episodes with other service systems in which service systems act as resource integrators of operant and operand resources” (Wieland et al., 2012; Vargo; Lusch, 2006). A further definition reads service system as “a network of agents and interactions that integrate resources for value co-creation” (Ng et al., 2012, 1). It follows that service systems can be defined as networks, in which the value of the provided solutions always derives from interactions (Spohrer et al., 2008; Spohrer et al., 2010). However, even if the concepts of interaction and integration are present in the previous definitions, a system view seems to be more consistent than the notion of network, as it does not always imply a changing of system nature after the exchanges occur.

The SS has provided a definition of service systems that can be integrated with the SD logic in terms of right perspective, vocabulary, and assumptions provisioning (Maglio; Spohrer, 2008), which represents the starting point for the development of a service systems theory. To this end, the fundamental construct of service system, enhanced by the theoretical foundations of SD logic, has led to the development of service eco-system notion. According to one of its first definitions, a service eco-system is “a spontaneously sensing and responding spatial and temporal structure of largely loosely coupled, value-proposing social and economic actors interacting through institutions, technology, and language to (1) co-produce service offerings, (2) engage in mutual service provision, and (3) co-create value” (Vargo; Lusch, 2011a, 185). Starting from this definition, Vargo and Lusch (2011b) proposed a more advanced formulation, according to which service ecosystems are “relatively self-contained, self-adjusting systems of resource-integrating actors connected by shared institutional logics and mutual value creation through service exchange” (Vargo; Lusch, 2011b, 24). This definition looks at value creation and the related concept of value-in-context as a process able to contribute to systems’ viability (e.g. surviving and wellbeing) (Vargo; Lusch, 2011b).

Some authors (Akaka et al., 2013) stated that the extension of service ecosystem definition opens to a system view, mainly focused on: the central role of dynamic interactions and exchanges between actors; the role of institutions (Williamson, 2000) in value creation processes; the importance of social contexts (Chandler; Vargo, 2011; Edvarsson et al., 2011) within value is created. Therefore, the concept of service ecosystem highlights the importance and the embeddedness of the interactions occurring at micro level, directly influenced and sometimes limited by the stimuli coming from meso- and macro-level. These considerations also imply that each service eco-system is formed and reformed through recursive links (transactions and interactions) that can shape new and different service ecosystems sharing meanings (e.g., social norms, culture, etc.) (Akaka et al, 2013).

The importance of an inclusive approach to the analysis of dynamic interactions and transactions between actors, the link between value creation and viability, and the individual notion of context in which these processes occur, calls for a system approach pointing to the investigation of systems behaviour. Based on a constructivist approach, the investigation should consider a several different actors, needs, and systems configurations (Barile et al., 2014), including also the emerging demands arising from organizations participating to complex and ever-changing socio-economic contexts. Therefore, the emerging trends in the analysis of service ecosystems can be linked to one of the most recent and main drivers of economic, social, and environmental development: sustainability. This issue has gained a growing importance for the analysis of organizations' behaviour, as well as in the definition of general development paths, offering important insights in terms of social, environmental, and economic responsibilities for organizations and systems' viability.

However, including sustainability in service research is strictly related to the adoption of specific perspective, mainly focused on the contribution of different actors that interact also when sustainability and service are concurrently considered. It is evident that a system perspective contributes to the shifting from a reductionist approach to the analysis of phenomena to a holistic approach, mainly focused on the dynamics occurring and involving all the actors that participate to organizational processes.

In what follows, we will provide a review of the different theoretical contribution that deal with sustainability and service research.

3. What does Sustainability mean in service ecosystems?

In service research, sustainability issues are even more important not only in resources' integration, but also in value co-creation processes; thus, decision-makers have to punctually manage them (Ostrom, 2009), mainly through the establishment of more effective and sustainable relationships (Pels et al., 2014). In fact, nowadays we are witnessing the shifting of service purchase (value exchange) towards the collective contribution (multiple socio-economic actors) to service sustainability (value in use). In particular, the participation of several different actors according to a win-win logic in service (co)creation can lead to the achievement of a sustainable, collective, and shared value (Vargo et al., 2008b; Golinelli et al., 2015). It is now evident that sustainability makes service future-oriented and strictly focused on global wellbeing maintenance; in other words, on the preservation of coming generations' rights to

wellbeing (Wolfson et al., 2015). Sustainability also deals with some specific organizational processes and changes pointing to preserve the current resources and making them available for future generations and, at the same time, to increase business opportunities in order to make organizations able to stay viable (Barile et al., 2013).

Service research has been recently focused on two different approaches to sustainability, embodied by sustainable service and sustainability-oriented service. These two approaches represent a different orientation to sustainability in service; in particular, the first one offers an internal perspective, while the second one points to offer a holistic approach to sustainability in service.

Literature has defined sustainable service as based on resources' rational use, clean and smart technologies, information, and knowledge pointing to coherently respond to economic, social, and environmental issues (Edwards, 2005; Dresner, 2008). Moreover, a sustainable service roots on the rational use of resources and on a growing awareness about social and environmental issues (Wolfson et al., 2011; Halme, 2012). It is not only oriented to respond to customer demands, but also to achieve and maintain a long-lasting wellbeing, without a negative effect on natural and social resources, offering a basic value to the service itself (Wolfson et al., 2011). Furthermore, sustainable service also led to a shared and dynamic problem solving, focused on the achievement of potential long-term effects (Costanza et al., 2012) and of a shared value. In terms of long-term effects, a sustainable service is able to evolve over time, in order to be always as respondent as possible to customers, providers, and suppliers needs. In other words, this service can change and adapt itself to the surrounding environment and its ever-changing conditions.

More recently, service research evolution has led to the emergence of the so-called sustainability-oriented service, pointing to reduce or even remove the issues and influence that services can have on economic, social, and environmental activities (Waage, 2007). A sustainable approach to service can be also institutionalized promoting the development of win-win relationship among several interacting actors, such as national and/or local governments, institutions, public agencies, Non-Governmental Organizations (ONGs), other service providers, community based organizations, and even citizens (Nallathiga, 2012). In other words, a sustainable approach to service points to promote their ability to adapt themselves to the surrounding environment and to be self-sufficient in order to face the emerging changes. It is evident that this orientation overcomes the traditional organizational borders, enabling multiple different actors to interact, share, and use resources in a responsible way. Sustainability-oriented service paves the ground for new relationships, resources sharing, and interactions (Waage, 2007; Matzen, 2009), introducing the emergent concept of sustainable service eco-system (Ruokolainen, 2013; Letaifa; Reynoso, 2015).

According to an eco-system perspective, sustainability represents the ecosystems' ability not only to face stressing processes (Wolfson et al., 2011), but also to maintain them and the resources they use for the future generations. Furthermore, this perspective supports the definition and the exploitation of multiple interactions and sustainable relationships among the interacting actors (Pels et al., 2014) belonging to a same or other different contexts.

When applied to service eco-systems, sustainability represents the ability to support and assure a long-term viability (Ruokolainen et al., 2011), based on a conscious use

of economic, social, and environmental resources able to ensure the wellbeing of multiple interacting actors. Moreover, sustainable service ecosystems are able to promote value co-creation processes in which multiple actors are involved (Lusch; Vargo, 2014; Vargo; Lusch, 2016) in order to contribute to a global sustainable development. Consequently, a service eco-system is sustainable when built on the interactions among and between different actors, who are able to share their resources in order to achieve sustainable value co-creation processes (Letaifa et al., 2016). In other words, according to an eco-system perspective a service is sustainable when able to share and merge several different resources and capabilities (Rivera-Santos; Rufin, 2010). In fact, a sustainable service eco-system generally roots on specific or additional infrastructures and collaboration models that can be used in different service sets (e.g. health care, tourism, education, etc.).

4. Nowadays tourist destination as service eco-systems

The concept of 'place' takes different meanings according to the 'lens' with which it is interpreted. According to a general scientific definition, a place can be uniquely identified by geographic coordinates of latitude (the equator) and longitude (compared to Greenwich Mean Time); according to the humanistic definition, places are considered as spaces simply 'lived' (emotionally). Over time, the conceptualisation of place was commonly conceived as a bounded and identifiable physical space. In the global tourism market, places are considered complex and layered 'products', while the way they are perceived, offered, communicated and 'consumed' is under a continuous change and evolution. The knowledge and promotion of places has often presented an indirect, spontaneous, creative debate; consequently, it constantly stimulated the interest of many (local) stakeholders' groups, providing information, communication, hospitality and those additional services that contribute to the enhancement of the 'identity' concept (Godfrey; Clarke, 2002). Therefore, Territorial marketing (TM) is considered a valid tool and an appropriate productive intervention; its correct application led to a meticulous attention to environmental, natural, economic, and human resources that characterize a specific area. Consequently, the competitive strategy of a land area might be based on a scrupulous analysis of all the distinctive local resources, in order to understand how to increase its current resources and make internal capabilities able to make the potential development sustainable and 'exportable' (Pencarelli, 2003).

The competitiveness of a territorial system is strictly related to the attractiveness of sources and the improvement of these resources aimed at benefitting the actors that belong to the territory. Therefore, competitiveness points to the development of an Embedded Governance (EG) (Paniccia et al., 2011), aimed at combining a variety of skills with a strategic and sustainable vision of the future (Scafarto et al., 2006). Sustainable tourism development often refers to "a development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Our Common Future, 1987). This conceptualization has evolved over time, and the EG debate mainly focused on its size and direct consequences. The impacts of tourist promotion are numerous and primarily defined by the interaction among tourists, businesses, host communities, local political-organizational systems (De Carlo; Caso, 2007). Tourism can be considered as the result of strong relationships,

the increased awareness on environment, the fundamental dependence on local resources (see Figure 1).

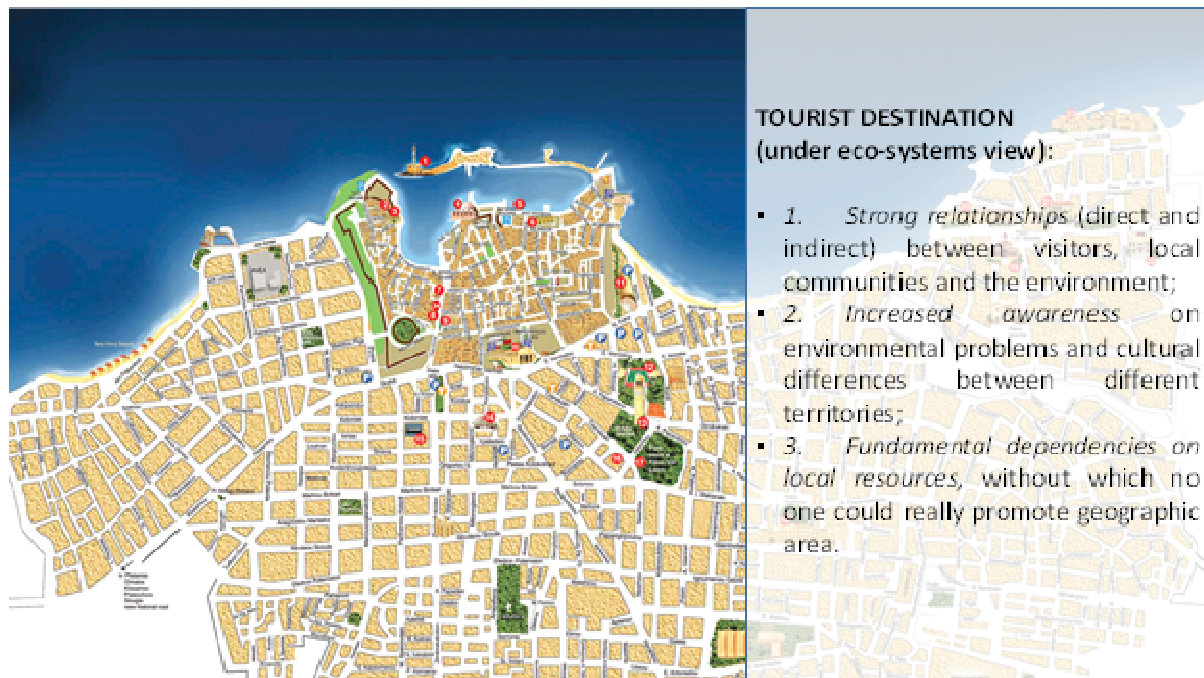


Fig. 1: Eco-system view of Destinations

Hence, there are definitely positive expected impacts such as job creation, attraction of new investments, development of local services, exploitation of resources, growth of the comparison, and inter-cultural relations. There are also negative expected impacts, such as the depletion of non-reproducible resources (crucial for the territory), the excessive strain of fragile ecosystems, the pressure on local host communities, each form of pollution, potential instability due to the strong alterations / related changes. Tourism-Environment report is now considered a very complex issue to deal with. From this point of view, sustainability have to pass by management capacity of absorption the above-mentioned negative impacts and by the will to balance the most popular benefits with quota risks. Talking about 'crowding out' might imply the negative externalities resulting from unsustainable tourism that leads to the irreversible deterioration of local livelihood resources. The extreme expansion of local infrastructure (e.g. roads, airports, etc.) and tourist facilities (e.g. resorts, hotels, restaurants, shops, etc.) can gradually destroy natural resources, even when they are not distinctive. Consequently, over the years the 'tourism product' has suffered from many changes that have affected its configuration, composition, and concept, shifting to a much more service-cantered orientation; thus, several are the linked services, such as: transport (e.g. air, rail, ship, etc.), hospitality and accommodation (e.g. hotels, guest houses, resorts, etc.), related and additional services (e.g. tour guides, sightseeing tours, planning tours, museum visits, exhibitions, fairs, natural parks and other tourist attractions, insurance services for the traveler, catering, etc.). The tourism product, understood as 'service product', is characterized by two different points of view (Della Corte, 2000) that contribute to better define a tourist system specific interest:

- Compared with the demand (demand side), it is the experience globally per-

ceived by tourists. The expression 'global experience' refers to the fact that it begins when the individual leaves the place of residence, and ends when he will return back. The product will then be understood as the set of services received (from the transport, reception, consumption and satisfaction) and its perception by the tourist will be tied not to the individual, but to all the services that make up the product: the poor quality of one of the services, will result in not good perception of the entire product.

- Compared to the offer (supply side), the tourism product can be defined as a bundle of utilities: which is a set of services offered, strictly dependent on the resources in the area, but also the skills of tourism businesses working in it.

Therefore, behind the creation of the 'product-destination' there is also the concept of customization and Bieger (1998) states that the target can be seen as a tourism product that already exists in some markets also competes with other markets, then it becomes necessary to focus the target concept of the consumer, and the actors of tourism. Starting from the consumer, the author defines destinations as areas that consist of all services and products that a tourist consumes during his stay. The satisfaction obtained through the provisioning of individual services and products, influences the overall satisfaction derived from experience in the target and, consequently, the perception of the consumer after leaving the visited place. This perception can be defined in qualitative terms (difference between the expected benefits and perceived) and in terms of the reference area (the boundaries of the destination in the consumer's mind). The destination read according to sustainability necessarily includes the natural resources, the local community, the actors offer but also the identity of the target. It turns into the product through local tourist and not local operator actions, in managed and non-managed, coordinated and uncoordinated (Carrubbo et al., 2012). That's why, as already noted, the boundaries of the destinations cannot be defined in advance, and should be a systems approach that should be applied to the entire analysis, planning, management and development control. What is confirmed is that the boundaries of the sector cannot be totally defined, since they depend on the different organizations that are involved in the formation of what is called global product. The set of systems included within destinations more or less extended rises to the role of eco-system of reference for all the actions developed therein; with what is stressed above, all the chance to play with an overview of the overall strategic nature, the shared organization, the integration of responsibilities of various organizations forced to commit to their own survival and for the maintenance of a general quality which everyone benefits (Carrubbo, 2013a, 2013b; Carrubbo et al., 2014). This holistic perspective is mainly due to Leiper (1979); according to him, in fact, we owe the definition of tourism as consisting of interrelated elements system, the system that is made up: the tourists themselves, by geographical areas of origin, transit and destination of tourists and the tourism industry.

The interdependence of attractions, transportation, information, promotions and integrated services highlights the need to collaborate; in order to be efficient, a destination must operate as an integrated system, characterized by a single shared vision and the same long-term aims (Ritchie, Crouch, 2003; Crouch, 1992). This type of synergistic 'coopetition' (Della Corte, 2000) bankrolls an innovative environment and encourages the participation of all actors involved in the use of experience (Pine and Gilmore, 2000).

In details, the typical diffusion and functioning of hubs and connections seems to be fundamental to reach each place of interest settled in a tourist destination; public institutions and organizations (intended as Actors) work together in order to foster and allow resources' integration.



Fig. 2: Public Actors' incidence

The ability to manage in an integrated manner and with a logical network the various components of the supply system, assume today the need for exploitation by local contexts both economically and socially (Ejarque, 2003). From the eco-system point of view the harmonization of local needs and the exploitation of the complementarity of interests must therefore take into account the possibility of complex and reticular nature aggregations (Polese, 2004; Polese; Minguzzi, 2009), for the correct appreciation of the real characteristics and potential of a territory (country specifics).

Then, the role of private companies (intended as Actors as well) seems to be strategic and able to valorise and enjoy any tourist destination; thus, they try to meet user needs and contribute to offer a global experience of the “product” as a whole.



Fig. 3: Private Actors' incidence

In general, the orientation to the customer and quality building deals with the expectations of most of tourists' target. Consequently, this point of view is a unique reference in the activity carried by the individual company is not suitable anymore, and it moves to a broader level that affects the destination as a whole (Martini, 2005). In this sense the idea that actors should ‘do’ a system is particularly suitable. According to this perspective, the tourist's benchmark is an aggregate stream, a set of environmental and instrumental factors that define the global tourism product and bring together (Carrubbo, 2013a):

- a) the elements of attraction in the destination and in transit areas, that can be natural, artificial (monuments), cultural (museums, theatres, festivals), social (local ways of life, opportunities for socialization);
- b) the services and facilities in the destination and in transit areas (accommodation, dining, sports, transport, services and other facilities);
- c) the access to the target elements (road, rail, airport and maritime, type of vehicles, the frequency of transport services, customs controls);
- d) the image of the destination, which often influences the images also of individual organizations operating in the destination itself.

These key elements could be clustered (see Figure 3) in function of the eco-system view, as previous intended, by focusing on: i) the Institutions' awareness helpful for the match between tourist attractions and transportations' connections; ii) Country specifics as typical and distinctive features of each destination; iii) Actor's relationships, ad result of common willingness of qualifying the global service provided in that area; iv) Local resources, as the sum of all elements related to the identity of a place, its organization and management (Ciasullo; Carrubbo, 2011; Carrubbo et al., 2015).

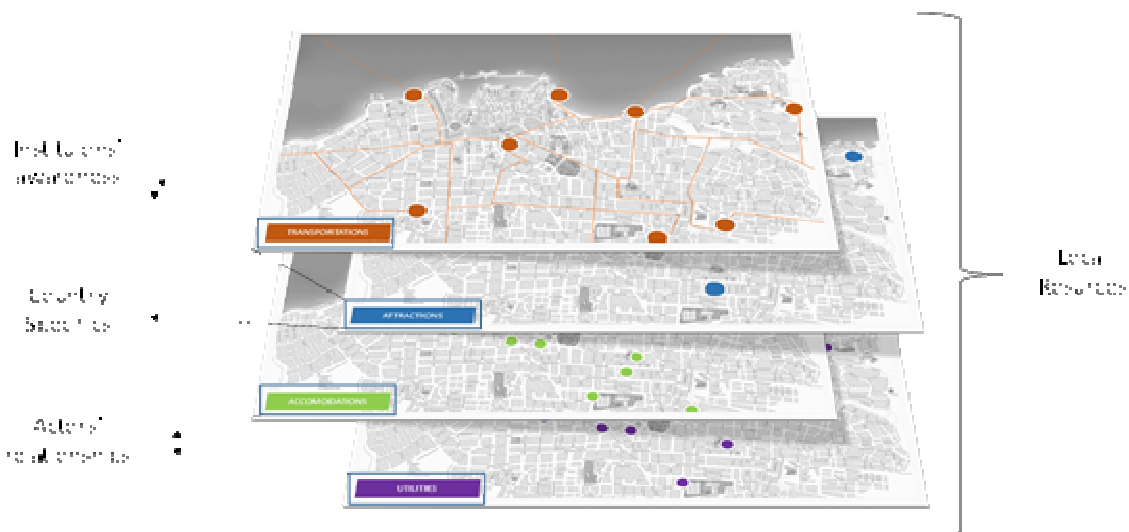


Fig. 4: Destination key elements

Decision-making processes of the organizations (including business) today seek to enhance Actor-to-actor relations, following the interpretive logic to reduce the complexity (Wieland et al., 2012; De Maio et al., 2016); this involves the necessary implementation of new communication architectures (including computer) useful to strengthen the management, measuring and performance of each system (Demirkan; Goul, 2006). Variety and variability of possible connections within the reticular service systems promote new forms of co-operation, be interpreted as interactions between the actors of a cognitive system in line. At the same time, the opportunity to explore the value creation processes in a networked environment identifies the 'eco-system complexity' (Basole; Rouse, 2008) within which everything is collected, identified and

active; This complexity does not depend only on the number of actors present, but also from the conditional probability that these bodies be involved in service delivery (Barile; Polese, 2009). The system in this direction is made viable by the behaviour assumed (including optic value creation), more strategic, more responsive, more adaptive, more intelligent (Polese; Carrubbo, 2008). The qualification and enhancement of the relations, the redesign of organizational configurations, manage complexity, sharing to the value generating processes are therefore all elements that identify a successful system (Polese et al., 2015). Furthermore, considering the service oriented perspective of the work, a service system so structured, that exploits reticular synergies and benefits of co-creation, can be considered smart, being able to survive over time within such a complex eco-system. As the world is becoming smarter (more and more often you hear of a smarter planet), to adapt the systems must be people-centric, information-driven and oriented, and mutual and collective satisfaction should encourage and cultivate people to work together and innovate, constantly (Qiu et al., 2007).

5. The proposal of a theoretical model to deal with sustainable service ecosystem

5.1 Ontological position and aim of the model

Dealing with sustainability in service ecosystem is the main aim of this theoretical paper; in more detail, the present study frames the extant theoretical contributions on sustainability in service eco-system, in order to define new perspectives on how configurations like ecosystems can be investigated according to a sustainability-based perspective. In fact, the literature review has pointed out that minor or no attention has been paid to the way sustainability can affect the relationships, the evolution, and the roles in a service eco-system.

Since this study is aimed at grasping additional meanings analysing and combining the extant literature, our ontological position is the constructivism. This choice depends on its suitability when related to service eco-system; thoroughly, service ecosystems are made up of "social and economic actors interacting through institutions and technology" (Lusch, 2011: 15). Such ontological position represents the most *commonly* suggested perspective to observe an objective reality (Strauss; Corbin, 1990) characterized by an ever-changing social order (Bryman; Bell, 2003), due to interactions that have to be analysed (Potter, 1996), aiming to represent social phenomena. In addition, the present paper aims to depict tourism-oriented contexts, providing some categories to understand the natural and social world (Bryman; Bell, 2003), namely the service ecosystem (Letaifa et al., 2016) shaped around a focal touristic destination. In some recent contributions, business scholars (Gretzel et al., 2015; Altinay et al., 2016) have read tourism as a service ecosystem. Starting from these recent advancements and the issues highlighted in the previous literature review, this study aims to depict sustainability in a tourism-oriented ecosystem. Furthermore, a theoretical model, shaped through a multi-level perspective in order to deal with the complexity (Basole; Rouse, 2008) and the wide set of interactions and interdependencies (Ritchie; Crouch, 2003) emerging from literature review, is proposed. Therefore, the model roots on the embedding of four nested levels, the meta-

macro- meso- and micro-level. This perspective has been already used to investigate some specific issues, such as systems' competitiveness (Esser et al., 1996), environmental space (Spangenberg, 2002), and regional developments (Malecki, 2004). In particular, scholars used it to better link tourism clusters' sustainability and competitiveness (da Cunha; da Cunha, 2005). With particular reference to this latter contribution, the present paper want to benefit from the proposed perspective, but it pay a great attention to the above-mentioned linkage between sustainability and tourism-oriented ecosystem.

5.2 A multi-level model for sustainable service ecosystem

In a service ecosystem, dealing with sustainability means to be in touch with some of the key elements highlighted in the literature review and in particular with the pillars of a service ecosystem (Vargo; Lusch, 2011a) – offerings' co-production, engagement in service provision, and value co-creation – and the features of sustainability in tourism-based debate – relationships, environment and culture awareness, local resources (De Carlo; Caso, 2007) - and their exploitation (Ejarque, 2003).

Scholars thought in slightly different ways the meta-level, sometimes referred to as meta-layer (Quero Gervilla et al., 2015), since Chandler and Vargo (2011) recognised

it as the reflection over time of the other three levels: macro, meso, and micro. A previous definition (da Cunha; da Cunha, 2005) presented meta-level as consisting of "social cohesion, political organization, actors' determining capability and local development project" (54), while more recently Quero Gervilla et al. (2015) defined it as the level framing "exchange among complex networks as service ecosystem" (5). This paper mainly roots on the perspective according to which a meta-level is mainly built on Andersson (2003) conceptualization; thus, he proposed it as "a higher logical level" (4) useful to classify the other – and lower – levels and relay to them.

Frow et al. (2014) proposed a focus on the three connected levels (macro, meso and micro); in addition, the authors also highlighted the central role of value proposition in shaping the three levels and in acting within and between levels. A graphic representation of a tourism service eco-system is proposed, with the example of the actors settled at each level and their mutual interactions pointing to achieve a long-run well-being thanks to resources' sharing (see Figure 5).

The proposed model is mainly based on those mutual, ongoing and sustainable relationships that link multiple actors through value co-creation practices. Therefore, resource sharing and co-creation practices play a deep influence on a service ecosystem viability, making it able to survive, change, shape or reshape the relationship between the interacting actors and the resources they share, in order to make them available also for the future generations.

According to the proposed perspective on tourism-oriented service eco-systems, the meta-level is shaped by the geographical context of a destination, its identity, and the institutions that support the value proposition of a specific destination. Consequently, acting in the main general context and the local setting the institutions have to set the policies useful to create a 'fertile ground' for value propositions, leveraging on local resources, favouring collaborations, and improving the building and the improvement

of a destination's identity. This view is aligned with the creation of a broad set of win-win relationships (Nallathiga, 2007) among a plethora of actors. The identity of a city (Godfrey; Clarke, 2002) acts as an element favouring social cohesion, in which value propositions take place to both preserve the context and make it viable (Barile et al., 2013). In this vein, sustainability is an all-encompassing perspective, moving from the classical approach to the triple bottom line (Dresner, 2008) and widening its view on the set of relationships among all actors in a service ecosystem.

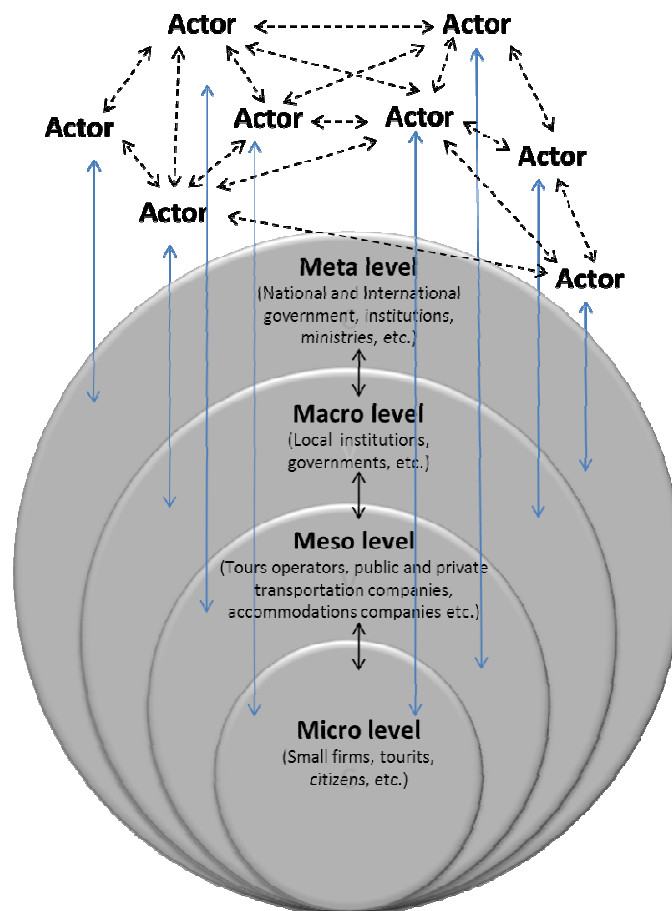


Fig. 5: The interaction among and between the different levels of a sustainable tourism-based service eco-system

As it concerns the macro-level, sustainability refers to in sensibly different ways; while, an economic-oriented perspective has been used to define macro-level as the pressure towards the achievement of specific corporate performances (Esser et al., 1994) or as an economic framework (Malecki, 2004). In a radically different view, Spangenberg (2002) proposed it as just the main geographical context where an activity takes place, while Frow et al. (2014) considered it as the whole service ecosystem. A similar conceptualization emerged even in Quero Gervilla et al. (2015) contribution, although they coupled meta- and macro-level to define a service eco-system. However, several scholars shared the Dopfer et al. (2004) and Dopfer (2012) view, since the macro-level represents the structure of the economy where changes show their main effects.

The service eco-system perspective on which the paper is focused, is useful to define a macro-level as the set of tourism actors interacting in a specific geographical area. The sustainability of this service eco-system depends on the macro-level, since the actors can make the whole industry viable, proposing changes, interdependencies, and the successful features of a destination. Consequently, value propositions lead to value co-creation if the awareness of an area attractiveness is confirmed over the time; in a similar vein, the notion of sustainability as an emerging and changing awareness over the time is recalled (Waage, 2007). The industry have to point to the achievement of a strategic process focused on sustainability embedding (Scafarto et al., 2006) in order to attain potential long-term effects (Costanza et al., 2012). The expected goals have been theorized in an industry-based perspective, but the actors' contribution might be partnered by their actions in the whole eco-system as they directly affect the whole industry. Recalling a sustainability-oriented perspective, the previous statement is aligned to Frow et al. (2014) n.5 premise, since value propositions can be useful in balancing value co-creation when offerings are shaped through the actions of multiple actors. Consequently, all actors are engaged in the activities leading to value propositions and, then, to value co-creation.

Scholars are quite all aligned in identifying the meso-level as consisting of policies (Esser et al., 1994; Malecki, 2004) and, in particular, of all the performed interventions aiming at supporting the whole set of actors through central institutions, their decision-making processes, and the related outputs. At the beginning, the meso level emerged in literature as a residual one, containing elements hard to be classified in either the macro- or micro-level (Dopfer, 2012). Nevertheless, the emergence of this new category is depending on Schumpeter (1942) contribution, claiming the meso-level as the context in which a change, arising from the micro-level, takes place before modifying what happens in the macro-level. In addition, in the meso-level actors are engaging to other actors, leading to collaborations (Frow et al., 2014).

According to the proposed view of service eco-system, the meso-level consists of interacting actors pointing to make value propositions sustainable over the time. In particular, the collaborations among actors take place in complex contexts and is influenced by the interdependencies emerging in such contexts. Meso-level is shaped by services providers, facilities and all the elements leading to more complete value propositions and to make them sustainable over the time and for potential users. Additionally, alliances, service policies and the integration among different services leverage on the merge of several resources and capabilities (Rivera-Santos; Rufin, 2010). In this direction, according to a user's perspective, sustainability needs to be coupled with the rational use of resources (Wolfson et al., 2015), due to the direct tie between tourism activities and the destination as a place. Recent advancements can be observed even considering smart technologies (Edwards, 2005) as the connector and collector of different actors, their resources, and activities to support the achievement of common aims. Furthermore, these expected goals are even in line with the emerging perspective on smart services, depending on the merger between ICTs and sustainability-based approaches (Bifulco et al., 2016)

Last but not least, scholars have provided a uniformly definition of the micro-level. Thoroughly, actors and their interactions shape this level through the direct exchange of resources (Quero Gervillo et al., 2015), the direct use of capabilities (Malecki, 2004), specific rules and carriers (Dopfer et al., 2004), and the direct application of a firm's sources of advantage, like knowledge, management activities, and organizational element (da Cunha; da Cunha, 2005). The interactions that commonly shape

the micro-level (Akaka et al., 2013) are usually dyadic and triadic and take place in a business-to-consumer context.

Following the assumed theoretical perspective, in a tourist-oriented service eco-system the micro-level depends on the direct interactions among actors deploying a value proposition. This interaction is driven towards sustainability if actors are successful in using their resources, the advantage(s) they built over the time and if the organizational elements are able to support value co-creation processes. The main feature of the micro-level is the achievement of a sustainable value for service (Wolfson et al., 2011), even by recalling the conceptualization of key stakeholders – customers – in processes leading to value propositions and shaped by a wide set of actors (Frow et al., 2014).

6. Theoretical implications

This paper offers some interesting and new insights on destination management, looking at a tourism destination as a sustainable service eco-system. Assuming an eco-system perspective, it has been possible to better understand the way multiple interacting actors contribute to make a tourism destination as sustainable as possible; in other words, the way they contribute to its long-run viability (Wieland et al., 2012).

The study also attempts to better define the fundamental assumptions at the roots of a tourism-based sustainable service ecosystem, proposing a possible theoretical model. The model has been built according to a multi-level perspective, in order to explain the complexity (Basole; Rouse, 2008), the interactions, and interdependencies (Ritchie; Crouch, 2003) typical of a tourism destination. In particular, it has been based on four nested ecosystem levels - meta, macro, meso, and micro levels –, representing the arena in which resources are shared through the dynamic and ever-changing relationships that bound together the actors belonging to the same or different eco-system levels. In particular, the addition of a fourth eco-system level, the meta-level, has contributed to a better classification of the lower ones (Anderson, 2003), framing the contribution of (national and international) institutions to a sustainable destination management. Therefore, the model has also contributed to better define the inner nature of tourism actors (e.g. institutions, tour operators, service companies, tourists, citizens, etc.), their position (meta, macro, meso, or micro level), their contribution to shaping eco-system, the resource they share in specific co-creation practices, and the following value propositions (Frow et al., 2016).

Last but not least, a sustainable approach to a tourism-based service eco-system have led to an emerging interpretation of value co-creation processes, which have been oriented to the creation of long-lasting advantages for all the actors that interact in an eco-system. In fact, a sustainable tourism-based service eco-system and the interaction among its actors can overcome current deficits, ensuring them and, of course, to the whole eco-system, an enduring wellbeing (Peters, 2016), which can be achieved even by cooperating and sharing resources in order to make them available for the future generations, too (Prescott-Allen, 2001; Kareiva, 2011). Additionally, sustainability emerges as an all-encompassing element. This is mainly due to its multifaceted perspective and to different features of service-based contexts and service provisions. In fact, being sustainable is a matter of performing activities considering

all actors potentialities and their needs, combining the current perspective and the short-term outcomes with a long-term based approach, and considering the use of resources and their combination as the key leading to value propositions able to offer valuable outcomes for all the interacting actors. Consequently, actors are expected to perform a crucial role to make a service eco-system sustainable. However, further research is needed to empirically validated the proposed model and check the eco-system sustainability and its long-run wellbeing.

7. Managerial implications

As noted before, in the economy of entertainment and tourism the proposed offering is gradually changing, trying to achieve (and then provide) increasingly sophisticated and customized "products". This is possible thanks to the continuous development of new interpretations and the adoption of original approach to management and tourism offering delivering. This means that the set of outcomes, the results of such measures and the (eco-system) overview affect the overall performance of a territory. In particular, the destination management is currently aimed at promoting the development of new methodologies for the better enjoyment of a holiday (Pechlaner; Weiermaier, 2000). For example, the ability to promote and manage an increasing number of solutions in the same geographical area stimulates the growth of tourist flows, also seasonally adjusted, by strengthening of the competitiveness of an entire area (Golinelli; Simoni, 2005). The geographical context (location, area or region) that tourists choose as destination is represented by his/ her own perception of the same locations (Mussner et al., 1999). In fact, successful tourist destinations are able to offer something visitors perceived as unique, since they create a sense of place that make it different from any other locations.

In this scenario, the recruiting of managerial skills and competencies is able to deal with these issues, rather than evading them, leading to the management and a possible development of a tourism area. The modern tourism industry seems to have shift from a spontaneous dimensional development to a systematic management of its own development, through an increased marketing orientation, the adoption of new administrative methods, the design, planning and delivery of useful services aimed at attracting tourists and positively affect the success of a destination (Laws, 1995).

8. Final remarks, limitations and future research agenda

This paper offers an integration of the current literature on service eco-systems and sustainability, with the destination management, as a topic representing a complex context in which the two above-mentioned elements can be merged to further advance the extant theoretical contributions. The addition of meta-level to the three commonly used eco-system levels – macro, meso, micro – as in the contribution by Frow et al. (2014), is useful to better frame the whole eco-system and the way actors contribute to make this specific context as sustainable as possible.

Thanks the adoption of constructivist approach and the development of a possible tourism-based sustainable service eco-system model, this study has offered some

interesting insights, even if it can be improved switching to an adductive approach, in order to deal with the empirical evidences arising from a touristic destination, confirm our theoretical proposal, and add new elements. Currently, this idea for further research mirrors the limitation of the present research, even if based on constructivism, so on the interpretation of the reality, moving from the analysed theoretical contributions. Finally, as both service ecosystem and sustainability literatures are still flourishing, the analysis of new contributions will be needed to better focus some of the elements presented in this research.

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PERSPECTIVES ON VALUE-IN-USE IN SERVICE RESEARCH

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This paper reviews and synthesizes contributions on value-in-use from service marketing literature. An extensive literature review generated three different perspectives on value-in-use, namely the utility approach, the consumption outcome approach, and the experience approach. Our analysis reveals similarities and differences among the three perspectives on value-in-use, and also shows how the characterizations of the concept have developed over the years, leading to different implications for both service research and practice. Finally, we suggest that future research should especially focus on exploring collective and societal aspects of value-in-use.

1. Introduction

Value has attracted great interest among scholars in marketing research as well as in business practice (Gallarza et al., 2011; Karababa; Kjeldgaard, 2014; Boysen Anker et al., 2015). Creation of customer value has acquired an increasing importance as it is expected to result in competitive advantage (Parasuraman, 1997; Steenkamp; Geyskens, 2006), superior financial performance (McDougall; Levesque, 2000), and organizational success (Wang et al., 2004). Additionally, Slater (1997) considers value creation as crucial in enabling both firms' existence and success. Several topics are linked to created value, like customers' repurchase intentions (Petrick; Backman, 2002; Gounaris et al., 2007), satisfaction (Eggert; Ulaga, 2002; Flint et al., 2011), and loyalty (Khalifa, 2004; Pura, 2005). Even before scholars had started to pay serious attention to value and value creation, Rust and Oliver (1994) had stated: "Ultimately it is perceived value that attracts a customer or lures away a customer from a competitor" (p. 7).

At the beginning of the millennium, value for the customer was further highlighted in marketing research thanks to the advance of a service perspective on marketing theory (Vargo; Lusch, 2004, 2008; Grönroos, 2008; 2011). Nevertheless, several definitions of value exist within the marketing literature (Gallarza et al., 2011; Gummerus, 2013). In the recent service perspective on marketing theory, value is defined as value-in-use (Vargo; Lusch, 2004, Grönroos, 2008, Grönroos; Gummerus, 2014). One of the fundamental assumptions of the notion of value-in-use is that value is always individually and contextually perceived and determined by the customer on the basis

of his/her use experience (Grönroos; Voima, 2013; Vargo; Lusch, 2016). In other words, value-in-use implies that value arises from the deployment of customers' activities, and consequently, no value is created until the customer uses the products or services of a firm (Vargo; Akaka, 2009).

However, recent contributions in marketing research on value-in-use highlight some elements calling for further research; for example, definitions and characterizations sometimes differ in terms of the scope and nature of the concept. Similarly, perspectives adopted by scholars on how value-in-use is created, who creates, and who co-creates it (Grönroos, 2008; Vargo; Lusch, 2016) are diverging. Finally, the theoretical backgrounds supporting the conceptualizations on value-in-use within marketing theory are still unclear. As this paper proposes, value-in-use has been conceptualized both within and outside marketing literature for a long time. Thanks to the recent service perspective on marketing theory, value-in-use regained a pivotal role in service marketing research. However, in order to let service-based marketing logic express all of its potential, we need to advance the understanding of value-in-use and pay more attention to the different ways it has been depicted.

The aim of our paper is therefore to perform a review of the different approaches to value-in-use proposed by service marketing scholars. To generate implications for further advances in service research and practice, we will synthesize the different characterizations of value-in-use and compare and contrast their different highlighted features.

The conceptual analysis carried out in this paper resulted in the identification and portrayal of three different perspectives on value-in-use: the utility approach, the consumption outcome approach, and the experience approach. These three perspectives are based on different theoretical backgrounds and consequently come with different implications for service marketing theory and practice. Hence, the paper contributes to service marketing literature by discussing and clarifying critical issues regarding value-in-use and its implications for contemporary service marketing research.

The remainder of the paper is organized as follows: first, the methodology section describes how the literature review was carried out; then, we discuss the three identified perspectives on value-in-use, by providing a description of the most relevant conceptualizations and main features highlighted by different scholars. Lastly, we summarize and compare these perspectives in order to attain an overall view on value-in-use and its main elements and propose implications for service marketing research and practice.

2. Methodology

In order to review and synthesize the different approaches to value-in-use in service marketing literature, we performed an extensive literature review on the topic of value-in-use. We followed general guidelines for conducting literature reviews in business research (Hart, 1998; Denyer; Tranfield, 2009). More specifically, we used the descriptor "value-in-use" and searched the following databases: ABI/Proquest, Business Source/EBSCO, Emerald, ScienceDirect/Elsevier, JSTOR, SAGE, Springer Link, and Wiley Online. We selected papers regardless of context or methodology

used in their research process, since our focus is on how value-in-use has been characterized and depicted, not on how the concept has been empirically applied.

After having identified and collected relevant articles that explicitly characterize value-in-use as a concept we set up a first dataset; then, we also used the reference lists of the articles shaping our dataset to further identify relevant book chapters that did not show up in the databases. We finally got a list composed of 48 papers and 8 book chapters published over a time span ranging from 1965 to 2015.

We performed the review as stand-alone researchers, and then discussed and compared our insights in order to reach a common view and gain a better understanding of the content proposed by each of the article. The discussion among us led to the development of three different categories and each of them is useful to highlight a different approach to value-in-use. Thanks to the usage of categories, the main features of each theoretical contribution were highlighted, leading to an easier way to discuss them and then compare the conceptualizations and their key features with one another.

3. Three perspectives on value-in-use

This section discusses the concept of value-in-use and reviews the literature from a service marketing perspective. Value-in-use has been a key concept within service marketing discussion since the publication of the “Evolving to a New Dominant Logic for Marketing” article by Vargo and Lusch (2004). Hence, value-in-use is the definition of value adopted by the recent service perspective on marketing theory (Vargo; Lusch, 2008; Vargo; Akaka, 2009; Grönroos, 2008, 2011; Heinonen et al., 2010, 2013). As a result of our literature review and conceptual analysis, three different perspectives on value-in-use will be presented: the utility approach, the consumption outcome approach, and the experience approach. Each of these perspectives on value-in-use has different theoretical backgrounds and implications for service marketing theory and practice.

3.1 *The utility approach*

Value-in-use as a concept can be traced back to classical economic philosophy and the utility concept (Wooliscroft, 2008). Already Aristotle discussed how value-in-use is a subjective and individual perception of the utility of a particular good or service (Gordon, 1964). According to Aristotle, value-in-use can vary over time for an individual as well as between individuals, and even arise from the mere possession of a good. He further explains how market demand, expressed through value-in-exchange (price), is a function of the value-in-use (utility) of a good or service. Much later, Adam Smith (1723-1790) recognized the difference between value-in-exchange and value-in-use and observed how “the things which have the greatest value in use have frequently little or no value in exchange; and on the contrary, those which have the greatest value in exchange have frequently little or no value in use” (Smith, 1776, 28). Similarly, Karl Marx (1859) acknowledges every commodity to have a two-fold aspect – use-value and exchange-value – and describes how value-in-use is realized only by use or in the process of consumption.

Even though the view of most early economists was that “The Value of all Wares arises from their Use” (Barbon, 1690, 21), value-in-exchange became the main focus of later economic philosophy. As marketing as a discipline emerged from the field of neoclassical economics in the early 20th century, also marketing has traditionally focused on distribution and exchange of manufactured goods (Sheth et al., 1988; Vargo; Lusch, 2004). With exchange as a fundamental framework for marketing theory (Bagozzi, 1974), value-in-use received limited attention in marketing theory until Vargo and Lusch (2004) placed the concept at the center of their service-dominant logic (SDL). As Dixon (1990) reports, throughout the 20th century marketing scholars largely ignored the classical value-in-use literature from economic philosophy.

In their seminal article “Evolving to a New Dominant Logic for Marketing”, Vargo and Lusch (2004) adopted the utility-based view of value-in-use from classical economics and contrasted it to the (value-in-) exchange perspective of mainstream marketing. Hence, in early SDL publications, the nature of value-in-use is described as the utility of goods or services (Vargo; Lusch, 2004, 2006; Gummesson, 2007). For example, Lusch et al. (2008) explain how “value-in-exchange might represent expected utility but it is not the actual utility; utility (value-in-use) can only be realized by and in the context of the life of the customer” (p. 12). This utility (or value-in-use) has been realized when the “the customer’s (service system’s) well-being has somehow been improved” (Vargo et al., 2008, 150). Similarly, Vargo and Lusch (2004) explain how value-in-use is “defined by and cocreated with the consumer rather than embedded in output” (p. 6).

As previously discussed, Vargo and Lusch (2004) derived their definition of value-in-use from classical economics, but they also added the notion of “co-creation” as a way to explain how value-in-use (or utility) arises. Inspired by service marketing and service management (for example, Normann; Ramirez, 1993; Gummesson, 1997; Grönroos, 2000), Vargo and Lusch (2004) explain how “the customer is continuing the marketing, consumption, and value-creation and delivery processes” when using a product or service (p. 11). The firm and its customers are thereby always co-creating value-in-use (or utility) together during the production and consumption process. Vargo and Lusch (2004) thus connected value-in-use to the overall marketing process in an attempt to answer Alderson’s (1957) call for “a marketing interpretation of the whole process of creating utility” (p. 69).

3.2 The consumption outcome approach

The consumption outcome approach to value-in-use has its origin in the rise of the awareness of the consumer in marketing theory in the postwar years of the 1950s. Societal changes and increased competition forced businesses to start paying attention to the needs and wants of consumers, and the outcomes or objectives of consumption therefore became more and more important in marketing (Vargo; Morgan, 2005). Alderson (1965) was the first marketing scholar to connect value-in-use to the satisfaction of customers’ needs and wants and thus characterize the concept as a consumption outcome. Thereafter, the value-in-use concept went rather unnoticed in the marketing literature until the mid-1990s when Woodruff and Gardial (1996) provided the first clear definition of value-in-use: “a functional outcome, purpose, or objective that is served directly through product consumption” (p. 55). Woodruff and Gardial (1996) explain how “value is created when a product and a user come together within a particular use situation” (p. 59) and also emphasize the dynamic na-

ture of value-in-use by describing how it changes over time and across use situations.

Many marketing researchers have adopted Woodruff and Gardial's (1996) outcome-based view of value-in-use. Payne and Holt (2001), for example, define value-in-use as "a functional outcome, a goal purpose or objective that is served directly through product consumption" (p. 162). Another value-in-use definition inspired by Woodruff and Gardial (1996) is provided by Flint et al. (1997): "Value-in-use reflects the use of the product or service in a situation to achieve a certain goal or sets of goals" (p. 170). The characterization of value-in-use as a positive outcome, objective, or goal of consumption is the common denominator in all definitions based on Woodruff and Gardial (1996). In other words, products and services are seen as means to ends (customers' goals), and achieving that desired end-state is equated to value-in-use.

The influence of this value-in-use definition stretches all the way into present-day service marketing debate. For example, Lemke et al. (2011) and Macdonald et al. (2011) are positioned within SDL, but follow Woodruff and Gardial's (1996) definition of value-in-use as a customer's functional and/or hedonic outcome that is achieved through use of products or services. In line with Woodruff and Gardial (1996), these authors emphasize the dynamic and fluctuating nature of value-in-use. Based on means-end theory (Gutman, 1982), the authors explain how value-in-use changes depending on customers' overall consumption goals and this can take many forms and change with situation and time. Hence, value-in-use is seen as a highly contextual phenomenon.

Unlike the utility approach to value-in-use, marketing scholars with a consumption outcome view do not contrast value-in-use to value-in-exchange. In fact, they do not even discuss value-in-exchange. Different theoretical focus and starting points can probably explain this. While the utility-based stream of value-in-use literature is focused on the dual meaning of value as a phenomenon (utility vs. monetary worth) and their relative importance, the consumption outcome approach mainly focuses on how the needs and wants of customers are satisfied and the role of value-in-use as the outcome of a means-end chain. Alderson (1957), however, makes a connection between value-in-use and exchange, but rather portrays exchange as a creative function that "creates value in the sense that there is greater value in use for all of the products involved after the exchange than before the exchange" (p. 195). In other words, Alderson (1957) views exchange as a facilitator or creator of value-in-use in itself, rather than just a money/goods-transferring process.

3.3 The experience approach

The experience approach to value-in-use is the most recent perspective on value-in-use and came about as a reaction against the utility definition of value-in-use in the early SDL discussion (Vargo; Lusch, 2004, 2006). Schembri (2006) criticizes this "utility transmitter" view of goods or services as a remnant of a goods-centered logic and argues that "products, whether they are predominantly goods or services, are essentially experiences" (p.385). In an attempt to fully move away from a goods-centered logic, the experiential-phenomenological perspective therefore gained popularity in SDL discussion (Vargo; Lusch, 2008). Also Holbrook's (1994, 2006) definition of value as "an interactive relativistic preference experience" (p. 27, 715) thus started to influence service marketing researchers (e.g., Ballantyne; Varey, 2006; Kowalkowski, 2011). Vargo and Lusch (2008) took the final step away from the clas-

sical utility characterization of value-in-use when they defined value-in-use as “idiosyncratic, experiential, contextual, and meaning laden” and “always uniquely and phenomenologically determined by the beneficiary” (p. 7). Consequently, SDL has moved from a utility definition of value-in-use in early publications to characterizing value-in-use as a phenomenological experience.

The statement “phenomenologically determined by the beneficiary” by Vargo and Lusch (2008, 7) indicates that value-in-use originates from use experiences rather than products or services. Hence, a main characteristic of the experience approach is its focus on the customer’s use experience as the source of value-in-use (Flint, 2006; Sandström et al., 2008; Plé; Cáceres, 2010). In other words, value-in-use emerges through experiences, not products or services per se (Schembri, 2006; Helkkula et al., 2012). As a result of the characterization of value-in-use as arising through use experiences, the scope of value-in-use is significantly wider in this approach than in the utility and consumption outcome approaches. The experience approach essentially gives value-in-use the same holistic and multifaceted features as experiences. From this perspective, value-in-use can therefore involve everything from use experiences during physical consumption (Grönroos 2006; Lusch et al., 2007; Vargo; Lusch, 2008) to memories, possession, and future imaginary consumption experiences (Heinonen et al., 2010; Helkkula; Kelleher, 2010; Grönroos; Raval, 2011).

From the experience perspective, value-in-use is longitudinal and develops over time, just like experiences (Grönroos; Voima, 2013; Heinonen et al., 2013). Although value-in-use was recognized as dynamic and changing also in the consumption outcome approach (Woodruff; Gardial, 1996), it still viewed value-in-use as an outcome of value-creating processes, not a processual experience in itself. The dynamic and processual nature of value-in-use was therefore not fully elaborated upon until the experience approach. Hence, the experience approach is unique in its explicit characterization of value-in-use as longitudinal and constantly evolving through use experiences. The dynamic and processual nature of value-in-use is emphasized by Grönroos and Voima (2013) who state that value-in-use “accumulates over time through experiences during usage” (p. 136).

The experience approach also emphasizes the possibility for value-in-use to evolve negatively. This is illustrated in Grönroos and Voima’s (2013) definition of value-in-use as “the extent to which a customer feels better off (positive value) or worse off (negative value) through experiences somehow related to consumption” (p.136). The existence of negative value-in-use is a logical consequence of the characterization of value-in-use as emerging through experiences of using products or services (Gummerus; Philström, 2011). In the same way as an experience can be positive or negative, value-in-use should then also have the capacity to be positive as well as negative. The experience-based characterization of value-in-use thus brought forth a discussion of negative value-in-use within contemporary service marketing. This differs from the previously discussed two perspectives of value-in-use. When value-in-use is characterized as the utility from products or services (Vargo; Lusch, 2004), or as the objective served through consumption (Woodruff; Gardial, 1996), it is either created or not, being either positive or zero (e.g., utility did or did not arise, or the objective was or was not met). Consequently, the utility and consumption outcome approaches never considered the negative side of value-in-use. Table 1 illustrates some examples of how different marketing scholars have characterized the concept of value-in-use.

Table 1: Examples of characterizations of value-in-use in marketing literature

Author(s), year	Article type	Characterization of value-in-use	Approach
Grönroos and Voima (2013)	Conceptual	"The nature of value-in-use ... is the extent to which a customer feels better off (positive value) or worse off (negative value) through experiences somehow related to consumption" (p. 136)	Experience
Heinonen et al. (2013)	Conceptual	"The customer-dominant logic extends the scope of value-in-use to a longitudinal experience perspective stressing value as part of the customer's dynamic and multi-framed reality, i.e., value-in-experience" (p. 110)	Experience
Lemke et al. (2011)	Empirical	"Customers appraise their experience with respect to its perceived contribution to value-in-use — the customer's functional and/or hedonic outcome, purpose or objective that is directly served through product/service usage" (p. 847)	Consumption outcome
Macdonald et al. (2011)	Empirical	"We define value-in-use as a <i>customer's outcome, purpose or objective that is achieved through service</i> " (p. 671)	Consumption outcome
Lusch et al. (2008)	Conceptual	"Value-in-exchange might represent expected utility but it is not the actual utility; utility (value-in-use) can only be realized by and in the context of the life of the customer" (p. 12)	Utility
Vargo and Lusch (2008)	Conceptual	"Value [-in-use] is idiosyncratic, experiential, contextual, and meaning laden" (p. 7)	Experience
Woodruff and Gardial (1996)	Book chapter	"Value-in-use, as the name suggests, is a functional outcome, purpose, or objective that is served directly through product consumption" (p. 55)	Consumption outcome
Wilson and Jantrania (1994)	Conceptual	"Use value or value in use ... is the properties of a product or a service that accomplish or contribute towards accomplishing a task or work. It is the utility of some particular object" (p. 60)	Utility
Alderson (1965)	Book chapter	"Use value is the realized potency expressed as the product of the incidence of use and the conditional value if used, that value depending on the intensity of satisfaction with the product when used" (p. 50)	Consumption outcome

4. Discussion

The aim of this paper was to present the different approaches to value-in-use found in contemporary service marketing literature and compare and contrast their different characteristics. As a result of our conceptual analysis, three different perspectives on value-in-use were outlined: the utility approach, the consumption outcome approach, and the experience approach. These three perspectives on value-in-use differ in their characteristics and have different theoretical backgrounds, reflected in their subsequent characterizations of value-in-use. The differences in characterizations of value-in-use have implications for future research and use of the concept. But few, if any, discussions of these implications exist in contemporary service marketing literature. Instead, value-in-use is generally treated as a uniform concept, with its characteris-

tics taken for granted rather than explicitly outlined. This study contributes to service marketing literature by discussing and clarifying critical issues regarding value-in-use and its implications for service marketing theory and practice.

The three presented perspectives on value-in-use have similarities as well as differences. One of the similarities is the fundamental assumption that value-in-use is seen as a dynamic concept dependent on time, place, and the individual. The differences mainly relate to the scope and nature of value-in-use. The experience approach widened the scope of value-in-use to also include mental use, such as possessions, memories, and imaginary use (Helkkula et al., 2012; Grönroos; Voima, 2013). This development was a logical continuation of the experiential-phenomenological trend in value-in-use theorizing (Vargo; Lusch, 2008; Helkkula et al., 2012). Similarly, it was within the experience approach that arguments were raised for the existence of negative value-in-use (e.g. Grönroos, 2011; Grönroos; Voima, 2013). The logic is that if value-in-use arises through the experiences of using products or services, and these experiences can be perceived as positive or negative, customers must also be able to perceive value-in-use as positive or negative.

Our review clearly shows how the value-in-use concept has developed throughout the three approaches presented in this paper. It is also clear that the conceptualization of value-in-use still continues to develop within the experience approach. Recently, service marketing scholars have started to direct their attention towards collective aspects of the creation of value-in-use. Edvardsson et al. (2011), for example, draw from social construction theories and remind us that value is always created and determined in a specific social context, thus arguing for the term value-in-social-context. Not only is value-in-use rarely created in isolation by a single individual, but a customer's assessment and determination of value-in-use is also dependent on societal and cultural factors within the specific context he/she operates (Akaka et al., 2013). In a similar way, Heinonen et al. (2013) describe how value-in-use "is not isolated since the reality of the customer is interconnected to the realities of others" (p. 9)".

It is not only important to understand the characteristics of the different perspectives on value-in-use in for service marketing researchers, but also for service practitioners. Depending on which approach to value-in-use that is adopted when firms want to use the concept, there is difference in how activities and processes will be implemented and evaluated. The utility approach to value-in-use fits best for service firms with very basic offerings, such as cleaning, laundry, electricity, or water. The consumption outcome approach to value-in-use is more suitable to adopt for service providers with more ambitions for brand building and supporting higher-end services, such as retail banks, airlines, telephone and internet-providers, and more advanced health care services, since it allows the inspection of different types of desirable outcomes and how a product helps the consumer to achieve these. Lastly, the experience approach to value-in-use is the best choice for service firms that wish to create excellent experiences for their customers, typical examples include entertainment companies such as TV, radio, movie and tourism, but also coffee shops such as coffee house chains, cinemas, and amusement parks. Managers must also acknowledge that customers seek different types of value-in-use in different products and services, and adapt their marketing strategies thereafter when developing new offerings.

Regarding avenues for future research, we believe collective and societal aspects of the value-in-use concept need further exploration. For example, there are many gaps in our understanding of the role of societal and cultural factors in the creation and determination of value-in-use. Another interesting research avenue may be customer perceptions of future value, i.e. disposal value, and whether these influence value-in-use. Moreover, the scope and nature of value-in-use in the larger context of entire service ecosystems of actors and institutions (Vargo and Lusch, 2016) have not yet been explored. Hence, we encourage future research on these areas. In addition, we definitely think there is an opportunity to retrace the evolutionary paths of the theoretical propositions on value-in-use, in order to understand how the conceptualizations have changed over time. Similarly, we encourage service researchers to pay attention to the ways in which different fields (and sub-fields) of science got inspired by the conceptualizations highlighted in the three presented perspectives on value-in-use, and which are the methodologies that favor investigations based on each of the different views on value-in-use.

Finally, we also suggest these approaches to value-in-use can be useful to cluster customers and analyze their behavior in order to understand whether their decision-making process is oriented towards the utility, the consumption outcome, or the experience of the product or service. Since value-in-use is idiosyncratic and contextual, it would also be necessary to take in consideration eventual individual and contextual conditions that lead the customer to adopt a utility-based, consumption outcome-based, or an experience-based decision-making process. In addition to this, managerial thinking can be further researched and questioned in order to capture some more meaning about the way in which a specific value proposition is set up, leading to a focus on one of the three value-in-use approaches or a combination of them. Also, managers' own views on value-in-use with regards to their products and services need to be researched, and hence, compared with the perspectives of existing and potential customers.

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PROFILING CULTURAL TOURISTS. THE CASE OF HIGH TECHNOLOGY CULTURAL DISTRICT IN NAPLES

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The aim of this paper is to understand how the process of visitor/tourist profiling can be developed within a cultural district. In order to propose a profiling model, this paper analyzes the literature review on the topic and identifies the main variables that contribute to the model building. The current paper takes into account both explicit and implicit visitor/tourist profiling. The former is realized through the collection of visitor's personal data and preferences; while the latter considers a visitor/tourist behavioral study through the direct observation of the researcher. The units of analysis of this study are the visitors/tourists of the High Technology Cultural District (DATABENC), located in Naples

1. Introduction

Nowadays the topic of customer profiling assumes a strategic importance for the firm that concentrate the attention not only on the economic performance but also on the key factors generating the strategic advantage.

The importance of profiling activity comes from the reason that it is at the basis of market segmentation. Sociology (Hanquinet, 2013), marketing (Boe, Hamrick, and Aarant,, 2001; Linoff and Berry, 2011), information and communication technology (ICT- Buhalis and Amaranggana, 2015) are some of the main perspectives used in the academic publications.

This paper studies the topic of profiling in the field of high technology cultural districts. The profiling of current and potential tourists/visitors is essential both in strategic and marketing terms. Indeed, strategies of cultural districts must take into account the needs and the behaviours of tourists/visitors, while marketing has to promote and valorise these districts in the light of the different targets of tourists/visitors. In this direction, the profiling activity constitutes the strategic choices for high technology cultural districts.

The strengths of profiling activity are different. First, profiling allows to collect a variety of data and personal information that can be used to guide the strategic choices of the district operators, to reduce all the information asymmetries that exist between the tourist/visitor and the different players of the district chain cultural, to target the best marketing policies and to offer a cultural product experiential, closer to the needs of tourists/visitors. Since they have their own preferences, stereotypes, atti-

tudes and knowledge, the outlining of a real profiling allows to make clearest to operators what are the needs of the visitor/tourist of the cultural district.

If cultural districts apply a strategic profiling activity, it helps in encountering visitor/tourist's expectations, allowing to generate higher degree of satisfaction after the visit.

Compared to the number of cultural districts at national and international level, the profiling activity results to be not fully exploited in terms of organization and sometimes it is also not implemented. This result is linked, firstly, to two main reasons. The first refers to the need to own resources and skills for the implementation and development of profiling activities and strategies; the second reason is connected to both the need to balance the cost-benefit gap, and the likelihood of ensuring that profiling is a part of the ordinary activities of the district.

Hence, the aim of this research is to understand how the process of visitor/tourist profiling can be developed within high technology cultural district.

The research questions at the basis of this work are:

- RQ1: How the strategic profiling model for a cultural district can be developed?
- RQ2: What are the main variables for the profiling of the cultural visitor/tourist of DATABENC?

This paper, based on the above-cited research questions, is organized as follows. The first section refers to the identification of models and systems for the management of the user/visitor/tourist profile with particular attention to the dynamic profiling models. The second aims at defining and building a specific profiling model that reflects the endogenous and exogenous characteristics of the district as well as the salient features of the tourist /visitor.

This research is the result of a wider research project, called "SNECS" (Social Network of Historic Centers 'Entities).

2. Literature review

Literature on the topic of profiling of fragmented because it mainly refers to the user profiling (based on ICT tools) rather than on visitor/user profiling.

The approaches suggested by literature are the knowledge-based approach and the behavioral-based approach.

The first one (Kim et al., 2001; Delgado and Davidson, 2002) refers to the need of modeling the user's knowledge and skills (if it is referred to the online profiling systems) or tourists / visitors (if the modeling is done during or after the use of resources phase).

This modeling approach is important because if the managers of the cultural district really understand the level of knowledge of the tourist/visitor/ user, they can get in

touch, creating dialogues' structures between the user/ visitor /tourist and the system for profiling.

The knowledge-based approach also incorporates the concept of "tracking of knowledge" (Sosnovsky and Dicheva, 2010) using Bayesian inference to calculate the wealth of knowledge that has the user during the *ex-ante* phase or during the experience in the cultural district.

This approach is very important if the profiling is done through ICT tools because users' answers are then compared with a series of stereotypes that may allow clustering the tourists/visitors/users. After this analysis, the system collects all the elements and builds the user model.

On the other side, the behavioral-based approach consists in the construction of the model through direct observation of the user/visitor/tourist. If this type of profiling occurs during the use of resources, the researcher directly observes the visitor/tourist behaviors.

This type of approach is, however, very complex in the case of online profiling. There is a precise technique used and it is the "machine learning", which allows both to store the behavior, analyzing and comparing them in the course of time.

Other approaches used by scholars refer to the explicit and implicit profiling (Byrne et al, 2003).

The first one refers to the collection of personal data on the visitor's preferences by filling in questionnaires during the resource use phase or when registering in an online system.

The implicit profiling, however, provides for a user's behavioral study through direct observation or detection of behaviors, using the best technology available. This type of profiling is linked to the behavioral-based approach.

The main variables for profiling are (Van Raaij, 2005):

- the geographic variables allude to the state, locale and city, atmosphere, market size and topographical characteristics;
- the demographic variables allude to age, sex, ethnic gathering, pay, education, business, family size, religion and social class;
- the psychographic variables contain the qualities of the identity, social class and way of life;
- the behavioral variables identify with the power of utilization, use events, related benefices, brand faithfulness and value affectability.

Using these parameters allows to distinguish the different market segments, namely the cluster of potential/current tourists/visitors of DATABENC (High technology cultural district), whose needs are changing in a personalized and highly experiential offer. It is important, in fact, that the governance entities of the district and the managerial level take proper segmentation and profiling of the market, based on the identification of parameters and characteristics that best present the related tourists/visitors to define the reference cluster.

The profiling procedure includes various stages. The main alludes to the identification of the variables for market segmentation; the second stage concerns the meaning of the profiles in view of particular bunch; the third stage plans to evaluate the recognized fragments and declaration the significance in the light of the already distinguished groups; the fourth step has the goal to select the target segments; the fifth stage characterizes how to position the product "DATABENC" in the referring market and the last stage characterizes the vital and advertising approaches for the advancement, commercialization and other promoting activity of the district.

Finally, the profiling of visitors/tourists can occur in the induced stage (before the outing), the organic stage (asset use stage) or in the post-travel experience. Usually, during the phase of use of resources, it is possible to profile the tourist through the administration of ad hoc questionnaires.

3. Theoretical model

Competitive dynamics push cultural districts to open to find innovative ideas, which can come from the users/visitors/tourists through the activation of an effective profiling process

The theoretical framework of this paper overlaps the resource-based theory, knowledge-based and relational view.

The recall to the resource-based theory (RBT- Barney, 1991) supports the high technology cultural districts to exploit valuable, rare, not imitable, and organized resources both at district level and firm's level in order to generate the competitive advantage,

The tourist/visitor can constitute a strategic resource if the cultural district is able to create interactions between service provider/s of the district and tourist/visitors. This interaction and co-creation is also possible thanks to implementation of profiling activity. Furthermore, RBT recalls the concept of the relational view contents. Indeed, this view (Acedo; Barroso; Galan, 2006), focuses on a wider vision that regards a set of relationships among different firm's stakeholders, and the tourist/visitor is one of them.

The overlapping between RBT and relational view is justified by the fact that the RBT claims the competitive advantage of the firm is based on customer's ability in co-creating value offerings and on the possibility that the visitor/tourist can become itself a strategic resource. This latter happens if the cultural district develops precise policies that allow to understand visitor/tourist's needs.

Moreover, the knowledge-based view (Grant, 1996) is useful since visitors/tourists can be considered as knowledgeable resources. Indeed, users/Visitors/Tourists can be also intended as innovators. Cultural districts can adopt new ideas implementing the opinions that the users spontaneously express on web communities or through the interviews if they strategically apply the knowledge-based view.

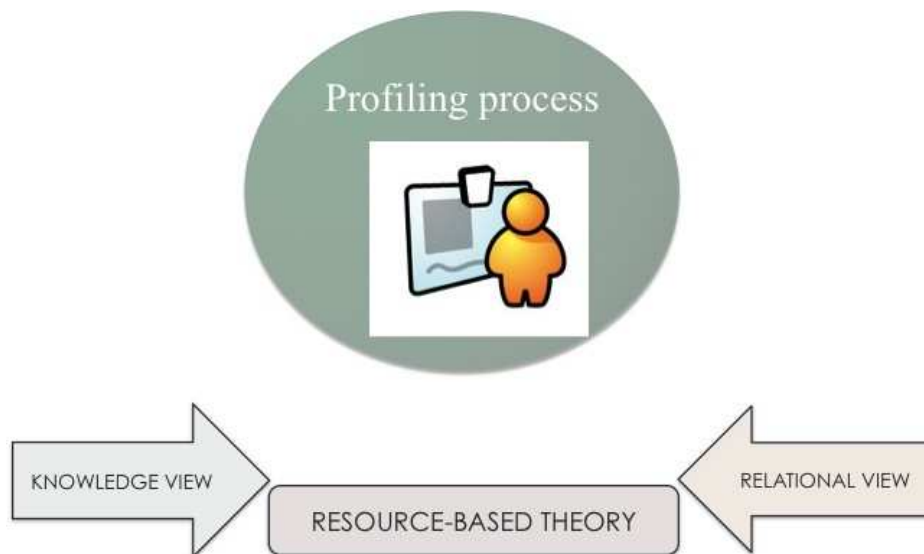


Figure 1- Theoretical framework

2.2 The profiling models

One of the most effective the profiling models is developed by the American Society for Information Science and Technology (Thelwall; Buckley; Paltoglou, 2011) that identifies a series of circles that characterize the profile of the tourist / consumer / user.

Different circles shape the model (figure 2) that contains the profiling elements. The pink circle shows the internal level referred to the attributes of the tourists/ visitors/users such as, for example, the demographic profile, gender, identification. The external aspects are shown in blue circle. They refer to the behavior or to users' interests. It is necessary to emphasize that the internal and external aspects continuously interact. External aspects affect the internal ones and *viceversa*.

Literature in this field also identifies (Van Raaij, 2005) the main elements for the profiling of the visitor are that are personal and individual traits and features; interest, preferences and behavior patterns; goals, knowledge and background; physical capacity and context.

To this model, it important to add another model that creates precise clusters for the profiling of the cultural visitor/tourist.

In particular, literature identifies (McKercher, 2002; Richards, 2006; Csapó, 2012) different profiles.

Serendipitous cultural tourist, whose main motivation of the trip is not the cultural one, but once the tourist is located in the destination, he/she lives the cultural experience with maximum participation.

Purposeful cultural tourist is tan intentional cultural tourist, whose travel main reason is precisely the cultural one. Given the high degree of interest in the cultural attractions, this type of tourist lives intensely the experience in the destination.

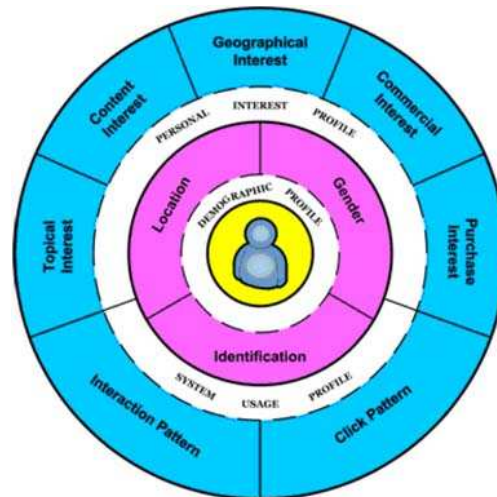


Figure 2- Profiling elements

Source: Thelwall; Buckley; Paltoglou, 2011.

Incidental cultural tourist is an incidental cultural tourist who, despite being a recipient of attractors and cultural experiences, he/she has not the cultural motivation as the main of his/her trip. This tourist, however, lives superficially the cultural experience.

Casual cultural tourist represents the random cultural tourists choose the destination for reasons, different from the cultural one, and even during the organic phase they are marginally attracted by cultural attractors.

Sightseeing cultural tourist refers to a tourist that denotes a deep understanding of cultural attractions and cultural experiences that can be lived in a destination. Compared to this very high initial knowledge, site experience shows to be less deep.

The graph shows a matrix that analyzes the degree of experience on site and the importance of cultural tourism in the choice of destination motivations. In fact, this classification allows to understand the different levels of the cultural tourist/visitor's motivation, which can vary from more general interest or to a specific and very high interest.

The Purposeful, the sightseeing and the serendipitous cultural tourists play an important role not only in terms of demand, but also because the travel decisions the cultural element is predominant one or, at least, present. The random and incidental tourists are, however, those less involved in the cultural experience (see figure 3).

The different types of tourists must also be analyzed in the light of the concept of experiential cultural tourism.

This perspective is connected to the idea of social tourism product as an experiential one: today's purchasers' incline toward to visit as well as to live encounters in the destination.

The idea of experiential tourism infers the need to make a contribution with the spots to visit regarding tactile joy, assortment and subjective incitement of the offer (Park et al., 1986). The experience-based occasion puts additionally the accentuation on activity, adventure and fantasy.

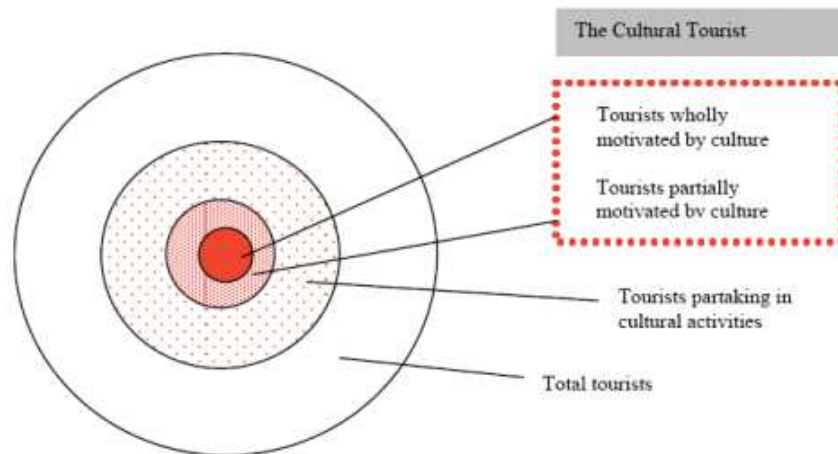


Figure 3-Clusters of cultural tourists

Source: McKercher, 2002.

Experiential offerings encompass, therefore, different aspects that contribute to the identity of the tourist destination in mind. The efforts of local actors and the territorial governance bodies must move towards the search for new horizons of experience (Vir Singh, 2004). It is important that the concept of experience is applied at both the destination and / or cultural district, both at the firm level through the implementation of a series of activities aimed at creating a highly experiential tourism product.

The analyzed literature leads to the outlining of a model that is useful for the profiling process of cultural districts' tourist/visitor (Figure 4). This is built according to an overlapping perspective between demand and offer side.

As regards the profiling on the demand side, the key elements are: the individual characteristics and traits; the interests, preferences and behavioral patterns; the aim of the visit, knowledge and background; the physics disability/ability and the context.

With reference to the offer side, it is important to gather information from the actors operating in this sector through specific questionnaires that allow to obtain a detailed profiling activity.

Furthermore, this model is also useful to verify the tourist/visitor satisfaction.

As a consequence, tourist satisfaction is linked to the size and the direction of the confirmation or disconfirmation experience, which are influenced by the consumer initial expectations. Tourists might be kept happy during their district's experience, in order to match all the previous expectations generated at the moment of the purchase. Identifying and reducing the gap between tourist expectations and actual performance is the key to improve the customer satisfaction level.

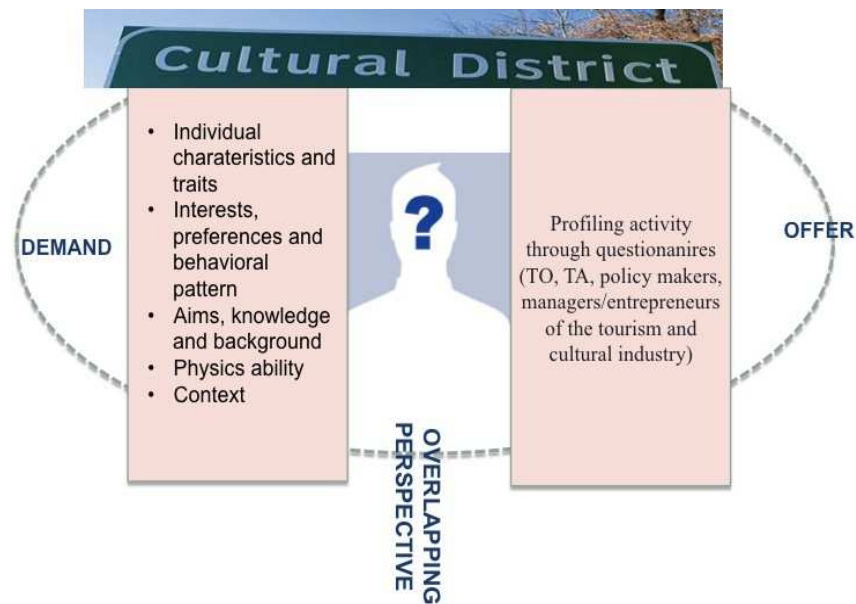


Figure 4 - The profiling model for a cultural district

Source: Our Elaboration.

The improvement of the tourist overall satisfaction is easily associated with his loyalty and purchase repetition (retention); one of its principle effect is the word-of-mouth (WOM) publicity, which is as positive as satisfaction increases; highly dissatisfied consumers tends, on the contrary, to engage in a negative WOM activity in a bigger proportion than the satisfied ones.

4. Methodology

In order to study the visitor/tourist profiling, the paper collects cross-sectional data via questionnaire. The adopted model allows to identify the variables that contribute to the formation of a correct and effective profiling. Indeed, since scholars use different measures and attributes to profile the tourists, we proceeded, in the above section of literature review, with a systematic review on the works related to tourists' profiling in order to understand what are the right variables to take into account.

Data were collected in Naples during the period May 2014-May 2015. Naples is a city located in Southern Italy with 2.166.518 presences and 918.485 visitors arrivals per year.

The survey was conducted through an *ad hoc* questionnaire, administrated to a convenience sample during three different periods of time in order to better capture the dynamicity of the profiling activity. The questionnaires was pre-tested and later distributed.

Respondents were selected by using convenience criteria, that means be based on the tourists' availability to be interviewed.

The questionnaires have been administered in the main attractors of High Technology Cultural District (i.e., Castel Nuovo and Borgo Orefici), that, in our case, are the main demonstrators of this research project. The District of high technology for Cul-

tural Heritage (DATABENC) originates from the willingness Federico II University. This university, indeed, can be defined as accelerator in creating an advanced cultural district in order to bridge the existing gaps in Campania Region' strategic management approach of both cultural and environmental heritage in its interconnections with tourism industry.

As regards the field of interest of this district, the entrepreneurial subject identified four thematic areas within archaeological areas, documentation and archiving and Smart historic centre:

1. Knowledge: under this voice, it is included the knowledge about the cultural products within Databenc district in terms of their history, contents and technical characteristics such as used materials and techniques of construction.
2. Preservation: this mostly refers to the logic of preventive preservation rather than curative one. In this sense, the district activities contemplate a planned maintenance that is less invasive of the restoration. Both preservation and restoration are linked to the transversal activity of constant monitoring.
3. Security and safety: these concern the identification and realization of measures towards possible risks that cultural heritage could be subjected to. While the security refers to intentional causes, the safety concerns motivations that are not directly intentional (i.e., environmental risks, transportation of cultural products for exhibitions out of the museum, etc.).
4. Valorisation, fruition and promotion: these two terms, in entrepreneurial terms, are conceived as unique expression since the valorisation of cultural resources allows to give a unique fruition both for tourists and local community where the use of specific technologies helps intensifying the degree of involvement, offering a unique experience during the fruition phase.

We collected cross-sectional data, i.e. data gathered by administering the same questionnaire to different samples composed by tourists characterized by different features.

We used little and convenient samples, constituted by 320 tourists/visitors.

5. Results

The first results show, first of all, the gender of tourists/visitors. The characteristics of the analysed sample demonstrate that the 48% are males and the 52% are females (figure 5). The majority of them are married 72%.

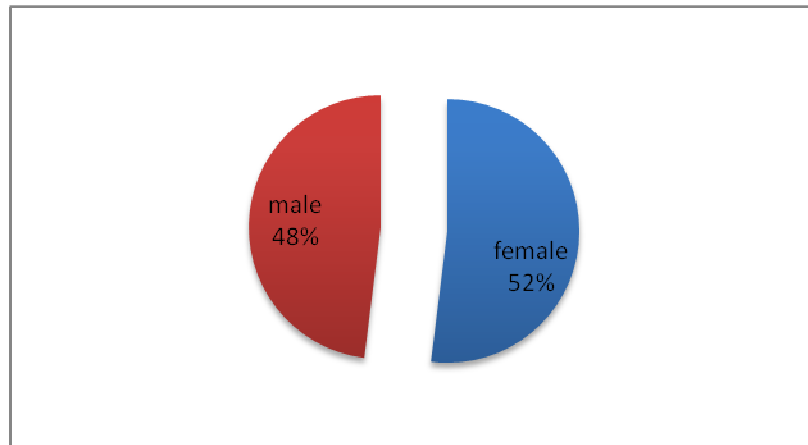


Figure 5- Gender of tourists/visitors

The tourists of DATABENC travel with family (28%), friends (26%), partner (20%), alone (18%), colleagues (8%). This result is also connected with the fact that the majority of tourists travel for leisure purposes rather than business one.

With reference to their educational background the 13% owns a master degree and the 1% the doctorate, the 30% attended the University, the 45% attended the primary school and the 10% attended the high school.

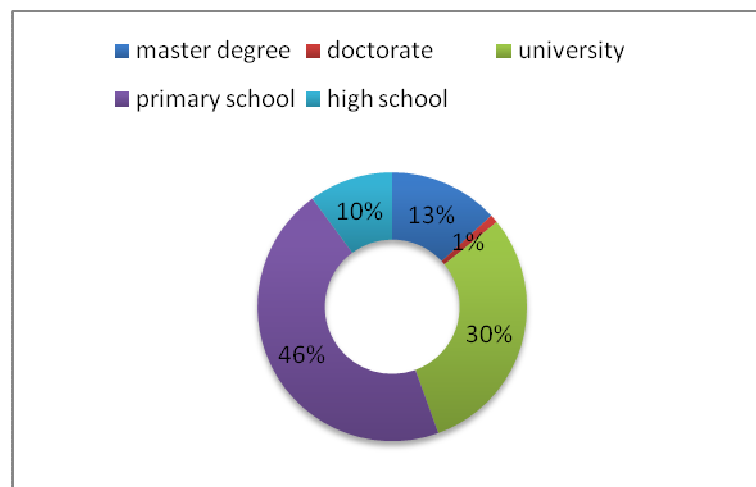


Figure 6 – Educational background

The preferred booking channels are Internet (51%), travel agencies (26%), or friends/relatives booked for them (11%), travel packages (6%), other booking channels (6%).

Their main accommodations (figure 7) are hotels (43%), B&B (17%), friends and relatives (20%), other (20%).

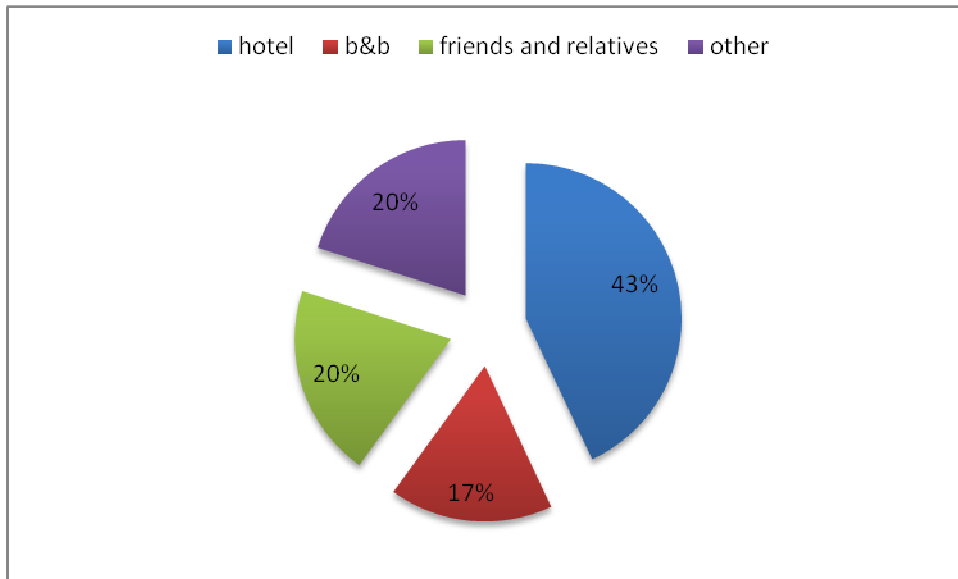


Figure 7 – Type of accommodations

The answers connected with the main reasons of the visit are of strategic importance. Tourists, indeed, declare that the first motivation of their travel in Naples is connected with the cultural and historic heritage. This motivation is followed by VFR motivations, local culture and food and wine, shopping and the access to high speed train that allows to reach cities, such as Rome and Milan, in little time.

The results show that the prevailing clusters are purposeful and sightseeing cultural tourists. This highlights that culture is the main motivation of their visit but also other connected activities and local resources are important (i.e., food and wine, local culture, shopping, etc.).

In this sense, the district DATABENC perfectly responds to the needs of this type of demand, that aims the cultural enrichment and knowledge of new factors of territorial attractiveness, linked to the other activities in the area.

6. Discussion

This paper allows to identify the current profile of the cultural visitor/tourist of DATABENC. In particular, the identified profiling model also paid attention to the phase of service delivery when the tourist satisfaction is generated.

From this study, it comes out that visitor/ tourist profiling depends on a complex process that views the interplay of different variables and transversal components.

Indeed, the result of the first research question show that the main variables of profiling are the individual characteristics and traits; the interests, preferences and behavioral patterns; the aim of the visit, knowledge and background; the physics disability/ability and the context.

On the other side, the second research question shows that the tourist/visitor of the district is highly interested in the cultural offer of Naples and in the other attractive factors.

This paper has a significant implication for the strategic planning of DATABENC, underlying the important role of profiling activities. Results show the existence different cultural visitors/tourists' clusters to whom specific marketing strategies need to be addressed.

According to a managerial perspective, this paper suggests that profiling activity allows to; identify the real needs of the tourist/visitors both leisure and business needs; identify the cultural experiences that can be targeted according to the needs of tourists visitors; identify the additional experiences that are compatible with the mission and the resources of cultural district; identify the ways through which potential users can be informed and attracted to the district experiences: ensure that visitors/tourists, both new and repeaters, are completely satisfied with the experiences lived within the district and the connected services.

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PUBLIC INNOVATION IN THE DIGITAL ERA: NEW OPPORTUNITIES FOR MULTIDISCIPLINARY COLLABORATION AND CITIZEN EMPOWERMENT

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This paper studies the integration of municipal services provided to children and youth. The study has been carried out in a middle-sized Finnish city which has developed an 'integrated model of wellbeing'. It is a new life-cycle based total offering that integrates daycare, schools, child welfare, family counselling, therapeutic and health services. In the core of the integrated service model is the use of digital platform as a mutual information channel between different professionals and citizens. An important cornerstone is a 'comprehensive service plan' which commits different service providers to the integration and co-production of services and empowers citizens to become active parties to plan the services targeted to them.

1. Introduction

Public services have traditionally been characterised by authoritative and rule-based practices, giving citizens the role of 'service receiver' (Torfing and Triantafillou, 2013). The introduction of 'New Public Management (NPM) twenty years ago challenged these practices by relating to citizens as 'customers' and by emphasising demand and user satisfaction. Lean processes and performance focus, adopted from the private context, have been ways to pursue these goals efficiently (Pollitt, 1993; Tummers, 2013). More recently, the increasingly complex societal issues have brought to the fore a third approach: 'Network Governance' (NG). It broadens the perspective from the provider-customer dyad to open dialogue with multiple actors, and emphasises the role of customers and citizens as co-producers of services (Sørensen, 2002).

Strong professional power is another characteristic of public services (Currie et al., 2012). The traditional approach fostered this power, which usually is built on a specific discipline and expertise (medical, educational etc.). Both the approaches of NPM and NG have aimed to lower the borderlines between disciplines. The efforts have been most apparent in healthcare where so-called integrated care programmes have been promoted (Ouwens et al., 2005). These programmes have actively utilized new digital platforms in order to increase opportunities for multi-actor collaboration and to empower citizens to become active parties in the services targeted to them.

The integration of services has been rare outside healthcare even though this practice could be widely applied in the public sector. Our paper presents an empirical study, in which the idea of integration has been extended to municipal services provided to children and youth: daycare, schools, child welfare, family counselling, health care and therapeutic services. The study has been carried out in a middle-sized Finnish city (in a consortium with two smaller cities) which has developed a new life-cycle based total offering for children and youth. The development is based on a nation-wide project in which an 'integrated model of wellbeing' is tested. The use of digital platforms as a mutual information channel between citizens and different professionals plays a central role in the model. An important cornerstone is a 'comprehensive service plan' to which both the citizens and the service providers commit themselves. Empirical data of this study bases on semi-structured face-to-face interviews (23 interviewees in total) carried out between October 2015 and February 2016.

The paper has been structured as follows. In the second section, we present the theoretical frameworks that form the starting point in our study: nature of public services, the shift from occupational professionalism to multidisciplinary collaboration and citizen empowerment through digital platforms. The third section presents our empirical research context and the methods of data collection and analysis. The fourth section summarizes the results and the final section includes concluding discussion.

2. Theoretical background

This section discusses the theoretical background of the paper. To start, it provides understanding of the three competing paradigms of governance: public administration, New Public Management and network governance. The different governance approaches form the basis to understand the nature of public services and the changes in them. The change in paradigms is reflected also in the current strivings for the renewal in public wellbeing services. The discourse highlights multidisciplinary collaboration among professionals and empowerment of citizens as central drivers for change. These two theoretical standpoints are discussed later in the section to understand the shift from occupational professionalism to multidisciplinary collaboration and the citizen empowerment accelerated with the digital platforms.

2.1. Nature of public services

In the literature, three competing paradigms of governance and public management have been identified: traditional public administration, New Public Management (NPM) and network governance. These paradigms represent different approaches to the generation, adoption and implementation of public services (Hartley, 2005; Levesqué, 2013; Moore & Hartley, 2008). Each paradigm contains a different 'world view': particular assumptions about societal needs and a diverse understanding of the means and roles of different actors in tackling the societal challenges and providing services related to them. Table 1 summarises the characteristics of the three paradigms on the basis of Hartley's suggestion (2005). (The analytical dimensions have been simplified to highlight the idea of this paper.)

Table 1. Three paradigms of governance (simplified from Hartley, 2005)

	Traditional public administration	New Public Management (NPM)	Network governance
Context	Stable	Competitive	Continuously changing
Governance practices	Bureaucracy; state centered	Market imitation	Network, partnerships and empowered citizenship
Service needs	Straightforward, defined by professionals; expert assessment	Expertise linked to demand	Context-specificity, co-production
Population	Homogenous	Atomised	Diverse
Service users	Clients	Customers	Partners; co-producers
Technology as enabler	Medical and wellbeing technology	Lean processes	User-centered processes
Key concepts	Public good	Free choice	Use value

The traditional public administration paradigm is based on a bureaucratic, hierarchic and rule-based approach. Societal context is considered fairly stable; needs and challenges are defined by professionals. Authority lies with the government, and standardised services – for the homogenous group of citizens – are provided by the public sector. New Public Management, instead, emphasises the competitive state, efficiency in terms of the economy and market selection, and the replacement of public services by private actors. Further, it sees the role of citizens as customers or service users who have right to require high service quality. (Hartley, 2005; Langergaard, 2011; di Meglio, 2013; Windrum, 2008)

The benefits of NPM are indisputable compared to the earlier bureaucratic view that provided users with very restricted opportunities of influencing. On the other hand, the limits of NPM have become apparent along with the development towards increasingly complex issues, multiple actors and need for open dialogue (Sørensen, 2002). Due to the increasing societal fragmentation, complexity and dynamism, new forms of non-hierarchical, de-centralised governance mechanisms have been demanded (di Meglio, 2013; Hartley, 2005; Lévesque, 2013; Moore & Hartley, 2008; Rhodes, 1997; Sørensen & Torfing, 2007; Voß et al., 2006). Network governance is seen as a possible answer. It includes relationships and partnerships, and co-production as the service model (Langergaard, 2011; Newman and Clarke, 2009). For the professional practice in public services, it means additional challenges because efficient in-house processes are no more sufficient but the crucial issue is the empowerment of citizens.

While the networked forms of governance have aroused much interest, and they are argued to be superior to both markets and hierarchies in complex environments (Levesqué, 2013; Moore & Hartley, 2008), there is no agreement whether they are becoming the dominant steering mechanism in the public sector. There are apparently phenomena that reflect a paradigmatic change but there are other phenomena that show a merge of different paradigms. Currently, the public steering and decision making is still largely organised on the basis of bureaucratic administration or New Public Management (Levesqué, 2013; Moore & Hartley, 2008). This causes that the focus in public service development and delivery is still on expert and market driven

approaches which is why the ways to support multidisciplinary collaboration and service co-production and to activate empowerment of citizens are still in their infancy.

2.2. From occupational professionalism to multidisciplinary collaboration

Public services have been developed by the strong input of professionals whose status has been legitimised by scientific knowledge (Tummers, 2013). In line with the paradigmatic change described above, there has been a change in the nature of professionalism in the public context (Evetts, 2003). The traditional paradigm fostered occupational professionalism which emphasises autonomy and the self-regulation of work by professional groups, whose expertise places them in a unique position to act best in the users' interests. With the rise of NPM, organisational professionalism has gained ground: it is managerialist version of professionalism that serves the interests of the organisation rather than professional groups. Organisational professionalism is strongly associated with New Public Management (Hood, 1991).

In this context, professionals are expected to be entrepreneurial, creative, and efficient lifelong learners and team workers (Dent and Whitehead, 2002). From the service point of view, the question is of the ability of professionals to share and transform their knowledge and cooperate with other professions. These new practices may threaten the power and status of professionals. An additional challenge is that professionals often have difficulties to identify the policy programmes they are expected to implement (Tummers et al., 2009) which may lead to the non-spread of innovations (Ferlie et al., 2005).

Recent research has suggested a position between the ideal types. According to this research, a critical factor is the extent to which organisational professionalism is perceived as a threat to professionalism as an occupational value (Evetts, 2011). As innovations are increasingly co-created by professionals, there is a multiplicity of possible outcomes between the extremes (Fischer and Ferlie 2013). A change of focus can also be perceived in recent research: seeks to identify the ways in which professionalism is acted upon and evolves over time (Tonkens et al., 2013). Professionals can make use of managerial pressures and technologies to promote their own interests (Evetts, 2011). Hence, there is a strand in contemporary studies which posits the existence of a hybrid of organisational and occupational professionalism (Skelcher and Smith, 2015).

The hybrid perspective provides a good starting point for the consideration of the issue how to promote innovativeness among professionals. The approach of employee-driven innovation (Høystrup, 2012; Kesting & Ulhøi, 2010) has highlighted that actions supporting the wellbeing of employees are relevant in terms of creating a better atmosphere for the adoption of new practices among them. Flexible service production models that are more responsive to the changing needs of the users require more focus on supportive leadership, boosting employees' intrinsic motivation, creativity and well-being (Deci & Ryan, 1985). They call for managers to better recognise employee-based bricolage, referring to mundane problem-solving activities with the resources at hand (Fuglsang & Sørensen, 2011). The needs of users are embedded in the approach of employee-driven innovation but need attention in order to make the interaction with users successful.

2.3. Citizen empowerment and digitalization as its accelerator

According to the idea of networked governance, citizens are active partners in planning, creating and shaping the delivery of public services (Hartley, 2005; Moore & Hartley, 2008). 'Citizen empowerment' has been the key concept to understand the citizen participation. WHO (1998) defines empowerment as a process through which citizens get greater control over the decision and actions affecting their health and wellbeing. This empowering approach views people as subjects and actors who have sufficient skill, understanding and self-efficacy to take the responsibility of their own health and wellbeing in their own hands (Mäkinen, 2006). Citizen empowerment and a role as partners has been 'a revolutionary concept in the area of public services' (Bovaird, 2007). To locate citizens in the middle of service related decision-making improves the democracy and makes politicians and professionals to find new ways to interface with citizens (ibid.).

With the rise of information technology and new digital applications, citizens have gained new abilities and ways to participate and express themselves in a networked society. In the recent discourse, digital empowerment has been topical (Mäkinen, 2006; Papastergiou et al., 2009; Samoocha et al., 2010; Webb et al., 2010). Especially, in the area of health care citizen empowerment through digital platforms has been active area of research and development (R&D) (Honka et al., 2011). Digital empowerment does not concern solely use of technical facilities; but it is aimed to be a multi-phased process to gain better networking, communication and cooperation opportunities, and to increase the competence of citizens to act as influential participants in the society (Mäkinen, 2006).

Several studies, especially in the area of health care, show that empowerment of citizen can be accelerated with digital devices and applications (Samoocha et al., 2010; Webb et al., 2010) and digital games (Papastergiou et al., 2009). Digital empowerment has helped to put citizens on the drivers' seat to manage their own wellbeing and lifestyles (Honka et al., 2011). In general terms, new digitalised services accelerate empowerment and enriches participation by diversifying the information flows, empowering horizontal communication and by opening new digital bridges to marginal or remote areas and people (Mäkinen, 2006).

However, the potential of service co-production with users and citizens has not been fully understood in the context of public services (Bovaird, 2007). Especially, understanding the collaborative process of public service creation and delivery through digital platforms is insufficient (Bovaird, 2007; Honka et al., 2011; Moore & Hartley, 2008). Therefore, the potential of digitalized tools and practices to support and accelerate citizen participation have not been developed and utilised enough (Mäkinen, 2006). What is required, is the renewal of the service culture which enables both actual partnership with citizens and the utilisation of variety of communication and interaction channels between citizen and professionals.

3. Empirical context and methodology

The empirical study focuses on the integration of municipal services provided to children and youth. It studies the development of an 'integrated model of wellbeing'. Its development is based on a nation-wide project which aims to promote experiment

culture in Finnish municipalities and to accelerate creation and implementation of more innovative and integrative services. Renewed service culture is targeted to answer better to the needs of citizens, empower them as customers, create possibilities to enhance multi-actor collaboration and to reduce costs of wellbeing services.

The experiment project in the area of integrated model for wellbeing is being implemented in nine municipalities (or municipality consortiums) in Finland. Our study has been carried out in a middle-sized Finnish city (which is in a consortium together with two smaller cities) and has approximately 67 000 inhabitants. The city was one of the pioneers in the application of the integrated wellbeing services. This section presents the empirical context and describes the collection and analysis of the empirical data.

3.1. An integrated model for wellbeing for children and youth

'Integrated model of wellbeing' is a new life-cycle based total offering which integrates daycare, schools, child welfare, family counselling, health care and therapeutic services. Its main objective is to support multidisciplinary work and reinforce citizens' ability to take responsibility of their own wellbeing. In the core of the integrated service model is the use of digital platform as a mutual information and communication channel between citizens and different professionals. Another cornerstone is a 'comprehensive service plan' which commits different professionals to provide services in a holistic and user-centred manner. It also empowers citizens to become active parties to plan the services targeted to them.

The development of the integrated service model has its roots in on-going development work which has started in 2008, and which has aimed at comprehensive renewal of services for children and youth. Renewal of wellbeing services has been directed by two main principles. The first focuses on the implementation of process thinking to renew the customer process. Customer processes frame the offering by using life-cycle based models. The second principle relates to the regional development. According to it, local and regional characteristics direct the development work: seven suburbs and the city center area of the municipality are all encompassed to set targets, plan and implement of the service model.

Operational implementation of the development work is aimed to be carried out in accordance with these two principles. As regards the customer process, the main target is to put the focus on preventive services instead of "correcting the mistakes afterwards". That requires four key processes which are common in all sectors, and which pay attention to the following aspects: encouragement to the preventive discussion in the case when there is a concern of the wellbeing of the citizen, high quality multidisciplinary collaboration, coaching of parenthood (starting from the pregnancy and lasting till the age of adolescence) and development of social skills (both parents and children). These processes are visualized and segmented to life cycle based products, which integrates different service sectors. As regards the regional and local aspects of the development work, both city center service provider and suburbs are encompassed to provide the specific local requirements and participate to the development work. Local participation is encouraged with operational and managerial principles. In each location, the development and implementation is carried out by the management team which consists of representatives from the different service sectors. In addition to multi-disciplinary team work, integration of the perspectives of grassroots level workers is encouraged.

Comprehensive, personalized and digitalized service plan is at the core in the development project presented in this study. In practical terms, this means that one customer or customer family (later citizens) has only one service plan instead of multiple plans created with different professionals. For each citizen, there is a named professional who is responsible for co-production of the comprehensive service plan: she or he involves all relevant professionals to creation and implementation of the plan, and makes sure that all information is up to date and distributed between the key actors. The service needs are defined in the close cooperation between variety of professionals and citizen: the plan is personalized to the prevailing needs of the citizen. Moreover, the service plan is created in a digitalized platform in which all different professional professionals and the citizen in question have access. Professionals and citizen can all see the same information and have admission to make notes and complement the plan.

These integrated wellbeing services are specially targeted to citizens who have many service needs: they are in contact with different professionals across the service sectors and therefore they use multiple information channels. As regards the objectives of the development work the novelty from the perspective of citizen is the close collaboration and communication with the professional in the creation of the service plan. Within this process the citizen is aimed to put on 'drivers' seat' in planning their own wellbeing services. From the viewpoint of the professionals new service model aims to enhance information delivery, communication and collaboration between professionals, and it accelerates the multidisciplinary work. In addition, the novelty comes from seeing all the information in one place.

3.2. Data collection and analysis

As a main source of data we applied a semi-structured interview method: the topics were decided beforehand but within them the respondents were given a great deal of freedom (Bryman and Bell, 2011). In the interviews the main themes were 1) the background of the multidisciplinary collaboration and its current stage in the children and young services, 2) the role of citizens in the multi-actor service interaction, 3) the main elements of the integrated model for wellbeing 4) aims of the new model, specifically regarding the digital service plan, and 5) the managerial challenges linked to new services and the pursued change.

We interviewed both city managers and the professionals involved in the development work. The manager interviews were conducted individually (5 interviews), while the professional interviews were group interviews for day care and early childhood education, child welfare and therapeutic services and the professional responsible for the service need evaluation (3 interviews; each group consisted of six or seven professionals). The total number of interviewees was 23 and they were carried out between October 2015 and February 2016. To identify the interviewees, we applied snowball sampling: the first interviewee was service manager responsible for the service provision in the area of children and young. Based on her suggestion, we thereafter selected the other interviewees among the members and employees involved in the development work. Other manager interviews included two educational managers, manager responsible for the service digital platform development and manager responsible for the service commission. Professional interviews were carried out with the employees from the day care services, child welfare and therapeutic services, and employees responsible for evaluation of service need of citizens. The duration of

the interviews ranged from one and half to three hours. All interviews were recorded and transcribed.

Another source of information was documentary material. This included for example strategy documents on nation-wide experiment project and description of integrated service model and implementation plans of municipal development work provided by the city.

The analysis and interpretation of the data was made in a dialog between theory and empirical findings. In the analysis of empirical data any computer-assisted coding tool was not used, but several rounds of analysis were carried out to derive meanings from data and to reduce the amount of data (Huberman and Miles, 1994). While reading the interviews and the other documentary material we uncovered the most common and typical themes, and classified and structured them. Aim was to create holistic understanding of the research topic via systematic and thorough analysis rounds of interviewees' responses. The quotations in the results sections illustrate the level at which extracts were picked from the material. The empirical observations were linked to the theoretical views of the paper: nature of public services, multidisciplinary collaboration and empowerment of citizens. After the analysis, the results were presented to the project managers in a workshop in order to validate them and to get supplementary information for the next steps of the study (to be reported in further papers).

4. Research results

This section presents the main results of the empirical study. To start, it describes the development and implementation of the experiment project from the perspective of professionals. Results will be analysed in accordance with multi-disciplinary collaboration, service plan, technological aspects of the development and implementation phase. Thereafter we present results from the point of view of empowering citizens through digitalized platforms. The analyses will be done accordance with the expectations of the citizens, potential benefits and ways of empowering citizens.

4.1. Professional culture to collaboration

The city has an organisational culture which supports development of new practices and participation to development projects (local and national). In national wide perspective, the city has been very active in developing customer oriented service models and creating new ways of collaboration. According to the interviewees, the organisation encourages personnel to participate to development activities and attitudes towards professionals led ideas and innovations are very positive.

Our analyses revealed that attitudes and expectation towards the studied experiment project varied between the city management and professionals. City management expected that the use of the new tool would make the work of professionals easier and manageable. This would happen, because it would make the access to information easier. The professionals knew little about the new tool. The first quotation from the interview demonstrates that the management expected that the comprehensive service plan would lead the city towards customer centric services and would be a

good tool for the professionals to manage their work. The second quotation presents professional's current knowledge about the new comprehensive service plan. With the professionals, there have been some misunderstandings and they were unaware how the tool would be used in practise and what it means for their daily work.

"Comprehensive service plan is a good tool for making multidisciplinary work easier" (Representative of the city managers)

"I don't quite know what this comprehensive service plan is, no one has explain it properly" (Representative of daycare/early childhood education)

Multidisciplinary work is at the core of the development project. According to the interviews, the change towards multidisciplinary work and the use of comprehensive service plan have been challenging from the intra-organizational viewpoint. The results revealed that the professionals participating in the change process welcomed multidisciplinary practices. The interviewees had positive experiences working with other professionals. Also all interviewees wanted to break down organisational silos and to lower barriers between professionals and citizens. Even though attitudinal problems have not hinder multi-disciplinary collaboration between professionals in social care, the inherent difference between the 'missions' of schools and daycare were visible. Schools are focused on teaching contents whereas daycare focuses on children's welfare in a holistic way. These kinds of differences make it difficult to set common goals despite a genuine will.

Even though, the multidisciplinary work has been common between professionals working in social care for some time, some interviewees talked about existing barriers between professionals from different sectors. Professionals from social work have had doubts of introducing the new model to health care professionals working in specialist care. They thought that multidisciplinary work is difficult between special health care and social work mainly because of the division of labour and power distribution. Nonetheless, one interviewee told an example where the preliminary belief was that the special care doctor would not like to do cooperation with social workers and participate using the comprehensive service plan. The citation below describes the eye-opening perception when the reality was that the doctor thought that the comprehensive service plan is excellent way of sharing information and would be beneficial to all.

"Two special health care professionals have been very excited and that has been a total surprise" (Representative of the city managers)

According to the interviewees, the use of the comprehensive service plan could have positive effects and promote multidisciplinary work. First, before the new model, professionals didn't have a possibility to see information produced by other sector professional about the citizen. For example, professionals from daycare didn't have a possibility to see (or discuss) information produced by child welfare or therapeutic services. This hampered of creating an overall picture of the situation and reduced possibilities of offering the best possible service. Passing this information was in the hands of the citizens and they were unaware of which information is available for different professional. Citation below illustrates these problems:

"At this stage, it is difficult to transfer information to different professionals even when the customer wishes so, because we don't have access to other

professional's information systems" (Representative of service need evaluation team)

Second, according to the interviewees, the reality in social and health care is that individual professionals participating to the care and support of citizen, changes many times. As stated in the following interview quotation, comprehensive service plan helps to manage situations where a professional participates to a new multidisciplinary team. From the service plan the professional can see previous discussed issues and also goals which are set by citizens and professionals together.

"When we make a service plan for the customer and new professionals come to the team, they can see all the information" (Representative of daycare/early childhood education)

Technological perspective has been described to be the most difficult part of the development work. Even though it helps to share information, the use is not straightforward. Comprehensive service plan has a possibility to bring together different professionals, but the interviewees also pointed out that there are issues which are preventing this from happening. One of the main issue is that the digitalized platform is not connected to other ICT platforms used by professionals. Also, introduction of new digitalized platforms is increasing continually requiring time and patience from the users. The interviewees told that this time is away from the direct customer work which is the most important thing from their point of view. This issue is illustrated in the first citation. For the professional, different and incompatible digital platforms also lay extra burden as stated in the latter citation:

There is this feeling of guilt when you can't do everything. There is a lots of different projects and development issues and at the same time you just try to do your everyday work" (Representative of child welfare and therapeutic services)

"If the digitalized platform is not going to be connected to other system then it is nothing else but a burden" (Representative of daycare/early childhood education)

Also, using the new digital tool raised questions. In the case study, implementation of the new tool faced many technical problems which had negative impact of the reputation of the renewal. The interviewed professionals hoped that the digitalized platform would work without any problems from the beginning. Citation below illustrate another challenge which is the use of the new digital tool in practice. The professionals who work for example in daycare don't have technological tools, for example new computers, to use the digital platform (especially together with the citizens). Mistrust towards new technology was also a problem. Some professionals were afraid that information might disappear or be deleted accidentally. Also senior professionals had difficulties understanding and using the new tool.

"In a way it is a question of having a suitable working environment which enables the use of digitalized services in a dialogue with the customers" (Representative of daycare/early childhood education)

An important issue preventing the implementation process was the experienced feeling of 'a never ending flow of new tasks' which is clearly visible in the first two citations. The third and fourth citations illustrates the feelings of professional as they felt

that the new model could be another experiment which will be tested and piloted but will not become a part of daily practices. In that case, it is difficult to motivate themselves to participate actively to the development process. This attitude was common among the interviewed professionals. Notable is that this wasn't the only development project facing this challenge.

"There is always something more and no responsibilities are reduced" (Representative of child welfare and therapeutic services)

"The main problem is that there is always more and more responsibility even though the workload that you have at the moment is full. Nothing are taken away. The question is, how long you can increase the workload of professionals and think they can to cope with it." (Representative of daycare/early childhood education)

"This could be momentarily experiment" (Representative of service need evaluation team)

Projects come and go, and you don't know which ones are going to stay alive" (Representative of daycare/early childhood education)

Overall experience among the interviewees was, that the new tool came as a surprise to professionals. Development of the new tool was in the hands of the management. A few professional participated to the development phase, but it was not described in the interview as a co-creation process. Citizens were not involved in the development phase. The city arranged all together three implementation session, but all professionals couldn't attend to these sessions. Even though some professionals attend to the session, they felt that they didn't get enough information of the comprehensive service plan. This inhibited them in recruiting families to participate to the project. The interviewed professionals said that they felt unsure and didn't have all the necessary information to start recruiting citizens. This opinion is illustrated in the next two citations:

"We didn't get enough information to completely understand the concept. And understand it so that it is possible to market it to customers as a positive and good tool" (Representative of daycare/early childhood education)

"I can tell you that I don't know how to market this to the customers, because I don't remember quite well what this is about. I need to have handouts or something like that when I market this to them" (Representative of child welfare and therapeutic services)

Next we will demonstrate the development work and the use of the comprehensive service plan from the citizens perspective.

4.2. Empowering citizens through digitalised platforms

The idea in the development project is to create services that better answer to the needs of citizens. Project also aims to empower citizens in a new innovative way. Earlier, the services have been delivered based on the service process, which is generated on the basis of the needs of service provider, and which forgot the needs of citizens. With the new personalized and digital service plan, there is a possibility to

orient towards the co-creation and customer centered thinking. A citation from the interview demonstrates this:

"Comprehensive service plan (with the help of the national-wide program) also creates a change where the professionals become from all knowing and problem bearing professionals to a sparring partner for customers" (Representative of the city managers)

Initiating comprehensive service plans with citizens have been slow. A main difficulty has been in selecting those families who would benefit from the new practice: who had a multi-disciplinary service need, who were motivated, and whose problems were not too severe for this way of working. In addition, professional have had difficulties to market the new service for the customer families. According to professional they do not have enough information about the new digitalised service plan. Therefore, they did not know how to market it to the citizens and how to motivate them to take it into the use. Because of these challenges the information about the possibility to use the new tool have not reach all the citizens.

Citizens (according to the professionals) attitudes towards this new integrated service model varied. Some citizens welcomed the digitalised service plan. According to them, the citizens' opportunity to know the same information than professionals and to have access to all information would improve wellbeing services. Further, it would help the collaboration and communication with all the relevant actors required for the delivery of the services. From the citizens' perspective, the use of comprehensive service plan would make the use of services more simple and manageable. However, all the citizens have not been satisfied with the renewal. Some citizens did not want to deliver openly all their personal information, and they did not want different professionals to know about all the services they were using. The professionals assumed that this worry was based on fear of stigmatizing. Also professionals thought that when the problem is not known by many professional, the problem might feel smaller and manageable to the citizen. These thoughts are illustrated in the citations below:

"Although perspective is that if a customer has a problem, it is the interest of the customer that all the professionals know about it at the same time. However, there is a point of view from the customers that they don't want all professionals to know their about problem. They prefer to tell it only to one professional who is responsible for the issue... Maybe it is the feeling that the problem is smaller when only one or few professionals know about it" (Representative of the city managers)

"Nowadays being a "normal" family is very important. They don't want that many professional to know about the problems they have" (Representative of child welfare and therapeutic services)

However, according to the professionals it is very important to let the citizens know that all the professionals are there to help and not just `spying` or giving advises. As stated in the citation, when there is a situation where there are many professionals and one citizen, it's a matter of experience to create the situation so that the citizen doesn't feel like an underdog.

“It is a certain professional skill to manage the situation in a way that doesn't put the customer as an underdog” (Representative of service need evaluation team)

This idea is also closely tight up with the problem of presuming what the citizen should want or aim at. Finding a balance between customer centricity and expert advice was considered challenging. Even though this balance is not a new issue, it is highlighted when all participants see the information in the comprehensive service plan and participate in creating it. Professionals have sometimes a vision about what is a good life. This vision is placed as an aim even though it might not be the vision of the citizen. The quotation from the interview illustrate this problem of differing aims.

“... Their customers represent totally different social class, so the possibilities for identification is low... We have these mantras and beliefs about what is good Finnish everyday life and set that as an aim. The reality is that the customer would be happy with something less... We need to better hear the customers real needs and take it as a goal and support the customer to achieve it” (Representative of the city managers)

However, according to professional, the comprehensive digitalised service plan has a possibility to benefit citizens. It can strengthen their role as active customers, and to support them to take actively part in the development of the service palette based on their own needs. In the best case, the empowered citizen would be motivated to take care of their wellbeing in a proactive way. Also getting the support from one channel is valued by the citizens. These opinions are illustrated in the citations below:

“I believe that when the customer sees the text that was produced, it helps to visualize the situation and creates dialogue... ..it is a tool to have discussions and also helps the customer to cooperate with the professionals” (Representative of daycare/early childhood education)

I think that the most important benefit is that the customer becomes as an active partner. Also customer's issues and problems are handled as a whole and not like professional A deals with one thing, professional B one thing and professional C another thing” (Representative of the city managers)

With the integrated model of wellbeing and the comprehensive service plan, the citizen has a better change of setting the aim as they see fit. With this reformation, the service produced by professionals has better possibility to answer the needs of citizens and be more customer centric.

5. Concluding discussion

This paper has examined the challenges of developing and implementing an integrated model of wellbeing in the context of children and youth services. In the core of the new model is the use of digital platform which act as a channel of collaboration and information delivery between citizens and professionals. It is targeted to support the creation and implementation of a comprehensive service plan based on the needs of citizens. Digital platform is open to all relevant professional and citizen in question: it creates a forum to all participants to make notes and complement the plan both in its creation and implementation phase. The empirical study has been

carried out in a middle-sized Finnish city which has been one of the pioneers in Finland to implement the integrated services of health and wellbeing. Empirical study reflects the ongoing renewal of the public service provision and delivery. Theoretically the discussion is grounded on the idea of the three competing paradigms of governance: public administration, New Public Management and network governance (Hartley 2005; Levesqué, 2013; Moore & Hartley, 2008). The different governance approaches form the basis to understand the nature of public services and the changes in them. It also focuses the discussion to the shift from occupational professionalism to multidisciplinary collaboration (Evetts, 2003, 2011; Tonkens et al., 2013) and the citizen empowerment accelerated with the digital platforms (Bovaird, 2007; Honka et al., 2011) which have been recognised to be key drivers for change in public services (Mäkinen, 2006).

The results of our empirical study indicate that the integrated model of wellbeing – including the use of comprehensive and digitalized service plan – has a possibility to promote integration and multidisciplinary work in social services. In addition, it enhances collaboration between administrative and professional silos such as and social services and specialized health care. Multidisciplinary work is not a new issue in the area of health and wellbeing. However, the use of comprehensive service plan is a good and practical tool to support and accelerate the multidisciplinary collaboration between variety of professionals: it breaks down organizational silos and lowers barriers between professionals. Comprehensive service plan connects loose information to be used in a single digitalized platform and therefore helps to share information between professionals and between professionals and citizens.

According to our results, integrated model of wellbeing and the comprehensive service plan improves the possibilities to answer the needs of citizens. It supports the creation of more customer centric services. Further, it clarifies and structures the use of services and makes them more manageable. An important result is that with the new model, citizens can participate more actively in setting the targets for the services. It has improved the citizen participation in service creation and delivery; thus it has strengthened their role as active customers. Due to their empowered role – and their improved possibilities to have an influence and impact on their own services – citizens are both committed and motivated, which in longer term may effect on the efficacy and profitability of the new services. However, as the results showed, citizens' attitudes towards the new integrated and digitalized comprehensive service plan were not solely positive. In some cases, new digitalized services cause doubts: sharing all the information with the many professionals in the digital faceless platform may be frightening and raises the limits to collaborate. This aspect highlights the need for the active collaboration and co-creation to in the different phases of the development to remove the fears.

As our results revealed, the use of new technological tool in ordinary work is not as straightforward as it appears from the management point of view. Technological readiness to use digitalized platforms (technical equipment, network capacity and knowhow) is not yet in sufficient level to fully utilize the potential of digital platforms. Professionals need support from the management and different levels of readiness to use digital, and many times unfinished, platforms need to be understood and accepted. Also, the use of experiment development projects requires tolerance towards mistakes and problems. The studied municipality has the long tradition and the organizational culture which both support development and implementation of new services. However, as a managerial implication the fully potential of the collaboration

and partnership has not been utilized yet. Co-creation with professionals and citizens is essential in experiment projects to make sure that the project answers to the needs of professionals and citizens and can be implemented also in the work of professionals.

To fully understand the citizens' role in the renewal of wellbeing services more research, which provides understanding from the perspective of citizens, is needed. However, organising citizen interviews is a demanding task, because the issues discussed in the area of health and wellbeing are very sensitive. Therefore, in the future projects new methods to approach and involve citizens – to collect the valuable information of their expectations and needs – is required.

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PUBLIC SERVICE INNOVATION: A PUBLIC SERVICE DOMINANT LOGIC VIEW

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The paper departs from research on Public Service Dominant Logic (PSDL) to advance a framework of service innovation for the public sector. It continues the incorporation of Service-Dominant Logic (SDL) concepts that has been initiated by PSDL research to the public management domain, in particular the notions of resource integration and value propositions is incorporated to PSDL, and builds a conceptual framework of Public Service Innovation (PSI). This framework consist of three resource integration processes, users value creation in use, users and personnel's value cocreation in direct interaction and internal value facilitation, and suggest that these three processes contribute to service innovation by integrating resources into value propositions. Through an empirical study of primary care the paper finds that the framework describes how PSI is conducted in practice in the public management domain. The paper contributes to articulate a PSDL-based service innovation framework. It also contributes by grounding this framework in an empirical study. In addition, it contributes by elaborating PSDL in such a way that may be drawn on to study public service innovation.

1. Introduction

Osborne and colleagues (Osborne et al 2013; 2014; Osborne and Strokosch 2013) has articulated Public Service Dominant Logic (PSDL) for analysing and managing the public sector. They draw on research in service marketing, in particular the so-called Service-Dominant Logic (SDL) research (Vargo and Lusch 2004; 2008; 2016) to articulate PSDL. In doing that they articulate an alternative to the New Public Management (NPM) that have dominated the reform and research agenda of the public sector for more than two decades. Whereas NPM is rooted in research on manufacturing with a focus on intraorganizational efficiency (Osborne et al 2013), PSDL is rooted in service research with a focus on the interaction between Public Sector Organizations (PSOs), public service users and other stakeholders. In particular PSDL emphasizes that PSOs and users cocreate public service – in direct interaction PSOs and users together realize public service.

Osborne and Strokosch (2013) argue that the focus on cocreation in PSDL presupposes an alternative view on public service innovation to the existing. According to

this new view public service users take active part in the service innovation process. Specifically, Osborne et al (2013: 146) argues that "...a service-dominant approach to innovation in public services puts the service user rather than the policy maker or professional at the heart of this process". Based on these insights Osborne and Strokosch (2013) articulate a PSDL based framework for public service innovation. They argue that that "The next challenge is surely for empirical research to test and refine this framework [the PSDL framework on public service innovation] and its contribution to public administration and public management theory" (p. 44). In addition, the PSDL based framework of public service innovation is in need of some conceptual elaboration prior to being used in empirical research. In particular, we argue that the framework suggested by Osborne and Strokosch (2013) does not include all the key concepts that S-D logic outlines to analyse and manage service innovation. Therefore, the aim of the paper is to present an elaborated PSDL based framework for public service innovation and to apply this framework in empirical research.

We illuminate on the aim based on conceptual analysis and empirical research. The conceptual analysis focuses on elaborating the PSDL framework of public service innovation presented by Osborne and Strokosch (2013) by integrating some key concepts from SDL (Vargo and Lusch 2004; 2008; 2016). Empirically, the paper draws on a study of service innovation in primary care. Specifically, the paper draws on observations and interviews with 20 members of six service innovation groups. The service innovation groups consisted of five to nine patients, personnel or a mix of patients and personnel. Their task was to accomplish service innovation through cocreation.

The paper contributes to articulate a PSDL-based service innovation framework. It also contributes by grounding this framework in data. In addition, it contributes by elaborating PSDL in such a way that may be drawn on to study public service innovation.

The paper is structured as follows. In the next section the conceptualization of the PSDL based framework of public service innovation initiated by Osborne and Strokosch (2013) is elaborated by drawing on SDL and SDL informed service innovation research. This is followed by a description of the methods employed to conduct the empirical research and an outline of the findings. A discussion about the implications and contributions ends the paper.

2. Literature review

This section draws on SDL and SDL informed service innovation research to elaborate the conceptualization of the PSDL based framework of public service innovation initiated by Osborne and Strokosch (2013).

2.1. Public service dominant logic

PSDL draws on the research on SDL by Vargo and Lusch (2004; 2008; 2016). Vargo and Lusch make a distinction between what they refer to as the goods-dominant logic (GDL) and SDL. GDL and SDL are according to them two contradictory views on value creation. GDL conceptualize value as embedded in products and services, and

as produced by organizations in isolation from their users. GDL has much in common with the understanding of value creation that inform NPM research and the reform agenda stemming from it (Osborne et al 2013). SDL conceptualize value as cocreated by organizations, service users and other actors, and as assessed by users in use.

It is important to note that SDL focuses on service (without an s at the end). Vargo and Lusch (2004: 8) contend that service is sometimes provided directly, and sometimes it is provided indirectly, that is, through the provision of tangible goods; 'goods are distribution mechanisms for service provision'. Thus, SDL captures both services and goods, immaterial and material resources. It argues that the role of organizations is to support and assist their users' value creation process making them better off (Grönroos and Voima 2013). Prior to the introduction of SDL, the focus of service research was services not goods, but what SDL argues is that creation of value more often than not takes place through a combination of services and goods – by integrating material and immaterial resources. SDL is thus a general framework for understanding value creation. The term "service" denotes the value or benefit that is created for the user.

By articulating PSDL, the work by Osborne and colleagues (Osborne et al 2013; 2014; Osborne and Strokosch 2013) has advanced the understanding of value creation from a service perspective in a public management and administration context. However, PSDL does not yet fully acknowledge that SDL is a general framework for analysing and managing value creation. PSDL focuses on public services (with and 's' at the end) understood as an output that is distinct from goods. However many public organizations offers combinations of material and immaterial resources, services and goods, to citizens. This neglect implicates that the key SDL notion of resource integration has not yet been integrated to PSDL. In particular, this limits the ability of PSDL to explain public service innovation focused upon here.

According to Grönroos and Voima (2013) the notion of resource integration is invoked in SDL to explain three different types of resource integration processes. For one thing, customers and firms collaboratively integrate resources while directly interacting to cocreate value⁵⁸. Furthermore, customers integrate material and immaterial resources in their usage process to create value for themselves or others. Value cocreation and value creation is thus different resource integration processes – in the former organizations and users (and other stakeholders) collaborate in direct interaction to integrate resources while in the later users integrate resources without the support of organizations. In addition, organizations internally integrate resources into configurations in their value facilitation process. These configurations are referred to as value propositions that are offered to users. The term value proposition has not been discussed in previous PSDL research. However, Skálén et al (2015) argues that the term value proposition together with the notion resource integration is key to

⁵⁸ Osborne and colleagues (Osborne et al 2013; 2014; Osborne and Strokosch 2013) refers to cocreation of value with the term coproduction of value. Coproduction was substituted for by cocreation by Lusch and Vargo (2006) as coproduction denotes a GDL view on value creation. In this paper we adhere to the terminology of Vargo and Lusch. As Hardyman et al (2015) in a public management context explains coproduction may be a part of cocreation denoting the value creation that users do for organizations.

understanding service innovation from a SDL perspective. We turn to this next in order to elaborate on the PSDL based view on public service innovation offered by Osborne and Strokosch (2013).

2.2. Service innovation

As SDL does not understand value as embedded in services and goods but as created and cocreated through resource integration it implies that organizations never can guarantee that the value propositions they offer to users are realized. Rather, SDL understands a value proposition as "...a promise that customers [e.g., users such as patients] can extract some value from an offering" (Grönroos and Voima 2013: 145). It is up to the user to create value based on an organizations value proposition(s), perhaps in combination with drawing on other value propositions and their own and other users resources when they create value in use. Through cocreation, organizations may assist and help the user to use the value proposition but the organization can never determine user value creation.

Organizations integrate material and immaterial resources into value propositions in their value facilitation process. Elaborating on this conceptualization Skålén et al (2015: 139) defines '...service innovation as either the creation of new value propositions or the development of existing ones'. The process of service innovation commonly involves users. Users may be involved directly through cocreation. But the user perspective may also be accounted for by front-line employees as these cocreate value with users (Karlsson and Skålén 2015) or through observing users value cocreation *in situ* (Edvardsson et al 2012). Indeed, service innovation research commonly argues that integrating the user perspective benefits service innovation processes. This is so because successful service innovation commonly relies on both technology knowledge, that is an understanding of the limitations and the possibilities that technology provides which organizations' commonly possess, and use knowledge, which is knowledge regarding what the innovation shall accomplish and which commonly users possess (Magnusson 2009).

2.3. An elaborated PSDL framework of service innovation

The above elaboration of PSDL (Osborne et al. 2013) and the PSDL based public service innovation framework (Osborne and Strokosch 2013) enables presenting a PSDL based service innovation framework. The three different types of resource integration processes of SDL –users value creation, PSOs value facilitation and collaborative value cocreation – provides the backbone of this framework (see figure 1). Service innovation is accomplished by PSOs integrating resources into value propositions. PSOs integration of value propositions is assisted by users directly through value cocreation or indirectly through PSOs in different ways taking into account users experience of value creation.

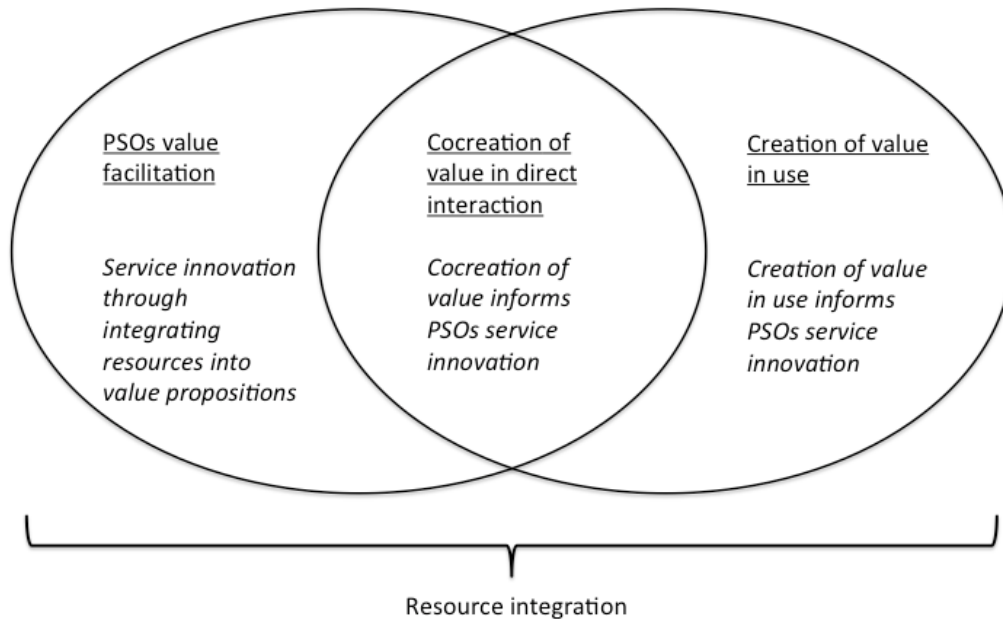


Figure 1: A PSDL based framework of service innovation

In the next section we apply the framework to a study of service innovation involving users and personnel in public primary care. We ask if the PSDL framework of service innovation depict how service innovation is conducted in practice.

3. Method

The present paper is based on a study of public service innovation in primary care; in particular the idea generation process is focused upon. The data is collected through observation and interviews with members of six service innovation groups. The service innovation groups consisted of five to nine patients (2 groups), personnel (2 groups), and a mix of personnel and patients (2 groups). Members of the groups were selected though a convenience sample in which patients and personnel of the groups signed up for participating in the innovation groups. Based on the personnel and patient that signed up for participation the researchers of the project selected participants with the aim of creating an even age and gender balance – the final selection were skewed towards woman on the personnel side (reflecting the uneven gender balance among personnel in primary care) and older people on the patient side (reflecting the skewed age balance among the customer base of primary care units). The task of the members of the service innovation groups was to present one idea for an innovation concerning the primary care unit they were associated with as employees or patients at each meeting. During the meeting the ideas were discussed and developed by the group members. The result was suggestions about how the value propositions of the primary care unit the group members belonged to could be developed.

In total 23 meetings were observed. All 23 meetings were also recorded and transcribed verbatim. In addition, 20 individual interviews were conducted with members of the service innovation groups. About half of the members were interviewed. The interviews focused on the members experience of participating to the service innovation groups. The interviews also reviewed the ideas that each interviewed participant

had contributed and they were asked to rank the ideas they had contributed in order of importance. Participants were also provided the opportunity to elaborate on their ideas.

The data analysis process was consistent with the emergent design and the constant comparative method (Strauss and Corbin 1998). Hence it was ongoing and iterative and the focus was on creating a reflexive process during which the research team could probe lessons learned from prior interviews, analyses, and theoretical exposure in order to inform the subsequent data collection, analysis, and theorizing.

180 ideas for innovations from the innovations groups were collected. These were coded into five general themes listed below. Listed are also some codes that build up the categories.

- Availability (availability)
 - Booking, telephone hours, opening hours, choosing language when telephoning.
- Patient experience
 - Self-care, security and trust, personal treatment.
- The physical environment
 - Reception, waiting-room, treatment rooms.
- Organization of work
 - Collaboration within and across units, ergonomics, it-systems/digital medical record system.
- Quality
 - Patients safety, competence development, treatment methods.

The data analysis was done with the PSDL framework of service innovation in mind (see figure 1, previous section). The aim of the coding was to empirically validate figure 1. Hence, focus was on if analysing if the key proposition that figure 1 makes is correct or not. In other words the focus was on if it is true or false that service innovation understood in terms of organizations development of value propositions stems from the three resource integration processes it depicts: value cocreation, value creation and value facilitation.

4. Findings

The figure below shows the distribution of ideas across the three types of innovation groups (personnel, patient and mix).

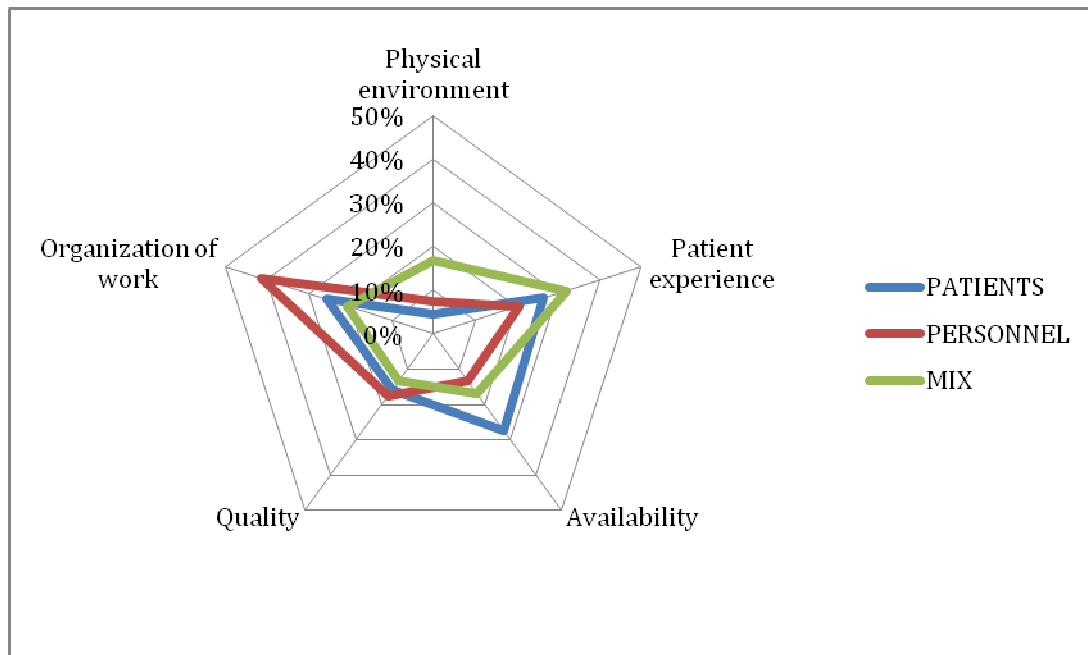


Figure 2: Comparison of the types of innovation groups related to the five themes

Next, the five themes are elaborated and discussed to illustrate the three processes of value creation; value facilitation, value co-creation and value in-use and how these are linked to service innovation. Accordingly the findings focus on the process of resource integration at the micro-level.

4.1. Availability

The ideas clustered around “availability” emanates, as displayed in figure 2, primarily from the users, that is the patient participants to the innovation groups, but also from the personnel as indicated by the score for the personnel and the mixed groups. The ideas pertaining to availability are typically illustrations of making it easier for patients to access primary care. In general these ideas concern “administrative availability” as a premise for getting medical care; for example setting up appointments and retrieving information.

The bulk of the ideas of the availability category stems from problems patients have experienced when trying to access primary care. In relation to figure 1 above, the ideas concerning availability primarily comes from the perspective of users’ value creation. The following quote describing an idea by a patient participant illustrates this.

I called the medical center today and after being held up in the queue for twenty-five minutes, the voice suddenly announced; “We are sorry to say that we can not take your call now, but leave a number we can reach you at”. So, after waiting for twenty-five minutes I am cut off and then I just thought of my idea for the innovation group that has to do with the technology of today. It should be easy to design a telephone system offering everyone in the telephone queue a possibility of a return call, instead of waiting for twenty-five minutes and then get cut off. [Patient, Innovation group 2].

An upgraded and more flexible telephone system would ease the availability to the medical center, hence improving value creation. Similar types of availability ideas for innovations are discussed in all of the innovation groups involving patients, and all have in common the need for reducing the time waiting in the telephone queue. With the availability-problem as a point of departure, different solutions are suggested and discussed within the innovation groups; like getting a text message stating the time one can expect a call, and separating incoming calls based on information needed: medical or administrative.

Although the ideas pertaining to availability primarily comes from patients/users and stems from problems these have encountered when creating value in use (cf figure 1), the personnel also contributes ideas for innovating primary care that has to do with availability. However, the ideas of the personnel stems from problems they have encountered when facilitating patients value creation in use. Hence, in relation to figure 1 the personnel's ideas pertaining to availability stems from the value facilitation in which PSOs integrate resources to solutions in order to assist users value creation in use. A case in point of availability ideas from personnel relates to how their work becomes harder as an effect of the lack of flexibility that existing telephone-systems creates at the primary care units. The following quote illustrate this:

This [patients waiting in phone-queue, authors remark] is difficult for us. It represents a problem, as we would like patients that are calling us to get help. [...] When people are forced to call us repeatedly, it is extremely frustrating for us. [...] We get stressed when we see so many patients held up in the telephone queue. [Personnel, Innovation group 1]

In conclusion, the analysis regarding the ideas for making primary care more available suggest that they stem from problems that patients perceive when creating value in use and problems that the personnel perceive when facilitating patients value creation. Few, if any, of the ideas regarding availability emerged from patients and personnel cocreating value in direct interaction.

4.2. Patient experience

The ideas comprising the theme "patient experience" concern primarily ideas from patient emerging from their experiences of interfacing with the medical center and the medical staff. In relation to figure 1 these ideas stems from patients creation of value in use. The ideas reflect the role of being a patient or being in the situation as a patient; e.g. an insecure and/or uncomfortable situation. Hence a lot of the ideas are triggered by patients need for confidentiality and the need for information: for example being able to address the receptionist confidentially, receive written information after surgery, "open house" for children to introduce them to medical centers and health care services. The following quote are from a patient and suggest that the primary care unit the patient attends should engage patients in motivation-conversations/groups;

We need to build peoples competences. [...] To have a motivation conversation about the fact that one might not take care of one self in the best and healthiest way. [...] Not every medical staff can have that kind of education, like different medical specialists. [...] I believe certain peo-

ple need this type of service and I think that these people come here to the medical centers. [Patient, Innovation group 1]

The patient talks about that lifestyle diseases such as obesity and stress becomes increasingly common in the society. From the patients own experience of dealing with such problems the patient concludes that it is importance to be motivated. The idea is picked up and elaborated by the personnel in the innovation group. What follows is two examples of such elaborations:

A key is to motivate the patients to think about their situation because they often have an idea themselves. [...] To create an insight for the patient without a sense of blame [talking about diseases like diabetes]. "If I eat that bun well than my sugar level will be sky high", and then the patient get depressed. But it is not that they cannot eat that bun, but more about the amount. And what counts is how we inform the patients and meet and talk with them. [Personnel 1, Innovations group 1]

But we need more resources. As it is now we do not have time. And we need to think differently, to develop it into a preventive service. For people before they get sick. [Personnel 2, Innovations group 1]

The elaborations from the personnel suggest that not only patients may contribute to generate ideas concerning patient experience, but the personnel may also do so. Figure 2 provides support to this interpretation as it shows that about 20 % of the patient experience ideas come from the personnel groups. When contributing to generate ideas regarding innovation of the patient experience, the personnel departs from their experience of cocreating value with patients. The first of the two quotes above from personnel illustrates this. However, contributions from personnel to patient experience ideas also relates to the value facilitation process. The second quote above from personnel 2 supports this interpretation as it concerns how resources needs to be added and integrated into value propositions that personnel may draw on to cocreate value with patients and that patients may enact to create value in use.

In sum the ideas of innovating the value propositions of primary care in order to improve the patient experience stems from patients value creation in use, the patients and the personnel's cocreation of value in direct interaction and from the personnel's experience of value facilitation. Hence, the ideas pertaining to patient experiences stems from all three resource integration processes suggested by figure 1.

4.3. Physical environment

The theme of physical environment entails ideas that foremost have to do with the service scape of the medial center. Hence the ideas of this category focus on how the physical environment in which a service process takes place impact value creation (Bitner 1992). The theme has some resemblance with the patients experience theme reported above but focus particularly on ideas for service innovation of primary care that has to do with the role of the physical environment. The ideas of the physical environment category primarily stems from experiences and problems patients and personnel has gained and encountered during cocreating value in direct interaction as this interaction takes place within and is heavily affected by the possibilities and limitations that the physical environment creates. Perhaps this is also why physi-

cal environment are over represented in the mixed groups comprising 20 % of the total in that type of group while it only makes up 9 % of the ideas of the personnel groups and 5 % of the ideas in the patient groups (see figure 2). In particular, the ideas for innovating primary care in this category has to do with the practical way of arranging and facilitating the physical environment of the interaction between actors, primary personnel and patients. Examples of ideas includes creating space for children to play while waiting for service, making information signs more user friendly and re-arranging the waiting-room. The following quote from a patient in one of the mixed groups illustrate the need for privacy for patients when interacting with the personnel at the medical center.

When I arrive here at the [primary care] unit and register at the reception, I feel exposed, as I know that a lot of people can listen to what I say. [...] If I have things to say that I feel are private and I would like to have a room where I can shut the door behind me. So, my idea is to rebuild the reception, so you are able to have some kind of shelter to talk to the contact person and to be able to do so undisturbed. I think it also would be positive for the other patients in the waiting area, so they don't have to listen to concerns that are private to me. [Patient 1, Innovation group 3]

The idea is recognized as a good solution to a known problem by the personnel in the innovation group; "There is a lot of patients that express the same problem [regarding lack of privacy, authors remark]", [Personnel, Innovation group 3]. The innovation group participants go on to discuss potential solutions to secure confidentiality for the patients in the reception area: "One could have one part that is open and one that is shielded. Then the patient could choose where to go depending on why she or he are there and what needs to be said to the receptionist" [Patient 2, Innovation group 3].

The idea from the patient clearly shows that physical environment ideas stems from patients and personnel cocreating value in direct interaction in a particular service scape, in this example the reception of the primary care unit. This is a general trait of the ideas for innovations in the physical environment category. However, the reported quotes in this section also suggest that ideas of the physical environment category ideas stems from problems of creating value in use due to the design of the service scape. For example the long quote from patient 2 suggest that the patient feels embarrassed by avowing some issues when other patients can listen which may lead to that the patient refrain from doing so. The quote from the personnel support this interpretation as the personnel suggest that the problem that patient 1 is pointing to is common among patients. In addition, the quote from patient 2 suggest that physical environment ideas relates to the value facilitation process as the patient suggest how resources needs to be reintegrated in order to address the problem that patient 1 raised. Hence, the physical environment ideas for service innovation relates to all the three resource integration processes depicted in figure 1 above, albeit the cocreation process is the most salient for these ideas.

4.4. Organization of work

The ideas categorized as "organization of work" are, not surprisingly, delivered primarily by the personnel – 33 % of the ideas stemming from the personnel group concerns organization of work while only 15 % of the ideas from the patient groups and

10 % from the mixed groups has to do with organization of work. This also implies that the bulk of the ideas regarding innovation of organization of work represents the personnel's internal perspective and thus is associated most closely with the resource integration process referred to as value facilitation in figure 1. Ideas regarding organization of work relates to how products and IT-solutions may be developed for conducting health service and suggestions of new working routines, e.g. summon patients to yearly physical examinations. The common denominator of the ideas is that they aim to develop new value propositions of the primary care units that patients may use to create value in use and which the personnel may draw on to cocreate value with patients. The following is a representative quote from the data:

There are patients that need leg-bath (pediluvium = medical term for footbath), but it is very difficult to arrange that for just one leg, when we don't have a bucket that is big enough and that will fit to knee-height. So, we need a big enough bucket or something that enables the patient to sit with one leg in the footbath [...]. Today patients get the treatment by applying the solution on compressive bandages; however, this does not provide the patient with the best care. [Personnel, Innovation group 3]

The idea for a new solution is based on the personnel's experience of facilitating value for patients – not from patient's value creation nor from the direct interaction between patients and personnel. This is a common denominator of the ideas in this category. However, the new value proposition that the patient suggest is not only intended to create better effects for personnel but also to improve patients value creation as the following quote indicates: "The work required to provide a patient's leg-bath is today demanding and heavy. We do the procedure many times, and it is tough for the back and the small buckets we have don't give the patients good care". [Personnel, Innovation group 3]

In sum, ideas for innovating the organization of work stems from the value facilitation process (see figure 1). Even when patients suggest ideas for innovating the organization of work these commonly stems from the value facilitation process as their ideas commonly departs from observations they have made of the internal work process of the primary care units. However, the ideas are intended to improve patient's value creation process.

4.5. Quality

The final theme, "quality", entail ideas that stem almost equally from all the three innovations groups, albeit with some more from the personnel group (see figure 2). The ideas covers a broad range of issues, such as establishing patients and personnel innovation groups on a regular basis, developing routines for sharing practices across primary care units, establishing routines for obtaining patient evaluations of services (e.g. surveys), and developing routines for communicating patient-relevant information (e.g. web-sites for the primary care units, pamphlets with practical tips and checklists). These ideas all have in common an ambition to improve the quality of the medical services in general for both the patients and for the personnel at the primary care units. An example of an idea for a service innovation pertaining to quality from one of the personnel attending one of the innovation groups is using iPads when examining patients.

It would be great if we could start using iPads or similar tablets. It would enable us to take pictures of for example skin-alterations and instantly send it further for expert examination, and to attach the picture to the patient's journal. [Personnel, Innovation group 1]

The proposed idea initiates a discussion amongst the personnel of the innovation group of how existing technology (like the iPad) would improve the quality of the pictures of skin-alterations, which in the current practice needs to be scanned to digital format that reduces the quality of the image. The discussion in the group also covers how tablets would improve the quality of care. For instance, it is suggested that the format of the tablet enables the personnel to easily carry it around and that it would be useful when interacting with patients; e.g. showing and/or explaining something to the patients. These elaborations of the original idea stems from the personnel's experience of value facilitation but also from problems they have experienced when cocreating value with patients such as lack of opportunity to display to patient images of their medical issues and how these could be treated.

Ideas presented under the theme of "quality" suggest how new value propositions may solve common problems for patients and personnel. In one innovation group the idea of introducing a "note for the doctor" is discussed. The idea was picked up by one of the personnel participants that visited an other primary care unit. "I wish we had a note that were presented for the patients before they came to the appointment that said; 'think about what you wish to discuss with the doctor'", [Personnel, Innovation group 4]. A note would help both the patients and the personnel to keep track of all the different issues that the patients wish to discuss, which otherwise can be missed. This is an idea that, as pointed out in the innovation group, will benefit both parties; "It will be helpful for the patients as well as us" [Personnel, Innovation group 4].

The ideas of innovating primary care in order to improve quality in general cover a variety of issues. The ideas stems mainly from the personnel experience from value facilitation, but also from the patients value creation in use (e.g. the need for more and better information) and from problems personnel and patients have experienced when cocreating value in direct interaction.

5. Discussion and contribution

Based on the findings we conclude that the PSDL based framework of service innovation outlined above (figure 1) describes how public service innovation is conducted in practice. By merging current developments of PSDL and the PSDL perspective on service innovation (Osborne et al 2013; 2014; Osborne and Strokosch 2013) with the notions of resource integration, the three key resource integration processes of value facilitation, value creation and value cocreation in particular, and the notion of value propositions key to SDL (Vargo and Lusch 2004; 2008; 2015) and for understanding service innovation from the perspective of SDL (Skålén et al 2015) the paper contributes with conceptual development. By grounding this conceptual development in data regarding service innovation in primary care the paper contribute to understand how service innovation is conducted in practice in a public management context. Specifically the paper shows that ideas stemming from internal value facilitation, patient's value creation and the value cocreation in direct interaction between personnel and

patients contributes to integrate new resources into value propositions, that is what Skålén et al (2015) refers to as service innovation. As such the paper contributes to the PSDL research agenda in public management (Osborne et al 2013; 2014; Osborne and Strokosch 2013).

It needs to be noted that not all empirical themes identified – Availability, Patient experience, The physical environment, Organization of work, and Quality – represents ideas for service innovation stemming from all three resource integration process of figure 1, that is value facilitation, value cocreation and value creation. However, taken together the ideas of the themes represent all these three resource integration processes and most themes represent all of them. Hence it shows that users/patients may contribute through experiences stemming from their value creation and value cocreation to public service innovation something that has been overlooked in previous public service innovation research. The paper furthermore suggests that the use knowledge of users and the technology knowledge of personnel is combined to create new service innovations, something that is supported by research conducted in the private sector (Karlsson and Skålén 2015; Magnusson 2009).

In sum the paper makes the following contributions:

- The paper contributes to articulate a PSDL-based service innovation framework.
- It also contributes by grounding this framework in an empirical study.
- In addition, it contributes by elaborating PSDL in such a way that may be drawn on to study public service innovation. This is accomplished by incorporating the notions of resource integration and value propositions with the PSDL framework.

As with all research this paper suffers from limitations that point towards extensions of the present research. First, the paper focuses on the idea generation process and does not include data about the implementation of ideas in practice. Hence, the paper does not actually show how ideas are used to develop the value propositions of primary care. Future research needs to focus on the implementation of ideas in practice in addition to idea generation to see if the ideas stemming from all three resource integration processes depicted in figure 1 is used to develop value propositions or if ideas from any of the processes is dominating. Second, the paper may be accused for having an internal focus as it defines service innovation as development of PSOs value propositions which are internal to the organizations. Service innovations may also take place in other actors spheres such as patients or other external stakeholders. Third, the paper is a study of a single context, that of primary care. Future research needs to broaden the perspective. Are the conclusions valid for all parts of the public sector?

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RESERVATION OF PEOPLE-PROCESSING SERVICES: WHAT DOES DIGITIZATION CHANGE?

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While advantages for platform providers (i.e., a share of the respective business) and merchants (i.e., increased operational efficiency) seem obvious, we know less about how customers respond to new forms of online services in traditionally less digitized areas. Drawing on the idea that customer involvement in a service delivery implies a greater degree of responsibility towards successful service execution, we investigate how different booking channels affect perceived booking risk and subsequently, the evaluation of the booking channel's usefulness and the intention to use. The results show that high involvement in booking traditionally less digitized services positively affects users' perceived booking risk and negatively affects users' intention to use the reservation service. Additionally, users' attitudes towards online reservation moderate the influence of involvement on perceived booking risk.

1. Introduction

Digitization has permeated many traditional industries and aspects of our private lives (MacDonald et al., 2015, Rosner et al., 2014). Examples include smartphone apps for navigating cities, online banking, submitting tax returns online, checking sports activities with special devices, and several other digital services. Recently, many booking services in less digitized areas have been transformed into online services as well. For example, while booking a flight or a hotel online has become "normal" (e.g., Bernardo et al., 2012, Khare; Handa, 2011, Morosan; Jeong, 2008), we observe a trend towards online reservation even in less digitized areas such as booking hairdresser appointments (e.g., Salonmeister), restaurant tables (e.g., book-a-table, Quandoo), doctor visits, and auto repairs. The rationale of such systems follows the rationale of booking a hotel or a flight: increased operational efficiency and service productivity for the vendor (Rust; Huang, 2012). In particular, hotels and airlines are confronted with the managerial challenge of optimizing their utilized capacity and minimizing marginal costs under capacity constraints. Analogously, restaurants and similar people-processing services in less digitized areas seek to optimize their efficiency by integrating information technology. For example, a hairdresser might be able to serve customers more effectively when personnel are not completing phone reservations, as customers self-book merchants' online calendars. However, in contrast to large companies such as hotel chains or airlines, a single merchant possesses limited resources to invest in digitization and technology-enabled service produc-

tivity. Platforms such as ‘book-a-table’ capitalize on this situation by offering small service providers a scalable mechanism to increase productivity and utilized capacity. A scalable mechanism does not require large investments from merchants beforehand and charges payment based on usage (e.g., a small fee per successful reservation). The potential of these platform approaches is mirrored in a vital venture capital activity. For example, Quandoo, a Berlin-based portal for online reservations, was recently bought by Japanese investors for 200 million Euros (Venturevillage, 2015).

Whereas the advantage for both the platform provider (i.e., a share of the respective business) and the merchant (i.e., increased operational efficiency) seems obvious, we know less about how customers respond to these new forms of online services. The success of these new emerging business models hinges on if and why customers switch from phone to online bookings (Simon; Usunier 2007).

Research on self-service technology (e.g., Bitner et al., 2002, Meuter et al., 2000) may be useful for investigating online reservation services in general and online reservations for less digitized services in particular. This stream of research suggests that customers are no longer passive receivers of (digital) services but actively participate in their creation (Bettencourt, 1997, Meuter et al., 2000, Meuter et al., 2005). According to Ennew and Binks (1999), participation generally comprises three broad dimensions: information sharing, responsible behavior and personal interaction. Specifically, customers must share information with a service provider (or the technology mirroring the provider) to receive personalized treatment (Heidenreich et al., 2014). Responsible behavior implies that customers recognize their duty and responsibility of being an important part of the service delivery process (Ennew; Binks, 1999). Finally, as Yen and colleagues (2004, 9) highlight, “personal interaction [...] implies that relationship elements such as trust, support, cooperation, and commitment will be present or emerge.”

Drawing on the idea that involvement in a service implies a greater degree of responsibility towards successful service delivery, this research investigates how involvement in different booking channels affects perceived booking risk and subsequently, the evaluation of the booking channel’s usefulness and the intention to use. The remainder of this paper is structured as follows. First, we review literature concerning self-service technologies to develop a set of hypotheses concerning involvement and online reservation preference in less-digitized services. Second, we report a pretest of perceptions of complex versus simple services. Third, we provide results of a 2 (involvement in terms of booking channel: online vs. phone) x 2 (service complexity: high vs. low) experimental survey design. Finally, we discuss the implications of these results for both management theory and practice.

2. Background and Hypotheses

Research on self-services technologies (SST) has a long tradition. Whereas early research related to self-services did not distinguish technology-based from labor-intensive services (e.g., Bateson, 1985), later research on technology-based self-services revealed contrasting results. Researchers such as Meuter et al. (2000) or Robertson et al. (2016) find that the absence of service personnel might lead to customer satisfaction under specific conditions. Other streams of the literature advocate

that an attitude towards human interaction in service encounters will impede the adoption of SSTs (e.g., Dabholkar; Bagozzi, 2002). Researchers further suggest that convenience is a major adoption factor (Berry et al., 2002, Collier; Kimes, 2013).

An emerging form of SSTs is online reservation for services that are usually less permeated by technological advancement. Although there is reason to believe that motives and drivers to adopt such technologies are similar to those for more mature forms of SSTs (i.e., automated teller machines (ATM)), one might also surmise that the non-digitized nature of the actual service exerts an additional influence on adoption or rejection. As for many other SSTs, we do not predict an either-or relationship between online reservation and other forms of booking reservations but accept their coexistence. Relatedly, Simon and Usunier (2007) maintain that people develop a preference for one form of service (e.g., SST vs. employee-contact service) but do not necessarily boycott the alternative. However, for merchants, it is important to know which factors increase usage of the online reservation alternative, as online reservations beget multiple advantages (e.g., reduced costs, increased operational efficiency).

Research has further differentiated service types in terms of involvement. For example, Bitner et al. (1997) distinguish among low involvement, which requires customers to be present during service delivery, moderate involvement, for which customer inputs are crucial to perform a service, and high involvement, where customers co-create the service. In this study, we treat online reservations for less digitized services as a high involvement scenario compared with a phone reservation, as the customer's responsibility to the online booking service is higher (e.g., typing in the correct names and dates). We argue that the form of involvement will affect the perceived booking risk and subsequently, the usefulness of and the intention to use the booking service. We concentrate on usefulness and intention to use because these parameters are among the most studied in adoption research (McKenna et al., 2013). We further control for service complexity, as more complex services might affect role clarity and perceived risk (Cunningham et al. 2005). The conceptual framework of our research is shown in Figure 1.

-- Please insert Figure 1 about here --

Involvement in service delivery creates responsibility for service execution. For example, customers tend to attribute successful service experiences to themselves and unsuccessful outcomes to the service provider (Dong et al. 2008, Zeithaml; Bitner, 2003, Hilton et al. 2013). This tendency holds with regard to technology-mediated co-created services (Heidenreich et al., 2014). Thus, customers possess specific responsibilities in participative services such as online reservations. Research on responsibility suggests that people generally avoid responsibilities when possible (e.g., Riess; Schlenker, 1977). As phone reservations are typically valid alternatives involving less responsibility for successful service execution, a high involvement in the booking process will lower evaluations of perceived usefulness and limit the degree of usage intention. We therefore hypothesize:

H1: A high (vs. low) involvement in booking processes, in terms of online (vs. phone) reservations, will negatively (vs. positively) affect the intention to use the booking system.

H2: A high (vs. low) involvement in booking processes, in terms of online (vs. phone) reservations, will negatively (vs. positively) affect the perceived usefulness of the booking system.

Another oft-cited outcome of involvement and adoption in the literature is perceived risk (Im et al., 2008). Generally, perceived risk reflects customers' sense of uncertainty regarding the consequences of buying a good or service (Flanagin et al., 2014, Mitchell; Vassos, 1998, Sweeney et al., 1999). The related literature is concerned with various forms of risk, such as financial risk, situational risk, psychological risk, general risk, and performance risk. While many forms of risk may be connected to the scenario of online reservation of less digitized services, we focus on performance risk, defined as the possibility that the technology does not perform as designed and advertised to perform, with the implication of not delivering the desired value (Featherman; Pavlou, 2003). In this respect, high involvement in terms of online versus phone bookings might also be associated with higher performance risk due to increased responsibility because of the technological newness and the technological complexity of online bookings compared with phone bookings. We therefore hypothesize:

H3: A high (vs. low) involvement in booking processes, in terms of online (vs. phone) reservations, will positively (vs. negatively) affect the perceived booking risk.

Indirect effects of being involved in booking a less digitized service are also possible. There is reason to believe that whereas involvement lowers usefulness and the intention to use, it increases associated perceptions of risk, which themselves determine the evaluation of usefulness and the intention to use (Cunningham et al., 2005). Specifically, as involvement is hypothesized to affect perceived booking risk, risk might affect both the evaluation of usefulness and the intention to use. Adoption literature has identified risk as a major impediment to adopting technological products and services (Curran; Meuter, 2005, Lee; Allaway, 2002, Walker et al., 2002). Thus, although direct effects of involvement on usefulness and the intention to use might exist, it is the associated perceived booking risk that ultimately converts involvement in a service into the intention to adopt or to reject the booking system. We therefore hypothesize:

H4: The path from high (vs. low) involvement in booking processes to the intention to use will be mediated by perceived booking risk.

H5: The paths from high (vs. low) involvement in booking processes to perceived usefulness will be mediated by the perceived booking risk.

Research on the effectiveness of SST has identified consumer traits such as novelty-seeking, self-efficacy while using SST, self-consciousness, and the need for interaction with an employee as important determinants of SST adoption (Oyedele; Simpson, 2007, Dabholkar; Bagozzi, 2002). Similarly, social presence, defined as the extent to which a medium allows users to experience others as psychologically present (Fulk et al., 1987), has been studied in the context of SSTs (Hassanein; Head, 2007). Typically, personality traits become attitudes once people have evaluated a product or service (Aizen, 1987). For online reservations of less digitized services, people often already possess pre-adoption experiences for making reservations in terms of interactions with employees (e.g., calling to make a reservation for a hairdresser) and specific forms of technology-mediated booking (e.g., booking a flight online, ordering a pizza online) (Curran; Meuter, 2005). There is reason to believe that customers

already possess formed attitudes in relation to online reservations (and interactions with employees). We therefore surmise that an attitude towards online reservation (ATOR) and an attitude towards interaction with a service employee (ATEI) might affect how customers evaluate associated risks of booking, whether online or via phone. Specifically, customers who exhibit high levels of ATOR might evaluate online reservation for less digitized services as less risky in terms of performance risk than might other customers. Customers who feel more comfortable when interacting with service personnel (i.e., customers high on ATEI) might interpret their involvement in new forms of online reservations such as online reservations of less digitized services as riskier than might other types of customers. We therefore hypothesize:

H6: The relationship between high (vs. low) involvement and the perceived booking risk is moderated by attitudes towards online reservation such that the relationship is stronger for customers scoring low on attitudes towards online reservations.

H7: The relationship between high (vs. low) involvement and the perceived booking risk is moderated by attitudes towards employee interaction such that the relationship is stronger for customers scoring high on attitudes towards interactions with service employees.

3. Methodology

3.1. Pretest

As we aimed to control for service complexity in reservation scenarios, we began this research by assessing which types of services are perceived as complex versus less complex or simple. To recruit participants, we created a HIT on Amazon Mechanical Turk (MTurk) that asked participants to complete a survey. Participants were recruited with a posting that read: "Answer a short survey on different services; takes 2 min at maximum". As a requirement for participation, workers had to be US-based citizens with a minimum HIT approval rate of 95% on at least 100 tasks (Oppenheimer et al. 2009). We offered a compensation of US\$0.20 for completed tasks, amounting to US\$6 per hour, and asked for 85 responses. We did not include questions on controls and demographics but included an attention check question that read "please answer the following question with 'disagree'", as recommended by Peer et al. (2014).

Participants were required to evaluate four different types of services, namely, restaurant, hairdresser, car workshop, and dentist. This selection was motivated by service contexts for which online reservations have recently become available, and thus, services for which online booking is comparably new (compared with booking flights or hotels). Each service was accompanied by a description of an average service in the respective area and a picture illustrating the main purpose of the service. On five point-Likert-scales, MTurk workers evaluated each service in terms of attitude towards the service, associated risk with using the service, switching costs, involvement, and complexity. After excluding inattentive respondents (i.e., respondents who failed to pass the attention check), our sample contained 72 MTurk workers. Because we were particularly interested in service complexity, MTurk workers were asked to rank services along a continuum from very complex to not complex at all. The associated question read: "Which of the following services would you consider the most

complex from a customer point of view? Please rank.” If a respondent, for example, ranked restaurants least complex and dentists most complex, restaurants would receive a value of 4, whereas dentists would receive a value of 1. With this procedure, dentists achieved a mean score of 1.57; car workshops, 2.21; hairdressers, 2.79; and restaurants, 3.43. These results indicate that booking a dentist service is regarded as more complex in terms of customer involvement compared with booking a car workshop, a hairdresser appointment, or a table at a restaurant. According to this ranking, the difference in complexity of booking restaurants and booking dentists is greatest, so we used restaurants and dentists as proxies for simple and complex services, respectively.

3.2. Research Design and measures

To test the hypotheses, we relied on a 2x2 between-subject scenario-based experimental research design. In particular, we manipulated involvement in terms of the booking channel (online vs. phone) and the service complexity (dentist vs. restaurant). For each of the four cases, we provided a short scenario stating that respondents should imagine they are booking a reservation for their favourite restaurant or a trusted dentist. This approach was based on the logic that respondents are willing to book a reservation particularly when they are familiar with the provider. Finally, the scenario stated whether respondents should imagine calling the service provider or using a newly introduced online reservation system. The online scenario included screenshots of existing reservation platforms for physicians and restaurants to make the situation more realistic. Participants were randomly assigned to one of four experimental groups.

Before respondents experienced the stimulus, they were required to answer questions concerning whether they had used online reservation systems before, their attitude towards online reservations and interactions with employees, the intensity with which they use the respective service, and their demographics, such as age, gender, and education. To measure attitudes (i.e., ATOR and ATEI), we used semantic differentials, following Heise (1970, see Appendix I). ATOR was checked by asking respondents to evaluate online booking (e.g., booking concert tickets or hotel rooms) in general. Similarly, respondents were asked to rate how important they perceive interaction with employees during the reservation process.

After respondents read and became familiar with the scenario (the next button was invisible for 25 seconds), they answered a set of questions that included model variables and manipulation check questions. For all constructs, we used seven-point-Likert scales ranging from ‘1’ = fully disagree to ‘7’ = fully agree. To measure the booking risk, we relied on the notion of performance risk (e.g., Kaplan et al., 1974) and used three items adapted from Curran and Meuter (2005). Usefulness was also captured by items inspired by Curran and Meuter (2005). The items were adapted to the context and to compare booking at a desk (for both online and phone bookings). Finally, the intention to use was measured with a single item that read: “I would use this way of booking the service”. The items, factor loadings, and reliabilities for the scales are specified in Appendix I.

The survey also contained various questions on demographics and potential control variables. Apart from gender, age, and education, we captured respondents’ frequency of usage of the respective service (not the booking option) on a scale from ‘1’ = very seldom to ‘7’ = very often.

3.3. Sample

We recruited participants with the help of two trained student assistants. The assistants posted the link to our online survey on various Internet platforms, such as Facebook and Twitter, using their personal and friends' networks. While this approach poses disadvantages in terms of representativeness, it is advantageous for finding an appropriate number of respondents who are familiar with online booking and reservation. To obtain a sufficient number of responses, participants could agree to be considered for a raffle for one of five Amazon vouchers worth \$10 each. In total, 589 individuals clicked the survey link. However, only 308 individuals completed the entire survey, resulting in a completion rate of 52.3%. Of these 308 responses, we excluded 26 responses for reasons of failing attention check questions (e.g., "Please answer the following question with 'disagree'") or failing to recall the scenario, which was shown to them (e.g., incorrect answers to "what kind of service was described in the scenario" and "how did you have to book your service in the scenario"). The remaining 282 responses represent 155 male responses and 127 female responses. The demographic structure mirrors the sampling strategy: two respondents younger than 18 years; 166 respondents between 18 and 25 years; 80 respondents between 26 and 35 years; 15 respondents between 36 and 45 years; 16 respondents between 46 and 55 years; 6 respondents between 56 and 65 years; and no respondent older than 65 years. In terms of education, 16 respondents possessed a basic high school degree; 30 respondents had completed an apprenticeship; 139 respondents had a university-entrance diploma; 90 respondents had a college degree; and nine respondents preferred not to indicate their highest degree of education.

Due to dropouts and inattentive respondents, the cells are not equally sized. The restaurant/online group received 66 responses; the restaurant/phone group received 66 responses; the dentist/online group received 72 responses; and the dentist/phone group received 75 responses.

3.4. Manipulation checks

To determine whether our experimental design captures degrees of service complexity with respect to the booking channel, we conducted manipulation checks. Service complexity was assessed by a single item that read "Consider making a reservation for this type of reservation at a desk. How complex would you rate the process?" and that was scored from '1' = simple to '5' = complex. The dentist scenario should reflect a complex service while a restaurant scenario should represent a comparably less complex service. Following Perdue and Summers (1986), ANOVA tests were conducted to check whether the manipulation was successful. As expected, the results indicated that a dentist service is more complex than a restaurant service (complexity: $M_{\text{Restaurant}} = 2.63$ (SD = 1.22) and $M_{\text{Dentist}} = 3.31$ (SD = 1.30), $F(1,280) = 20.169$, $p < .001$). Similarly, we assessed whether the manipulation of phone vs. online reservations generated differences by measuring involvement. According to various streams of literature, online services require a higher level of customer involvement compared with offline services (e.g., Bitner et al., 1997, Meuter et al., 2005). We measured involvement with a single item that read "Compared to the service provider, my participation in the reservation process is higher" on a 7-point-Lickert-scale ranging from 1 = 'fully disagree' to 7 = 'fully agree'. Respondents reported significantly higher levels of involvement for online reservations compared with phone reservations, indicating that the manipulation of booking channels was

successful ($M_{\text{Phone}} = 3.61$ (SD = 1.72) and $M_{\text{Online}} = 4.36$ (SD = 1.73), $F(1,280) = 13.357$, $p < .001$). Overall, these findings provide evidence of a successful manipulation due to our experimental design.

4. Results

First, we assessed whether our measures capture what they should by conducting a confirmatory factor analysis (CFA) for variables consisting of multiple items. Thus, we integrated 14 items representing booking risk, usefulness, ATOR, and ATEI into an AMOS CFA model and a maximum likelihood estimator. The resulting model fit the data reasonably well, as indicated by the following statistics: $\chi^2/df = 1.492$, goodness-of-fit-index (GFI) = .95, comparative fit index (CFI) = .99, and root-mean-square-error-of-approximation (RMSEA) = .041. All constructs revealed satisfactory item reliability (Composite reliability $> .7$ for all constructs). Except usefulness, which had an average variance extracted (AVE) of .48, all constructs revealed an AVE greater than 50%. Additionally, all square roots of AVEs exceeded any correlation with any construct in support of discriminant validity (Fornell; Larcker, 1981). Table 1 displays all correlations, AVEs, and square roots of the AVEs in italics.

-- Please insert Table 1 about here --

We predicted that involvement in a service in terms of a booking channel (online vs. phone) affected the perceived booking risk, the usefulness, and the intention to use. We tested these predictions with ANOVAs (see Tables 2-4). We formulated neither hypotheses concerning the complexity of services nor interaction hypotheses. However, we report results for service complexity and interaction effects to provide a complete picture. First, the intention to use was hypothesized to be affected by involvement (i.e., booking channel: online vs. phone). The results of an ANOVA supported this hypothesis ($F_{\text{involvement}}(1,280) = 13.302$, $p < .001$, $\eta^2 = 0.046$). Service complexity did not affect the intention to use, nor did the interaction of involvement and service complexity (Table 2). For usefulness, the results show that the outcome is unaffected by involvement (Table 3). Finally, the perceived booking risk (Table 4) is affected by involvement in terms of the booking channel ($F_{\text{involvement}}(1,280) = 26.323$, $p < .001$, $\eta^2 = 0.086$) and the service complexity (dentist vs. restaurant) ($F_{\text{complexity}}(1,280) = 5.010$, $p < .05$, $\eta^2 = 0.018$). Thus, whereas H1 and H3 are supported, H2 received no support.

-- Please insert Table 2 about here --

-- Please insert Table 3 about here --

-- Please insert Table 4 about here --

4.1. Mediation results

Hypotheses 4 and 5 predicted the indirect effects of involvement on both usefulness and intention to use. Specifically, based on theoretical insights, we predicted that the perceived booking risk would mediate this relationship. To test our prediction, we used the SPSS macro PROCESS, which can calculate indirect effects and confidence intervals (Hayes, 2013). The results of this procedure are presented in Table

5. First, we regressed booking risk on involvement and included age, gender, use intensity, service complexity (manipulated as dentist vs. restaurant), ATOR, and ATEI as control variables (Model 1). Consistent with H3 and Table 4, involvement had a significant effect on booking risk; a first indicator of mediation. Second, involvement was used as the independent variable, whereas intention to use and usefulness functioned as dependent variables (Models 2 and 3). The results revealed that involvement affects neither usefulness nor intention to use when the perceived booking risk is introduced to the model. In turn, booking risk is associated with usefulness ($b = -.42$, $se = .05$) and intention to use ($b = -.62$, $se = .06$), thus definitively indicating a mediation effect. To further quantify this mediation effect, specific indirect effects were calculated with 1000 bootstrap samples (Preacher & Hayes, 2004). The indirect effect of involvement on usefulness was significant ($b = -.35$, $se = .07$), as indicated by a bootstrap confidence interval that does not include zero (LLBI = $-.5363$; ULBI = $-.2178$). Similarly, the indirect effect of involvement on intention to use was significant ($b = -.51$, $se = .12$; LLBI = $-.7726$; ULBI: $-.2910$). In summary, the regression results and the indirect effects support H4 and H5. Recall that the direct effect on usefulness as predicted in H2 was not significant, whereas the indirect effect is (H5). This finding resonates with the suggestion by Zhao et al. (2010), who maintain that mediation might exist even in the absence of a significant direct effect.

-- Please insert Table 5 about here --

4.2. Moderation results

We predicted two moderation effects on the relationship between booking channel and booking risk, namely, the effects of ATEI and ATOR. We conducted two separate regression analyses in PROCESS to discern whether such moderation effects exist. First, to assess the moderation effect of ATEI (H7), we modeled the booking channel (online vs. phone) as the independent variable and the booking risk as the dependent variable. We further integrated controls such as age, gender, use intensity, service complexity, and ATOR. We then integrated the moderator, that is, ATEI, as well as the booking channel x ATEI interaction. Both components of the interaction were mean centered prior to their integration into the model (Echambadi; Hess 2007). The resulting regression analyses revealed an explained variance of $R^2 = .14$ in booking risk. Except ATOR ($b = -.23$ (.10), $p < .05$), no predictor was significant. The independent variable booking channel (online vs. phone) is significantly related to booking risk ($b = .82$ (.16), $p < .001$). The moderator ATEI has a significant effect on booking risk ($b = -.21$ (.09), $p < .05$), whereas the interaction term has no effect ($b = .05$ (.18), n.s.), thus indicating the absence of a moderation effect of ATEI.

Second, to test for the moderation of ATOR, we followed the same procedure. The same set of controls were used, but ATOR was replaced by ATEI and vice versa. A regression analysis in PROCESS with the booking channel as the independent variable and ATOR as the moderator explained approximately 16% of the variance in booking risk. The booking channel (online vs. phone) had a significant effect on booking risk ($b = .82$ (.15), $p < .001$), as did ATOR ($b = -.24$ (.10), $p < .05$). In contrast to the regression analysis with ATEI as a moderator, here, the involvement x ATOR interaction had a significant effect on booking risk ($b = -.66$ (.20), $p < .01$), thus indicating a moderation effect and H6. To further analyze the moderation effect, we first followed Spiller et al. (2013) and compared different regions of the moderator; we then used simple slope analyses (Aiken & West 1991). For low levels (-1SD) and medium

levels of ATOR, the relationship between booking channel and booking risk is significant ($b_{low} = 1.32 (.21)$, $p < .001$; $b_{medium} = .82 (.15)$, $p < .001$). For high levels of ATOR, the relationship is insignificant ($b_{high} = .32 (.22)$, n.s). Moreover, the simple slopes for low and high values of ATOR indicate that customers with a low value of ATOR show significantly higher values of booking risk in the online scenario, whereas no difference was observed in the phone scenario (Figure 2).

-- Please insert Figure 2 about here --

5. Discussion

This study began by discussing how new forms of online reservation services for less digitized people-processing services differ from well-known self-service and e-service technologies. Acknowledging that the new forms of online reservation might prompt user behaviour to deviate from behaviour known for SSTs and e-services, we employed an experimental scenario-based survey design to investigate how booking less digitized services online differs from making phone reservations. Drawing on the idea that involvement in service execution implies responsibility, the results show that booking online is associated with higher performance risk perceptions and a lower intention to use the reservation service. Additionally, ATOR was found to moderate the relationship between involvement in a booking channel and perceived booking risk such that people with a positive attitude towards online reservation in general evaluate online bookings for less digitized services as less risky. Surprisingly, service complexity influenced neither booking risk nor usefulness or intention to use.

5.1. Implications for management

Management practice might benefit from these results in the following ways. First, these results indicate that customers prefer making phone reservations compared with online reservations when booking less digitized people-processing services, such reservations for restaurants and dentists. This result is supported by the fact the people report lower levels of associated risks and higher levels of intention to use for phone reservations compared with online reservations. Thus, merchants that intend to install online reservation systems must be aware of the fact that people might continue making phone reservations and thus must prepare service personnel to respond to customer calls.

Second, this research provides implications for triggering online reservations of less-digitized services. Here, merchants are advised to incentivize customers to book online to change preferences in booking behavior towards the online alternative (Simon & Usunier, 2007). These incentives should differ for people who book for the first time (ex-ante incentives) versus frequent online booking customers (ex-post incentives). Additionally, the fact that ATOR acts as a moderator as it reduces the effect of involvement on booking risk may lend support for advertising customers high on ATOR first. To assess which customers are high on ATOR, merchants could include corresponding questions on feedback cards. These customers might act as market mavens and recommend the booking service to late adopters. Similarly, merchants or reservation platform operators could identify customers who are generally reluctant to adopt new products on services based on scales measuring passive in-

novation resistance (Heidenreich; Kraemer, 2015). Passive innovation resistance refers to individuals' inclination to resist changes in general, apart from specific product or service innovations. Identifying these customers may facilitate a more prudent use of marketing budgets.

5.2. Limitations and avenues for further research

As with all research, this research has limitations. First, in terms of sampling, respondents for the main study were recruited via online channels. Accordingly, the respondents are likely to possess a specific attitude towards the online world in general. While this recruitment strategy was partly intended to capture the intentional behavior of people already familiar with online reservations, future research could nevertheless investigate how individuals who are not digital natives respond to an experimental design such as the one employed in this study. Additionally, this study built on parts of the e-service adoption literature but did not use established concepts such as the technology acceptance model in their fullest sense. Future research therefore could replicate the findings using less parsimonious theoretical models. Finally, as with other studies on service adoption (e.g., Wang et al., 2006), this study captured only intentional behavior, yet no real booking behavior. Although the link between intentional behavior and actual behavior is known to exist, this link is nevertheless typically mediated by context-specific factors. Thus, future research could investigate mediation and moderation effects concerning the relationship between intentional and real behavior in booking less digitized services online.

6. Conclusion

This study is among the first studies to address the adoption of online reservations for less digitized people-processing services. In particular, a scenario-based experiment differentiated whether customers made an online reservation or a phone reservation. The study furthermore distinguished a rather complex service (i.e., visiting the dentist) from a comparatively simple service (i.e., restaurant dining). The results indicate that the booking channel affects associated performance risks and subsequently, the intention to use the respective booking channel. Additionally, customers who already possess a positive attitude towards online reservation in general perceive online bookings to be less risky compared with customers who do not possess a positive attitude.

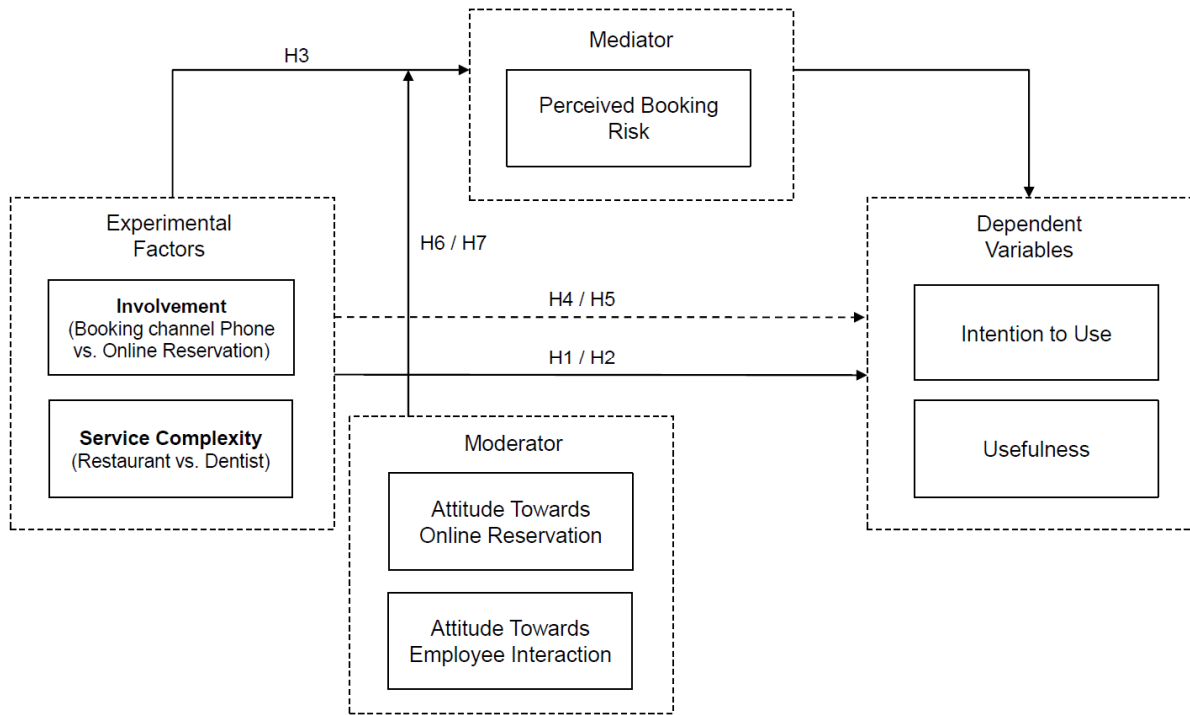


Figure 1. Proposed conceptual model

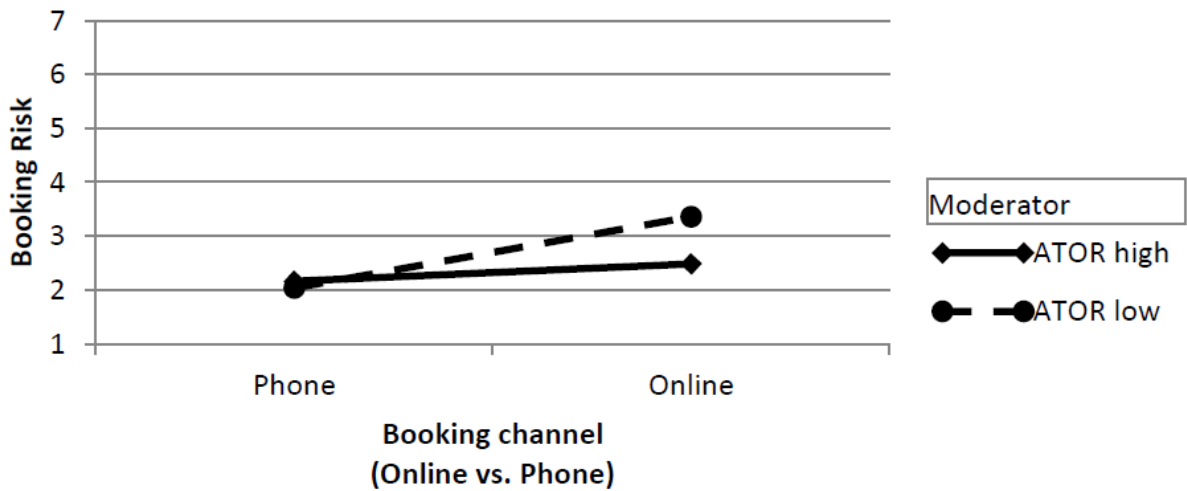


Figure 2. Simple slope analysis

Table 1. Correlations of multi-item scales

	CR	AVE	Usefulness	Booking risk	ATOR	ATEI
Usefulness	0.72	0.48	0.69			
Booking risk	0.89	0.73	-0.46	0.85		
ATOR	0.91	0.78	0.25	-0.11	0.88	
ATEI	0.92	0.78	0.10	-0.14	0.10	0.89

Table 2. Mean values of intention to use and results of the ANOVA (DV: Int. to use)

	Involvement (I)		F		
	Low: Phone	High: Online	C	I	C × I
Service Complexity (C)					
High: Dentist	6.21 (1.30)	5.26 (1.89)			
Low: Restaurant	5.88 (1.56)	5.44 (1.63)	0.16	13.302***	1.78

Table 3. Mean values of usefulness and results of the ANOVA (DV: Usefulness)

	Involvement (I)		F		
	Low: Phone	High: Online	C	I	C × I
Service Complexity (C)					
High: Dentist	5.45 (1.30)	5.17 (1.33)			
Low: Restaurant	5.46 (1.22)	5.34 (1.12)	0.392	1.688	0.299

Table 4. Mean values of booking risk and results of the ANOVA (DV: Booking Risk)

	Involvement (I)		F		
	Low: Phone	High: Online	C	I	C × I
Service Complexity (C)					
High: Dentist	1.86 (1.05)	2.82 (1.40)			
Low: Restaurant	2.36 (1.39)	3.01 (1.41)	5.010*	26.323***	1.016

Table 5. Mediation results

	Model 1	Model 2	Model 3	
	Booking Risk	Usefulness	Intention to use	
<i>Independent variable</i>				
Involvement (high vs. low)	.83 (.15)***	.14 (.14)	-.20 (.16)	
<i>Mediator</i>				
Booking Risk		-.42 (.05)***	-.62 (.06)***	H4/H5
<i>Controls</i>				
Age	-.08 (.08)	.01 (.07)	.09 (.08)	
Gender	-.10 (.15)	-.16 (.13)	.32 (.16)*	
Use intensity	.03 (.07)	.02 (.06)	.06 (.07)	
Service complexity (high vs. low)	-.33 (.19)	-.20 (.16)	.02 (.21)	
ATOR	-.21 (.10)*	.31 (.08)***	.39 (.10)***	
ATEI	-.21 (.09)*	.02 (.08)	-.02 (.09)	
R ²	.14	.27	.36	
N	282	282	282	

Note: ***p < .001, **p < .01, *p < .05, and +p < .1

Appendix I. Items, factor loadings and reliability

	Factor Loadings (CFA)
<i>Booking Risk</i>	
I feel safe when using this type of reservation. (R)	.87
I am sure that my reservation is entered correctly. (R)	.90
There are only fewer hazards that something goes wrong when using this reservation. (R)	.78
<i>Usefulness</i>	
This form of reservation is useful.	.86
Compared with a reservation at a front desk, this form of reservation is more convenient.	.50
Compared with a reservation at a front desk, this form of reservation makes reservations simpler.	.65
<i>Attitude towards online reservation</i>	
In general, I regard booking online (e.g., hotel rooms, flights) as...	
bad – good	.87

negative – positive	.98
useless – useful	.79

Attitude towards employee interaction

In general, I regard interaction with employees (e.g., having an opportunity to specify my demands) during a purchase as...

bad – good	.93
negative – positive	.91
useless – useful	.81

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REVIVING DIY: THE IMPORTANCE OF DO IT YOURSELF TO THE PORTUGUESE ALTERNATIVE ROCK SCENE⁵⁹

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The approach of DIY music careers lies in the premise that music is a unifying pole of activities, clustering a diversity of practices and lifestyles around it. The analysis of musical production is usually based on an entrepreneurial perspective about creative workers and, specifically, about the musicians. In this context, it can be useful to revisit one of the core values of the punk subculture, the DIY ethos, based on empowerment, on taking possession of the means of production, as an alternative to mainstream production circuits. Starting from the case of three projects - Filho Único, Haus and Hey, Pachuco! - we explore the relevance of do it yourself logics and procedures in the construction and maintenance of musical careers in the alternative rock, considering their impact on Lisbon metropolitan area's music alternative scenes.

1. Introduction

The approach of DIY music careers is usually based upon the premise that music is a unifying pole of activities, which can be understood as a cluster of interrelated traded and untraded activities, which structure, on one hand, the revenue and income sources of those persons, and on the other hand their lifestyles and daily lives, as well as their reputation in the respective art world. The analysis of musical production is based on an entrepreneurial perspective about creative workers and, specifically, about the musicians. Several authors have paid particular attention to the 'new independents', freelancers workers involved in a logic of reducing specialization and promoting multiple skills, which makes them simultaneously assume the role of musicians, producers, designers and promoters, generating contamination between various artistic-creative sub-sectors, challenging boundaries between the professional and the amateur in a social sphere marked by relational densification (Hennion,

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Maisonneuve and Gomart, 2000; Leadbeater and Oakley, 1999). This is particularly true when the differences between work and leisure, supply and demand, traded and untraded interdependencies progressively blur, in institutional contexts marked by project oriented work, labour flexibility, collective knowledge accumulation based on interest interdependencies and complex territorially embedded regulation mechanisms (e.g. O'Connor and Wynne, 1996; Scott, 2000; Caves, 2002; Costa, 2008; Borges and Costa, 2012).

This emphasis can be related to the exercise of social theory to revisit one of the core values of the punk subculture, the DIY ethos, based on empowerment, on taking possession of the means of production, as an alternative to mainstream production circuits. It's about mobilizing DIY skills (strength, achievement, freedom, collective action) as new standards to promote employability, managing the uncertainty and precariousness of this option in terms of building a professional career.

In the contemporary fluid landscapes of music creation and music consumption, and seizing in particular the advantages of digitalization and technologic progresses in production and dissemination mechanisms, artist-producers-gatekeepers collectives structure their activities, formal and informally, in this kind of practice, assuming its ethos and philosophy, but also its economic advantages, for the affirmation of their cultural goods as well as their reputational assets within their art worlds. Both in the middle of the main creative milieus of the city or in the peripheries of the urban core, they develop their specialized activity, strongly networked, both at local and international levels, around the creation, presentation, dissemination, production, and legitimation of musical manifestations (both at supply and demand sides) which relate to their specific aesthetic and creative purposes. From the promotion of gigs, events and festivals to the daily promotion and nurturing of a lively scene in each of the places they are anchored in, they develop a persistent DIY-based activity which explores those principles as tools for their competitiveness in their "market segments" and for the symbolic affirmation within their artistic worlds.

Starting from the case of three cultural associations (Filho Único, HAUS and Hey, Pachuco!) which are exemplary of these principles and DIY ethos, we explore in this paper the relevance of do it yourself logics and procedures in the construction and maintenance of musical careers in the alternative rock scenes, considering their impact on Lisbon metropolitan area's musical art worlds. The analysis is based on a variety of methodologies and techniques, including in-deep interviews with each scene's protagonists, ethnographic observation and media and bibliographic reviewing.

In next section a discussion on DIY and its evolution in contemporary music scenes is made, framing, from a more theoretical perspective, the set for the empirical analysis. Sections three, four and five present the three cases which were studied, respectively, Filho Único Association, HAUS project and Hey, Pachuco!. Finally, a brief conclusive note systematizes some of the achievements obtained so far with this research.

2. DIY today

Both, the DIY acronym and the expression in English "do it yourself" are current, being also used the expression in Portuguese "faz por ti próprio" (do for/it yourself). In this context it refers to a musical production way far symbolically separated from the phonographic industry and professional circuits and ideologically motivated (Guerra, 2013, 2014). It is not always easy to date, if that is possible, precisely the emergence of an idea. However, it is possible to establish some key moments: first, in 1957, largely due to the action of International Situationist, a cluster of various artists, with Guy Debord standing out amongst them, who had as main objective to rebel "against the dominant discourses, images and ideas of capitalist consumer culture, (...), and sought to incite a revolution, employing cultural tactics that exposed contradictions and openly criticized the society" (Downes, 2010: 3).

A second moment is the 1970 crisis, characterized by a break period in exchange rates, wage freeze, and economic stagnation led to the British artists of the poor class to be even more disenchanted with the state and its inability to cope with the crisis. This has led the United Kingdom to the formation of new youth sociability movements, particularly in punk, with Sex Pistols, which simultaneously served as a foundation of social explosion, and an inducer of fear in the general society (Holtzman *et al*, 2007).

This apparent death of punk gave new life to the counterculture. However, and in the United States that gave rise to several local scenes in communities, suburbs and cities, united by a DIY spirit. All they repudiated the influence of capitalism, and began to create their musical and cultural production networks, with the intention to move away from capitalism and its institutions (Holtzman *et al*, 2007). This is the approach around the DIY gained greater importance because of the general trend towards a post materialism in developed industrial societies and even a feeling widely shared in the 80s and 90s: that the the old radical politics was no longer able to cope with the forces of capitalist globalization (Císar and Koubek, 2012).

And this appreciation of the sense of community of amateur musical practice goes hand in hand with the connotation of marginality. On the one hand, musical marginality, to claim the young musicians in a unique artistic expression, authentic experience - not without contradictions and ambiguities - contrasted with the market and the dominant musical conventions. On the other hand, the connotation of marginality related to the social condition of the young musicians in terms of symbolic challenge to the authority and youth rebellion conveyed through music, whether at the level of use of music as a political mobilization tool of identifiable social groups (which is more visible in more politicized musical genres and socially cut form punk or rap) (see Silva and Guerra, 2015; Humeau, 2011).

More, we can analyze this space as being of multiple socialization, a social sphere in which stratification factors, such as class or school capital are played in a context of symbolic trial, opening the possibility of new practices and cultural backgrounds. The musical self-production circuits form a plurality of spaces for socialization, character-

ized by diverse symbolic codes - according to different musical genres, youth culture, social environment, urban environment, degree of approach to professional circles, among other factors (Laing, 2015; Martin-Iverson, 2014; Guerra and Bennett, 2015)

That said, what does this concept mean? What is its range? Is it only about music? Some authors do not fail to notice that it is a term that is not without its ambiguities, but may be confined to a particular ethics to guide the activities of movements fighting for the autonomy and independence of a society geared to consumption (Guerra and Quintela, 2014).

Similarly, a first approach may refer to the creation of a symbolic alternative creating a self-empowered space, a space of mutual aid and alternative social organizations (Kuhn, 2010). Or associative and recreational practices organized by the participants themselves in a process of empowerment and capacity to impact on personal life project and in the struggle for gender equality. More than anything, the DIY serves as a counterforce to neoliberalism.

However, this is only part of the story. We have to take into account, likewise, questions that refer to alternative forms of socialization (new forms of education and establishment of community families); rejection of corporations, business chains and multinational companies; emphasis in the media and alternative information channels offered; compared with the strategies of direct action; alternative housing system (squats, cooperatives); practices of DIY participatory culture in computer learning, both in concepts and capabilities. The program is particularly relevant, giving the creator the ability to manipulate the environment in which it moves the establishment of the computer, adapt it, and reinterpret experiences with ecological principles, doing gardening, repairs and recycling, music and preserving their own food; adult education, etc. (Hemphill & Leskowitz, 2013; Guerra and Quintela, 2014, 2016).

And despite being a dimension that was not present in the above mentioned two moments, the truth is that the Internet, and contacts for it enabled, revolutionize the DIY (Guerra, 2015 and 2010; Guerra and Silva, 2015). It is commonly accepted that technological advances such as the Internet, greatly benefited the movement facilitating the contact with other punk scenes worldwide. However, if it created more contact, it also created more division within the punk genres (Moran, 2010).

How we could not stop talking, we have to stress the importance of zines to spread the movement. Non-commercial, small circulation, punk zines served primarily to establish communication between the various scenes, expanding to a forum where people could discuss some topics covered by the media (O'Hara, 1999). Respondents are focused and give value to this kind of attitude, because it is a time of recovery and appropriation of something distant and seized by capitalism - the publication (Bryant, 2014; Hemphill & Leskowitz, 2012). The value of zines is not only the external and internal encouragement of producer and the reader, through a production that seeks to express passions, knowledge and frustrations through a DIY artistic creation (Holtzman *et al*, 2007).

About the piracy, for example, Hemphill & Leskowitz (2013) they mention their radical character, marked by issues such as pirate radio stations and their meaning - return power to the masses and creators without corporations as the media. Equally relevant is the fact that the public does not have to pay for information. (Hemphill & Leskowitz, 2013). There is also here the prospect of creating a lasting documentation of the event, that is, DIY videos valued in their ability to replicate the feeling of being on the show, being understood as gifts within the explicitly non-mercantile or non-commodified systems of exchange, ending by providing a point of contact between individual users, fan communities and bands (Guerra, 2010 and 2015).

About the *skillshares*, the authors note as it has been one of DIY marks and the creation of free unions in events where volunteers create workshops on a capacity to control and dominate, from civil disobedience to work with wood. Equally remarkable, radical study groups are another way to share this type of accumulated knowledge - and serve a purpose of disseminating information gathered by traditional channels. In this sense, therefore, the DIY of these groups involves the formation of a community of practice. With regard to the Internet and open source materials, participants' responses tend to point to democratization projects, pointing out the online groups as self-educated communities. Moreover, the creation of tools such as wikis and open source allows for even greater democratization of the internet (Hemphill and Leskowitz, 2012).

Is interesting the research on DIY scene of Baltimore, by Eversley, which analyzes the nation-state from a perspective rarely addressed: those who managed to escape the merger of the state and understand that the nation-state draws a clear distinction between those who accept their control, the civilized, and those who are not under its jurisdiction, the barbarians. But this barbarism is nothing more than the resistance to the incorporation by the state apparatus and the pursuit of freedom out of this apparatus (Eversley, 2014: 51).

And it appears that DIY ethics in Baltimore, where it seeks to escape the control and surveillance state seeking to achieve greater autonomy. But the relationship is now more complex, because there is no clear division between state and non-state spaces. There is no clear rejection of power and state control, they know that this is not plausible. There is a clear choice for legal places where they operate, thereby to avoid the constant police operations against illegal or semi-legal sites (Eversley, 2014: 52).

Here Eversley, relying in Houston (2008) introduces the term rebel citizenship, that is, the use of citizenship as a "sphere of resistance, agency and contestation" (Eversley, 2014: 52). And transposing this concept to the DIY scene of Baltimore, the author defines it "as the use of space for purposes other than its original intent and at the same time, subverting the hegemonic patterns of productive citizenship (productive citizenship)" (Eversley, 2014: 53). Therefore, we can establish a horizontal policy, without any kind of leader. It is a form of protest against what is regarded as the cooptation of states by large multinationals and their inability to deal with the problems of people. So, the answer is an organization that allows people the ability to organize the society in a the bottom up way (Eversley, 2014: 75).

Thus, the "DIY punk scene resembles the direct democracy in the sense that the musicians are free to organize their own spectacles if they can find a space or collaborate with others from the DIY community" (Eversley, 2014: 76). And this horizontality policy has clear implications in terms of sociability in the DIY community. First, the barrier between audience and artists is overthrown; second, there is an intimacy that "permeates the whole social environment in punk shows, and thus promotes a hyper-social atmosphere" (Eversley, 2014: 76). That is, as Moran notes: DIY is revealed as an ethical principle and can be summed up in a phrase "made by fans for fans". So one of the consequences mentioned by Eversley is that the barriers between audience and artists are felled; second, there is an intimacy in punk gigs, and which therefore promotes an atmosphere of strong sociality and conviviality.

3. Cultural Association Filho Único

The Cultural Association Filho Único emerged in early 2007 in Lisbon. It is a project of two young brothers (at that time with less than 30 years old) who always were related to music. Music was present in their lives since their childhood. One of them even started to write about music with 18 years old in a webzine called 'Putada Subjectividade', because he hated everything which was written about music in the traditional press. And this is already a form of materialization of the DIY logic. It has to do with the recognition that the existing means don't have the expected quality and because of that, people should do something to fill that gap (Dale, 2008). He also worked in a record store and through this job and the webzine he started knowing several people related to music. The other became Dj with 18 years old and began to organize some parties. Later and for three years, both worked together at Galeria Zé dos Bois (ZdB), a non-profit organization created by a civic initiative which is also an art centre and a space of musical fruition and dissemination, based in an eighteenth-century palace in the heart of Bairro Alto, Lisbon (which is generally consensually recognized as one of the main central cultural agents in "alternative" performing and visual art worlds in Portugal). They were responsible for programming and curating concerts. Like they say, to work at ZdB meant a kind of 'knowledge avalanche'. Almost all people with whom they had contact were musicians or were somehow related to music. Nowadays their network of social relations also revolves around the music – musicians, journalists, people from labels and distributors. Their lives are about music: they make music, they write about music in several national and international publications, they promote concerts and their cultural consumption and leisure time are mainly related to music. Everything intersects with music allowing them to be connected to it in an increasingly broadly, dense and rich way.

Having music such a relevant role and presence in their lives, in 2007 they decided to create the Cultural Association Filho Único. This decision is related to their personal tastes, with their way of being and their attitude in general. After the work at ZdB, they felt the need and the desire to seek new approaches even because they detected a gap in the market – the city had big gaps at the alternative and independent music level. There were few concerts and little promotion.

Lisbon was a desert in terms of independent music, underground music. And I'm specifying that niche because it was a very large gap, which was sorely lacking to complete, it was a desert. (...) what made us create this is still a huge need to continue to do what nobody else does.

Filho Único co-founder

In fact, several authors associate DIY to a specific action regime or model of work within the subjects tend to assume different roles in order to meet specific needs. It may be the need to do something that nobody else does (Bradley, 2004; Hein, 2012), or the need to act without many resources and to make money doing something that we really like, here in the case of artistic creation dissolving the distinction of art from commerce (Eversley, 2014; Reitsamer, 2011). DIY emerge as an alternative answer when the dominant logics and procedures don't work, when there is a gap, when people think they can do something to improve the surrounding environment. That's what Pete Bradley describes about Nottingham and his decision to create 'Enjoy the Ride', an initiative that 'offers an autonomous space for an audio-visual celebration of art, music, poetry, film and, generally, anything creative' (Bradley, 2004:180). The project began with a shared perspective about the lack of venues and promoters in the city. Bradley was looking for a space to showcase his latest audio-visual work and was given the opportunity to put on a show at the café-bar where he worked. With the help of a network of artists, creatives and friends, Bradley created an experimental night called 'Enjoy the Ride', in which he and other artists show or perform some of their work. The first night was a success and he decided to transform this experience into a regular, monthly celebration.

The Cultural Association Filho Único appeared in a similar way. Considering the existence of failures in the programming and distribution of independent music and leveraging the knowledge and the relational network constructed through previous work experiences, the two brothers created their own and independent structure of communication and programming of independent music. They became at the same time artists, programmers, mediators and this is exactly the logic underlying the functioning of the association.

I think we're in a rebuilding and redesign process. I think the future, and already the present, is you create independent communication structures, you as an artist, as a developer. It's to create diffusion organs completely independent of the press and audio-visual hierarchy. It's you "destroy" the importance of these people and you being the artist or the programmer and at the same time, the mediator of what you do, because if you are really good and know what you're doing, you know communicate what you do better than anyone.

Filho Único co-founder

The main objectives of the association are the presentation, promotion, production, edition, display and integration of all musical manifestations which are governed by

aesthetically progressive creative purposes. The association seeks to promote, organize and produce events of things seen as the result of a progressive thinking, an attempt to aesthetic achievement. It seeks to integrate the more creative and daring music otherwise in people's lives and is nowadays a very important agent of the Portuguese alternative rock scene, an essential reference in terms of alternative culture promotion.

If today, the words 'indie' and 'independent' are commonly taken only to be connotative of a musical style, here and like in the earlier punk and post-punk period we are using them to denote a specific way of work separateness from the major labels, from the main agents, from the dominant logics. In this kind of perspective, the word 'indie' and the expression DIY are at the same time connected with the creation of an alternative and with an empowerment and action process. DIY skills (strength, achievement, freedom, and collective action), logics and procedures enable these musicians and cultural promoters to create and promote what they want and what they think is important to the city's cultural scene. In another words DIY skills, logics and procedures can be seen as an empowerment and autonomy tool, as a way to work independently in relation to established standards and hierarchies, taking control of the entire process. But this does not mean that some success factors such as competence, focus on results, and all the work and all efforts around visibility, legitimacy and impact of the project are disregarded. In general terms, they are identified as some of the key success factors in this sector and therefore articulated with the DIY logic and procedures.

At Filho Único we have temporal, intellectual and emotional freedom (...) We can do what we really want, which is absolutely essential for the cultural, intellectual, spiritual and social life of the city.

Filho Único co-founder

Actually, we can say that nowadays Filho Único is a successful project and despite its beginning in a more independent spectrum, has experienced a path characterized by a certain institutionalization. Today the cultural association is composed by seven elements and works in continuous and integrated collaboration with various public and private cultural agents all over the country. During all these years of experience, and being part of its working model, we must highlight the issue of proximity to the various cultural agents with whom Filho Único works. Not only the cognitive proximity, which means a common set of ethics, civic principles and goals, but also the physical or geographical one. This leads us to the existence of an atmosphere shared by a community and to the possibilities of creation of networks, essential to the success of this kind of projects. In the beginning Filho Único was located at Bica, a central area of Lisbon downtown near to Bairro Alto, assumed as the closer case to what is referred as a creative or cultural neighborhood and recognized by the association's founders as the "only truly creative centre of this country," where is everyone - musicians, visual artists, programmers, promoters and all the others cultural agents (cf. Costa, 2007, 2013 on this). Today Filho Único is located at Pólo Cultural das Gaivotas, a new centre of artistic creation, with offices and rehearsal rooms for projects in the areas of theatre, dance and music. The space is managed by the city

council and entirely dedicated to the cultural sector, promoting synergies between the various projects.

As we said previously, today Cultural Association Filho Único has a recognized work in terms of the alternative musical offer and it has already begun to have an impact on a new generation of musicians, promoters, musical producers and labels of Lisbon whose work is inspired by the DIY ethos and procedures. And this is something that the founders of the project always wanted: to have impact on other people and to change something that is not working correctly, showing that it is possible to act. That's one of the main DIY principles.

So I did to add. I did to change. I did to have an impact on people. And it was always because of that I started to work, because I want to change something. There is something I don't like and I want to change it. I think this is the civic duty of the people. Put themselves in situations and positions of power where they have a lot of property and knowledge about a particular thing and act constructively, in an ethically correct and constructively way on this.

Filho Único co-founder

4. HAUS Project

Also in a central area of Lisbon, near the river and the train station, we find another cultural project in which are present the DIY principles and mechanisms. HAUS, open since 2015, is at the same time a recording studio, a set of rehearsal rooms, a space for agency and production of concerts and other shows and also a place where the relations between music and brands are explored. Actually, its founders see the project as a music centre where are concentrated different and complementary valences and whereby they play different roles going to meet the horizontal policy idea of Eversley (2014).

The business model reflects also that community attitude. It is not a linear studio. HAUS is organized as a music centre, because we would like to add the maximum of skills and solutions to our experience of music. It's crucial to have a place to rehearse, a place where you may come and talk about the experience of doing with other people. The fact that the bands are together, feeds and inspires many things and this is fundamental. To have a place with quality for someone help you to record your music in the best possible way is also very important. To have someone who can help you and take you to the road or think with you about the best ways to promote what you're doing is also crucial.

HAUS co-founder

The project results entirely of a previous musical career, made together by the four founders of HAUS⁶⁰. It emerges from the desire to share with other musicians the knowledge acquired in years of studio and road. Therefore, the project is based on a community spirit and experience exchange. It can be seen as a way and a space of transmission, accumulation and co-creation of knowledge. Something made by a group of people thinking about alternative forms of the Portuguese musicians create and manage forms of expression and income. Therefore, this is a project that seeks ways of sustainability not only to the elements that integrate it, but also for other musicians related to it. As we said before, HAUS can be understood as an important space of socialization based on a deep symbiosis between the people who attend it. They form a community of affections, consisting of people united around the same principles and objectives, which is something characteristic of the independent and DIY ways of doing - the creation of an atmosphere of strong sociability and conviviality, essential to the creation and management of musical careers.

We are together. We all have valences, consciousness and complementary knowledge, so we will join in because it's easier. This idea of symbiosis is natural and it depends on affinities and affections. (...) It only happens so because we know each other and we work together for a long time. And this is another marker of the independent and DIY scene. It's a chemical, an affinity that brings people together. The idea of community of affections applies here perfectly. There are not the shared goals of profit or whatever. It is the fact that people get along and want to do the same things or to go to the same places or want to share the experience of making music together.

HAUS co-founder

In this sense we can say that HAUS arises from a DIY attitude and a way of doing. Its founders, all of them with musical careers linked to punk and hardcore, did not wait, did not ask for support, they acted mobilizing its background, the knowledge, the tools, the networks of relationships they had and, above all, the fact that they were not afraid to fail. Above all it is the idea of DIY as a tool for autonomy and independence and as a way of empowerment.

In an article which reflects about the possibility of DIY be considered a counterculture, Hein (2012) shows that the punk rock scene has demystified the cultural production process, underlining the capacity everyone has to become a cultural agent. This dynamic is translated into DIY, a system of action that presided over the development of a punk entrepreneurship, relatively independent from the mainstream recording industry. In fact, the author speaks about the development of an "alternative economy" entrepreneurship. In this perspective, he says DIY shows that it is possible to develop a cultural business directed to a specific niche maintaining the punk's values can thus be considered a counterculture. DIY can promote the self-production of a cultural or musical scene taking part of an empowerment process, an awareness of

⁶⁰ Apart from other older bands, currently they have a common band, called PAUS.

action capacity. The involvement in DIY ethos encourages people to invent and innovate. In some way, it promotes experimentation and creativity, but as Hein underlines this dynamic depends on the actors' determination to create and to 'make the product'⁶¹. Actors have to learn to identify the resources, to be aware to the opportunities and to build their own strategies. DIY can be seen as an empowerment process through which a person or a group acquire the necessary resources to reinforce their action capacity and to emancipate themselves. So this empowerment process emerges as promotor of creativity. Therefore, we can say HAUS is a space and a project which promotes this empowerment and stimulates creative freedom through the possibilities of share provided. This leads us to the importance of do it together and of the role of creative community for the creation of musical careers. This perspective is based on a relational approach of music, understood as a collective creation, a product of the connection between the different elements that composed the worlds of music (Guerra, 2015; Crossley & Bottero, 2015; Crossley, McAndrew, & Widdop, 2014; Mcandrew & Everett, 2015).

The fact that we do together implies to be with friends, to be with someone who is motivating you. That's why communities evolve faster. Who learn together, evolves faster because you have this side of comparison, of healthy competition and motivation.

HAUS co-founder

As evidenced earlier, and as recognized by the elements that compose HAUS, the particular DIY ethics which guide the activities and services developed by this project allows a democratization of the ways to create and consume music. It demystifies the traditional idea about all the resources needed to have a band or to release a record, contributing to the proliferation of the idea that everyone can do it (Dale, 2010). At the same time, this promotes the breakdown of barriers between audience and artists.

The DIY spirit implies that if you are a fan, you must feel inspired to do. It is a very recurrent discourse. 'If he does, I also can do.' (...) To do is more important than a career or whatever, so it is because of that DIY is a super breeding ground for many people who are working today because it demystified it to match. It leveled the aspirations, because somehow the entertainment system until the 90s was a more or less diagonal thing. The artist was someone unattainable, superhuman (...) 'This is not for everyone.' The idea of being very difficult meant that the records and the concerts were the closest people could be to the artists. DIY dismantles it. You do not need to know how to play to have a band, you do not need to know how to write to have a fanzine. What matters is that you do and your perspective is very important. And this gives a lot of creative and expression freedom of creating new discourses, new vocabularies, new techniques.

⁶¹ Reference to the music *I make the product*, from the Desperate Bicycles, an English punk band pioneered the do-it-yourself ethic. The music belongs to the EP *New Cross, New Cross*, released in 1978.

HAUS co-founder

These changes are boosted with technological advances and the proliferation of Internet and of various social networks. Authors such as Oliver and Green have been working on the self-sufficiency of the DIY artist and the role of new technological tools at this level (Oliver & Green, 2009; Oliver, 2010). They show how important is to use all relevant tools in terms of databases, social networking, education, training and communication. These information systems are essential to the fulfillment of creative activities. They introduce new forms of collaborative thinking, act as self-promotion tools of creative activities and enhance networking with other musicians and fans. In this way, they contribute to a profound change in modes of creation and interaction. Through these new technologies, artists and fans have the same opportunities for communication, information sharing and visibility. In their daily work, members of Haus mobilize recurrently these tools.

Internet and then the technology that follows it facilitate the production of cultural products. Suddenly we are no longer dependent of many thousands of euros to rent a studio. The digital printing methods, the share of information on these networks and the democratization not only of the information but also of the technology allowed more people start working with a DIY spirit because it was easier to be independent.

HAUS co-founder

5. Hey, Pachuco! Cultural Association⁶²

Already in the outskirts of Lisbon, but belonging to the metropolitan area, we highlight another cultural association, Hey, Pachuco!. Headquartered in Barreiro, on the south margin of the Tagus River, the association exists since 2000. It started its activities first as an informal group of young people and, in 2005, was formally constituted as an association. It works to promote a new image of Barreiro: that of a young city full of life, with an ideal location for the growth of a cultural event of urban nature. Today it is renowned for being the producer of one of the most prestigious European rock'n'roll festivals, Barreiro Rocks. At the same time, it also works as an editor, essentially releasing the work of bands and artists of the city moving in rock musical sphere. To these projects we can add the Music Factory [Fábrica de Música] and the Young Musicians Program [Programa de Jovens Músicos].

Starting by the festival, over its fifteen years Barreiro Rocks has to position itself as an international reference, being one of the most popular in the circuit of European festivals of rock'n'roll. Apart from the quality of the artists and bands who take the

⁶² The approach of this case study results from an exploratory analysis conducted until this moment using the analysis of institutional information about the association and press articles regarding the same and its projects.

stage, the festival stands out for its atmosphere. This one is characterized by the festive atmosphere and the celebration of friendship among those on stage and the audience. In fact, this is a festival in which the audience is composed by musicians and in which the musicians are also audience. Indeed, the festival began as a way to give an opportunity to play to the new groups of the Hey, Pachuco! label and eventually became a 'structure' for these and other groups could develop their projects in a more consistent and objective manner. To this it was essential the festival presentation parties around the country (and not only) and the creation of networks with other associations and festivals, promoting an exchange of ideas and musicians and even creating a circuit essential to the creation and management of the careers of these artists. At the same time, it proved to be crucial the quality of the bands presented and the bet not only in big international names but also in the bands of the city and of the country. In other words, the combination of established foreign groups and local bands proved to be strategic (Fast Eddie Nelson, 2015; Lopes, 2015b). As we said, today the festival is a reference, always aware and involved in the promotion of the names that stand out and the emerging names in the underground and rock'n'roll ball sphere (Lopes, 2015a).

Music Factory is another project developed by the association since 2012. It is a platform for the promotion of artistic creation of the county. Its main objective is to create synergies between the companies and the musicians on the south margin of the Tagus River, in particular by supporting the creation of projects of social inclusion through music. These supports pass through funding spaces for rehearsal, recording, editing, merchandising, tours, among others. Physically, this project is located in the King Studio, a music studio, which provides the facilities and equipment necessary and that gives their experience in organizing and promoting bands, events and actions of social inclusion. The project has been developed with the support of the Municipality of Barreiro.

Another project developed by the association is the Young Musicians Program, created in 2012 to stimulate musical creation in the south of the Tagus River, more specifically in the city of Barreiro. This project is a partnership between the Music Factory and Baía do Tejo, a public company dedicated to the management of the development of the real estate of a set of large brownfield areas in the periphery of Lisbona metropolitan area (the "Lisbon South Bay", as they branded it), whose mission is to enhance and develop their territories, promoting its urban and environmental improvement, pursuing simultaneously the Business Parks management activity located in the municipalities of Barreiro, Seixal and Almada. It arises from the aim to overcome a previously identified gap (the lack of a free rehearsal space) that can be assumed as an obstacle to artistic aspirations, particularly of young creators. In this sense, the program offers to all young people of the South margin of Tagus River the possibility to use a fully equipped rehearsal room (King Studio) without costs for the ones enrolled in the program. The objective of this project is to energize and explore all the musical creative power in the region.

The creation of Hey, Pachuco! Cultural Association is closely related to the associative dimension strongly present in Barreiro. There are numerous associations in the city, with specific modes of relationship, which act as social cohesion factors and which encourage participation. There is therefore a collectively accumulated and

shared large associative tradition that is assumed as an important cultural heritage, particularly for the current cultural and artistic projects (Belanciano, 2010). Basically, the size of the association intersects with some of the DIY values and principles previously explored. We speak of the idea of promoting forms of music production alternatives to mainstream circuits, because of an ideological question, or because it is easier the access to these non-conventional mechanisms. We also speak of the sense of community and the importance of networks for artistic creation and promotion. And of course we talk about the empowerment process very inspired in this associative dynamics, and that led the association's founders to start the project, albeit with limited resources.

Within this cultural heritage, music has always played an important role. During the dictatorship music was linked to the associative movement, with singers repressed by the authorities palying in the associations, providing a cultural offer that was not anywhere else (Belanciano, 2010). Nowadays the musical offer of the city, particularly the one that is promoted by Hey, Pachuco! and by Barreiro Rocks Festival, is also associated with very specific sounds. At the same time, alongside the festival, it is also recognized the proliferation of numerous musical projects, many of them located in the 'most exuberant languages of rock' (Belanciano, 2010).

In addition to this 'inspiration' in the cultural heritage of associations, Hey, Pachuco! is also perceived as a result of the explosion of possibilities brought on the one hand by DIY principles, and on the other by technological innovations which, as we said, democratized the access to forms of music production (Fast Eddie Nelson, 2015). Like labels such as Bee Keeper did in the 90s Bee Keeper, in 2000 surge is created Hey, Pachuco!, first as a label and later as an association and events promoter.

With a beginning essentially marked by DIY ethics and procedures, Hey, Pachuco! is nowadays an association with a set of activities recognized and supported by local political and economic powers, and with an important role in the transformation and conversion of the city and its identity. At the same time, through the opportunities it provides, people already recognize the influence of the association in promoting a new generation of bands that have formed and began playing more regularly inspired by the dynamics surrounding the Barreiro Rocks Festival and supported by the Young Musicians Program. In other words, it's already possible to peak about the existence of new musical projects that result from the fact that the association have shown that there are always alternative ways of doing things and that what is really important is to do, to act, or to 'make the product', as Desperate Bicycles would say (Duarte, 2015).

6. Conclusion

As a result of the comparative analysis of these three case studies, we can take some ideas that give us a relatively clear panorama of some of the DIY mechanisms that base music services provision in contemporaneity, particularly if we focus on the specific case of alternative rock scenes.

On one hand, we can see clearly traces of this DIY ethos in the analysis of these agents' labor's logics. The 'new independents' that are the paradigm of this kind of activities and practices can be seen as freelancer workers reducing specialization and promoting and seizing multiple skills, enabling them to assume, formally or informally, the role of musicians, producers, designers, promoters, generating contamination between various artistic-creative sub-sectors, and challenging boundaries between the professional and the amateur in a social sphere marked by relational densification, where the thin borders between work and leisure tend also to blur and disappear. The artist-creator-consumer, seen here as a real entrepreneur of himself (cf Borges and Costa, 2012), between production and consumption, between symbolic subject and symbolic object, between vocation and opportunities, affirms himself in the core of these collaborative processes, and builds his/her "career" and professional trajectory in a self-built milieu which is constructed, progressively, generating and exploring successive opportunities of self-capability-building, collective empowerment, and reinforcement of self-autonomy. Collective learning mechanisms and shared knowledge accumulation are here fundamental, like in any creative milieu in general, including all the symbolic aspects, and thus gatekeeping functions and reputation building mechanisms are also an important part always strongly explored in these DIY mechanisms.

On the other hand, we can also see clearly the DIY in the analysis of the competitive advantages of these values and processes as part of the development of alternatives to mainstream production circuits. Highly specialized and strongly connected in networks, both locally and externally, these DIY circuits are a very efficient way to affirm the specificities of the difference (aesthetic, artistic, symbolic, processual, or other) that is explored as an economic competitive advantage in the structuring of the markets for the goods and services that are produced by these creators. These circuits are a way affirming and exploring business opportunities, linked to certain market niches, based on differentiation and distinction (in the goods and services, in the way that are experienced, in the symbolic distinction their consumption conveys, etc.), and to seize their higher risk propensity (compared with mainstream activities and players – see Caves, 2002) rooted in their ability to operate their specific knowledge, and manage their reputation.

In this context, we argue that the mobilization of traditionally acknowledged DIY skills (strength, achievement, freedom, collective action) enable these actors to promote a certain kind of "employability" (but not necessarily the formal one we are used to), managing through time the uncertainty and precariousness of this option in terms of building a professional career. They develop a kind of self-sufficiency, in the construction of their trajectories and life paths, which is reinforced by the degree of integration in a specific milieu or scene they are into, locally and externally articulated through an extension of network mechanisms, both at material and symbolic levels. There is a tendency to link this autonomy to technologic evolution. However self-sufficiency is not just technologic. That is a part, which is decisively enabled in the music field by digitalization processes and internet, in recent decades, but, mostly, these self-sufficiency mechanisms come from the ability to build and manage economic, symbolic, cultural and social procedures that enable the agents to provide a space of autonomy from other hegemonic forces in each of those fields (from mainstream markets to social control or to the symbolic over-legitimization in certain art worlds), and DIY procedures give many tools for enabling this.

A final word must be addressed to the role of the specific personalities and strong charismatic leadership in each of the projects which were analyzed. We are fully aware of the importance of the specific creative milieus and scenes where each of these experiences is embedded, as well as of the importance of the “collectives” each of them assume (and is genuinely convinced) to be. But the strong “charisma”, “vocation” or “leadership” qualities of some of their members, crossing often several artistic collectives and different kinds of activities, is definitely an aspect which will need further inquiry.

Naturally, these and other exploratory conclusions will be tested and developed, in further work, both with the in-deepening of these case studies, and with the analysis of other associations and interesting cases, in the scope of a broader on-going research project, in which these aspects will be furthered disentangled.

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SERVICE DOMINANT ARCHITECTURE BASED ON S-D LOGIC FOR MASTERING DIGITAL TRANSFORMATION: THE CASE OF AN INSURANCE COMPANY

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Digitalization and digital transformation requires dramatic change of the enterprise information systems. Today, digitization and related technology trends promise new opportunities but imposes as well certain threat for many businesses. Majority of traditional companies still lacks clear digital strategy because struggling with thorough understanding of the phenomenon digitization. S-D logic provides clarification and explanation concerning the strategic implications of and working mechanisms behind digitally enabled business models and offerings. The paper conceptualizes a service architecture, here defined as Service Dominated Architecture (SDA), because its central purpose is to mobilize resources necessary for service-dominated, customer-centric solutions. The case of insurance companies serves as explorative case and hands-on example as it illustrates how companies can transform their businesses to enable novel value propositions.

1. Motivation

Digitalization and digital transformation requires dramatic change of the enterprise IT. New technology trends promise new opportunities. Employees, business partners and customers have to be engaged through a new generation of enterprise IT systems (Arthur, 2009; Weill and Woerner, 2015; Moore, 2011). Today, customers expect companies to offer digital solutions to excel in customer orientation, through interactive offerings and digital-enabled services, in a way they are used to it from their private and daily lives. However, business appear to lag behind digital developments as they stick to fulfil compliance of internal regulations and their existing IT assets. Service-dominant (S-D) logic serve as a core of digital strategies that emphasize the development of innovative services. In particular, digital strategies focus on the digital transformation, which is a prerequisite for success in the long term. S-D logic and its foundational premises provide hints which capabilities are required to develop and implement digital strategies. S-D logic provides clarification and explain concerning the strategic implications of digitally enabled business models and offerings. By this, S-D logic provides many useful concepts for developing digital strategies such as co-creation, service ecosystems, service platforms, value creation, etc.

Service ecology links resource integrating entities or actors through shared institutional logics enabling interactions, which result in mutual value creation (Lusch and Nambisan, 2015, 162). Integrating external resources offers competitive advantage (Spring and Araujo, 2013, 61) and motivates innovations. Service architectures relate to modular service development and thus innovation (Lokkegard et al., 2016, Voss and Hsuan, 2009). It is an interesting concept as it provides structures, standard practices (such as structural deepening or internal replacement) (Arthur, 2009, 132-134) and design artefacts such as modules (functional units or building blocks), interfaces, rules and constraints to design and operate service systems (Lokkegard et al., 240). Our research strives for practices to analyse and design service systems on various abstraction levels (Spohrer and Maglio, 2010; Voss and Hsuan, 2009).

Service architectures decompose service systems and their arrangements of components into individual functional elements (modules), their interactions and interfaces. Architecture strongly relates to structure and mechanisms to fulfil a specific purpose or functionality (Arthur, 2009, 33; Böhmman et al., 2014; Voss and Hsuan, 2009; Lokkegaard et al., 2016). Service architectures enable dynamic solutions and customization through constraining modular design synthesis (Lokkegard et al., 2009, 239). Thus from a service system engineering perspective, service architectures are fundamental to understand service innovation and service science (Voss and Hsuan, 2009). Because of its integrated position, the insurance business has to react on innovations occurring in other domains. As example, in the car industry, where intelligent products and services are created, based on networked sensors and devices (Warg and Engel, 2016; Warg et al.; 2015). Insurance companies have to react to offerings of “digital attackers” (Warg and Engel, 2016) by establishing own digital platforms and innovative value propositions. Customers are looking for value more than ever and are easily lost to competitors. User experience and value in use are the new drivers of customer retention. Thus, companies if relying on appropriate digital strategies combined with service strategies can create a strong competitive position in digital markets. Hence, companies have to adapt their existing strategies in order to fit the needs and requirements of the digital age. The remainder of this paper is organized as follows. Section 2 motivates our research objectives and presents the pillars of our research design and methodology. Section 3 then introduces briefly to the challenges of digital strategy and transformation before section 4 creates the link to our case of an insurance company, which creates the practice-oriented research context. Section 5 reviews premises and fundamentals of S-D logic and sheds light on constituent elements of our conceptualization of Service-Dominant Architecture (SDA). SDA provides practices to analyse and build service architecture and solution design. Finally, in section 6 we apply and demonstrate SDA to the case of an insurance company. Section 7 concludes the paper.

2. Objectives and Methodology

This paper explores digitization and digital transformation by presenting the case of an insurance company. In this case, the company is developing digital strategies to react on changes in its environment, such as changing customer behaviour, new technologies, new business models, new “grammars” how to (re)combine and use technical building blocks to create required solutions for their future business. SDA proposes to operationalize requirements and characteristics for the planning, design-

ing and building of customer centric solutions, which are characterized by value in use. Thereby giving the structure for integrating and arranging operant resources. Following S-D Logic, SDA consists of at least three distinct service systems and a “data lake”. The service systems are system of interaction, system of participation, system of operant resources. External resources can be integrated via fix coupling with SDA-external platforms or flexible, lose coupling with resources out of the service ecosystem (Warg and Engel, 2016). Following a business and information system engineering approach (Krcmar, 2015, 228) and software engineering process models (Balzert, 2008; Oestereich, 2009), the SDA proposes high-level requirements and design paradigms without concretizing or deciding for any specific technologies or design principles – but using open standards principles. The output will be a design in the sense of a “[...] a form, a set of architecture assemblies, to fulfil a set of purposes” (Arthur, 2009, 91). Service architectures constitute service system entities (Spohrer and Maglio, 2010). They can be instantiated as service systems to offer value propositions in given contexts following the basic principles of resource mobilization, interactions and value cocreation activities (Böhmman et al., 2014). The paper takes focus on challenges related to transforming business and design requirements into configuration of resources of value cocreation (Spohrer and Maglio, 2010; Böhmman et al. 2014). We make suggestions for reproducible structures or assemblies of system components in the sense of “engineering service architectures” (Böhmman et al., 2014) by suggesting SDA as constituent element of service ecosystems. Service architectures and related systematic development processes are an interesting emerging research field within Information Systems (IS) (Böhmman et al., 2014). In this context, architectures represent assemblies of connected building blocks (Voss and Hsuan, 2009; Lokkegard et al., 2016) (e.g. modules, subsystems) and configuration of resources (Spohrer and Maglio, 2010) to fulfil a specific purpose or functionality in a given context (Arthur, 2009, 35; Böhmman et al., 2014; Voss and Hsuan, 2009; Lokkegard et al., 2016; Chandler and Vargo, 2011).

Align IT strategy with business strategy (Applegate et al., 2007, 39) is a pivotal activity of IS management. Followed research design and methodology is eclectic and grounds on various disciplines and related practices. Our research design integrates various disciplines, e.g. information system engineering (Krcmar, 2015), service systems design and engineering (Spohrer and Maglio, 2010), service system piloting and action design approach (Böhmman et al., 2014), IT strategic alignment model (Henderson and Venkatraman, 1990; Applegate et al., 39; Krcmar, 2015, 398) and S-D logic principles (Vargo and Lusch, 2004; Nambisan and Lusch, 2015; Akaka and Vargo, 2012; Grönroos and Voima, 2013; Grönroos and Ravald, 2011; Grönroos, 2008). In addition, our research suggests that service architectures are a way to support rhetoric, action and identity to master and drive organizational and digital transformation (Eccles and Nohria, 1992,8-10).

3. Digital Strategy and Transformation

The effect of digital transformation is discussed to be a revolution that unleashes and develops disruptive powers to change existing structures. In this process, especially business models tend to get servitized (Zolnowski, 2015, Böhmman et al., 2013). However, those disruptive elements and effects through the adoption and use of digital technologies can be explained as (re)organization of businesses and commercial

procedures – around digital technologies, until “[...] these technologies adapt themselves [...]” (Arthur, 2009, 157) to a specific industry. This process is called “restructuring” or re-architecture of the economy “[...] to make use of the new domain” (Arthur, 2009, 157). “It is not sufficient that businesses and people adapt to a new body of technology. The real gains arrive when the new technology adapts itself to them” (Arthur, 2009, 158). Figure illustrates that digitization is one element in the identified set of drivers of change (Warg et al., 2015). Digitization captures various phenomenon and restructuring of industries around digital technologies. As shown, digital transformation requires to elicit and document service system requirements, in our case mainly societal changes, change of customer behaviour and digitization, to arrive at implementable solutions. A key essence of strategic planning and digital transformation is to translate abstract requirements into service system entities (Spohrer and Maglio, 2010) and mobilize required resources (Voss and Hsuan, 2009; Böhmman et al., 2014) to derive and implement new capabilities, structures and mechanisms of the organization (Applegate et al., 2007, 39; Henderson and Venkatraman, 1992, 6-7).

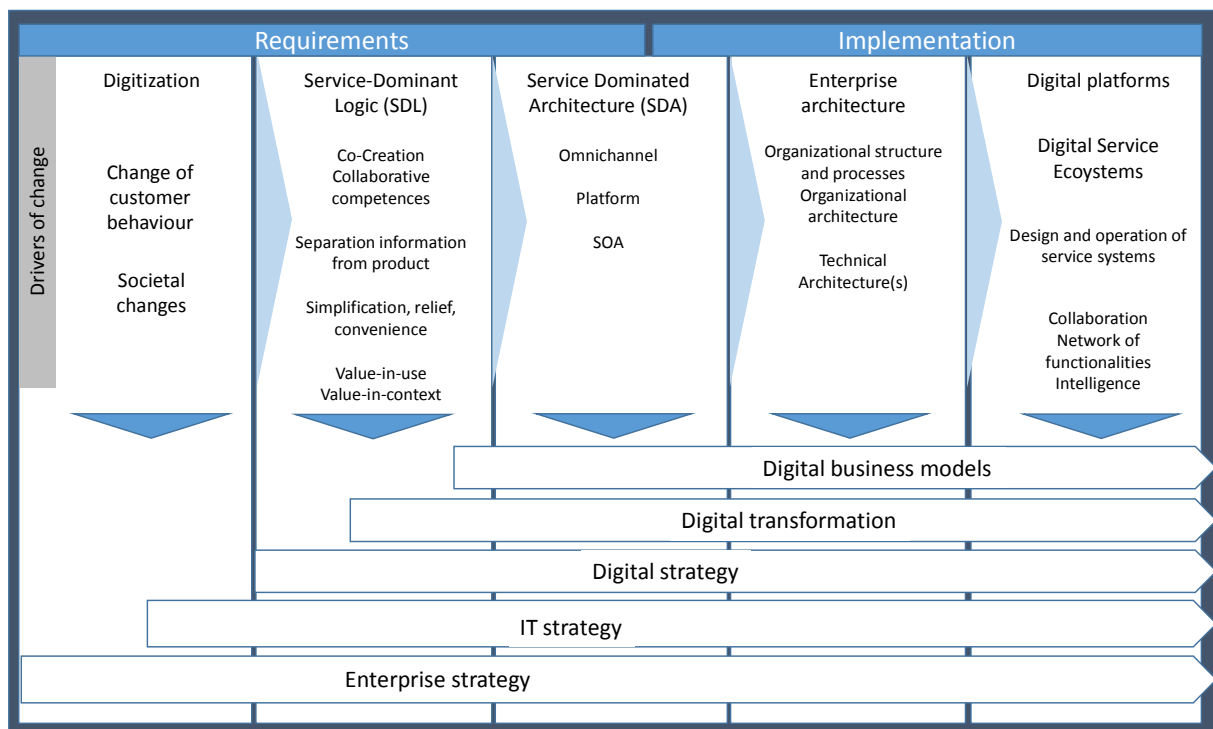


Figure 1: Digitization and Digital Transformation: Service Dominated Architecture operationalizes Digital Strategy and S-D logic principles

In this way, we respond to research challenges as motivated by Böhmman et al. (2014) such as exploration of new and unknown service systems as well “participatory design” and “prototyping approaches”. SDA enables “*complex service systems innovations and their real world effects*” (Böhmman et al., 2014). Thus, this research is work in progress and constitutes an initial starting point for follow up activities and future research endeavours to contribute to service systems engineering. SDA intends to set up a research community to share practical insights and experiences of pilot designs to tackle real world problems (Böhmman et al., 2014). SDA contributes to action design research. SDA supports piloting of novel, complex service systems and value propositions for the digital age (Böhmman et al., 2014). Architectures decompose assembled systems into their building blocks or components organized

around specific principles, functions or a purpose (Arthur, 2009, 31; Böhmman et al.; 2014; Voss and Hsuan, 2009; Spohrer and Maglio, 2010, Lokkegard et al., 2016).

One key essence of digital transformation (Kane et al., 2015a; Kane et al., 2015b) lies in linking various service systems to create value (Grönroos, 2011), enable value cocreation (Vargo et al., 2008) and novel value propositions (Böhmman et al., 2014) in and among service systems (Vargo et al., 2008). This requires the ability to enable interactions and mobilizing resources (e.g. resource density and resource integration) across connected service systems (Vargo et al., 2008) to support value cocreation activities (Lusch and Nambisan, 2015; Akaka and Vargo, 2012; Böhmman et al.; 2014; Spohrer and Maglio, 2010; Voss and Hsuan, 2009). Digital transformation is primarily about digital technologies and the conceptualization of their potential impact on a companies' current or future business. It is crucial for business leaders to understand the disruptive forces that digital technologies can unleash changing current business logics and value constellations (Kane et al., 2016), (Deloitte, 2016). Digital disruption is a process, which creates dramatic change for industries or business branches based on the following attributes (Weill; Woerner, 2015): (1) rapidly digitizing, (2) breaking down industry barriers, (3) creating new opportunities, and (4) while destroying long-successful business models. Subsequently, focus lies on digitalization and digital transformation in the insurance business before the paper overviews the role of service innovation in the context of S-D logic and digitization.

4. Digital Transformation in Insurance Business

“A combination of disruptive forces – some economic, some societal, some technological – is shaking up the insurance industry comfort zone” (IBM, 2014).

No doubt, insurance business is currently undergoing dramatic change and is subject of digital disruptions (originating from new innovative service offerings and new market players (“digital attackers”). Despite the fact that discussion about digital transformation of traditional business is not new (Andal-Ancion et al., 2003; Erickson et al., 1990, McKinsey, 2012). Various research reports are available evaluating threats and opportunities of digital transformation. The reports explore influencing factors driving respective change in the insurance business. Furthermore, the reports come up with recommendations how insurers successfully transform their business and are able to create new business options to thrive their business in the digital age (EY, 2013; IBM, 2014; Naujoks et al., 2013). From a service systems perspective, digital technologies influence processes of valuing and algorithms, mechanisms how value is determined (Spohrer and Maglio, 2010). Presented use cases present the first wave of digital transformation. It is expected that next generation of digital value propositions adapts to changing processes of valuing (Vargo and Lusch, 2004; Spohrer and Maglio, 2010) as service systems change as their structures and mechanisms coevolve (Spohrer and Maglio, 2010). Nevertheless presented cases are the starting point of SDA and presented research. **Table 1** overviews the use cases and derives properties and characteristics concerning service and information system design.

Table 1: Use cases to be analysed and used for service system design and piloting

No.	Use case	Value proposition (service system entities)	Service-Dominated Architecture (SDA)	
			S-D principles service components	IT capabilities/ solution components
1	Life insurance	Life insurance with flexible fees dependent on actual customer behaviour and pro-vision of access to personal customer data (vital functions trackers, analytics apps)	<ul style="list-style-type: none"> - Resource liquefaction - Resource density - Resource integration - Value cocreation - Interaction systems - Service ecosystem - Process of valuing - Mobilization of resources - Modularity - Reciprocity 	<ul style="list-style-type: none"> - Service platform - Big data analytics - Social networks - Mobile apps - Wearables; sensor networks and data - Cyper-Physical-Systems - Cloud computing - Microservices / containers / docker technologies - Resilience
2	Car insurance	Car insurances are offered on flexible basis or as "as-a-service" offerings. Flexible fees are offered on basis of technical car and behavioural driver data combined with external third party services.		
3	Household insurance	Make use of sensor data and monitoring apps of the insured facility. Insurers and technical service providers may collaborate to create new value propositions for customers.		
4	Emerging digital markets	Insurance offerings making use of digital technologies to create new value propositions and offerings. New unprecedented market offerings create new markets.		

5. Service related foundations

In this section, we look for explanations and theories, which explicate why whole markets are subject of disruptive powers and digital transformation. By adding a service systems view as argued by Spohrer and Maglio (2010), Maglio and Spohrer (2008) and the concept of “service ecosystems” as motivated by (Akaka and Vargo, 2014; Lusch and Nambisan, 2015; Vargo and Akaka, 2012; Edvardsson and Tonvoll, 2013), our perspective results in a broader view of service innovation in the context of digital transformation and service systems. SDA translates and proposes high-level requirements concerning derived new capabilities to realize digital solutions and digital-enabled services for customers. For this, firstly, we review the aspect of service innovation in context of S-D logic as well as S-D logic key messages and principles, before we derive a list of requirements and concepts that need to be included in our solution design. Subsequently, we overview and summarize major results yielding from our analysis.

5.1. Service and service innovation

In contrast with old service definitions that define service with negative, enumerative, and constitutive definitions (Corsten, 1997; Buhl et al., 2008), Vargo and Lusch (2004) present a new perspective on the exchange in economics, called the service-dominant logic (S-D logic). The main focus of S-D logic is value and value creation, particularly value for the stakeholder as well as the way the value is created. Service is the main basis for value exchange and is created with the cooperation of different actors (Vargo and Lusch, 2004; Vargo and Lusch, 2011). Within the S-D logic, service is defined as “the application of specialized competences (knowledge and skills) through deeds, processes, and performances for the benefit of another entity or the entity itself” (Vargo and Lusch, 2004, p. 2). Other service definitions take a similar direction. For example, Grönroos (2008) defines service as “a process that consists of a set of activities which take place in interactions between a customer and people, goods and other physical resources, systems and/or infrastructures representing the service provider and possibly involving other customers, which aims at assisting the customer’s everyday practices.” (Grönroos 2008, p. 300).

S-D logic defines eleven foundational premises that describe the nature of service. As core of these premises, five axioms are emphasized from which the other premises can be derived. The first axiom specifies that “*Service is the fundamental basis of exchange*” (Vargo and Lusch, 2016). With this axiom, all economic transactions are defined as service. Another axiom claims that “*All social and economic actors are resource integrators*” (Vargo and Lusch, 2016). Hence, in order to create value, all relevant actors have to integrate their specific resources and thus have to cooperate. A third axiom says that “*value is cocreated by multiple actors, always including the beneficiary*” (Vargo and Lusch, 2016). Within this axiom, the integration of resources from many different sources is accentuated. The fourth axiom claims that “*Value is always uniquely and phenomenologically determined by the beneficiary*” (Vargo and Lusch, 2016). By this, the context of the beneficiary is emphasized when discussing the actual value of a customer. The last axiom highlights that “*value cocreation is coordinated through actor-generated institutions and institutional arrangements*” (Vargo and Lusch, 2016) and thus, the importance of service ecosystems.

The actor system perspective and the respective value for each of the actors, is an important concept in S-D logic. In S-D logic, service encompasses all economic activities (Lusch and Nambisan, 2015). This includes goods that serve as alternatives to a direct service provision (Lusch and Nambisan, 2015). In particular, the exchange of a good has no direct value (value-in-exchange); rather, value is created by the application of a good (value-in-use) in a specific context (value-in-context) (Lusch and Nambisan, 2015). From the S-D logic perspective, service is viewed as a “[...] *transcending mental model for all types of forms of innovations (intangible and tangible)*” (Lusch and Nambisan, 2015).

An additional concept in S-D logic describes the resource liquefaction. It “[...] *refers to the decoupling of information from its related physical form or device*” (Lusch and Nambisan, 2015) and emphasizes the importance of knowledge and skills. Knowledge and skills are operant resources and the basis of strategic benefit (Vargo and Lusch, 2016). As far as a network of actors institutionalize resources, they become a service ecosystem. A service ecosystem is defined as a “[...] *spontaneously sensing and responding spatial and temporal structure of largely loosely coupled value proposing social and economic actors*” (Chandler and Vargo, 2011). In this loosely coupled system, actors establish a relationship network to conduct complex processes of resource integration, service provision, and value creation (Vargo and Lusch, 2010). Once, these networks are established service systems can emerge. Service systems are defined as “[...] *a socio-technical system that enables value co-creation guided by a value proposition*” (Böhmman et al., 2014). Hence, service systems are socio-technical systems comprising a composition of resources that exist to fulfil a specific purpose and to achieve desired outcomes (Spohrer and Maglio, 2010; Vargo and Lusch, 2004; Böhmman et al., 2014).

Service innovation (Gallouj and Weinstein, 1997) is a prerequisite to achieve competitive advantage for companies. S-D logic views innovation as a collaborative process (Lusch and Nambisan, 2015). From their perspective, all product innovations are service innovations (products being only mechanism, medium or vehicle for delivering service (Lusch and Nambisan, 2015). Current discussion concerning S-D logic create a link between service systems (Spohrer and Maglio, 2010; Edvardsson and Tronvoll, 2013), value co-creation (Vargo et al., 2008), service ecosystems (Vargo et al., 2015) and technology (Lusch and Nambisan, 2015; Akaka and Vargo, 2014) as pivotal elements to service innovation. Companies need to develop their “[...] *ability to create service innovations systematically and reliably*” (Spohrer and Maglio, 2010). Service science aims to improve this ability through provision of theory and practice around service innovation. From this viewpoint, service innovation is about the “[...] *evolving repertoire of value-cocreation mechanisms used by service systems entities*” (Spohrer and Maglio, 2010). One important field of innovation is enabled by digitization, such as the development of new data-driven business models (Zolnowski et al. 2016). To take advantage of digitization, companies require new capabilities and have to develop a thorough understanding of service theory, mainly S-D logic, to be able to develop effective digital strategies and innovations.

5.2. Technology

In the context of S-D logic, technology, as computer software and hardware, determine their benefit by the application in value propositioning and value cocreation. This is also reflected by reviewed literature that considers technology, beside prac-

tices and institutions, as one central component of innovation (Akaka and Vargo 2014). However, even if service innovation is technology based, technology act mostly as operand resources (Lusch and Nambisan, 2015). IT as operand resource provides required digital infrastructures which supports actors to maintain their business relationships (either latent or evident) and in this way enabling collaboration in the ecosystem (Lusch and Nambisan, 2015). Beside its role as operand resource, IT can also be seen as operant resource and thus, as basis of strategic benefit.

Akaka and Vargo (2014) argue that institutions develop strong influence concerning acceptance or rejection of particular technologies in a given social context. Based on the review of Akaka and Vargo (2014) and Lusch and Nambisan (2015) it can be concluded, that interaction with technology influences both institutional setting itself and humans in their actions. This means technology transforms the structures of organizations, whereas institutional properties influence humans in their action with technology. In consequence, *“technology can be considered as either an operand or operant resource, because it can be both a medium (operant resources) and an outcome (operand resource) of human action”* (Akaka and Vargo, 2014). As conclusion, *“[...] technology can be conceptualized as the recombination of a set of practices, processes and symbols to serve a human purpose, but this recombination occurs through both value proposition and value determination phase”* (Akaka and Vargo, 2014). Digital strategies have to reflect the important role of S-D logic to achieve competitive advantage and to take an active role in transforming their business by means of digital technologies. Hence, if technologies are integrated isolated of the associated or connected institutional settings the potential risk of failure of technology-based innovations gets evident.

5.3. Conceptualization of Service Innovation

From S-D logic perspective, service innovation is embedded in an actor-to-actor network, which *“[...] underscores the importance of common organizational structures and sets of principles to facilitate resource integration and service exchange among those actors”* (Lusch and Nambisan, 2015). Figure illustrates the conceptualization of service innovation through a tripartite framework proposed by Lusch and Nambisan (2015) consisting of three major concepts, namely service ecosystem, service platform and value cocreation. We propose service architecture as additional concept because it enables piloting of complex service systems and action design approaches (Böhmann et al., 2014).

The aim of this conceptualization is to understand the role of technology (foremost IT or digital technologies). Service ecosystems provide an organizing structure for actors, whereby service platforms provide an organizing structure for the resources (Lusch and Nambisan, 2015). Platforms and ecosystems are pivotal concepts, which have to be part of an adequate digital architectural design. These concepts include important capabilities for organizations to develop, such as collaboration or networking (building, maintaining and participating in actor-to-actor networks) as well as the ability named “resource integration” as prerequisite of value co-creation. Ecosystems can be platform-based and either open or closed (Lusch and Nambisan, 2015). Table shows the conceptualization of service innovation through the tripartite framework based on (Lusch and Nambisan, 2015). S-D logic principles and capabilities are described.

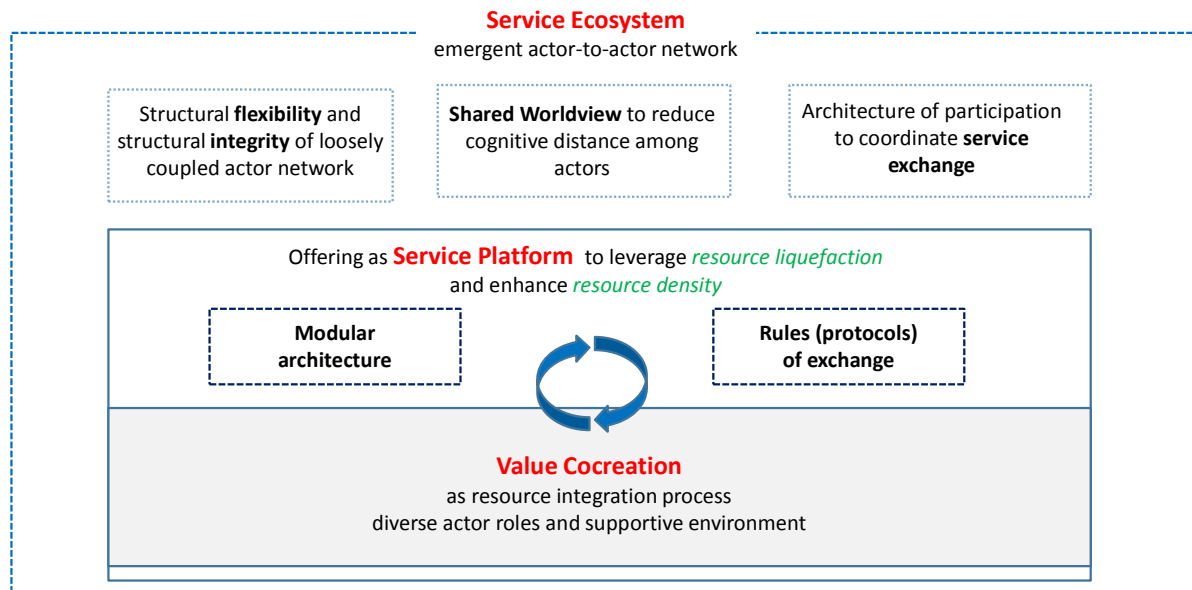





Figure 2: Conceptualization of S-D logic and service innovation (based on (Lusch and Nambisan, 2015))

In **Table 2** S-D logic principles are mapped to capabilities and competences with regard to an architecture design using three layers, which vary concerning type of system and focus / purpose. The two columns on the right show two antipoles spanning a continuum from systems supporting interactions and value cocreation and systems offering stability and access to organizational memory (e.g., here seen primarily as operand resources). On the platform level this data and information is transformed into knowledge through the given context and processes. This layer provides mechanisms and structures to access operand resources (competence and knowledge or service potential (Bettencourt et al., 2014)). Important elements on the platform level are support of capabilities such as resource density (Lusch and Nambisan, 2015), resource integration and aggregation (combining and configuring resources to become available service system entities deployable to the service ecosystem (Spohrer and Maglio, 2010)). Ability of docking various platforms as resource configurations defines the boundary for accessibility of resources (resource density).

Table 2: Conceptualization of service innovation through tripartite framework (modified from (Lusch and Nambisan, 2015))

Conceptualization	Definition	Principles / Key issues
<p>Service ecosystem (S-D logic: actor-to-actor network.</p>	<p>- self-contained, self-adjusting system of mostly loosely coupled social and economic (resource-integrating) actors - connected by shared institutional logics and mutual value creation through service exchange.</p>	<p>- structural flexibility and structural integrity of the service ecosystem (and manage the potential conflicts between the two) - develop and maintain a shared worldview among a set of cognitively distant actors - devise and implement architecture of participation to coordinate actors and their service exchanges.</p>
<p>Service architecture (service systems: structure and mechanism)</p>	<p>- a structure for planning, designing and building solutions / piloting of complex service systems - enables customer centric solutions by configuring, mobilizing and integrating operant resources</p>	<p>- 3 service systems oriented at S-D Logic: * system of interaction * system of operant resources (mobilization of resources) * system of participation - data lake - loosely coupled systems and modular architecture</p>
<p>Service platform (S-D logic: resource liquefaction; resource density)</p>	<p>- modular structure that consists of tangible and intangible components (resources) - facilitates the interaction of actors and resources (or resource bundles)</p>	<p>- devise an appropriate modular architecture that enhances resource density - define and implement the rules of exchange of protocols for exchange of services through the service platform (i.e. prescribe how actors/resources can interface with the platform)</p>
<p>Value co-creation (S-D logic: resource integration, interaction)</p>	<p>- processes and activities that underlie resource integration - incorporate different actor roles in the service ecosystem.</p>	<p>- define the key roles (including those of the beneficiaries) and - describe the nature of value created or cocreated by each actor role. - create supportive environment for resource integration by focusing on (1) mechanisms that facilitate interactions among diverse actors, (2) adapting internal processes to accommodate different actors (roles), (3) enhancing the transparency of resource integration activities in the service ecosystem.</p>

Table 3: Service Dominated Architectures: Operationalization of S-D logic Principles and Capabilities (Warg et al., 2015; Warg and Engel, 2016)

Architecture layer (assembly/ part)	Capability / competence	S-D logic principles	Focus	Type
<p>Value Cocreation (Omnichannel)</p> 	<ul style="list-style-type: none"> Context-oriented solutions for customers and customer processes Interactive, consistent customer experience over all communication channels Seamless, channel independent, dynamic interactions 	<ul style="list-style-type: none"> Interaction of services Exchange of competences Customer relationship Value in-context 	<p>Dynamic interaction</p> 	<p>Systems Engagement</p>
<p>(Service) Platform</p> 	<ul style="list-style-type: none"> Orchestration and assembly of value creating building blocks (modules/ micro-services) and prompt interplay (co-creation, collaboration) between services, data and other resources (knowledge, processes, rules, technologies and systems) Aggregation and combination of resources 	<ul style="list-style-type: none"> Value co-Creation Collaboration Value-in-use (solution) Resource aggregation Resource density Co-Production 	<p>Elementary transaction</p>	<p>Systems Record</p>
<p>Service Oriented Architecture (SOA)</p>	<ul style="list-style-type: none"> Integration of core services of the organization and made accessible to i.e. platform layer and interactive processes (omnichannel) 	<ul style="list-style-type: none"> Modularization Access to resources Exchange of services Resource integration 	<p>Elementary transaction</p>	<p>Systems Record</p>

6. Solution Design

The most consequent operationalization of this service-dominant logic yielded in an architectural blueprint, which we call Service Dominant Architecture (SDA). The architecture constitutes a conceptual design and articulated respective IT-related functional and non-functional requirements, namely derived from S-D logic and service systems perspective. It comprises mainly the following three functional layers, which implement the required capabilities to act as exchange services across distinct service ecosystems, act as resource integrator and to facilitate cocreation of value supported by service platforms. SDA provides guidance and serves as appropriate approach to respond to current challenges in service systems engineering (Böhmman et al., 2014) by embracing S-D logic principles and related practices to foster service innovations (Lusch and Nambisan, 2015).

6.1. Service Dominant Architecture

In the remainder, the Service Dominant Architecture (SDA) is overviewed presenting major building blocks and elements. SDA conceptualizes a solution design based on yielded results from our research.

The central aim of SDA is to offer value propositions and flexible solutions for the given customer context and its processes. It makes use of dynamic configurations of resources. The SDA is configurable to the needs of the service business model and underlying business logic. Figure 3 shows the conceptualization of S-D logic principles and related capabilities as high-level architecture for the design of digital-enabled services and solutions. As shown previously elicited S-D logic concepts are mapped as conceptual design to respective subsystems of SDA, that require further concretization concerning underlying technological concepts and paradigms to be used to become implementable in real life scenario. Important to note, that there will be not one solution design, SDA serves as vehicle to communicate strategic targets and related capabilities required by the organization to utilize digital business models. The second layer shows the **systems of engagement** (Moore, 2011) characterised as fast, open, interaction-oriented and agile. This layer includes all required subsystems and elements to interact with customer and to collaborate with other actors in the network (e.g. partners but as well other customers). It responds primarily to the need to react fast and flexible to customer preferences and changing conditions on the market to tailor **solutions** (1) exactly to the needs and the context of the customer process. Thus, it is important to understand how customers determine and calculate value in their given context (Spohrer and Maglio, 2010). The customer's process needs to be in focus. The **interaction system** (2) supports customer interactions and value cocreation activities through respective structures and mechanisms "[...] to access resources in a coordinated and purposeful manner" (Spohrer and Maglio, 2010). The **system of participation** (3) integrates external resources and provides access to resources of other platforms or systems. Thus, it provides access to the actor-to-actor-network and the stakeholders forming the service ecosystem. The **system of operant resources** (4) implements the capabilities to integrate and orchestrate resources. Last system element is the **data layer** (5), which exchanges data with other systems (primarily the systems of record). The **systems of record** (Moore, 2011) includes all legacy and back-end systems.

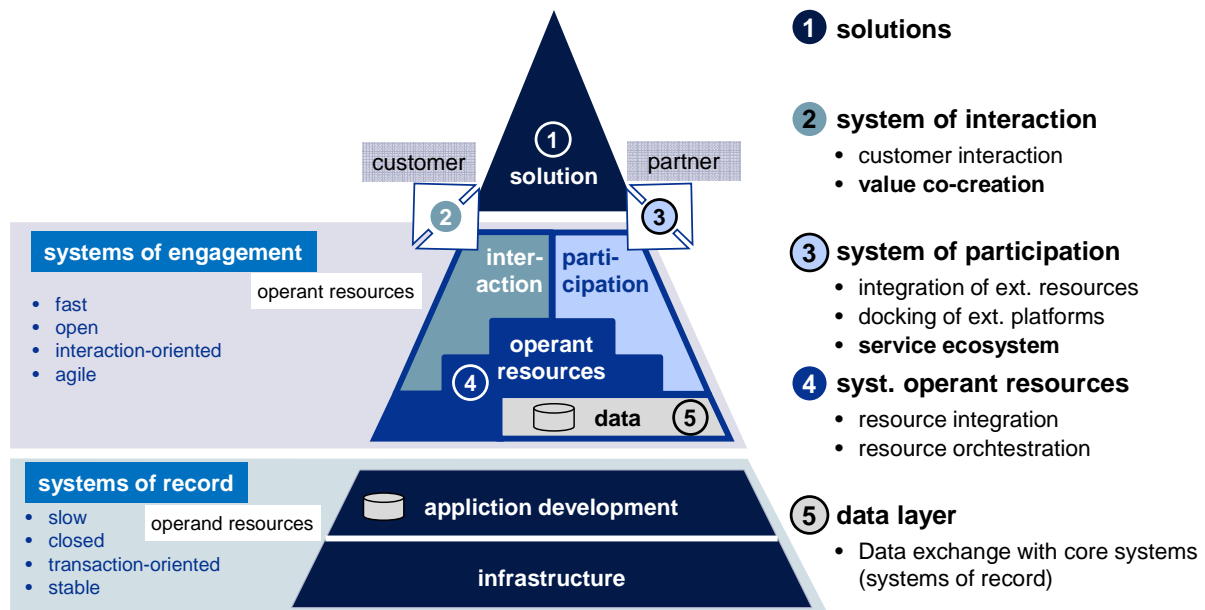


Figure 3: Service Dominated Architecture (SDA) as SDA as core component of digital transformation (Warg et al., 2015; Warg and Engel, 2016)

In this way, SDA provides access to the organizational memory and resources (mainly operand). Data brought in the context of respective processes and service system entities transforms to operand resources (knowledge and competence), which is fed into respective value cocreation activities.

6.2. Use Case: Household Insurance

Figure 4 depicts the use case household insurance and related business process and transactions. SDA offers a structure for resources and provides mechanisms how resources can be accessed and made available (access rights, roles, etc.). In our example, the service process is illustrated by five major subprocesses and related activities. SDA supports and enables interactions required to support cocreation processes between involved actors. First activities refer to the arrival of the customer. The system interacts with the customer using a web portal or app. The customer fills in required data (e.g. login data) and the system grants access to his individual profile. The actor now continues his journey personalized. The interaction system supports the customer through search mechanism and analysing customer behaviour to understand his intention in order to present context-sensitive and purposeful information (activity 1 and 2). In this case, the customer is interested in household insurances and the system configures dynamically resources for the given purpose. The platform layer starts mobilizing resources by extending the user profile as soon the systems reasons that the customer is interested in household insurances (based on real time analytics). The system then sends queries and processes retrieved data to present it process-aware as information in the user interface. The interaction system triggers the operand resources system. Data is queried from various IT systems (core systems), which store relevant contractual and product-related data. This includes checking contracts and customer's portfolio.

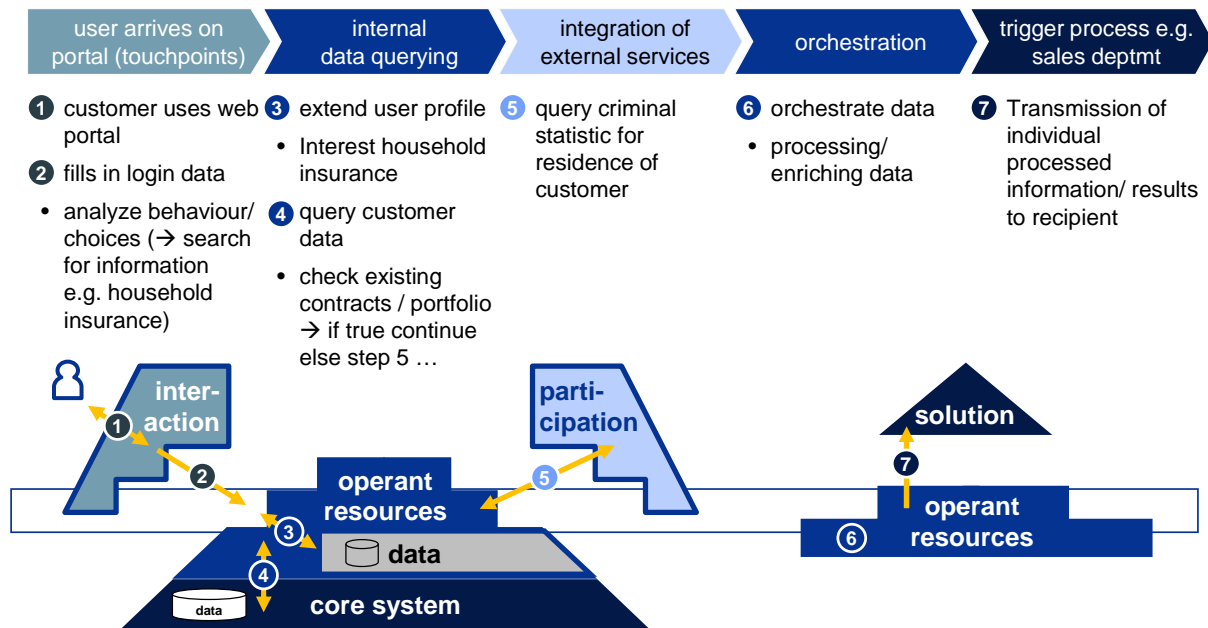


Figure 4: Example Use Case: Customer journeys as starting point (example household insurance) (Warg and Engel, 2016)

Now the process “issue household insurance” triggers the workflow system, which guides the customer through the single process steps. The system configures available “operant resources” to cocreate value with the customer processing context variables to involve potentially additional actors (e.g. partners or personal service personal from an agency located close to the customer’s residence). Based on knowledge and competence the system assists and guides the customer through his information and decision-making process to achieve best outcome for both insurance company and the customer. The system follows thereby the logic “one-stop-to-the-customer”, “everything” and “anything” (Kagermann et al., 2011, 39-44). Interactions with customers aim at creation of user experiences (activities 3 and 4). Before the household insurance can be issued, various steps are required to clarify the contractual details and to process the fee for the customer based on available data. The system queries external sources, such as criminal statistics for the residence of the customer (using big data sources and techniques). All data is orchestrated and enriched with further data, which is further processed analysed in context to achieve knowledge. In the last step, the case is processed to internal departments (e.g. sales department) and respective follow-up processes are triggered to issue the household insurance (e.g. prepare, check and send offer to customer). SDA enables customers, insurance company and partners to cocreate value and to develop value propositions based on interacting service systems, which suggest novel service experiences and offer solutions tailored to the needs of the customer’s process.

6.3. Systematic Development of Service Innovations

Böhmman et al. (2014) motivate three challenges for service systems engineering, namely service architecture, service systems interaction and resource mobilization. Architectural innovations are seen as key to achieve innovations on value propositions (Böhmman et al., 2014). Figure shows a proposal for a systematic design and development of service innovations based on four steps. First step identifies and packages use cases making use of service design thinking methods. Second step then analyses and designs the service business model. Service Business Model

Canvas (SBMC) (Zolnowski, 2015) as methodology provides guidance concerning decision on the required dimensions. This exercise results in a business configuration and provides clarity concerning required resources and related questions of availability and sourcing. Both activities can be summarized as service design or systematic development of service innovation and service operation.

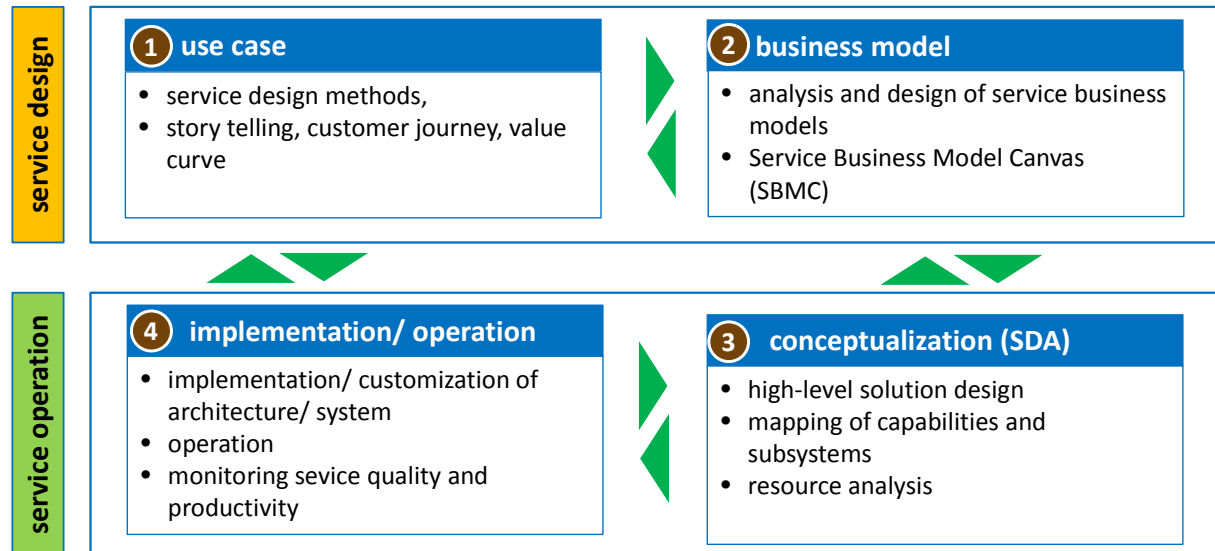


Figure 5: Systematic design and development of service innovations

The configuration of the service business model (modelled by means of SBMC) then translates into implementable concepts. The SDA offers a shared language between business analysts/ designers and IT professionals/ specialists through conceptualizing requirements into a high-level solutions design. This supports IT business alignment processes. Then, SBMC concepts are translated into capabilities and competences, which are assigned to the system elements of the SDA. As shown previously, SDA is primarily a conceptualization and hence does not explicate concrete technologies and implementable systems. This is subject of subsequent fourth step implementation and operation. Last step foresees to customize and configure the IT systems so that the business scenario can be implemented. Important to note, that the shown process does not explicate all required steps. As an information systems engineering approach is followed, all required steps such as agile system development, use case analysis and design, process and data modelling are not explicitly named and described. However, the approach motivates to conduct further research in order to develop a common SDA methodology supported by respective processes and tools. Each use case evaluates and demonstrates the broader applicability of the SDA approach.

7. Summary and Outlook

Previously, we have suggested that digital strategies grounded on S-D logic are adequate to develop digital strategies. We have described what digital strategies and their purpose are and have proposed Service-Dominated Architecture (SDA) to overcome current challenges of service systems engineering. This architectural design conceptualizes major components by organizing them into a structure that describes

system elements encapsulating S-D logic principles and related functionalities. We followed an action oriented research design (Böhmman et al., 2014) based on piloting and evaluating results by means of a real world case of an insurance company. We suggest that digital strategies ground on S-D logic. Thus S-D logic principles provide fundamental components and building blocks (as capabilities) to develop compelling digital strategies and novel value propositions. We described what digital strategies are about and presented a conceptualization of a solution design. SDA constitutes a high-level (IT) architecture that translates purpose and high-level requirements into respective configurations of resources and infrastructures (e.g. strategic alignment model of Henderson and Venkatraman, 1990). Presented research is work in progress and constitutes an initial starting point for follow up activities and future research endeavours to contribute to service systems engineering. We conclude that SDA contains mechanism and structures to build **service ecosystems** on basis of interacting service systems as important catalyser of future service innovations. SDA intends to become standard practice and an integral element of digitization and digital transformation strategies. However, this requires further research and evaluation.

Next steps foresee to invest in further research to sharpen the theoretical base and strengthen the fundamental theory behind the SDA approach and evaluate pilots of complex service systems and value propositions. SDA intends to set up a research community to share practical insights and experiences of pilot designs to tackle real world problems. Thus, this intentions guide our next research steps. Future research on SDA contributes to action design research to establish service systems engineering as discipline within service science. SDA can make a substantial contribution by its ability of piloting and evaluating novel, complex service systems and value propositions in real world scenarios. SDA enables novel value propositions not only for the insurance business, but for all companies challenged by digitization.

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SERVICE ECOSYSTEMS AS FRAMEWORKS TO ELABORATE SUSTAINABLE FUTURES

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This paper elaborates an analytic framework to extend the socio-economic processes of service ecosystem conceptualizations with the ecological-environmental dimension of sustainable development. The framework illustrates how sustainable futures unfold differently through the lenses of goods-dominant and service-dominant logics and how sustainability, as a system benefit, has different interpretations. This paper stems from the field of futures studies and discusses scenario methods as a means to manage emerging service ecosystems.

1. Introduction

Service ecosystems are an evolving conceptual framework to discover how markets or society at large work (Lusch and Vargo, 2014). Vargo and Lusch (2016) define service ecosystem as “a relatively self-contained, self-adjusting system of resource-integrating actors connected by shared institutional arrangements and mutual value creation through service exchange” (p. 10). Part of the institutional arrangements, where companies, their suppliers, customers, and various stakeholders operate, is the demand for sustainable development. Environmental concerns and climate change create uncertainties concerning the future. Growing global population increases pressure on natural resources, and international processes, both regulatory and voluntary, are initiated to enhance responsible resource use (WCED, 1987; MEA, 2005; WBCSD, 2010). From the perspective of the limits of nature, socio-economic systems operate within natural ecosystems (Meadows, 2009; Matthies et al., 2016).

Services have been investigated about their impacts on the environment, including service innovation in societal transformations, sustainable production and consumption (Djellal and Gallouj, 2015; Gallouj et al., 2015). Service research studies tend to limit their investigations to socio-economic processes, for example, with respect to systemic innovation (e.g., Hyytinen et al., 2015) or eco-innovation business (e.g., Mele and Russo-Spena, 2015). However, corporate sustainability is also deliberated through the idea that sustainable development is a systemic process where social, economic, and ecological systems are interdependent with divergent and complex feedback loops (Amini and Bienstock, 2014). This calls for exploring sustainability holistically in service systems.

Research on sustainability transitions has been elaborated through socio-technical systems frameworks (Markand et al., 2012). These transformation processes stretch over several decades and encompass society at large, i.e., production and consumption as well as the regulative basis, norms, standards, and meanings (Geels, 2002; Kemp and Rotmans, 2004). Like emerging service ecosystems, the transitions conceptualizations address systemic change with multiple causalities and co-evolution of several parallel processes across micro–meso–macro levels (e.g. Geels, 2002). Here, institutional theories can also be applied to understand the processes. Although there is a tendency to lock-in of a system to existing technologies, developments are not dictated by the prevailing paradigm or past history, but also the deliberate exercise of agency has a role to play (Smith and Raven, 2012).

Sustainability vision is a tool to direct action toward a preferable future, but the means and processes for reaching the goal vary considerably. The challenge for decision making of today is to assess the alternative development trajectories and their impacts even though the processes through which they emerge are not predictable (Elzen et al., 2004; Kemp and Rotmans, 2004). Futures study methods support decision making in such complex situations. For example, modeling, including methods of mathematical complexity, is useful for analyzing trends and assessing impacts; expert panels, futures workshops, and scenario methods can be utilized to elaborate alternative futures and to address the social complexity related to the developments (Bradfield et al., 2005; Aaltonen and Sanders, 2006). These methods can also contribute to the management of emerging service ecosystems.

This paper studies service ecosystem conceptualizations as a framework to elaborate pathways toward a sustainable future. An analytic framework is introduced where the socio-economic processes described in the service-ecosystem conceptualizations are extended with the ecological-environmental dimension of sustainable development. The analysis on the construction industry as a customer for the forest-based sector illustrates how sustainable futures unfold differently through the lenses of goods-dominant (G-D) logic and service-dominant (S-D) logic. In other words, we use G-D and S-D logics as cognitive maps to understand how actors make sense of not only the past developments and present realities but also the future opportunities and challenges.

With the analytic framework, the study on emerging service ecosystems in sustainability transitions can be broadened from an analysis of sensemaking, i.e., parallel logics embedded in system changes, to sensemaking, i.e., deliberate utilization of alternative future scenarios in supporting the change.

2. Theoretical basis for the analysis

2.1. Futures orientations

Sustainable development is development “that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987). The definition sets sustainability into a temporal and spatial context; sustainability and specific criteria for it become re-assessed over time and, for example, in light of new knowledge. From a systemic view, sustainability problems and their solu-

tions are interdependent through several feedback loops, the interlocked functions of which are not necessarily easy to detect (Meadows, 2009; Huutoniemi and Willamo, 2014). For example, an increasing use of intangible services does not necessarily lead to a decreasing use of tangible resources; availability of easy-to-use services may even lead to increased consumption of renewable and non-renewable resources because increasing service volumes require new infrastructure and related products (Heiskanen et al., 2003; Campbell et al., 2013; Djellal and Gallouj, 2015). Today's choices affect future opportunities, but how their impacts become perceived depends on how the system boundaries are defined.

The service-ecosystem perspective can be understood as inherently future oriented; actors by integrating resources for a common purpose create new resources and establish nested service ecosystems, which shape the context for future value co-creation (Lusch et al., 2016). Wellness of the system is a co-evolutionary process of service-for-service to improve one's own wellbeing by improving the wellbeing of others (Vargo and Lusch, 2011; Lusch and Vargo, 2014). Vargo and Lusch (2016) build on systems analysis and foresee modeling and computational tools useful in allowing to "grow service-ecosystems in a 'cultural petri dish'" (p. 20). I.e. if we know the variables of the system with sufficient accuracy, it is possible to model outcomes of systemic processes or assess the probability of certain outcomes. This is useful for reducing uncertainty and assessing risks involved in emerging service ecosystems, for example, for business making.

Futures studies investigate uncertainties but also the deliberate processes toward a preferred future. Futures are addressed from three distinctive angles (Amara, 1981; Bell, 1997): what is *probable* based on the past and present trends; what is *possible* beyond existing structures and processes, and; what is *preferable* by individuals, organizations, or at the overall system level, for humankind. Although the future cannot be predicted nor the analysis based on observable data, the robustness of methods builds on a systematic collection of data and information from multiple sources, covering multiple angles about past developments as well as the values, wishes, fears, and intentions that are detectable from the present (Bell, 1997; Fuller and Loogma, 2012).

The epistemological bases as well as the approaches and methods of futures analyses differ, for example, on how the system under investigation is understood and how much complexity is included (Aaltonen and Sanders, 2006). In other words, it varies whether it is the factual basis and observable developments that are expected to provide means to reach more accurate approximations about the future or whether more emphasis is placed on the process where knowledge about future(s) is produced, including emergence as part of the investigation (Bradfield et al., 2005; Ramírez and Selin, 2014). However, in the analysis, "future" is in the plural form, i.e., the focus is on *alternative futures*. Through imagination and visioning, the future opens as spaces with a wider variety of options than can be concluded from past and present developments (Masini, 1993). Scenarios or alternative storylines of how futures might evolve provide decision makers with a context for planning and strategizing.

Scenario methods are also used in long-range business planning (Bradfield et al. 2005). This covers several methods and approaches how scenarios are built. Van der Heijden (1996) emphasizes the learning process and increasing capacities and calls scenarios a method of strategic conversations, useful for testing how company's

strategic choices made today prepare them to tackle alternative futures. In neuroscience research, these images are called “memories of future” because they are based on the same neural mechanisms and can be recollected by individuals in a similar manner as memories of the past (Ingvar, 1985). Thus, although our sensemaking is based on the past and present experiences (Weick, 1995), exploration of futures serves as simulation and rehearsal. With interaction and reflections, production of alternative futures can shape sensemaking at the individual level as well as create shared understandings (Bell, 1997; Fuller and Loogma, 2012). Changing the mental map changes the perception of the landscape ahead (Normann, 2001).

2.2. G-D logic and S-D logic lenses

The service-ecosystem definition refers to shared institutional arrangements that both constrain and enable sensemaking of individuals, organizations, and groups of organizations (Vargo and Lusch, 2016). Friedland and Alford (1991) emphasize “society as a potentially contradictory interinstitutional system” (p. 240) where the three levels—individual, organizational, and institutional—are nested. There is not only one guiding frame for an actor’s sensemaking but several which affect, and from which the actor can choose in a particular context. In this process the actor can also work across temporal sensemaking frames, i.e. iteration of past developments, evaluation of the present situation, and imagination of the future (Battilana and D’Aunno, 2009). Parallel logics create tensions that may contribute to a change in the prevailing institutional arrangement and/or open an opportunity for agency to work (Thornton et al., 2012). In this paper, we use G-D and S-D logics as lenses to assess how actors make sense of their operating environment and particularly about pathways toward a sustainable future.

Through the lens of G-D logic, or manufacturing logic, value is created in the successive value-adding stages of the production of tangible goods and finally consumed by consumers (Normann and Ramirez, 1993; Vargo and Lusch 2004, 2008). S-D logic in turn starts from the notion that service is the basis of any exchange and all socio-economic actors are service providers. Resources are integrated in value co-creation of multiple actors, i.e., producers, customers, users, suppliers, and wider networks, which are nested in institutional arrangements (Vargo and Lusch, 2011; Lusch and Vargo, 2014).

Although G-D logic emphasizes tangible production, intangible services can also be approached through this lens (Vargo and Lusch, 2008). Interaction is a core element of service provision, but technological development, for example, digital services or the Internet of Things, enable new kinds of provision mechanisms (Gallouj et al. 2015). In fact, G-D logic is challenged by the new forms of servicing, which mix traditional borderlines of service industries and manufacturing or the producer and consumer (Vargo and Lusch, 2004; 2008). Furthermore, in the future, bio- and nanotechnology applications are also expected to radically change modes of operation, for example, in healthcare (Pelli et al., n.d.). S-D logic, with its idea of tangible products and intangible services as carriers of value and the concept of value co-creation, provides a wider frame where manufacturing logic is nested (Normann, 2001; Vargo et al., 2008). S-D logic can be understood as a narrative (Lusch et al., 2016) that shifts attention from production to utilization and context, from product to process and benefit, and from transaction to relationship and dynamic adaptive systems (Vargo et al., 2008; Vargo and Lusch, 2016).

This opens up a continuum of several sensemaking logics, which can be variably mobilized in different contexts (Lusch and Vargo, 2014). Instead of understanding G-D and S-D logics as metrics or transitions between them as unidirectional, there are several dimensions possible from one interpretation and from one context to another, for example, from one customer interaction to another (Vargo and Lusch, 2016).

2.3. Extension to nature and natural resources

The S-D logic conceptualization divides resources into operand—mainly tangible assets—and operant—human skills and knowledge. Natural resources as raw materials are operand resources that require human skills and competences to use them for value co-creation (Vargo and Lusch, 2004; 2008). This does not represent natural resources as less valuable but emphasizes the need of a knowledgeable actor to recognize resources and make use of them in an efficient and sustainable manner (Koskela-Huotari and Vargo, 2016). The S-D logic conceptualizations on resources have been criticized by the macro-economic field for neglecting the interconnectedness of the material and immaterial, especially if markets are addressed in a wider global perspective of sustainability, natural resource use, and social equality (Campbell et al., 2013). However, the idea of connecting the S-D logic conceptualizations with natural ecosystems has also been discussed (Lusch and Vargo, 2014).

Recently, Matthies et al. (2016) from the field of forest research argued for an integrative approach to connect the natural and business ecosystems. Ecosystem services are the benefits that natural ecosystems offer for people. These include provisioning services, such as food, water, and timber; regulating services, such as the impact on climate; cultural services, i.e., recreational, aesthetic, and spiritual benefits; and supporting services, such as photosynthesis or nutrient cycling (MEA, 2005). The concepts of value-in-exchange and value-in-use connect to what is discussed in the field of ecosystem services; value defined on markets is often a necessary step to recognition of these services to society (cf. Vargo et al., 2008). However, ecosystem services also contribute to human well-being without any market exchange, further processing, or use of human skills (Campbell et al., 2013). This means that natural ecosystems can also be interpreted as actors within the value-creating system where the socio-economic exchanges are embedded (Matthies et al., 2016). Resource integration leads to co-creation but also co-destruction of potential value, and Matthies et al. (2016) propose the concept “value-in-impact” in order to extend the service systems definitions to these positive and negative impacts that markets cause on ecosystem services.

The elaboration of service-ecosystem conceptualizations is foreseen through the institutional theories perspective (Vargo and Lusch, 2016). Institutional arrangements, or logics, provide the rules by which actors produce and reproduce their material subsistence and organize time and space (Thornton et al., 2012). Building on the inter-institutional systems by Friedland and Alford (1991), the context where resources are integrated can be seen affected by multiple parallel institutional arrangements. The potential that resources represent, i.e., how they become resources, is also perceived through these frames of reference (Koskela-Huotari and Vargo, 2016). The interpretations about natural resources and the potential they have may vary in the emerging service ecosystems.

The timescale in which natural ecosystems have evolved is very different than the timescale we use for assessing socio-economic systems (Meadows, 2009). In fact, our competences to understand how nature works are incomplete, and science aims to increase our understanding of nature's design and engineering capacities. This knowledge can be used, for example, for developing new bio-based substances or biomimicry technologies (Campbell et al., 2013). Furthermore, this knowledge is used for developing metrics and an evidence base on the effects that nature has on human physiology and wellbeing (Jäppinen et al., 2014). Based on this notion, we extend the G-D and S-D logics to include natural resources both as operand (tangible assets) and operant (active competences). The framework (Table 1) widens the socio-economic processes discussed under service ecosystems with the third dimension of sustainability—the ecological-environmental one.

Table 1. An extended G-D and S-D logics framework (perspectives on sustainability in italics)

Natural resources	operant (skills, compe- tences)	G-D logic extended: value created in production, but nature and its resources offer useful properties and benefits; <i>sustainability is ensured with sustainable management of natural resources; external experts guide decision makers and consumers to make informed choices</i>	S-D logic extended: nature is actor in value co-creating systems; <i>sustainability is wellbeing of ecological, socio-cultural and economic systems, ensuring resource integration potential of all these systems for future value creation</i>
	operand (tangible assets)	G-D logic: value created in production; <i>environmental sustainability is ensured by efficient, verified production processes and knowledge-based use of natural assets</i>	S-D logic: service-for-service systems based on resource integration of multiple actors; <i>sustainability is wellbeing of the socio-economic system, ensuring resource integration potential for future value creation</i>
		value adding chains	value co-creation systems
Value creation			

The four fields presented in Table 1 should not be interpreted as excluding one another. Rather, different emphases are expected to be found across the axis of G-D logic–S-D logic and the axis of operand–operant resources. Essentially, the left-hand side illustrates product(ion)-oriented sensemaking and the right-hand side a system-oriented approach; the bottom row focuses more on socio-economic processes, while the top row connects also natural ecosystems to these processes. The following example on the emerging collaboration between the forest-based sector and the construction industry as its customer will illustrate this further.

3. Example of the construction industry and the forest-based sector

Buildings account for approximately 40% of all energy consumption and for almost a similar share of greenhouse gas emissions in the EU (EC, 2013). There is a considerable potential for climate change mitigation, and policies direct the industry toward increasing resource and energy efficiency. Criteria are developed for assessing alternative materials and solutions, their emissions and environmental and other impacts along entire supply chains as well as throughout the product lifecycles. New

technological applications, such as 3D printing, circular processes, and sensor and digital technology, i.e., smart properties embodied in buildings, are foreseen to open new opportunities in the construction sector, its supply chains, and the service providers further downstream.

The construction industry can be defined as a complex products and systems sector, part manufacturing and part services (Bröchner, 2010). It includes various supplies, materials, components, and equipment as well as engineering, design, consulting, project management, and financing services. Complex processes, capital intensive-ness, and project-based activities lead to an emphasis on cost-efficient processes, risk minimization, and a slow adoption of novel technical solutions. Services are developed along supply chains, for the construction industry customers, real estate sector, and users, including, for example, public-private services on energy (Hyytinen et al., 2015) and facility management and residential services (Siltaloppi, 2015). Novel technological applications also open possibilities for a shift from product orientation to more customer-oriented processes; for example, energy efficiency applications enable learning about users and usages, networking with service providers, and facility management as well as using the accumulating knowledge to develop the processes, new products, and solutions (Bröchner, 2010; EC, 2013).

The construction and real estate sectors seek to optimize their processes but also strive to provide customers with increased value. Customers, such as tenants of office buildings, compete for the workforce and use the built environment to strengthen their brand and to increase productivity and innovation in work (PwC and ULI, 2016). Future buildings can be envisioned as service platforms co-designed by customers or residents, composed of flexible, adaptive, modular solutions to satisfy their needs (Hietanen, 2011).

Wood products enter into this market setting with renewable sustainably-sourced materials, novel products, and technical solutions applicable for multi-story buildings and large-scale construction traditionally dominated by the concrete and steel industries (Haapio, 2013; Hurmekoski, 2016). Figure 1 illustrates a forest-based supply chain and its connection to a construction industry customer's value networks and the institutional arrangements level.

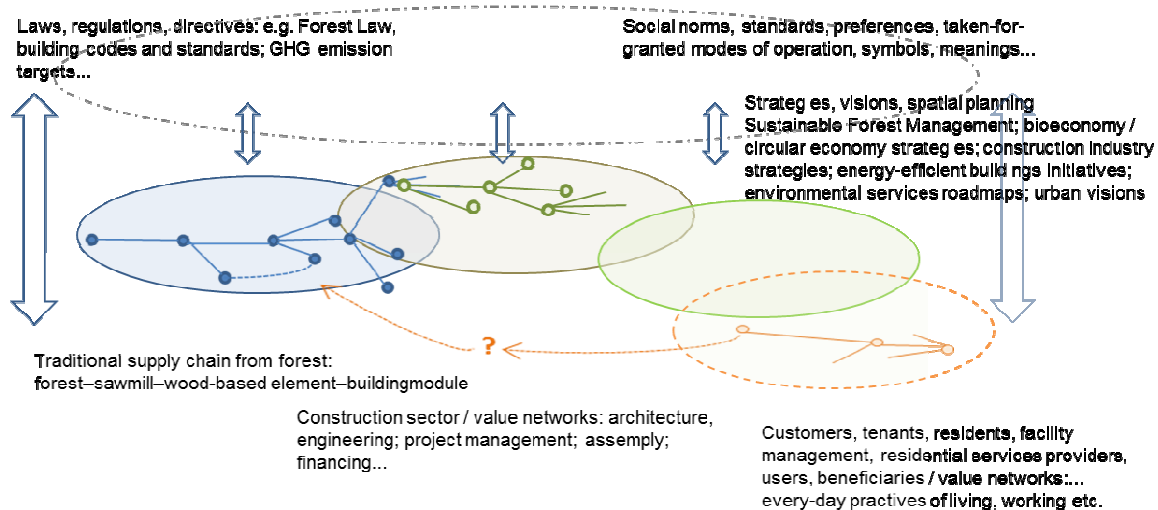


Figure 1. Construction industry as a customer for the forest-based sector: zooming out from supply chains to value networks and toward a system view.

To respond to the needs of the construction sector, wood products companies emphasize cost efficiency and the technical and economic feasibility of their products, such as pre-fabricated elements and modular solutions. For the construction industry and their clients, wood is not perceived as an additional benefit but may be perceived as an additional risk, for example, concerning fire (Haapio, 2013; Hurmekoski, 2016).

Mere product innovation or additional assembly services are not enough to convince customers of wood products, but system-level changes are required. Adoption of new products is promoted with R&D development, pilot projects to test and approve new techniques, novel risk-sharing solutions, changes in regulations and building codes, and information campaigns to address perceptions of developers and residents (Hurmekoski, 2016). Some construction companies have extended their activities upstream in the supply chain and downstream to facility management. The challenge of increasing services is that new capabilities are needed to change the project-based mindset to continuously deliver support services (Bröchner, 2010). Further downstream in residential services, core of value creation is not buildings as profitable assets and well-functioning technical systems, but the insight about the needs of the residents (Siltaloppi, 2015).

Upstream of the value chain, i.e., in the forest-end, the raw material supply potential is assessed as part of the increasing biomass demands for the evolving bioeconomy (Pelli et al., n.d.). New wood-based substances and materials are envisaged not only for traditional wood products, the pulp and paper industries but also for the energy, fiber, and chemical industries. The wood products industry is part of the interdependent forest sector dynamics; wood from different stages of a forest lifecycle provides raw materials for different types of products, and residues from one production process are typically used for the production of other products, e.g., from sawmilling to pulp industry. In other words, changing one element of the traditional forest industry supply chains affects the future conditions both for forestry and for other wood-using industries. With the foreseen increased demand for renewable raw materials, the forest-based sector promotes its services to society, such as sustainable management of forest resources that ensures the provision of multiple ecosystem services, and forestry and industry that contributes to rural employment and income (Pelli et al., n.d.).

An evidence base is accumulated on the good properties of wood, such as its positive impact on human health and wellbeing (Muilu-Mäkelä et al., 2014). From the ecosystem services perspective, there are several benefits that trees provide in the urban environment, such as green spaces, air quality, noise reduction, and hydrological and micro-climatic regulation (Jäppinen et al., 2015; JPI Urban Futures, 2015). New techniques are sought to develop a built environment that mimics nature, such as plants extracting phosphorus from waste materials (Nehls et al., 2015) or regenerative designs contributing to improved ecosystem health, instead of having a negative impact on nature (Pedersen Zari, 2012).

Table 2 summarizes the above points into the extended G-D and S-D logics framework. Through the G-D logic lens, the increased use of wood provides a strategic benefit for the construction industry by improving efficiency, safer and faster processes, and faster payback times; for the customers and residents by providing an impact on health and wellbeing; and for society by providing economic returns, re-

ducing emissions, and enhancing environmental sustainability. Through the S-D logic lens, in turn, resource integration with multiple actors leads to effective use of buildings and built environments but focus is in wider socio-economic processes that ensure future value creation.

Table 2. Summary of the analysis

Natural resources	operant	<p>“wood is good for human health”;</p> <p>informing users about benefits creates demand for wood-based solutions; increased use of renewable materials contributes to reduced emissions, and benefits both society and nature</p>	<p>“built environment cooperates with nature”;</p> <p>socio-economic operations are designed to minimize their negative impacts on nature and to enhance the positive impacts; wellbeing of ecological, socio-cultural and economic systems ensures future resource integration potentials</p>
	operand	<p>“wood is the new concrete”;</p> <p>renewable materials substitute non-renewable materials; cost and technical benefits through more efficient production processes benefits customers and society at large</p>	<p>“buildings are service platforms”;</p> <p>best-fit-for-purpose solutions are co-designed with suppliers, residents, users and service providers, and this leads to effective use of built environments; wellbeing of socio-economic system shapes future value co-creation</p>
		G-D logic	S-D logic
		Value creation	

Following this line of thought, the pathways toward a sustainable future unfold differently. Through the G-D logic lens, a sustainable future is ensured first and foremost through the production processes, which are based on a proven knowledge base and optimized processes to increase efficiency of operations. Controlled processes reduce uncertainty and improve risk management but lead to more incremental developments. Through the S-D logic lens, sustainability becomes negotiated in several value co-creation contexts where interactions lead to accumulation of knowledge among the resource-integrating actors. Experimentation as part of the systemic processes may lead to radical innovations and unpredictable outcomes.

4. Discussion

In this paper, the socio-economic processes elaborated in service-ecosystem conceptualizations were extended to include alternative perceptions about natural resources within G-D and S-D logics. These perceptions were defined from sustainability research and ecosystem services research literature. Emerging collaboration space(s) of the forest-based sector, construction industry, and their wider value networks were analyzed as an example based on literature reviews, secondary sources, and sector-level strategies and technical reports. The four statements concluded from the analysis (Table 2) do not represent present realities but rather alternative ideas of a future in the exemplified context: “wood is the new concrete”, “wood is good for human health”, “buildings are service platforms” or “built environment cooperates with nature”. Through these statements, sustainability, as a system benefit, becomes defined differently, including who the key actors are, which resources are needed, and what the expected outcome is.

The service ecosystems focus on socio-economic processes to understand how markets or society at large work (Lusch and Vargo, 2014). The deliberate guidance of systems toward increased wellbeing—or sustainability—is not a target as such, although modeling of service ecosystems is foreseen to bring new tools for firms and policy makers (Vargo and Lusch, 2016). The challenge for modeling service ecosystems is the social complexity that is inherent in them (cf. Aaltonen and Sanders, 2006).

Sustainability transitions are studied as fundamental transformation of socio-technical systems, which can be aimed at with deliberate visioning and target setting, but which also include emerging features (Markand et al., 2012). The timescale of transitions extends over several decades. This calls for thinking beyond existing constraints, such as present-day production and consumption patterns or the commitment to old technologies when more advanced and efficient solutions are breaking into the markets. Scenario methods are often used to support the transitions (Kemp and Rotmans, 2004; Elzen et al., 2004). These scenarios are a tool to connect the micro–meso–macro levels, assess the variety of options available, and co-produce cognitive frames that support sustainable paths. For example, backcasting is a normative approach that defines a shared vision, and then builds alternative pathways from the future toward the present-day how the end state could be achieved. Exploring alternative scenarios, in turn, assesses different storylines, for example, the evolvment of alternative technology trajectories or changing use, and provides information on different choices and the impacts of decisions of today (Elzen et al., 2004; Tapio et al., 2014).

The scenario methods do not aim to deliver something that would become evidenced as an observable future in a set timeframe but to support decision making by reducing the level of uncertainty and raising the level of knowledge (van der Heijden, 1996; Bradfield et al., 2005). As already noted, the methods and approaches to this end vary. For managing emerging service ecosystems, the scenario methods provide dual approaches (Ramirez and Selin, 2014): 1) methods to reduce uncertainty by approximating the most likely or the best possible scenario; 2) methods to stimulate learning and capacity building among stakeholders in a particular context, using ambiguity rather than trying to reduce it in order to reach out from the conventional thinking. Production of knowledge about futures is a social process where meanings and shared understandings are constructed (Fuller and Loogma, 2012). The step from an analysis of *sensemaking*, i.e., parallel logics embedded in emerging service ecosystems, to *sensetaking*, i.e., explication of alternative futures and their deliberate utilization, moves the methodological emphasis to the field of social complexity. This process shapes the toolbox that individuals, organizations, and groups of organizations have in order to assess future opportunities and challenges and to tackle future situations. In other words, the latter mentioned scenario approach for managing emerging service ecosystems emphasizes more users' and beneficiaries' resources in producing knowledge about futures as well as co-creating the future.

This paper is conceptual, and empirical analyses are needed to test and further elaborate the extended G-D and S-D logics framework. The example presented focused on tangible production, and similar analysis of, for example, the architectural or engineering services related to the construction industry could be useful. In fact, there are several possible ways to define the boundaries for a service-ecosystem investigation in this field. S-D logic with its system view makes explicit the role of users, customers, and beneficiaries in value co-creation and provides an important contribution to

the sustainability transitions and natural resources sector investigations. The perspective of users remains often less developed in the forest sector and bioeconomy strategies (Pelli et al., n.d.). For example, bio-refineries could be addressed as service ecosystems that, while developing the business and engineering processes, at the same time contribute to (re)defining the very concepts of “biotechnology”, “bioeconomy” and “circular economy”.

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SERVICE FIRM INNOVATION: DISAGGREGATED CLASSIFICATION ANALYSIS FOR MÉXICO

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All the world's most advanced economies are dominated by service sector, with many of them providing more than 70% of its GDP. This participation is also similar for Less Developed Countries (LDCs) (OECD, 2011). Projected service growth will continue in both groups of countries. This is an innovation study for Mexican service firms at level of sectors and economic branches (North American Industry Classification System, NAICS). The investigation is made with surveys from the economic censuses (13 sectors and 96 branches for 2004 Census and 13 sectors and 64 branches for 2009 Census). However, innovation surveys are traditionally concentrated in technological innovations according with the subordination approach in services innovation (Djellal and Gallouj, 1999). Therefore, we also compare the results using technological trajectories from Soete and Miozzo's taxonomy (1990), which take into account service sector.

1. Introduction

For the economists, innovation is the engine of economic growth and development (Schumpeter, 1942; Griliches, 1986; Fageberg, 1988; Freeman, 1994; Baumol, 2002; Aghion and Durlauf, 2005; Ayyagari, et al., 2011). Innovation surveys show that companies invest in innovation to gain market share, reduce costs, and increase profits (OECD, 2000).

The world is being characterised by services. All the world's most advanced economies are dominated by the service sector, with many of them providing more than 70% of its GDP. This participation is also similar for Less Developed Countries (LDCs) (OECD, 2011). Projected service growth will continue in both groups of countries. For example, 48.1 % of China's GDP and 62.3 % of México's GDP is attributed to services (the World Bank, 2014).

The traditional way to gather service companies is by industry or by sectors (hospitality, banking, telecommunications, transportation, maintenance, etc.), this classification is somewhat standardized in the countries' economies, and therefore there is data that can be compared between countries, sectors and companies. However, between sectors are integrated diversity types of services that makes complex to evaluate them. Besides, in the majority of LDCs, there is no consensus or sufficient information to measure the effects of innovation.

The research aims to show the innovation in Mexican services firms into a highly disaggregated level (in this case at branch level). It is important to denote that the majority of innovation services studies are made for sector level regardless the type of classification used.⁶³ Furthermore, to take account firms' technological bases in their innovative efforts. Even that the results are shown at large disaggregated level, we attempt to use Soete and Miozzo's technological trajectory approach in the study.⁶⁴ And this is done in order to make a comparison between one national industry classification and one technological change approach. Also because we consider that innovation is a cumulative and specific process rather than a disembodied outcome (Gallouj, 2002). Therefore, we have the next questions:

Which sectors and branches of services in México are more innovative using the North American Industry Classification System (NAICS)?

Which sectors and branches of services in México are more innovative using Soete and Miozzo's technological trajectory approach?

This study is an innovation analysis in Mexican firms using the 2004 and 2009 Economic Censuses which contain a module of surveys for Innovation and Research with qualitative answer questions (dichotomous). With them we will try to explain the innovation characteristics in Mexican services firms at level of sectors and branches according to the North American Industry Classification System (NAICS).

Like the majority of innovation studies, these surveys are more concentrated in technological innovations and the questionnaires were designed first to use it in manufacturing firms (according with the subordination approach in services innovation; Djellal and Gallouj, 1999).⁶⁵ Furthermore, both surveys are different: 2009 survey has more questions than 2004 survey and for the former; many of them are for the use of ICTs (Information and Communication Technologies). Besides of this, we think the database has its advantages, firstly because the data comes from censuses and the coverage accounts the mayor part of service firms in México; and also because the structure of the survey has tried to cover all types of innovation like product and service innovations; process innovations; organizational innovations and external relationship innovations as well.

The study uses the methodology of Ayyagari, et al. (2011), although it adapts to the data available in México. They made a global research of over 19,000 SMEs (Small and medium-sized enterprises) both private and public; with the particularity that the countries surveyed were 47 developing countries (surveys were answered from 2002 to 2004). However, they only could do it for innovation in general without unsplit the sectors.

It is a reality, that this sector is complex and there is no consensus to gather it in the best way. As a result, the data (if it exists) is not grouped in a way to allow how to measure the effects of innovation in services. The contribution of this study is the

⁶³ NAICS' economic classification from highest to lowest is: sector, sub-sector, branch, sub-branch, class.

⁶⁴ Soete and Miozzo (1990) approach is based on Pavitt (1984) taxonomy. But, they reject the hypothesis that technological behaviour in the service sector is homogeneous, and services could follow different technological trajectories than just a single one.

⁶⁵ Community Innovation Surveys (CIS) have produced consistent evidence that R&D plays only a marginal role in services, Gallouj and Djellal (2010).

possibility to study a Less Developed Country (LDCs) such as Mexico. Most of the innovation service studies are made for developed countries. Additionally, the high level of coverage achieved (from sectors to economic branches). We refer some of the few studies for LDCs: Kubota (2009), Vélez-Ospina (2009), Garcia, et al. (2014), Soares, et al. (2014), de Moraes, et al. (2015) and Linn (2016).

This article is divided into five sections. The second reviews the literature background. The third describes the database and methodology. In the fourth section we analyse innovation: sectors and branches with NAICS and with Soete and Miozzo's technological trajectory approach. In the last section will synthesize and the results are discussed.

2. Services innovation and taxonomies of technological trajectories

2.1. Services innovation

According to Gallouj (2002), in the services innovation literature there are three basic approaches: 1) Technologist or subordination: Equates or reduces innovation in services to the introduction of technical, material transport, processing and information and communication systems; 2) Service-oriented: It is based on the particularities in the nature and organization of innovation in services; 3) Integrative: Intends a similar analytical approach to innovation in both cases. However, studies of technological innovation have an overwhelming majority in services literature and these studies are incapable of accounting innovation in services in all its richness.

Studies of researchers as Djellal and Gallouj (1998), Gallouj (2002), Miles, et al. (1994) and Sundbo (1998), show that there is innovation in services and a significant amount, moreover, that it could be different from that of the manufacturing sector in certain cases. Also data from CIS (Community Innovation Surveys) by the European Union and OECD, for example, confirm innovation in different forms and industries.

Furthermore, service sector has a particularity of characteristics different from the primary and manufactory sector: the intangibility; the difficulty of assessing the service by the client; the amount of tacit knowledge that is in many processes; the interactive mode of service that combines customer and provider in the design, production, delivery, consumption and other active phases of the service; the simultaneity of production and consumption; and in some cases, the dependence on information technologies (Miles, 2005 and Castellacci, 2008).

For example, the use of advanced ICTs has enabled to create new service delivery mechanisms and has reduced the time required to develop and introduce new services. Service sector is a heavy user of these technologies and the economic impact of such technologies is more visible (Cainelli, et al., 2006).⁶⁶ Moreover, service firms

⁶⁶ According to Miles (1995), around 80 % of information technology investments are consumed by the service sector in the United Kingdom and the United States.

are more prone to collaborate with customers and suppliers and manufacturing firms do it through in-house R&D (Tether, 2005).

We can still find debate in terms of theoretical approaches, methodology, epistemology and investigations results. Some of the main discussion topics are the separation of innovation in various industries, and these industries are: manufacturing and services. And that is due to the specific characteristics of each sector, but also, because the data is accounted separately for each of these sectors. There is an attempt to change the emphasis in separate innovation by sectors; but this requires the incorporation of many tools and theories that do not belong to the traditional studies of innovation, and that will include studies of organizational behaviour, social networks, marketing, strategy and communication (Tether and Howells, 2007).

The nature of services and measurements errors are important issues in service innovation, but the intrinsic characteristics of services are the most problematic of them (e.g. "Nebulous" process, interactivity and extreme diversity) (Gallouj, 2002). Since, "a service is a process, a sequence of operations, a formula, a protocol, a mode of organisation" and normally it is intangible, the traditional distinctions between product, process and organisational innovation are not well defined.

Furthermore, the service may be embodied not in technologies but in competences. The custom-made or ad-hoc innovations are not taken into account and there is possible that the customer can be one of the actors in innovation. If the firm has an innovation department (it is not the case for most of the firms), they are seldom the only actors in the innovation process. They are almost always supplemented by (and are in competition with) formalised but non-permanent innovation structures (project groups made up of people from different departments) and, particularly in knowledge-intensive activities, by a high level of informal activity on the part of individuals (Sundbo, 1998; Fuglsang, 2008; Gallouj and Djellal 2010).⁶⁷

2.2. Taxonomies of technological trajectories

Firm economic growth is based on technological change and innovation (Solow, 1957; Griliches, 1998; Silverberg and Soete, 1994; Freeman and Soete, 1997). But the role and impact of technological change in services has been considered as technological backward, with innovation playing no role in explaining the aggregate performance of this sector (Cainelli, et al., 2006). Recently, the impact of technological innovations in service sector is recognized. However, Gallouj (2002) denotes that in services other types of trajectories have a particularly important place (cognitive trajectories, for example).

In order to identify the main sources and characteristics of technological change and its economic impact in sectoral studies, diverse taxonomic typologies have been utilized: Freeman, 1982; Pavitt, 1984; Freeman and Soete, 1987, 1997; Mills, 1986; Lakshmanan, 1987; Pavitt et al., 1989; Soete and Miozzo, 1990).

⁶⁷ Miozzo and Soete (2001) point out, that the "areas or spaces" dedicated to innovation can be different between sectors: in manufacturing firms there are production engineering departments and in services firms similar trends can be detected with "network engineering" departments.

Sectoral models are determinate by firms' technological bases and by firms' learning processes and absorption capacities. These sectoral taxonomies and the corresponding trajectories introduce specificity or history into firms' behaviour, just as they introduce variety and potential for evolution, though, also subject to a certain degree of irreversibility ('path dependency'). However, technological behaviour is "heterogeneous and shaped by the 'trajectory' operating at any given time and the non-transparency of knowledge and its costs", Gallouj (2002).

In Soete and Miozzo's taxonomy (1990), a typology that takes account the service sector; there are three types of firm or industry:

- 1) Firms 'dominated by suppliers' of equipment and technical systems, which are not very innovative and adopt their process technologies from industrial suppliers. They can be divided into two groups:
 - 1.1) Personal services: Small firms whose customers are sensitive to performance and whose modes of innovation appropriation are non-technological like professional know-how, aesthetic design, branding and advertising. The technological trajectory is mainly product design (e.g. Repair services, cleaning, hotel and catering, retailing, laundry services).
 - 1.2) Public and Social services: Large firms and organizations, whose customers are conscious of quality in the wider sense and whose innovations constitute public goods that they cannot claim to appropriate for themselves. The technological trajectory is mainly by improving performance (e.g. Education, Health and Public Administration).
- 2) "Networks firms": Firms that follow a trajectory characterized by cost reduction and the implementation of a networking strategy. They tend to be large in size. Standards and norms constitute their main modes of innovation appropriation. Their customers are extremely price-sensitive. These firms may turn to outside suppliers for their technologies, but always do so from a position of strength, they can be divided into two groups depending on the principal medium of service delivery:
 - 2.1) Physical networks: Firms whose services are based on tangible mediums (e. g. Transport, Wholesale Trade).
 - 2.2) Informational networks: Codified information is the medium of service delivery (e. g. Finance, Insurance, Communications).
- 3) "Specialized suppliers and science-based services": Characterized by small firms whose technological trajectory is based on system design. Their clients are more concerned with the performance of the technologies than with their cost, while the innovation appropriation regime is dominated by R&D know-how, copyright and product differentiation. The source of technology can be in-house, customers and suppliers (e. g. Service providers that have particular relationships to R&D, Information Technologies and Telecommunications).

3. Database and analysis methodology

The available information for the study is: 13 sectors and 96 branches for 2004 Census⁶⁸ and 13 sectors and 64 branches for 2009 Census.⁶⁹ The analysis counts the affirmative responses linked to innovation activities made by firms (see Table 1 for 2004 Census which includes ten questions and Table 2 for 2009 Census which includes 21 questions). Those responses are codified like dichotomy variables (Yes=1, No=0). Then, they are grouped at level of sectors and branches. The percentages obtained are utilized to construct the indices for the study. It should be noted, that these censuses do not have information for each firm,⁷⁰ they have information with answers at branch level, therefore, the indices are constructed from the percentages for each sector and branch. Besides, the questions in tables are classified by the type of innovation: Product and Service innovations (PSI), Process innovations (PI), Organizational innovations (OI) and External Relationship innovations (EI). We denote that one activity (question) can have two innovation types.

In addition to census questions, we include two aggregate indices of innovation: "Core Innovation" and "Aggregate Innovation" (constructed according to the methodology proposed by Ayyagari, et al., 2011). Specifically, the "Aggregate Innovation" index measures the total of responses linked to innovation activities. The "Core Innovation" index measures only responses linked to activities considered as basic or essential to the development of product or service innovations (in our innovation classification this questions just belong to one type: Product and Service innovations). "Core Innovation" index includes three questions (1, 2 and 6) for 2004 Census and two questions (1 and 5) for 2009 Census. "Core Innovation" index belongs to a "technologist view" in where services are unsuited to R&D and innovation, as Gallouj and Djellal (2010) argues. For this reason, we consider that results for this indicator are technological biased. Still, we use it for contrasting results against the "integrative view" content in the "Aggregate Innovation" index.

The values for the aggregate indices are constructed by adding the percentages of affirmative responses for each classification. We find these indices to be very useful for indicate which sectors or branches are more innovative. In all cases high values of these indices reflect high levels of innovation. The maximum value for "Aggregate Innovation" indices in 2004 Census and 2009 Census is ten and twenty-one, respectively. And the maximum value for "Core Innovation" indices in 2004 Census and 2009 Census is three and two, respectively. And the minimum value for all cases is zero. With all indices from the innovation activities, we construct tables for each classification level and for each census. Although, it is important to note due to methodological differences, comparisons between each census are difficult to make (because

⁶⁸ Are excluded from this census, sectors 48-49 which correspond to Transportation and Warehousing.

⁶⁹ Are excluded from this census, sectors 55 and 62 which correspond to Management of Companies and Enterprises and Health care and Social assistance, respectively. The number of questions for the 2009 Census were increased and it used the "Open Innovation" approach, defined as "Deliberate use of inputs and outputs of knowledge to accelerate internal innovation, and expanding the use of innovation markets respectively" (Chesbrough, 2006), with an emphasis on the way to use, manage, apply and also to generate intellectual property" (Herzog, 2008). Besides, this census has more questions on the use of ICTs.

⁷⁰ Firm-level data are not available due to reasons of confidentiality, but also for certain variables of some branches and sectors. This in accordance with the law of the National System of Statistical and Geographical Information, in articles 37, 38, 42 and 47.

of the number of questions for each census, confidentiality problems, and incompatibility of versions of NAICS).

Finally, we analyse the responses for Mexican firm's innovation activities at level of sectors and branches into the Soete and Miozzo's taxonomy (See Table 3 to see classification codes). Although the sector analysis allows us to see which sectors are more innovative, we believe that national classifications (e.g. NAICS, International Standard Industrial Classification (ISIC)) do not consider all the services' characteristics in order to evaluate innovation in all activities. Therefore, comparisons can be unfair between sectors due to the form of how the classifications are made.

For the last part of the study, we only use the aggregate indices ("Aggregate Innovation" and "Core Innovation"). Firstly, we obtain for each census, the average percentage of those indices at sector and branch level. Secondly, we classify sectors and branches into Soete and Miozzo's categories. Thirdly, for every category we choose the sectors and branches with major or equal value against the average aggregate indices. Finally, we calculate the category percentage of innovation (in all cases higher percentages correspond to higher degrees of innovation).

It is important to point out that in the case of "Networks firms", we find one sector and some branches that are not easy to separate into the Soete and Miozzo's taxonomy groups: Physical networks and Informational networks. Rather, we consider that they share in the same proportions tangible mediums as well as codified information for service delivering. Therefore, these sector and branches have been catalogued like "Networks firms".⁷¹

Code	Question	Innovation type code
1	Had a department dedicated total or partially to the design or creation of new products or processes	PSI
2	Invested in the creation of new products, materials, devices or components	PSI
3	Registered products or other works of intellectual creation to intellectual property institutes	PSI, PI
4	Trained staff in the use of new technologies and work processes	PI, OI
5	Implemented processes of reorganization in working systems	PI, OI
6	Adapted their goods or services to changes in the preferences of their customers	PSI
7	Used computer equipment in administrative processes	PI
8	Used internet in their relationships with customers and suppliers	EI
9	Used computer equipment in technical processes or design	PI
10	Developed programs or software packages to improve their processes	PI

Source: based on Economic Census of México, 2004.

Notes: Each question is classified by the type of innovation: PSI (product and service innovations), PI (process innovations), OI (organizational innovation), EI (external relationship innovations). "Core Innovation" index includes questions 1, 2 and 6.

Table 1. Questions of innovation activity in Mexican firms, Census 2004

⁷¹ The sector is Administrative and Support and Waste Management and Remediation Services for both censuses. The branches are: Retail trade in supermarkets; Retail trade in department stores; Parks with recreational facilities and electronic gaming also for both censuses. Ambulances, organ banks and other ancillary services to medical treatment for 2004 Census and Foreign package delivery services for 2009 Census.

Code	Question	Innovation type code
1	Had specialized areas dedicated to the design and creation of new products or services, production processes or provision of	PSI
2	Registered or transacted patents of trademarks, products or processes	PSI, PI
3	Hired or acquired patents of trademarks, products or processes	PSI, PI, EI
4	Made collaboration agreements with research centers, universities and consulting firms	EI
5	Made research for innovation	PSI
6	Hired companies to do engineering research	EI
7	Developed patents of trademarks, products or processes	PSI, PI
8	Due to lack of resources stopped planning innovative projects or ceased to find substitutes that failed	PSI, PI
9	Qualified full time staff dedicated to find solutions or improvements in quality control	PSI, PI, OI
10	Qualified full time staff dedicated to find solutions or improvements in production processes efficiency	PSI, PI, OI
11	Qualified full time staff dedicated to find solutions or improvements in innovation of products, services or processes	PSI, PI, OI
12	With regular use of computer equipment	PI
13	With regular use of the internet	PI, EI
14	Used communication networks: broadband internet	PI, EI
15	Used communication networks: intranet	PI
16	Used communication networks: extranet	PI, EI
17	Made by internet: banking and financial operations	EI
18	Made by internet: procedures with government	EI
19	Made by internet: purchase or sale of products or services	EI
20	Made by internet: information search	EI
21	Made by internet: management activities for the firm (planning, organization, direction and control)	PI

Source: based on Economic Census of México, 2009.

Notes: Each question is classified by the type of innovation: PSI (product and service innovations), PI (process innovations), OI (organizational innovation),

EI (external relationship innovations). "Core Innovation" index includes questions 1 and 5.

Table 2. Questions of innovation activity in Mexican firms, Census 2009

Code	Type
DS	Dominated by suppliers
PER	Personal services
PUB	Public and Social services
N	Networks firms
PN	Physical networks
IN	Informational networks
SC	Specialized suppliers and science-based services

Source: based on Soete and Miozzo (1990) taxonomy.

Table 3. Classification codes based on Soete and Miozzo taxonomy

4. Results

In order to analyse the innovation activities that Mexican service firms incurred, we construct the next tables: Table 4 (2004 Census) and Table 5 (2009 Census) show the proportions at sector level. For the branches we construct Table 6 (2004 Census)

and Table 7 (2009 Census). In all tables (from 4 to 7), we also include Soete and Miozzo's classification codes. Finally, we construct Table 8 (2004 Census) and Table 9 (2009 Census) to analyse the innovation's degree at sector and branch level using Soete and Miozzo taxonomy.

Table 4 (2004 Census), shows that 51 sector (Information) has the greatest number of innovation activities undertaken as a percentage, with an "Aggregate Innovation" index of 5.78 and sector 72 (Accommodation and food services) is the lowest with a rate of 1.37. "Core Innovation" index that represents the use of "core" activities of innovation as a percentage; shows that 52 sector (Finance and insurance) is the highest with a rate of 1.81. And the lowest is once again sector 72 with a rate of 0.65. Meanwhile, the activities most used are "Adapted their goods or services to changes in the preferences of their customers" as well as "Trained staff in the use of new technologies and work processes ". The activity that is the least used is "Registered products or other works of intellectual creation to intellectual property institutes".

Table 5 (2009 Census), shows that 52 sector (Finance and insurance) is the most innovating with an "Aggregate Innovation" index of 11.68 and the least (just as the previous census) is sector 72 with a rate of 3.83. "Core Innovation" highest index is again for 52 sector (Finance and insurance) and the lowest is also for 72 sector. In this census, the most commonly activity used is "Made by internet: information search". The least used are "Hired or acquired patents of trademarks, products or processes", "Hired companies to do engineering research" and "Developed patents of trademarks, products or processes".

Table 6 (2004 Census), shows that the highest "Aggregate Innovation" index is for branch 5151 (Transmission of radio and television programmes, except via the Internet) and the lowest is for branch 7213 (Pensions and guest houses, apartments and houses furnished with hotel services). "Core Innovation" highest index is for branch 5172 (Cellular and other wireless telecommunications, except satellite services) and the lowest is again for branch 7213. For this census, innovation activities are more and less used as for sector analysis.

Table 7 (2009 Census), shows that the highest "Aggregate Innovation" index is for branch 5221 (Multiple banking) and the lowest is for branch 4872 (Tourist transport by water). The highest "Core Innovation" index is again for branch 5221 and the lowest is for branch 4842 (Specialized freight trucking). Besides, innovation activities are more and less used as for sector analysis.

Table 8 (2004 Census), shows innovation degree using Soete and Miozzo's taxonomy, divided in two parts: sector level and branch level. In "Aggregate Innovation" index at sector level analysis, we obtained (just like the majority of innovation studies) that the most innovative firms belong to "Specialized suppliers and science-based services" trajectory with a 100 % of sectors with major or equal value against the average. The second most innovative is "Networks firms" with 66.67 % (however only "Informational networks" firms with 100 %). And the least are "Dominated by suppliers" firms with 16.67 %. In contrast, "Personal services" category innovate more in core activities than "Public and Social services" (25 % vs. 0 %, respectively).

At branch level, the different trajectories innovate as in sector level, but the percentages show less dispersion, and for example, we do not have branches with 100 % or 0 %. Furthermore, we can see that all "Networks firms" and "Specialized suppliers

and science-based services” groups have more types of innovation (in both “Aggregate Innovation” and “Core Innovation” indices) than “Dominated by suppliers” firms.

Table 9 (2009 Census) shows innovation degree using Soete and Miozzo’s taxonomy. In “Aggregate Innovation” index at sector level analysis, the order’s degree of innovation is the same as for the 2004 Census: “Specialized suppliers and science-based services” (100 %), “Networks firms” (66.67 %) and “Dominated by suppliers” firms (20 %). Besides, “Personal services” obtains 0 % just like in 2004 Census, but “Physical networks” goes from 0 % to 33.33 %. Also, “Public and Social services” increases from 50 % to 100 %. Excepting for “Personal services”, all cases increased, or at least have the same percentage than 2004 Census. And for “Core Innovation” index, we obtained a leaser percentage in “Networks firms” than 2004 Census (50 % vs. 66.67 %).

At branch level, the order degree of innovation it is maintains, but like in 2004 Census, there is less dispersion. Besides, as same as 2004 Census, all categories obtain more than 0%.

Soete and Miozzo code	Sector	Description	Question										"Core Innovation"	"Aggregate Innovation"
			1	2	3	4	5	6	7	8	9	10		
PN	43	Wholesale trade	0,17	0,15	0,05	0,51	0,51	0,60	0,44	0,32	0,18	0,16	0,92	3,09
PER	46	Retail trade	0,18	0,13	0,04	0,60	0,57	0,67	0,07	0,04	0,03	0,03	0,99	2,37
IN	51	Information	0,54	0,40	0,18	0,81	0,76	0,80	0,69	0,60	0,60	0,40	1,74	5,78
IN	52	Finance and Insurance	0,56	0,48	0,07	0,68	0,71	0,78	0,66	0,43	0,38	0,37	1,81	5,11
PN	53	Real Estate and Rental and Leasing	0,14	0,11	0,02	0,30	0,30	0,44	0,29	0,21	0,15	0,10	0,68	2,06
SC	54	Professional, Scientific and Technical Services	0,32	0,27	0,12	0,63	0,59	0,67	0,58	0,42	0,31	0,20	1,26	4,11
IN	55	Management of Companies and Enterprises	0,37	0,27	0,11	0,55	0,51	0,56	0,84	0,67	0,50	0,46	1,20	4,83
N	56	Administrative and Support and Waste Management and Remediation Services	0,26	0,22	0,05	0,63	0,59	0,66	0,50	0,44	0,33	0,23	1,14	3,90
PUB	61	Educational Services	0,21	0,22	0,06	0,66	0,63	0,65	0,49	0,24	0,28	0,20	1,08	3,65
PUB	62	Health Care and Social Assistance	0,22	0,20	0,10	0,54	0,53	0,63	0,25	0,12	0,11	0,08	1,04	2,76
PER	71	Arts, Entertainment, and Recreation	0,24	0,22	0,11	0,53	0,51	0,67	0,08	0,05	0,04	0,03	1,13	2,49
PER	72	Accommodation and Food Services	0,11	0,12	0,02	0,30	0,28	0,42	0,06	0,03	0,02	0,02	0,65	1,37
PER	81	Other Services (except Public Administration)	0,13	0,12	0,04	0,40	0,40	0,46	0,08	0,05	0,04	0,03	0,71	1,74

Source: based on Economic Census for México (2004) and Soete and Miozzo taxonomy (1990).

Notes: Is not included in Census 2004, sector 48-49 (Transportation and Warehousing). Administrative and Support and Waste Management and Remediation Services sector has been catalogued like "Networks firms" instead of separate it into the two groups from Soete and Miozzo's taxonomy: "Physical networks" or "Informational networks". The averages for the "Core Innovation" and "Aggregate Innovation" indices are 1.10 and 3.33, respectively.

Table 4. Sector level innovation indices (NAICS), Census 2004

Sector and Muzco code	Sector	Description	Question																			"Core Innovation"	"Aggregate Innovation"		
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19			20	21
PM	43	Wholesale trade	0.12	0.11	0.05	0.06	0.11	0.04	0.06	0.11	0.20	0.17	0.21	0.94	0.91	0.91	0.25	0.09	0.87	0.72	0.50	0.81	0.40	0.23	7.64
PER	46	Retail trade	0.08	0.04	0.03	0.04	0.06	0.03	0.02	0.08	0.16	0.12	0.15	0.90	0.87	0.87	0.21	0.10	0.83	0.64	0.44	0.74	0.37	0.14	6.76
PM	49-49	Transportation and Warehousing	0.04	0.02	0.01	0.03	0.06	0.02	0.01	0.11	0.10	0.09	0.11	0.61	0.56	0.56	0.09	0.03	0.44	0.34	0.23	0.47	0.23	0.10	4.16
IN	51	Information	0.27	0.18	0.09	0.12	0.16	0.08	0.07	0.12	0.24	0.27	0.28	0.97	0.97	0.96	0.40	0.12	0.88	0.74	0.56	0.85	0.54	0.43	8.86
IN	52	Finance and Insurance	0.56	0.34	0.12	0.25	0.32	0.10	0.24	0.09	0.45	0.48	0.60	0.99	0.99	0.93	0.79	0.32	0.97	0.88	0.65	0.85	0.67	0.88	11.68
PM	53	Real Estate and Rental and Leasing	0.10	0.06	0.02	0.04	0.07	0.05	0.03	0.08	0.13	0.13	0.16	0.91	0.91	0.91	0.26	0.09	0.76	0.62	0.36	0.76	0.40	0.17	6.83
SC	54	Professional, Scientific and Technical Services	0.24	0.08	0.04	0.11	0.17	0.05	0.05	0.15	0.24	0.21	0.28	0.93	0.93	0.93	0.31	0.11	0.78	0.65	0.46	0.82	0.48	0.42	8.02
N	56	Administrative and Support and Waste Management and Remediation Services	0.17	0.06	0.02	0.09	0.14	0.04	0.04	0.10	0.23	0.19	0.26	0.95	0.95	0.94	0.32	0.10	0.83	0.69	0.49	0.85	0.47	0.30	7.93
PUB	61	Educational Services	0.21	0.09	0.03	0.23	0.20	0.02	0.04	0.13	0.20	0.12	0.27	0.99	0.99	0.98	0.30	0.08	0.80	0.69	0.39	0.88	0.55	0.41	8.21
PER	71	Arts, Entertainment, and Recreation	0.10	0.05	0.03	0.05	0.13	0.02	0.03	0.13	0.13	0.11	0.17	0.87	0.87	0.87	0.19	0.05	0.70	0.55	0.34	0.74	0.39	0.22	6.51
PER	72	Accommodation and Food Services	0.04	0.02	0.01	0.02	0.06	0.01	0.01	0.12	0.08	0.07	0.10	0.59	0.57	0.56	0.07	0.02	0.34	0.27	0.23	0.49	0.16	0.10	3.83
PER	81	Other Services (except Public Administration)	0.11	0.06	0.01	0.15	0.08	0.04	0.02	0.10	0.16	0.16	0.17	0.89	0.89	0.89	0.20	0.06	0.61	0.57	0.29	0.76	0.45	0.20	6.68

Source: based on Economic Census for Mexico (2009) and Sate and Muzco taxonomy (1990).

Notes: Are not included in Census 2009, sectors 55 Y 62 (Management of Companies and Enterprises and Health Care and Social Assistance, respectively). Administrative and Support and Waste Management and Remediation Services sector has been categorized like "New oris firms" instead of separate it into the two groups from Sate and Muzco's taxonomy: "Physical networks" or "Informational networks". The averages for the "Core Innovation" and "Aggregate Innovation" indices are 0.30 and 7.26, respectively.

Table 5. Sector level innovation indices (NAICS), Census 2009

Soete and Miozzo code	Branch	Description	Question										"Core Innovation"	"Aggregate Innovation"
			1	2	3	4	5	6	7	8	9	10		
PN	4311	Wholesale trade of grocery and food	0.15	0.13	0.05	0.46	0.49	0.58	0.49	0.30	0.16	0.18	0.85	2.99
PN	4312	Wholesale trade of beverages and tobacco	0.18	0.16	0.04	0.65	0.62	0.61	0.57	0.33	0.29	0.26	0.96	3.72
PN	4321	Wholesale trade of textile products and footwear	0.19	0.20	0.06	0.41	0.47	0.61	0.46	0.30	0.15	0.16	0.99	3.00
PN	4331	Wholesale trade of pharmaceutical products	0.26	0.23	0.08	0.65	0.63	0.62	0.68	0.53	0.26	0.27	1.11	4.22
PN	4332	Wholesale trade of perfumery and jewelry items and other clothing accessories	0.19	0.26	0.07	0.49	0.51	0.65	0.42	0.35	0.17	0.15	1.10	3.25
PN	4333	Wholesale trade of perfume and jewelry items and other clothing accessories	0.41	0.29	0.13	0.54	0.44	0.73	0.49	0.39	0.26	0.21	1.44	3.90
PN	4334	Wholesale trade of stationery, books, magazines and newspapers	0.23	0.18	0.08	0.54	0.54	0.62	0.70	0.51	0.31	0.22	1.02	3.92
PN	4335	Wholesale trade of minor household appliances and white goods	0.22	0.19	0.06	0.56	0.68	0.69	0.54	0.40	0.25	0.22	1.10	3.80
PN	4341	Wholesale trade of agricultural raw materials	0.15	0.16	0.06	0.48	0.51	0.58	0.23	0.14	0.08	0.08	0.89	2.48
PN	4342	Wholesale trade of raw materials for industry	0.15	0.15	0.05	0.50	0.50	0.61	0.41	0.29	0.15	0.14	0.81	2.96
PN	4343	Wholesale trade of waste materials	0.09	0.08	0.01	0.36	0.38	0.46	0.13	0.08	0.03	0.04	0.63	1.67
PN	4351	Wholesale of machinery and agricultural, forestry and fishing equipment	0.10	0.13	0.02	0.61	0.53	0.62	0.58	0.46	0.24	0.21	0.85	3.50
PN	4352	Wholesale trade of machinery and equipment for the industry	0.15	0.14	0.05	0.57	0.64	0.61	0.71	0.64	0.32	0.25	0.90	3.98
PN	4353	Wholesale trade of machinery and equipment for services and commercial activities	0.19	0.19	0.05	0.65	0.62	0.70	0.67	0.59	0.33	0.24	1.09	4.24
PN	4354	Wholesale trade of machinery, furniture and general-use equipment	0.25	0.16	0.06	0.62	0.56	0.62	0.76	0.68	0.43	0.30	1.11	4.53
PN	4361	Wholesale trade for trucks	0.26	0.18	0.05	0.80	0.79	0.84	0.75	0.66	0.40	0.34	1.28	5.07
PN	4371	Intermediation to the wholesale trade	0.24	0.23	0.08	0.52	0.48	0.66	0.64	0.76	0.45	0.45	1.13	4.70
PER	4611	Retail trade for food	0.16	0.13	0.02	0.41	0.39	0.50	0.01	0.00	0.00	0.00	0.79	1.63
PER	4612	Retail trade of beverages and tobacco	0.13	0.14	0.00	0.38	0.32	0.46	0.04	0.02	0.01	0.01	0.73	1.52
N	4621	Retail trade in supermarkets	0.20	0.17	0.02	0.82	0.70	0.83	0.40	0.29	0.26	0.28	1.20	3.94
N	4622	Retail trade in department stores	0.35	0.22	0.01	0.91	0.81	0.88	0.70	0.56	0.33	0.48	1.45	5.26
PER	4631	Retail trade of textile products, except clothing	0.04	0.03	0.01	0.50	0.50	0.60	0.06	0.04	0.02	0.02	0.67	1.82
PER	4632	Retail trade of clothing and clothing accessories	0.28	0.19	0.07	0.55	0.53	0.71	0.06	0.03	0.02	0.02	1.18	2.47
PER	4633	Retail trade of footwear	0.12	0.11	0.05	0.55	0.53	0.67	0.10	0.05	0.03	0.03	0.90	2.23
PER	4641	Retail trade of health care articles	0.22	0.10	0.12	0.62	0.63	0.73	0.19	0.09	0.06	0.07	1.05	2.83
PER	4651	Retail trade of perfumery and jewelry	0.09	0.07	0.17	0.66	0.59	0.70	0.11	0.06	0.03	0.03	0.86	2.51
PER	4652	Retail trade for recreation articles	0.40	0.26	0.13	0.67	0.58	0.67	0.12	0.08	0.05	0.05	1.33	3.01
PER	4653	Retail trade of stationery, books and newspapers	0.24	0.18	0.05	0.59	0.61	0.67	0.06	0.03	0.02	0.02	1.09	2.48
PER	4659	Retail trade of gifts, religious items, crafts, articles in importing stores and other personal items	0.16	0.18	0.05	0.47	0.40	0.51	0.05	0.03	0.02	0.01	0.85	1.87
PER	4661	Retail trade of home furniture and other household appliances	0.18	0.11	0.06	0.60	0.62	0.69	0.22	0.15	0.10	0.07	0.97	2.80
IN	4662	Retail trade of computers, phones and other communication devices	0.19	0.12	0.03	0.62	0.59	0.70	0.46	0.40	0.27	0.20	1.02	3.58
PER	4663	Retail trade of interior decoration items	0.13	0.17	0.07	0.46	0.50	0.62	0.08	0.06	0.03	0.02	0.92	2.14
PER	4671	Retail trade for hardware stores and glass	0.17	0.12	0.04	0.55	0.53	0.62	0.17	0.10	0.06	0.05	0.92	2.42
PN	4681	Retail trade for cars and light trucks	0.25	0.18	0.03	0.73	0.68	0.75	0.45	0.35	0.21	0.21	1.18	3.84
PER	4682	Retail trade of spare parts for cars, light trucks and trucks	0.13	0.10	0.02	0.58	0.52	0.65	0.23	0.14	0.07	0.07	0.87	2.51
PER	4684	Retail trade of fuels and lubricating oils	0.11	0.09	0.01	0.53	0.52	0.60	0.42	0.30	0.15	0.17	0.80	2.90
IN	5111	Edition of newspapers, magazines, books and the like, except via the Internet	0.66	0.49	0.38	0.77	0.69	0.77	0.64	0.58	0.67	0.34	1.81	5.88
SC	5121	Film and video industry	0.22	0.09	0.04	0.71	0.68	0.63	0.66	0.57	0.56	0.30	0.94	4.46
SC	5122	Sound industry	0.37	0.18	0.26	0.68	0.47	0.58	0.51	0.47	0.48	0.20	1.13	4.28
SC	5151	Transmission of radio and television programmes, except via the Internet	0.76	0.51	0.16	0.87	0.84	0.87	0.66	0.77	0.74	0.62	2.14	6.99
SC	5172	Cellular and other wireless telecommunications, except satellite services	0.62	0.72	0.28	0.89	0.88	0.86	0.84	0.74	0.60	0.50	2.19	6.92
SC	5175	Cable television programmes, except via the Internet	0.30	0.25	0.06	0.74	0.74	0.86	0.64	0.46	0.41	0.28	1.41	4.85
SC	5181	Internet access and search online services	0.50	0.50	0.44	0.81	0.75	0.81	0.61	0.59	0.48	0.36	1.51	5.84
SC	5182	Electronic processing of information, hosting of web pages and other related services	0.46	0.32	0.12	0.66	0.68	0.73	0.86	0.78	0.79	0.63	1.81	5.84
IN	5224	Brokerage credit and financial services not stock exchange	0.78	0.01	0.00	0.01	0.01	0.01	0.56	0.25	0.23	0.24	0.79	2.10
IN	5239	Other investment and brokerage services	0.66	0.50	0.05	0.62	0.73	0.78	0.90	0.90	0.79	0.75	1.94	6.68
IN	5241	Institutions of insurance and bonding	0.30	0.38	0.07	0.73	0.63	0.74	0.95	0.89	0.80	0.67	1.41	6.15
IN	5311	Rem without intermediation of dwellings and other real estate	0.11	0.08	0.02	0.23	0.24	0.38	0.15	0.08	0.06	0.04	0.57	1.39
PN	5312	Real estate and real estate brokers	0.14	0.10	0.02	0.29	0.30	0.41	0.70	0.52	0.33	0.22	0.65	3.03
PN	5324	Rental of industrial, commercial and services machinery and equipment	0.19	0.21	0.04	0.51	0.49	0.66	0.66	0.40	0.36	0.19	1.07	3.37
IN	5411	Legal services	0.19	0.17	0.07	0.43	0.43	0.53	0.60	0.28	0.28	0.13	0.90	3.12

(Continued)

Table 6. Branch level innovation indices (NAICS), Census 2004 (continued)

Source: based on Economic Census for Mexico (2004) and Soete and Miozzo taxonomy (1990).
 Notes: Is not included in Census 2004, sector 48-49 (Transportation and Warehousing). Retail trade in supermarkets; Retail trade in department stores; Parks with recreational facilities and electronic gaming branches have been catalogued like "New orfs firms". Instead of I separate them into the two groups from Soete and Miozzo's taxonomy: "Physical networks" or "Informational networks". The averages for "Core Innovation" and "Aggregate Innovation" indices are 1.10 and 3.49, respectively.

Soete and Mizozo code	Branch	Description	Question										"Aggregate Innovation"	
			1	2	3	4	5	6	7	8	9	10		"Core Innovation"
IN	5412	Accounting, audit and related services	0.24	0.20	0.04	0.72	0.62	0.67	0.82	0.58	0.32	0.28	1.11	4.49
IN	5413	Services in architecture, engineering and related activities	0.25	0.23	0.04	0.59	0.58	0.68	0.71	0.58	0.70	0.32	1.16	4.69
SC	5415	Computer consultancy services	0.55	0.44	0.23	0.76	0.66	0.84	0.86	0.86	0.80	0.65	1.83	6.64
SC	5416	Administrative, scientific and technical consulting services	0.26	0.21	0.10	0.60	0.56	0.59	0.85	0.74	0.87	0.36	1.06	4.84
SC	5417	Scientific research and development services	0.51	0.39	0.25	0.72	0.67	0.54	0.77	0.70	0.62	0.36	1.44	5.52
SC	5418	Advertising services and related activities	0.48	0.44	0.25	0.66	0.64	0.77	0.46	0.44	0.50	0.20	1.69	4.84
SC	5419	Other professional, scientific and technical services	0.30	0.22	0.13	0.61	0.58	0.73	0.18	0.13	0.15	0.07	1.25	3.11
PN	5511	Corporate management and business	0.37	0.27	0.11	0.55	0.51	0.56	0.84	0.67	0.50	0.46	1.20	4.83
IN	5611	Business management services	0.30	0.18	0.05	0.60	0.54	0.58	0.77	0.06	0.04	0.03	1.06	3.14
PN	5612	Facilities support services	0.13	0.13	0.00	0.53	0.56	0.63	0.64	0.01	0.01	0.00	0.89	2.63
IN	5613	Employment services	0.26	0.20	0.06	0.26	0.54	0.59	0.80	0.09	0.05	0.05	1.05	3.24
IN	5614	Support service of secretarial, photocopying, collection, credit research and similar activities	0.27	0.15	0.03	0.51	0.52	0.62	0.41	0.71	0.60	0.37	1.03	4.18
PER	5615	Travel agencies and reservation services	0.28	0.26	0.06	0.66	0.57	0.75	0.74	0.20	0.11	0.09	1.29	3.72
PER	5616	Research, protection and safety services	0.23	0.29	0.02	0.76	0.75	0.82	0.78	0.08	0.06	0.05	1.34	3.84
PER	5619	Other support business services	0.26	0.16	0.07	0.56	0.63	0.65	0.54	0.03	0.02	0.01	1.07	2.92
PER	5621	Wastes management and remediation services	0.12	0.24	0.05	0.54	0.52	0.60	0.41	0.33	0.22	0.16	0.95	3.18
PUB	6111	Schools of basic, secondary and technical education	0.17	0.20	0.05	0.64	0.61	0.63	0.51	0.21	0.27	0.19	0.99	3.47
PUB	6112	Career and Technical Schools	0.60	0.30	0.00	0.80	0.70	0.90	0.70	0.38	0.40	0.35	1.80	5.13
PUB	6113	Professional degrees and graduated schools	0.45	0.39	0.11	0.79	0.78	0.79	0.88	0.67	0.64	0.52	1.63	6.02
IN	6114	Commercial schools, computer and training for executives	0.50	0.31	0.21	0.76	0.74	0.79	0.73	0.51	0.59	0.47	1.60	5.60
PUB	6116	Other educational services	0.21	0.21	0.06	0.70	0.65	0.82	0.28	0.19	0.16	0.10	1.23	3.38
PUB	6117	Education support services	0.29	0.36	0.23	0.57	0.64	0.79	0.44	0.32	0.28	0.15	1.43	4.11
PUB	6211	Medical consulting offices	0.11	0.09	0.03	0.39	0.44	0.42	0.40	0.13	0.10	0.07	0.62	2.01
IN	6215	Medical and diagnostic laboratories	0.20	0.35	0.03	0.74	0.70	0.73	0.40	0.17	0.22	0.16	1.29	3.70
N	6219	Ambulances, organ banks and other ancillary services to medical treatment	0.00	0.00	0.00	0.33	0.50	0.33	0.41	0.23	0.20	0.14	0.33	2.14
PUB	6221	General hospitals	0.19	0.19	0.03	0.67	0.67	0.71	0.50	0.24	0.19	0.19	1.10	3.57
PUB	6223	Hospitals in other medical specialties	0.24	0.19	0.07	0.66	0.65	0.76	0.52	0.26	0.19	0.20	1.19	3.73
PER	6232	Homes for the care of people with mental retardation, mental health and substance abuse problems	0.00	0.00	0.00	0.60	0.80	1.00	0.26	0.09	0.09	0.07	1.00	2.91
PUB	6241	Guidance and social work services	0.41	0.05	0.40	0.13	0.11	0.47	0.05	0.03	0.03	0.01	0.94	1.71
PER	7113	Sponsors of artistic shows, sports and the like	0.21	0.11	0.05	0.29	0.40	0.49	0.34	0.28	0.22	0.14	0.81	2.53
PN	7121	Museums, historical sites, botanical gardens and the like	0.39	0.45	0.18	0.55	0.55	0.67	0.44	0.29	0.30	0.18	1.52	3.99
N	7131	Parks with recreational facilities and electronic gaming	0.14	0.13	0.04	0.46	0.30	0.67	0.03	0.02	0.01	0.01	0.94	1.80
PN	7139	Other recreational services	0.26	0.24	0.13	0.58	0.58	0.69	0.13	0.07	0.06	0.05	1.19	2.79
PER	7211	Hotels, motels and the like	0.04	0.05	0.01	0.20	0.21	0.34	0.35	0.24	0.13	0.11	0.42	1.67
PER	7213	Pensions and guest houses, apartments and houses furnished with hotel services	0.01	0.01	0.00	0.03	0.04	0.11	0.06	0.05	0.02	0.01	0.12	0.34
PER	7221	Restaurants with waiter service	0.23	0.31	0.03	0.62	0.48	0.74	0.10	0.04	0.03	0.03	1.28	2.60
PN	7222	Self-service restaurants and with food to take-out	0.50	0.50	0.04	0.82	0.77	0.85	0.02	0.01	0.01	0.01	1.85	3.53
PN	7223	Custom-made food preparation services	0.26	0.28	0.15	0.53	0.49	0.58	0.32	0.22	0.16	0.12	1.12	3.10
PER	8111	Repair and maintenance of automobiles and trucks	0.15	0.14	0.03	0.56	0.50	0.62	0.04	0.02	0.02	0.01	0.91	2.10
SC	8112	Repair and maintenance of electronic equipment and precision equipment	0.17	0.17	0.03	0.63	0.63	0.61	0.15	0.14	0.12	0.07	0.98	2.71
SC	8113	Repair and maintenance of agricultural, industrial, commercial and services machinery and equipment	0.13	0.15	0.03	0.58	0.57	0.69	0.20	0.15	0.11	0.06	0.95	2.67
PER	8122	Laundries and dry cleaners	0.16	0.20	0.02	0.65	0.67	0.76	0.06	0.02	0.02	0.02	1.12	2.57
PER	8124	Parking lots for cars	0.02	0.03	0.03	0.11	0.13	0.17	0.06	0.02	0.02	0.01	0.22	0.60
PER	8131	Commercial, industrial, recreational and professional organizations and associations	0.16	0.14	0.08	0.31	0.34	0.34	0.41	0.21	0.16	0.12	0.64	2.26
PER	8132	Religious, political and civil organizations and associations	0.12	0.05	0.02	0.24	0.27	0.26	0.30	0.17	0.15	0.10	0.44	1.68

Sources: based on Economic Census for Mexico (2004) and Soete and Mizozo taxonomy (1960).

Notes: Is not included in Census 2004, sector 48-49 (Transportation and Warehousing). Retail trade in supermarkets; Retail trade in supermarkets; Retail trade in department stores; Ambulances, organ banks and other ancillary services to medical treatment; Parks with recreational facilities and electronic gaming branches have been catalogued like "Networks firms" instead of separate them into the two groups from Soete and Mizozo's taxonomy: "Physical networks" and "Aggregate Innovation". Indices are 1, 1.0 and 3.49, respectively.

Table 6. Branch level innovation indices (NAICS), Census 2004

State and Muzco Branch code	Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	"Core Innovation"	"Aggregate Innovation"	
IN 5224	Borrowing credit and financial services not stock exchange	0.40	0.19	0.09	0.17	0.22	0.05	0.12	0.10	0.35	0.35	0.47	0.98	0.99	0.99	0.99	0.99	0.98	0.81	0.56	0.92	0.67	0.62	0.35	
IN 5241	Institutions of insurance and bonding	0.62	0.51	0.11	0.30	0.38	0.09	0.34	0.09	0.45	0.55	0.62	0.99	0.99	0.99	0.99	0.99	0.98	0.98	0.73	0.98	0.66	1.00	12.43	
PN 5311	Real estate management of dwellings and other real estate	0.07	0.03	0.02	0.06	0.04	0.04	0.03	0.06	0.09	0.10	0.13	0.77	0.77	0.77	0.77	0.77	0.77	0.51	0.45	0.18	0.62	0.31	1.13	
PN 5312	Real estate and real estate brokers	0.15	0.07	0.02	0.04	0.07	0.05	0.02	0.08	0.11	0.12	0.17	0.95	0.95	0.95	0.95	0.95	0.95	0.70	0.38	0.79	0.43	0.21	7.29	
PN 5324	Rental of industrial, commercial and services machinery and equipment	0.09	0.06	0.02	0.03	0.08	0.05	0.03	0.10	0.18	0.17	0.17	0.97	0.97	0.97	0.97	0.97	0.97	0.88	0.47	0.82	0.44	0.17	7.39	
IN 5411	Legal services	0.12	0.14	0.06	0.12	0.12	0.05	0.08	0.08	0.12	0.12	0.17	1.00	1.00	1.00	1.00	1.00	1.00	0.75	0.37	0.83	0.49	0.25	7.91	
IN 5413	Services in architecture, engineering and related activities	0.21	0.09	0.04	0.16	0.19	0.13	0.04	0.15	0.39	0.30	0.28	0.99	0.99	0.99	0.99	0.99	0.99	0.78	0.48	0.91	0.52	0.40	8.96	
SC 5414	Specialized design	0.27	0.06	0.03	0.06	0.16	0.02	0.04	0.21	0.14	0.19	0.24	0.97	0.97	0.97	0.97	0.97	0.97	0.61	0.54	0.87	0.42	0.43	7.79	
SC 5415	Computer consulting services	0.45	0.18	0.12	0.24	0.38	0.04	0.16	0.16	0.40	0.35	0.46	0.98	0.98	0.98	0.98	0.98	0.98	0.78	0.74	0.91	0.67	0.84	10.84	
SC 5416	Administrative, scientific and technical consulting services	0.22	0.09	0.02	0.14	0.18	0.07	0.03	0.09	0.37	0.27	0.39	0.95	0.95	0.95	0.95	0.95	0.95	0.81	0.44	0.89	0.51	0.40	8.96	
SC 5418	Advertising services and related activities	0.36	0.07	0.03	0.07	0.19	0.05	0.03	0.13	0.20	0.18	0.35	0.99	0.99	0.99	0.99	0.99	0.99	0.77	0.52	0.91	0.54	0.55	8.79	
SC 5419	Other professional, scientific and technical services	0.13	0.03	0.02	0.08	0.10	0.03	0.02	0.14	0.17	0.15	0.19	0.79	0.79	0.79	0.79	0.79	0.79	0.45	0.37	0.26	0.61	0.39	0.24	5.74
IN 5611	Business management services	0.15	0.08	0.04	0.11	0.17	0.06	0.07	0.04	0.28	0.24	0.23	0.96	0.96	0.96	0.96	0.96	0.96	0.80	0.34	0.85	0.49	0.32	8.46	
PN 5612	Facilities support services	0.17	0.13	0.04	0.10	0.10	0.07	0.08	0.09	0.12	0.34	0.25	0.27	0.96	0.96	0.96	0.96	0.96	0.75	0.44	0.79	0.49	0.34	8.34	
IN 5613	Employment services	0.17	0.04	0.02	0.09	0.11	0.03	0.04	0.05	0.25	0.21	0.25	0.91	0.91	0.91	0.91	0.91	0.91	0.82	0.73	0.31	0.79	0.44	0.28	7.58
PER 5615	Tour agencies and reservation services	0.15	0.04	0.02	0.07	0.13	0.02	0.02	0.18	0.15	0.12	0.25	0.97	0.97	0.97	0.97	0.97	0.97	0.56	0.71	0.88	0.42	0.29	7.64	
PER 5616	Research, protection and sales services	0.18	0.07	0.02	0.09	0.16	0.04	0.02	0.09	0.26	0.18	0.29	1.00	1.00	1.00	1.00	1.00	1.00	0.89	0.78	0.52	0.90	0.88	0.34	8.47
PER 5619	Other support business services	0.22	0.17	0.04	0.12	0.16	0.04	0.04	0.07	0.12	0.23	0.29	0.98	0.98	0.98	0.98	0.98	0.98	0.73	0.59	0.91	0.63	0.38	8.76	
PUB 6111	Schools of basic, secondary and special education	0.17	0.08	0.01	0.19	0.18	0.02	0.02	0.11	0.19	0.11	0.26	0.98	0.98	0.98	0.98	0.98	0.98	0.72	0.35	0.89	0.54	0.35	7.99	
PUB 6113	Professional degrees and graduated schools	0.29	0.14	0.04	0.50	0.31	0.06	0.08	0.14	0.26	0.18	0.35	0.99	0.99	0.99	0.99	0.99	0.99	0.76	0.52	0.91	0.56	0.60	9.47	
IN 6114	Commercial schools, computer and training for executives	0.22	0.06	0.06	0.11	0.18	0.02	0.04	0.17	0.19	0.11	0.23	0.99	0.99	0.99	0.99	0.99	0.99	0.56	0.39	0.29	0.65	0.39	0.26	5.93
N 7131	Parks with recreational facilities and electronic gaming	0.11	0.06	0.04	0.03	0.15	0.02	0.03	0.16	0.13	0.11	0.16	0.82	0.82	0.82	0.82	0.82	0.82	0.34	0.27	0.23	0.50	0.16	0.10	3.81
PN 7139	Other recreational services	0.09	0.04	0.03	0.06	0.10	0.02	0.02	0.10	0.13	0.10	0.19	0.91	0.91	0.91	0.91	0.91	0.91	0.88	0.38	0.81	0.40	0.20	7.00	
PER 7211	Hotels, motels and the like	0.04	0.01	0.01	0.02	0.06	0.01	0.01	0.12	0.12	0.06	0.09	0.59	0.59	0.59	0.59	0.59	0.59	0.27	0.23	0.30	0.16	0.10	3.81	
PER 7221	Restaurants with table service	0.11	0.07	0.04	0.04	0.13	0.01	0.04	0.12	0.21	0.25	0.22	0.81	0.81	0.81	0.81	0.81	0.81	0.54	0.29	0.87	0.36	0.23	6.34	
PN 7222	Self-service restaurants and with food to take-out	0.03	0.04	0.02	0.02	0.05	0.01	0.02	0.08	0.07	0.08	0.08	0.35	0.35	0.35	0.35	0.35	0.35	0.15	0.08	0.27	0.16	0.08	2.46	
SC 8113	Repair and maintenance of agricultural, industrial, commercial and services machinery and	0.22	0.06	0.03	0.10	0.11	0.06	0.03	0.15	0.35	0.32	0.30	0.96	0.96	0.96	0.96	0.96	0.96	0.76	0.54	0.89	0.46	0.33	8.42	
PER 8131	Commercial, industrial, recreational and professional organizations and associations	0.08	0.06	0.01	0.17	0.08	0.03	0.01	0.08	0.10	0.10	0.13	0.67	0.67	0.67	0.67	0.67	0.67	0.50	0.21	0.71	0.44	0.16	6.11	

Source: based on Economic Census for Mexico (2008) and State and Muzco economy (1990).
Note: A is individual; C is census; S is sector; SI is IGT (management of Companies and Enterprises and Health Care and Social Assistance, respectively); R is retail trade; N is non-market; P is public; PER is personal services; PUB is public administration and electronic gaming; SC is services; and IN is information and electronic gaming. The averages of the "Core Innovation" and "Aggregate Innovation" indices are 0.30 and 0.24, respectively.

Table 7. Branch level innovation indices (NAICS), Census 2008

Sector level	"Aggregate Innovation" %	"Core Innovation" %
Dominated by suppliers	16,67	16,67
Personal services	0	25
Public and Social services	50	0
Networks firms	66,67	66,67
Physical networks	0	0
Informational networks	100	100
Specialized suppliers and science-based services	100	100

Branch level	"Aggregate Innovation" %	"Core Innovation" %
Dominated by suppliers	17,95	33,33
Personal services	6,67	23,33
Public and Social services	55,56	66,67
Networks firms	60,47	48,84
Physical networks	57,69	46,15
Informational networks	69,23	53,85
Specialized suppliers and science-based services	78,57	71,43

Source: based on Economic Census for México (2004) and Soete and Miozzo taxonomy (1990).

Notes: The figures correspond to the obtained category percentage for sectors or branches with major or equal value against "Aggregate Innovation" or "Core Innovation" sectoral averages. Higher percentages correspond to higher degrees of innovation.

Table 8. Mexican services firms' degree of innovation (Soete and Miozzo's taxonomy) , Census 2004

Sector level	"Aggregate Innovation" %	"Core Innovation" %
Dominated by suppliers	20	20
Personal services	0	0
Public and Social services	100	100
Networks firms	66,67	50
Physical networks	33,33	0
Informational networks	100	100
Specialized suppliers and science-based services	100	100

Branch level	"Aggregate Innovation" %	"Core Innovation" %
Dominated by suppliers	31,25	25
Personal services	21,43	14,29
Public and Social services	100	100
Networks firms	66,67	33,33
Physical networks	56	20
Informational networks	100	70
Specialized suppliers and science-based services	88,89	88,89

Source: based on Economic Census for México (2009) and Soete and Miozzo taxonomy (1990).

Notes: The figures correspond to the obtained percentage for the number of sectors or branches with major or equal value against "Aggregate Innovation" or "Core Innovation" averages. Higher percentages correspond to higher degrees of innovation.

Table 9. Mexican services firms' degree of innovation (Soete and Miozzo's taxonomy) , Census 2009

5. Conclusions

This paper extends innovation studies for service firms; however, it is made for less developed countries (LDCs). The growth for LDCs is approaching to the developed ones. The importance on the knowledge of the subject has relevant implications due to the economic share that services have. We used data from 2004 and 2009 Economic Censuses of México and with this study we can show which sectors and branches are more innovative in Mexican firms. Also, we compared innovation in Mexican firms between North American Industry Classification System (NAICS) and Soete and Miozzo's technological trajectory approach.

The results from the surveys indicate that all sectors innovate in all forms, but in different degrees and according to their particularly characteristics. Service sectors that are traditionally known as "the most innovative" (Information, Finance and insurance, Professional, Scientific and Technical services) remain doing more innovation-related activities through both censuses. However, when they break down into branches, we can see that there are within these branches who venture in greater or lesser degree to the sectors where they belong.

Furthermore, there are activities with very low utilization between firms, for example: "Registered products or other works of intellectual creation to intellectual property institutes" (the exception is In-house property registration for Finance and Insurance sector in 2009 Census). And, this is an example of how some questions of the innovation surveys are made for capture technologist innovations rather than questions more suited for the intrinsic characteristics of services. In the case of Open Innovation approach, another example not very utilized is: Activities with the involvement of other external agents or external relationship innovations (EI type, according to our classification), with the exception for the Use of internet in their external relationships. We denote that 2009 survey it is an instrument with better options for capture the different types of innovation than 2004 survey.

The results show, as same as Tether (2005) European countries study, that services firms in LDCs like México, collaborate more with customers and suppliers than through in-house R&D. Also, Mexican firms at different percentages between sectors and branches, include an innovation department (the only exceptions are for Ambulances, organ banks and other ancillary services to medical treatment and Homes for the care of people with mental retardation, mental health and substance abuse problems branches). Although, due to the specificities of services, we infer that many of these departments are more "innovations structures" or flexible project groups (Djellal and Gallouj, 1999) instead of physical areas. As regards as the use of computer equipment and internet (considered as essential in services innovation), it is not used in all activities by all sectors and branches. But we can see that there is an extended use of ICTs for all firms, it just that they use it different.

Using Soete and Miozzo's approach, we can say that firms with different technological trajectories innovate as the science-based service firms, but in different forms and degrees. For example, "Physical networks" firms have technological trajectories more suited for core innovations. Technological behaviour in Mexican firms, like in other economies, is heterogeneous.

We confirmed that the most innovative type of firms are “Specialized suppliers and science-based services” followed by “Networks firms” and the least innovative are “Dominated by suppliers” firms. Thus, we can reaffirm that the composition of the services sector is an heterogeneous mixture and with many differences between some sectors and branches, and the comparatives using technological trajectories have the same problems but also similarities than do it with other classifications. Therefore, we affirm that disaggregated analysis details more the innovations of firms.

We can observe that Mexican firms make efforts on innovation despite the use of economic classifications or sectoral models based on technological change. This study shows that there is innovation in Mexican firms, and the effects of innovation are differentiated according the types of classification. Therefore, innovation policies in México should also be differentiated for each sector and economic branch. Accordingly to this study, the challenge is to do innovation services studies with the most classification detail that it is possible. And because the linkage between sectors, we believe that innovation policies based on the manufacturing sector (a very important sector for Mexican economy) should be included also, according to the integrative approach on innovation.

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SERVICE INNOVATION DRIVEN ENTERPRISES IN EMERGING MARKETS: A CONTEMPORARY NEW INSIGHT OF FIRMS IN DYNAMIC GLOBAL CONTEXT

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Nowadays services have become increasingly important to economic development worldwide. Services sectors are significant factors in maintaining a firm's competitive advantage in an increasingly service centered economies. Furthermore; service innovation acts as society's engine of renewal and provides the necessary catalyst for the service sector's economic growth. Firms in developed and developing economies are facing new competitive challenges in global markets. They increasingly must improve competitiveness through sustained innovation of the value and efficiency for customers that firms in emerging economies are not excluded from this reality. The main purpose of this paper is to represent different aspects of conceptual literature of service innovation such as service value creation capability model as contribution in today's enterprises with focus on emerging economies and also surveying the effects of service innovativeness on firm value. The method of this study uses a systematic conceptual literature review and develops conceptual models about this issue respectively. It is expected that this systematic review of existing research on service innovation in enterprises in global dynamic context helps to make a contribution to better understanding toward the concept of service innovation. This paper supports the notion, characteristics and development of the insight of service innovation. Also this systematic review is going to provide contributions to the theoretical understanding of service innovation in emerging markets.

1. Introduction

Over the past decades, the development of the global economy has gradually shifted from the traditional production of goods toward a service centered economy. The service sector now dominates the development of the global economy (Paton and McLaughlin, 2008). In particular, more than 70% of the global economy's gross domestic product (GDP) is derived from the service sector. Service economy has been growing rapidly and may lead to an increase in employment, competitiveness, innovation and economic growth (Hauknes, 1998; Tether, 2005). Services are provided in all types of business, ranging from SMEs, joint ventures, consulting firms, internet

services, transport, tourism, social welfare, telecommunication services and others. In this regard innovation plays a crucial role in ensuring the creation of economic activities (Ostrom et al., 2010). Global economic and business activities are significantly dominated by the service sector as this sector promotes the development and expansion of new services and enhancements through service innovation efforts. Service innovation operates as the engine of economic growth and pervades all service sectors. Given the extending and growing importance of the service sector in the concept of service innovation (SI) is of central importance. In today's business landscape, service firms and enterprises must successively renew their processes and offerings to the customers and market to remain competitive (Thakur & Hale, 2013). Service innovation is cited as the primary source of value creation (Maglio and Spohrer, 2008; Möller et al., 2008; Zhang et al., 2015), particularly in areas that involve creating value for customers via innovation (Möller et al., 2008; Wang et al., 2015) and increasing firm performance (Menor and Roth, 2008; Melton and Hartline, 2010). The importance of innovation and innovating in service sector in the emerging market economies has blossomed and became a considerable issue over recent years. Service innovation is recognized as the main drivers that contribute to value creation, economic growth and social welfare of the markets of emerging economies. Also, in this regard academic research is reflecting an increasing focus on service innovation (Dotzel, Shankar, & Berry, 2013; Ordanini & Parasuraman, 2010) through an increased number of publications and interest from diverse research disciplines (Carlborg, Kindström, & Kowalkowski, 2014; Toivonen & Tuominen, 2009). However, the concept of service innovation is broad and loosely defined and needs further exploration and development (Ostrom et al., 2010). The definition of service innovation is especially problematic because no common understanding exists regarding its meaning (Flikkema, Jansen, & Van Der Sluis, 2007; Toivonen & Tuominen, 2009). Theory building on service innovation is still novel (Flikkema et al., 2007), which explains the rather vague and dispersed definitions of the core concept. For example, this vagueness can be seen in the interchangeable use of new service development (NSD) and service innovation (Menor, Tatikonda, & Sampson, 2002). In addition, the term service innovation is also used to acknowledge a new service, that is, an invention that has not been successfully introduced on the market (Schumpeter, 1934).

Compared to goods manufacturers, a service based company's growth and value creation differs significantly, making service innovation as a distinct area of inquiry very relevant (Vargo & Lusch, 2004). Facebook and Google are examples of service innovation and rapid growth. Clearly, these companies demonstrate a different innovation model than any product based company (e.g., Ford, GM, or SKF). These product based companies required decades to grow to the stock value that the previously mentioned service based companies achieved in a much shorter time span. What have been the reasons of these companies grow so fast in a short period of time? service innovation entails the process of creating a new market for an invention, renewal of a market, and adoption or rejection. Service customers perceive the production process as part of the service consumption, not just the outcome of that process, as in the traditional marketing of goods (Grönroos, 1998). Using product based logic; customers consume the outcome of the production process.

Furthermore; it should be noted that nowadays emerging markets offer tremendous growth opportunities for firms and interest in innovating in the emerging market economies has blossomed over recent years. Over the past two decades, there has been a substantial shift in the global innovation landscape. First, multinationals from developed economies are increasingly globalizing their R&D activities and are devel-

oping an open innovation model to source innovations from outside the firm, including from emerging economies. Asia's emerging economies such as China, India, and South Korea, which traditionally served only as low cost manufacturing bases where developed economy multinationals sourced their low end value chain activities, have now witnessed a substantial growth in R&D investments by multinationals (Ernst, 2006; Ho, 2006). Second, firms from emerging economies such as Brazil, Russia, India and China, which traditionally have played a secondary role in the global innovation landscape, have now begun to catch up in developing their own innovative capabilities and some have emerged as major players in certain technology intensive sectors like mobile communications, electronics and information technology (Mathews, 2002). Due to saturation levels in firms' home markets, it is estimated that the vast majority of future growth will come from mainstream consumers in the emerging markets who have vastly different needs and preferences from consumers in developed markets (Prahalad & Hammond, 2002). Given the lower living standards found in up to 90–95% of the population in emerging markets, global corporations that seek to target more than just the top 5–10% must develop unique and affordable innovations that appeal to consumers living on extremely constrained budgets (Burgess & Steenkamp, 2006).

The main purpose of this paper is to represent conceptual literature of service innovation in enterprises of emerging markets as a review paper. It means that the basis of this paper is a literature review of service innovation. Issues such as service value creation capability model and also the effects of service innovativeness on firm value are being discussed in this paper. The main problem that needs to be addressed in this research is to explain different aspects of service innovation activities or concepts in service innovation oriented firms in economies of emerging countries.

2. Conceptual Background

Over the past two decades, the development of the global economy has gradually shifted from the traditional production of goods toward a service centered economy (Paton and McLaughlin, 2008). In particular, more than 70% of the global economy's gross domestic product (GDP) is derived from the service sector, and innovation plays a crucial role in ensuring the creation of economic activities (Ostrom et al., 2010). Global economic activity is significantly dominated by the service sector because this sector promotes the development of new services and enhancements through service innovation (SI) efforts. Service innovation is becoming a crucial issue for research on service based practice for several reasons. First, the global economy is transitioning from a traditional product oriented economy to one that is service based (Chesbrough and Spohrer, 2006; Sheehan, 2006). The majority of the economic growth in developing and developed countries is derived from service products and activities that continuously contribute to the global economy (OECD, 2006). Thus; SI has become an increasingly important concern for service based firms that focus on innovative service initiatives and the adoption and implementation of the market concept along their value added chains. Second, traditional manufacturing firms are beginning to integrate or combine products and services as bundled offerings to provide a complete value added service chain and thus to increase their competitive advantages. These bundled offerings are based on the notion of combining products, processes, and services to design and deliver new services and to create

value for customers and firms through services. Bundled offerings for service based firms have clearly resulted in greater interest in promoting new service development and value creation to meet market needs. (Hwang Chen and et al, 2016). Offerings based on SI require the integration of customers, employees, suppliers, and partners in an innovative service process that meets all of their needs (Carbonell, Rodríguez-Escudero, and Pujari, 2009; Maglio and Spohrer, 2008; Melton and Hartline, 2010; Zhang et al., 2015). Moreover; service innovation is cited as the primary source of value creation (Maglio and Spohrer, 2008; Möller et al., 2008; Zhang et al., 2015), particularly in areas that involve creating value for customers via innovation (Möller et al., 2008; Wang et al., 2015) and increasing firm performance (Menor and Roth, 2008; Melton and Hartline, 2010). Ostrom et al. (2010) suggest that service innovation creates value for customers, employees, business owners, alliance partners, and communities through new and or improved service offerings, service processes, and service business models.

Additionally, in today's business landscape, service firms must continuously renew their processes and offerings to remain competitive (Thakur & Hale, 2013). Moreover; service innovativeness, or the propensity to introduce service innovations to satisfy customers and improve firm value at acceptable risk, has become a critical organizational capability. Developed economies would become increasingly specialized in services, while developing countries like emerging economies would specialize in agriculture and manufacturing. Due to this fact, innovation in services is a particularly relevant topic to explore in developing economies. Innovative and productive services create new competitive sectors for these countries. For developing economies, it is particularly important to increase value added in manufactured products sold to the rest of the world. Service innovation is not only a way to add value, but also a way to diversify the economy and increase competitive advantages and positions (Rubalcaba. 2015). Hence; innovations for the mainstream emerging consumer market require considerations vastly different from those associated with innovations developed for consumers in advanced economies. In this regard there is more necessity to concentrate on the study of the role of service innovation conceptual literature in service innovation driven enterprises in emerging markets as an inevitable new novel paradigm of innovation for firms in global context that needs to be more considered. Also historically, the mainstream market in emerging markets has been ignored; this population base is hungry for product and service offerings that are safe, reliable, and affordable (Prahalad, 2009).

There are lack of enough studies in service innovation literature in particular in emerging economies, while the structure of these markets are mainly dependent on agriculture and manufacturing and services sector are rarely considered as the main source of value creation in their economic activities. Considerably less attention has been devoted to the study of innovation in emerging markets (see for example, Lee, Lin, Wong, and Calantone, 2011; Yang, Wang, Zhu, and Wu, 2012). Needless to say that there is more need to focus some research studies in the field of service innovation in enterprises of emerging markets as they are much more involved to play crucial roles in the global economy activities and also because of the population in emerging markets is underserved and could benefit greatly from innovations that are customized and affordable. innovation is also the primary source of competitive advantage and business success (Hult et al., 2004). Innovation is also a cornerstone of sustainable growth (Doz et al., 2001). Extant literature suggests that most innovation studies have focused on firms in developed economies (Hult et al., 2004). This is surprising given that world class emerging multinationals such as Tata Consulting

Services in India and Samsung in South Korea are innovation leaders. The rapid development of emerging economies requires scholars to pay attention to innovation in those markets (Kothari et al., 2013). It is therefore very important to understand the source of innovation in emerging economies. It should be mentioned that emerging market economies have high growth potential but are characterized by high environmental turbulence (Luo and Peng, 1999), underdeveloped institutional framework (Peng et al., 2008) and a large market at the middle and bottom of the income pyramid that is upwardly mobile (Prahalad and Lieberthal, 1998). As a result, the strategies and business models that work in the developed world will serve only the handful of rich in emerging economies (Prahalad and Lieberthal, 1998; London and Hart, 2004; Wright et al., 2005). Firms need to build business models particularly suited for emerging markets to become more successful. (Prahalad and Lieberthal, 1998; Wright et al., 2005) and this implies that developing innovation strategies align with the characteristics of these markets.

3. Methodology

In order to meet that demand of research gap in service innovation in enterprises of emerging economies, the research method of this paper is a systematic literature review and uses a systematic conceptual literature review which develops conceptual models in this field of study. This theoretical and review paper offers a conceptual framework for service innovation in enterprises of emerging markets.

4. Defining Services and Service Innovation

Services can be defined as processes that consist of a set of activities which take place in interactions between a customer and people, goods and other physical resources, systems and or infrastructures representing the service provider and possibly involving other customers which aim at solving customers' problems. Services are processes where a set of company resources interact with the customers so that value is created or emerges in the customers' processes. Hence; unlike goods that are value-supporting resources, services are value-supporting processes (Grönroos, 2006).

A service innovation is a new service experience or service solution in one or several of the following dimensions: new service concept, new customer interaction, new value system or business partners, new revenue model, new organizational or technological service delivery system. According to Miles (2008), service industries and firms can be defined as those industries and firms that have as their main function the provision of services. This is typically a service function or set of functions marketed as a commodity or public service. These are rarely material artifacts, such as goods, raw materials and buildings, although they may be embodied in such artifacts. According to intangibility, interactivity and customer intensity are the two core characteristics or peculiarities setting service activities (and thus service innovation) apart from other economic activities and thus goods based innovation (Argyris and Schön, 1978). As a result of the characteristic of intangibility, services and service innovations are highly conceptual, e.g. they are not necessarily embodied in a new product,

but are predominantly intangible as new ideas or combinations of existing elements that together constitute a mostly intangible new value proposition to a client (Argyris 2003). The customer is in many cases uncertain of what will be experienced and what will be delivered (Parasuraman et al, 1985). Customers value reliability and the customer's uncertainty creates a strong need for the service provider to focus on communication and branding of new service concepts.

Despite the growing awareness that innovation is not confined to technical processes and products alone, contemporary research on innovative activities is still largely focused on technical innovations in the manufacturing sectors. Until recently, researchers began to recognize that there are differences in the nature of innovation in services in comparison to manufacturing. A service is the application of competences for the benefit of another (Vargo and Lusch, 2004). It is a time perishable, intangible experience performed for a client who is sometime acting as a co-producer to transform a state of the client (Spohrer and Maglio, 2008). Thus; the customer owns or controls inputs that the service provider is responsible for transforming according to mutual agreement (Spohrer and Maglio, 2007). Services are intangible and perishable (Das and Canel, 2006). In addition; the production and consumption of services is not separable, e.g. both happen simultaneously because the customer is involved as a co-producer. Finally, services are heterogeneous as they tend to differ in nature and quality from time to time due to different employees as well as varying customer needs and input. In addition; a distinctive character of services is considered to be their process nature (Katzan, 2008). It is expected that the systematic review of this paper on service innovation in enterprises in global dynamic context helps to make a contribution to better understanding toward the concept of service innovation in emerging markets.

5. The role of Service Innovation in Emerging Markets

Emerging markets can be defined as economies with high growth potential, but without the sophistication of the institutional framework seen in developed markets (Meyer and Tran, 2006). Although a source of potential growth, these markets also present a unique set of environmental features and challenges for firms from developed countries (Hoskisson et al, 2000; Baack and Boggs, 2008). Emerging markets has large populations, a substantial proportion of which lives below the poverty line.

Innovation in services is a particularly relevant topic to explore in developing economies. Innovative and productive services create new competitive sectors. Examples are information and communications technology (ICT) and business process outsourcing (BPO) services, which have benefitted from service offshoring since 2000 in countries such as China, India (the leader in service offshoring), and Malaysia in Asia; the Baltic States in Europe; Brazil, Chile, and Mexico in Latin America; and Egypt in the Middle East and North Africa (MENA) region (Kearney 2011). As the European case shows (Stare and Rubalcaba 2009), service offshoring is a powerful way to integrate developing economies in global value added chains. Services innovation equally plays a particular role in the right balance and timing between international trade and foreign direct investment (FDI) (Castellacci 2014). Service innovation is also essential to overcome the sluggish productivity growth in regions such as Latin America (Tacsir 2011), where only 0.6 percent of service firms have a

productivity level comparable to the top productivity 5 percent firms in the United States for the same sector (Crespi et al. 2013). Productivity problems in agriculture and manufacturing are not as serious, and the lack of productivity growth in services had an overall negative effect on aggregate productivity growth in the region. In the new service economy, where services and goods are integrated (Rubalcaba and Kox. 2007), old myths, such as the non-innovative nature of services, the merely technological role of innovation, and the compartmentalization of innovation between innovation in goods and innovation in services, must be dispelled. For developing economies, it is particularly important to increase value added in manufactured products sold to the rest of the world. Service innovation is not only a way to add value, but also a way to diversify the economy and increase competitive advantages and positions.

Hence; this paper as a systematic review of existing research on service innovation in enterprises in global dynamic context contributes to support and extend the notion of service innovation in emerging markets. It develops the theoretical insight of service innovation in these markets as developing economies. Moreover; it helps to broaden the notion of service innovation in firms and enterprises of emerging countries in theoretical literature in this regard and give more knowledge to the readers to understand much better the topic of service innovation.

Many global service firms have research centers or service development teams scattered around the world, yet most of them focus on leveraging the knowledge available in their home countries only. Their innovation strategies tend to be dominated by the thinking and knowledge available in the countries where they are located. Lately, the trend is changing, as many U.S service firms are keenly taking interest in using service development resources derived from their subsidiaries and overseas branches (Alam, 2007). However; this phenomenon is taking off slowly because globalizing innovation is an evolution that typically takes place over a number of years (Ostrom et al., 2010). In this emerging trend, India is slowly becoming a key player. Having experienced success in outsourcing jobs such as call centers, IT and software services, many firms from developed countries are establishing their own off shore R&D facilities in India (Johnson and Tellis, 2008). This is no less true of financial services than of any other sectors in the U.S. globalization and deregulation of the financial services industry have also increased the competition among financial service firms in a vigorous search for a competitive advantage. New services are one such key source of competitive advantage. In addition; India has emerged as a country of immense industrial power by actively pursuing the policies of economic liberalization and privatization of its service sector since early 1990s (Johnson and Tellis, 2008). Consequently; many multinationals and U.S service firms are increasingly recognizing the importance of India's service sector and its potential in world economy (Saran and Guo, 2005), (Alam, 2014).

6. What does Service Innovation stands for?

Service innovation is a multi dimensional phenomenon. That implies that service innovations can take various forms and be linked to different parts of the value creation process of a service dominant firm. There are four dimensions of service innovation: 1) new service concept; 2) new client interface; 3) new service delivery system and; 4) new technological options. A new service experience or service solution can

consist of a new service, a new service portfolio and or a new service process that individually or in combination defines a new way of creating value for the customer. the majority of these services propositions are co created by the client and the provider (Arend, and Bromiley 2009). The degree of novelty as with goods based innovation may differ from new to the firm, new to the industry, new to the country or new to the world. Therefore; the definition of service innovation is that a service innovation is a new service experience or service solution that consists of one or several of the following dimensions: new service concept, new customer interaction, new value system business partners, new revenue model, new organizational or technological service delivery system (den Hertog and et al, 2010).

Mostly as a result of testing the 4D model in subsequent sectoral and case study research in the early and mid-2000s, the 4D model was enhanced and eventually extended into a 6Dmodel (Ark and et al, 2000). The dimension new client interface was changed to new customer interaction in order to reflect the co creation role of customers in the innovation and actual provision of new services more fully. The former technological options dimension was rephrased new delivery system: technology as technological options suggested too strongly that these options were readily available whereas some service innovators do actively invest in or benefit from new technologies specially to innovate the way they provide their service.

New service delivery system was renamed new delivery system: personnel, organization, culture to distinguish more markedly between the role of technologies and softer factors such as personnel, organization and culture play in realizing new service innovations.

7. What is the scope of Service Innovation?

Service innovation is a difficult concept to define. Given the service sector's size and scope, this difficulty is understandable. Service innovation cannot be one dimensional. A key point is that distinctive innovations start off to serve different objectives. These objectives include differentiating, streamlining, helping, creating unique experiences, or monetizing in different ways. These objectives help to understand the type of service innovation development, including a service bundle innovation, process innovation, social innovation, experience innovation, or business model innovation. A service innovation also causes behavioral changes (e.g. behavioral innovation or brand perception changes and brand innovation). Although these categories are not mutually exclusive, the catalyst for any innovation project must start somewhere (Martin and et al, 2016).

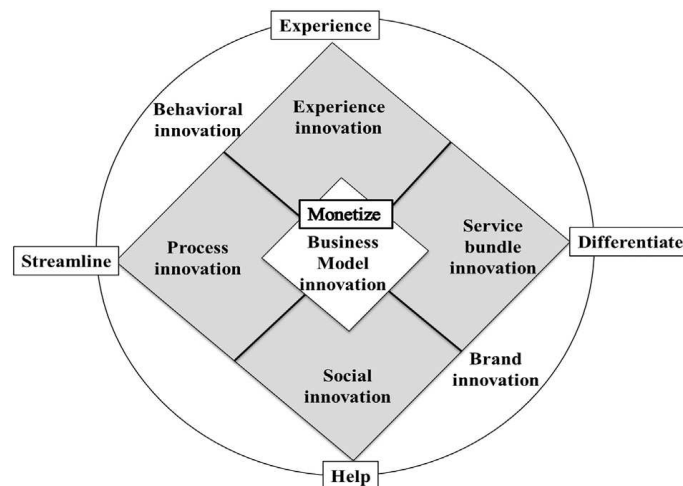


Fig 1- Insight about the meaning and scope of Service innovation (Martin and et al, 2016)

Common service innovation examples are often synonymous with brand names (e.g. Ikea, Starbucks, and Skype). Actually, these brands are not examples of one innovation; instead, they are multiple innovations or bundles of innovations that fit together and are organized under a brand name, a platform, or a service bundle innovation. This nexus becomes a system of linked activities (Johnson & Gustafsson, 2003). For example, Ikea's innovations include the flat packages, the long natural way (as called at Ikea), and their concept of democratic design (e.g. customer involvement throughout shopping and assembly). These innovation bundles make the service difficult to copy and help to differentiate the brand. Consequently; as the practical contribution, managers or policy makers involved in managing service innovation of firms in emerging markets will be offered a framework for systematically assessing service innovation concepts such as different models of service innovation which can give them insight to implement the theoretical founding in their decision making process.

8. Service Value Creation capability as Business capability

The Resource Based View (RBV) of the firm argues that organizations can be seen as collections of distinct resources (Wernerfelt, 1984), (Wade and Hulland, 2004). Following this perception, resources are most commonly framed as anything which could be thought of as a strength or weakness of a given firm (Wernerfelt, 1984). Moreover; resources are considered as an umbrella term covering both assets and capabilities. In this notion, assets are anything tangible or intangible that can be used by an organization (Wade and Hulland, 2004). In contrast, capabilities refer to the ability of an organization to perform a coordinated set of tasks for the purpose of achieving a particular end result such as a process (Helfat and Peteraf, 2003). An example could be an organization having access to gold (asset), the machinery needed to mine gold (asset), and the ability to use this machinery in an efficient and effective way (capability). Hence; capabilities are being understood as repeatable

patterns of action that utilize assets as input (Wade and Hulland, 2004), (Helfat and Peteraf, 2003).

The RBV argues that organizations that have certain assets and capabilities can achieve a competitive advantage. They must be valuable, rare, imperfectly imitable, and non substitutable. A position of competitive advantage that an organizational resource generates today cannot be sustained as changes in the environment may lead to erosion of the resource or replacement by a different resource (Collis, 1994). A stable resource configuration cannot guarantee long term competitive advantage as organizations have to adapt this configuration to the market environment (Eisenhardt and Martin, 2000). This argument is even stronger in dynamic market environments where there is rapid change in technology and market forces and feedback effects on firms. Therefore; organizations require capabilities that enable them to adapt their resource configuration. These capabilities are called dynamic capabilities (Teece and et al, 1997).

Literature reveals two types of capabilities from one another: First, the basic functional activities of organizations are called operational capabilities. such capabilities are, e.g. plant layout, distribution logistics, or marketing campaigns (Collis, 1994). With relation to the understanding of operational capabilities as the ability to perform a coordinated set of tasks for the purpose of the operational functioning of the organization, we understand the provision of services as an operational capability. Second, Teece et al (1997) introduced dynamic capabilities as the abilities of an organization to integrate, build, and reconfigure operational capabilities as well as external competences to address rapidly changing environments. Based on these arguments, dynamic capabilities are considered as the firm's ability to integrate, build, and reconfigure operational capabilities for the purpose achieving a fit with the market environment. Building upon the understanding of providing services as an operational capability, we can thus understand service innovation as a dynamic capability enabling the adaptation of service processes to changing environments.

Service value creation capability contains strategic capability, operational capability, managerial capability and adaptive capability which further consist of sub branches as shown in figure 2. In the context of service innovation this is a holistic approach by which firms in emerging markets can be transformed into a value creation firms.

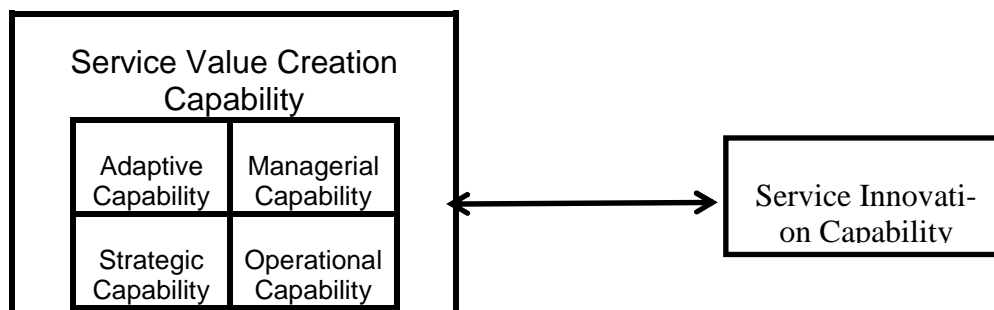


Fig 2. Service Value Creation Capability Model (SVC) (Nada and Ali, 2015)

9. Service Value Creation Capability Model (SVC)

Service value creation capability Model (SVC) is divided into two sections: service innovation capability and service value creation capability. Similar to recent research (Balaji and Ranganathan, 2006). It sets out to identify different activities within each of these sections. From service value creation capability perspective, agile enterprises address mostly problem knowledge due to its focus on identifying that a service innovation needs to be achieved. On the other hand, primarily solution knowledge is of need because the activities of adaptive enterprises focus on identifying how this change is put forward within the organization. In contrast other available model on service value creation by enhancing and strengthen service innovation capability, There is a holistic model which will transform an enterprise into an innovative and agile firm. The service value creation capability part of this model is consist of four branches, strategic capability, managerial capability, operational capability and adaptive capability, which are further divided into several sub branches to access their performance. (Nada and Ali, 2015).

CAPABILITY	SUB-BRANCHES
Strategic Capability	<ul style="list-style-type: none"> ❖ Operating Model ❖ Visual Strategy ❖ Financial Management
Managerial Capability	<ul style="list-style-type: none"> ❖ Leadership ❖ People Development ❖ Decision Making
Operational Capability	<ul style="list-style-type: none"> ❖ Service Process Management ❖ Service Performance Management ❖ IT Infrastructure
Adaptive Capability	<ul style="list-style-type: none"> ❖ Resilience ❖ Horizon Scanning ❖ Change Management

Table1. Service value creation capability and its sub branches (Nada and Ali, 2015)

10. Effects of Service Innovativeness on Firm Value

Innovativeness may have both direct and indirect effects on firm value (Bayus, Erickson, and Jacobson 2003; Dutta, Narasimhan, and Rajiv 1999; Fang, Palmatier, and

Grewal 2011; Moorman and Slotegraaf 1999). The direct effects stem from investors' direct assessment of the value of firm innovativeness. The indirect effects accrue through the combined effects of innovativeness on customer satisfaction and of satisfaction on firm value. Findings on the direct link between innovation and firm value are mixed. Eddy and Saunders (1980) find no significant relationship between new product announcements and stock prices, whereas other researchers (e.g. Fang, Palmatier, and Grewal 2011; Sood and Tellis 2009; Sorescu, Chandy, and Prabhu 2003; Sorescu and Spanjol 2008; Srinivasan et al. 2009) find that the effects are significantly positive. However, studies on the link between innovation and firm value have focused on goods innovation, leaving the effect of service innovativeness on firm value largely unknown.

Past experience, word of mouth, advertising, and public relations efforts can directly influence investors with regard to service innovativeness. For example, when Apple launched its iTunes service, investors might have anticipated an increase in firm value on the basis of word of mouth from iPod users or the market performance of Apple's past service innovations rather than from personal experience using the service. As a result, Apple's service innovativeness had a positive direct effect on its firm value that did not accrue from the satisfaction of these investors as customers. (Dotzel and et al, 2013).

11. Conclusion

The present paper has highlighted the importance of service innovation as a theoretical concept and stressed that it should be much considered as an unexplored important topic for explaining the service sector's growth particularly in emerging markets. It identified main prominent topics of service innovation with emphasize on emerging economies. It also represents the concept and scope of service innovation and its role in emerging markets.

There have been discussions in service value creation capability as business capability and service value creation capability was proposed as the model of service value creation. This review paper as the existing research on service innovation makes a contribution to understanding what a service innovation is? While innovation in emerging markets is still in its infancy, the majority of future growth in the world economy will come from such locations. This point is coming and will reemphasize the balance of power and wealth toward the emerging economies. Firms that ignore opportunities of acting as service innovative in the market and using service innovation practices will face new risks and falling behind their competitors. As emerging markets continue to gain in importance, the service innovative architecture of successful firms will continue to evolve to meet the unique challenges and benefits of participating in such markets.

12. Limitations and Further Research

While the objectives of this study in service innovation in emerging markets have been achieved, service innovation in this domain is still not completely explored. This study has certain limitations in literature review of service innovation with emphasize

on emerging economies. As service innovation is a new and much unexplored topic especially in developing and emerging economies, there have been some constraints regarding literature background in application of service innovation in emerging countries. Further research are needed to be carried out as academic research in service innovation in different fields of innovation study such as studying different models of service innovation in firms with emphasize on SME performance in services sector of developed/industrialized countries with emerging countries as a comparative research study. Another important subject in this area is reviewing the concept of open innovation and its impacts on services sector and service based firms in emerging and developed countries.

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SERVICE ORIENTATION AND TECHNOLOGY INNOVATION IN MUSEUM: MUSEO ARCHEOLOGICO NAZIONALE OF NAPLES CASE STUDY.

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Over last years, evidences coming from literature have shown that organizations that merge a propensity to innovate with service orientation are better ready to achieve durable competitive advantage. According to this prospective, this paper is focused on the impact of service orientation and technological innovations implemented by museums. In particular, we study Museo Archeologico Nazionale of Naples (MANN) strategy. MANN is investing in technological innovations to improve its exhibitions and performances in order to make its collections more accessible to a wide audience, including people with physical and cognitive disabilities, and in order to attract sponsors and donors.

1. Introduction

Throughout the twentieth century, museums adopted "product-oriented" approach, as a sort of container of pieces of art to protect, study and preserve, where the relationship with the public is generally solved by simple admission to visit.

This traditional closed model museum, static and unresponsive to the needs of users, in the late eighties and early nineties, takes gradually a new direction that shows clear references to the American experience: a new type "market-oriented" approach that targets not only the good but also the visitor (Solima, 1998). In this case the museum's mission is extended, not only oriented to protection, but also to the enhancement of the cultural heritage and public enjoyment. It outlines a different concept of museums, such as "providing service machine" (Sissini, 1992) for a multitude of visitors of all ages, backgrounds and training, in a logic of customer satisfaction (Bagdadli, 1997).

The aim of this work is provide, with the help of an Italian case study, evidence of the effect of services orientation on the technological innovation in museums.

In particular, the paper is structured in the following way: a theoretical section where we present museum service orientation and technology chance for museums in order to improve communication of its collections and exhibitions, establishing a more intense dialogue with the visitor; then, we present research methodology, main research results and conclusion.

2. Theoretical framework

Museum service

Regardless of the different forms that the contents of its mission can take place, the "museum is - in general terms - an organized system designed that performs a plurality of functions, characterized by common matrix to resolve by providing cultural activities and services of composite type" (Solima, 2004: 74), aimed at satisfying the needs and expectations of users.

In other words, the necessary functions and characteristics of each museum are parts of a definable set of "offer" system whose essence is to be "at the service of society and its development.

In this overall supply system, there are three principal sub-systems that can be distinguished (Solima, 1998): conserving function, exhibition function and service activities. In order to understand the offer of the museum service, its characteristics and purpose, it makes use of the economic model of service management. Service management is an organizational approach that makes the quality of service and therefore, the relative perception of the customer, the driver of "business management" (Gronoos, 1990; Eiglier; Langeard, 1987).

Peculiarities of museum services

In the production of the museum service, the relationship established between organizational system and client acquires the characteristics of a genuine "co-production", where the customer is the prosumer (Toffler, 1980). In terms later the museum offers a complex kind of service, derived from the sum of a basic service (display of the permanent collection) and other complementary and accessories (dissemination and reception services).

The museum's offer fall, therefore, in the service sector with a specific social connotation. That "it is not enough in itself to ensure the provision of the service (i.e. the accessibility to the museum), but it is essential to ensure the quality of the same enjoyment" (Solima, 1998: 34), in other words to ensure a certain level of customer satisfaction both for visitors, offering an experience qualitatively significant, challenging and rewarding, both in the museum among the employees, through an internal marketing policy (Solima, 1998: 181).

Quality orientation and innovation in museum

The continuous organizational research of customer satisfaction through services improvement, is quality orientation (Mohr-Jackson, 1998). In service research literature emerge two specific dimensions of service quality, as first outcome or product dimension (what service is provided), secondly a functional dimension (how service is provided) (Gronroos, 1990).

This approach can be applied also to museums. In fact, visitors perception of service quality is the result of what they receive as the outcome of process in which resources (collections, shops, restaurants) are organized. Museums' services can be

classified in primary services (conservation and valorization of collections), complementary services, providing a visit support (such as audio guide or online ticket selling) and complementary services, that enrich visitors experience. The experience is another core component of museum's service quality. It is strictly linked to personal perception in which visitors engage in the museum's activities.

Quality of museum experience is declined differently in literature. Some researchers, declared that quality of museum's experience is determined by qualities of the exhibition and its spaces (Hudson, 1997), others emphasizes the relevance of other components in service marketing, because resources jointly with governing system that make sense to visitor experience (Gronroos, 2001). The quality of the interaction between museum's collection and visitor shows the real meaning of the experience.

In manufacture sector, for example, firms involve their customer in co-creation experiences, in this activity customer is not passive but is a collaborative partner of firm that co-create value for firm, for him and for others (Lusch; Vargo; O'Brien, 2007; Vargo; Lusch, 2004). This vision is coherent also for museums, in which visitors do not merely observe an extraordinary collection, but they want to fill with meaning the experience. They wish to take part in a show in which experience is co-create thanks to the interaction between museum and visitor (Pine; Gilmore, 1998).

Technology helps museums to achieve new visitors and to create a community around them, but also these applications are necessary for museums in order to improve the experience of visit and for customers involvement. In this work, the focus is on the impact of technology application on museum's services in order to improve visitor experience.

In museum context information can be conveyed essentially by four kind of tools (Solima, 2000):

- traditional: associated to interpersonal communication that occur in a museum through all people with which visitors can activate a direct form of interaction;
- text: linked to classical and static media, such as information panels or printed guides;
- symbolic: with the presence of indoor signs and maps;
- digital.

The first three kind of tools can be used only inside the museum, but digital communication flows take place at different time and places. Until few years ago, access to internet was very limited, while today, thanks to the introduction of Smartphones and other mobile devices, user is potentially "always on" (Solima et al., 2015). Cultural organizations, particularly museums, could take advantage from this change, because their contents can be available not only before or post visit, but also during the visit.

Several technological solutions, with different technology intensity, can be used into museum spaces such as:

- recognition through identification number. Objects are associated with numbers and are insert into an app installed on personal mobile device. Thanks to this solution you can reach additional information;

- recognition by Qr-code (Haworth; Williams, 2012; Mincoielli et al., 2014). In this case a significant number of additional information can be stored and can be available for visitor;
- recognition through broadcasts on radio frequency. Bluetooth, RFid, Beacon technology are included in this group. The common features is represented by the easy recognition distance of an object by mobile device. This is particularly useful characterized by a little familiarity with technology;
- recognition by scanning of an object. In this case user photographs the piece of art and in a few time, thanks to a special algorithm, he has on his mobile device the necessary information on scanned object;
- identification of user's location. This is based on the identification of user's position into museum spaces through the triangulation of multiple signals into radio frequency. This solution is often combined with augmented reality apps (Izzo et al, 2015; Bonacini, 2014; Schavemaker, 2011);
- virtual reality application. Through this technology the environment is reconstructed in a digital format thanks to the help of sensors. In this case the visit experience is much more immersive (Lopes; Lindström, 2012; Hume; Mills, 2011; Borgatti, 2004; Wojciechowski et al., 2004).

3. Methodology

The article reports the case study of Museo Archeologico Nazionale of Naples (MANN). We interviewed museum manager Paolo Giulierini. In accordance with our research goal, we submitted a questionnaire based on following topics:

- a) museum strategy and creation value for visitor
- b) monitoring of the needs and expectations of visitors
- c) using new resources and technologies to assist the visiting experience
- d) cooperation with other institutions or firms to improve and/or implement technology innovation

4. Result and discussion

MANN Services

In order to improve the quality of service offered and experience for the fruition of the museum, MANN provides a complex service that includes a plurality of services offered to its visitors that can contribute to improving the overall level of enjoyment of the visit. For this reason, diverse lines of intervention have been individuated.

- In first place, a new plan for the fruition of the collections and the palace will be developed, through the planning of new and innovative visiting pathways that will be developed not just with referral to specific thematic areas but also taking into account the diverse forms of public of the museum and their needs, on

the base of what was observed within the field investigations and from the listening activities. Itineraries will take into account, therefore, visitors specifics under a demographic profile (children, young people, adults and pensioners), of the different cultural levels (neophytes, enthusiasts, experts) and of specific needs of particular types of visitors (visitors with physical, visual and auditory disabilities), for whom specific mediation instruments will be created.

- Secondly, there are plans to intervene on the traditional type of informative support, that are at visitors disposition within the museum's halls, that will be also re-planned in coherency with the museum's new visual identity.
- Ulterior interventions will regard the digital informative supports, able to interact with those of a traditional type, that materialise in the realisation of imagines with high resolution of the main works of the museum, of dioramas of audio registrations and of footage, that will be channelled also onto the web as well as through an application of the museum, that will allow the use of augmented reality.
- Supporting the fruition activity, the realisation of a multilingual brochure is additionally planned, for a rapid visit and the creation of a new string of guides, corresponding to the sections indicated in the new pathways plan (i.e. Pompeian murals, Pompeian mosaics, Farnese collection) alongside to the base guide always newly multilingual. An increase in the offer by the bookshop, with a specific section dedicated to the art and history of Naples is also planned.
- With a perspective to a constant improvement of the visiting experience, also for partially sighted and partially deaf visitors, the museum intends to create not just Braille language informative support but also creating scale models of exhibits and important objects of its collections, that could be therefore explored by partially sighted visitors, also within a framework of continuity of the project "hands on the city", promoted by the Educational Section of the museum, in addition the museum intends to realise some informative videos in LIS sign language, that can be used by partially and totally deaf visitors.
- For each item that will go on exhibition around the world will be realized a reproduction hologram and an app that allows you to have news on the item, a kind of digital passport.

The museum was in the TECA project with the IASI-CNR of Rome and the IASI-CNR of Naples creating a pilot project for an experimental multi languages application for visitors and installed on tablets.

- With referral to reception services some priority interventions have been identified, that also through tendering procedures for the externalisation of some services in regard to: renewing the ticket office and the wardrobe; the refurbishment and extension of the hygienic services; the realisation of a provisional cafeteria, while attending the opening of the restaurant planned within the new arm of the museum; the redefinition of the types of assortment in sales points, allowing for the presence of craft-made artistic and design products, of models of collection objects made by foundries or through 3D printing, silver, jewellery and textile objects inspired by the museum's collections; quality wine and food products, also to commercialise with the brand name MANN.

- Not any less important is the improvement of the relationship that can be established between visitors and hall personnel, for which not only is it foreseen the assignment of surveillance of the works but also, and in perspective, more than ever-that of support to the visitors, therefore a programme of requalification will be established starting with uniform, that allows hall personnel to have a basic preparation about the museum's collections and to represent an interface with the general public that necessitates not just assistance but also indications about pathways and places to visit.
- In consideration of all this, the activation of a process of continual monitoring of the visit experience through field investigation conducted with different methodologies of data collection (questionnaires, focus groups, observation investigations) have assumed a fundamental importance.

The target that the museum intends to achieve by 2019 are:

- a) 5 new visit paths by 2019
- b) 10 audio presentations, 10 video presentations, 1 app AR by 2019
- c) 5 guides per topic by 2019
- d) new internal communication instruments by 2019
- e) new ticket office and guard robe by 2019
- f) 4 surveys on public by 2019

Digital solutions

In order to implement part of service strategy MANN has planning the application of ICT technology, in particular:

- the museum has begun a complete restyle of its website, that will be based on more innovative criteria of realisation, so that it may be used in an optimal mode from any platform (PC, tablet and smartphone) and will result profoundly integrated with the system of Social Media, of whose presence will also be object of a profound and radical rethink.
- In other terms, the newsite represents the centre of irradiation of the museum's digital contents, that could be channelled through it, both with referral to the permanent collections that in relation to the temporary exhibitions, and further deepened and shared, also with contributions from users through Social Media (Facebook, YouTube, Twitter, Instagram, Pinterest etc.).
- In addition, the museum will develop procedures for updates of digital contents, products through which a constant flow of information that renders visible and appreciable also the number and variety of scientific and cultural activities (events, workshop, seminars, manifestations, expositions etc.) promoted by MANN.
- Contemporarily, a digitalisation campaign will be begun of the permanent collections of the museum, both in 2D as well as 3D, to be created also thanks to eventual external organisation's support (Google Art Institute, Apple, etc.), so as to improve the level of digital accessibility of exhibits of major importance of

Mann. The digitalisation activity will have as an object also precious material: photographic; archives; bibliographic; manuscripts and library as well as the patrimony of photographic plates and printing press, with periodic expositions of them and their use, in the rooms for narrating the architectural evolution and the exhibition of the museum. The results of the digitalisation campaign will be progressively channelled through the site MANN and the digital channels chosen. A new software for the management of deposits and loans.

- The museum intends to; in addition, explore in a systematic mode the new valorisation solutions offered by scientific and technologic progress; in this sense, particular attention goes to the application of augmented reality, virtual reality and IoT.

In this sense the target that the museum intends to achieve are:

- Redesign of web site and presence on social media by 2017
- 200 2D scans and 100 3D scans of items of permanent collection by 2019
- AR app experimentation by 2016.

5. Conclusion

Over last years, evidences coming from literature have shown that organizations that merge a propensity to innovate with service orientation are better ready to achieve durable competitive advantage.

According to this prospective, this paper is focused on the use of innovation and its related applications in museums. Museums represent a peculiar type of organization because they are nonprofit but, at same time, pursue commercial purposes in the sense they offer visitors an alternative free time activity, and also following financial goals (increasing visitors and revenue).

In order to achieve a competitive advantage the MANN' main effort is to enhance the museum experience and attracting greater visitors.

In fact, MANN is investing in technological innovations to improve its exhibitions and performances in order to make its collections more accessible to a wide audience, including people with physical and cognitive disabilities, and in order to attract sponsors and donors.

The work lacks on study about relation of technology innovation strategy on istitutional organization, these will represent the next step of this research.

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SERVICES CO-CONSTRUCTION IN THE FRENCH HEALTHCARE SYSTEM WITHIN PATIENTS' DIGITAL USES - AN APPROACH THROUGH SOME INFORMATION PLATFORMS

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The greater part played by patients in the French Healthcare System will be pointed out in a perspective of value creation. Actually, since the first Healthcare Networks (“réseaux de santé”), we can observe another step in coordination with patients' care pathways. Information and Communication Technologies (ICT) enhance the e-patients' involvement: patients are more and more active in checking information, getting interactions on digital platforms, sharing their feelings with other patients, evaluating the quality of care, etc. Thus we will analyse the process of co-construction through some new services provided in answer to the e-patients' needs and their effects on the Healthcare System. In order to identify the services provided, we will propose an approach through different examples of information platforms. They now tend to be more global, centralising a large range of services and above all improving information through interactions between patients. We will present a typology of these new interactive socio-technical devices.

1. Introduction

This paper is the result of the cooperation of two academic researchers and a consultant also associated researcher in the same University research team (DICEN IDF). This work in progress is based on data coming from practical observations and professional experience in the healthcare field.

In the French Healthcare System, the Healthcare Networks (in French, “réseaux de santé”) exist for thirty years, since the first experiments in the 1980s. Their aim is the coordination between medical, care and social professionals who take care of a patient. They were for a long while the better space for analysing the question of the patients in their healthcare pathways. The main characteristics of patient's healthcare pathways is a succession of hospital stays alternating with home stays thanks to the assistance of nurses coming at home, resuming social life and work as following treatments, etc. The general practitioner remains the “gatekeeper” for medical aspects but another coordination has to be organised for enabling patients to stay at home for day life. Compared to Healthcare Networks, dealing with long term patholo-

gies require to make the link between the different episodes in care: at the entrance of the hospital stay, on the way out, entering another place for “convalescence”, coordination with medical and nursing teams at home, specialists in town, etc. This transition to a longitudinal model demands cooperation with even more numerous and various professionals, each action having to contribute to a global improvement for a general better way of living in the long run.

The organisation of personalised care pathways enhances the patients’ involvement for their health, the so called “patients’ empowerment”. With the growth of chronic pathologies, patients get more and more involved in seeking information by their own, as they now have to handle their disease(s) for years. More patients get information on Internet before going to a medical consultation. And we can now observe a real growth of the healthcare digital platforms, as well as a diversification of the provided services.

For instance, the French healthcare insurance mutual fund: “*Caisse Nationale d’Assurance Maladie*” (CNAM) displays information for patients on its website Ameli and launched last April a new app called “*Annuaire Santé*” with information from its databases about care offers: seventy medical specialities, practitioners and hospitals locations, rates and opening hours: the click-to-call functionality enable direct medical booking.

This specific inference approach in producing knowledge for Information and Communication Sciences is related to F. Bernard’s reflections about an engaging communication. Information and Communication Sciences are a place for convergence of themes as connections (relations and interactions), sense and knowledge for action. In this method for producing knowledge, researchers are thus involved in action.

For purposes of pointing out the links between the co existing and the co acting, F. Bernard proposes “to make function, while associating and articulating them theoretically and practically, the issues of the link, the sense and the action” within the scope of the paradigm of the committing communication for understanding. It seems to us to constitute an input to the issue of the “existing together” in the organisations. “The sense and the link that appear from action into interaction” applied in this communication have led to favour a research-action approach.

2. The key concept of Digital Platform in the Healthcare field

The Healthcare Digital Platforms take now a larger part in services: patients search for more accurate information, select hospitals, give their opinion, share their experiments, assessments, feelings, doubts and questions, express their needs, test and evaluate healthcare services, interact with medical professionals and register personal data for screening...

Even elderly patients frequently seek information on Internet and have a permanent use of mobile phones for day life so that Information and Communication Technologies (ICT) are fully integrated by a majority of patients. With extended uses of ICT, e-patients expect in healthcare the same level of digital services as in other fields. Be-

sides seeking information about healthcare or diseases on Internet, more patients want to be able to get appointments on Internet.

For main services, people are now asked about their satisfaction through Internet survey after shopping or using information services: they can express themselves about matters of discontent or ways of improving the quality of the services.

Thus wondering what is the effect of such a change on the French healthcare system, we intend to examine the following question: how does the process of co-creation work through services provided on the healthcare platforms? We will try to analyse the way ICT constitute vectors for services innovation: e-patients require evolutions in provided IT tools and services through digital platforms, and technical device as computer, tablet and smart phone enhance the patients' empowerment.

Patients become more aware of their responsibility; they have a proactive role thanks to ICT and their higher involvement gets impacts on behaviour choices and on the healthcare system. They expect more self-directed interactions in digital services. The importance in co-creation is highlighted through this patients' implication, which contributes to producing new services, creating the hybridity between providers and users. So the e-patient is more "empowered" thanks to extended digital uses in which he is really implicated for his healthcare.

Considered as an intermediary between services providers and users, the platform model offers free services where the centre is the data created by the users' activity, or "free work" according to Collin and Colin (2013), which is source of value. Those personal data can be collected, used and made available for third party operators through programming interfaces that will then create new services and thus develop an ecosystem of applications around the platform. Centralising and standardising the data, the platform participates to a complex process of services co construction. The point of view chosen for the proposed communication is the service provided between patients, with data generated by the users' activities on platforms through sharing experiments and feelings about their healthcare. The platform operator or the third parties with the ability to create new services from the users' data are not directly addressed. This committed position can be explained by the strong development of the patients' activities on those platforms, and by the central role-played by data in the device value creation. However, we do not underestimate the decisive role of "hypermediation"⁷² performed by the organisation that manages the platform and that we will consider in the analysis.

Starting from the data exchanged between the patients on the platforms, the typology proposed by Romeyer (2008) helps to make the difference between two types of healthcare platforms: those dealing with medical information and those interested in more general healthcare information. The first type of platform proposes information from source guaranteed by professionals. The second type corresponds with general audience platforms. Information are various and coming from uses. They are the expression of citizens' empowerment (healthcare democracy in France in the law about

⁷² Blog de Nicholas Carr (2005): hypermediation 2.0 (<http://www.rougtype.com/?p=168>), (2009): google in the middle (<http://www.rougtype.com/?p=1249>)

the patients' rights - March 4th 2002 or "*démocratie sanitaire*") and can convey the ideal of "perfect healthcare" or "*santé parfaite*" (Sfez, 2011).

Such a differentiation is found again between the territorial support platforms: "Plateformes Territoriales d'Appui" (PTA), and the information platforms, the first ones providing care services and the others healthcare information services. Both types of services are part of e-health.

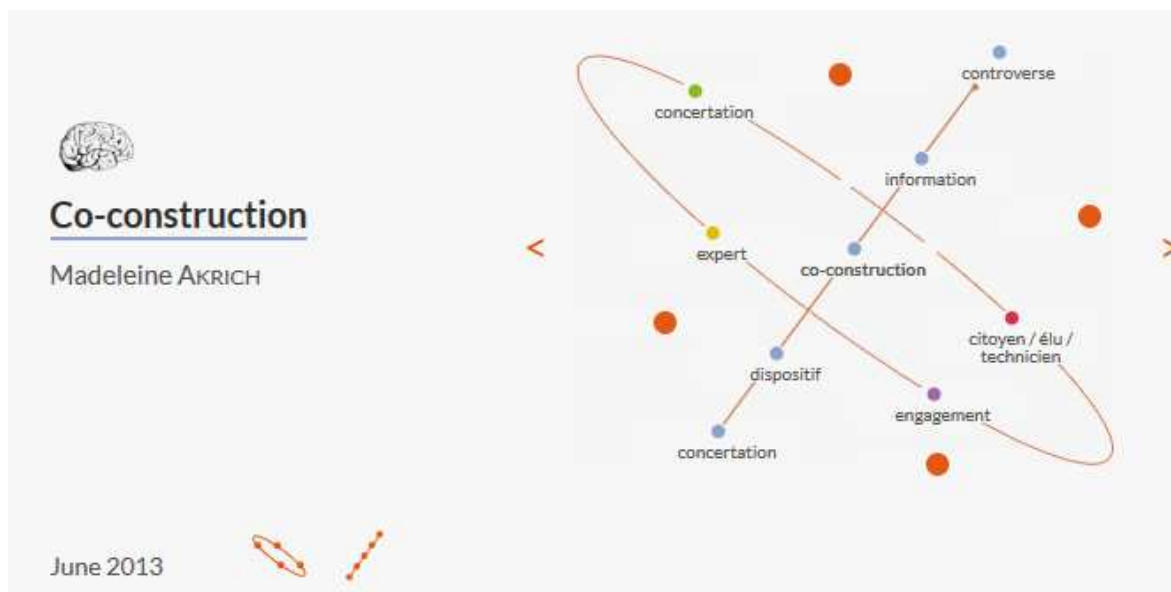


Fig. 1: Co construction – Source <http://www.participation-et-democratie.fr/es/dico/co-construction>

The healthcare sector has for long been quite cautious about digital technology, either with the resistance of the traditional healthcare players anxious about protecting the existing balances (the Kodak syndrome reminded by Ologeanu-Taddei et al. (2016) or as a precaution, as Marisol Touraine (2016) says⁷³ in her recent oral presentation of the e-health strategy. For the minister, the e-health, which expresses the digital transformation in the healthcare field, includes "women and men mobilised for improving our ways of preventing, diagnosing, curing, or simply communicating". This global approach does not seem to be either techno or medico focused, but remains vague. The ministry recognises the importance of expanding new practices.

Concerning the platform Be Patient, she highlights how "this start up points out to which extent the junction of digital and healthcare is a promise for the patients, the professionals and the healthcare system as a whole." She goes on as follows:

"Today, we are witnessing acceleration in healthcare digital innovations. It is nowadays possible to perform surgery remotely, to "print" prostheses, and soon organs, with 3D printers; medical devices are more and more often connected, as pacemakers, glucometers and soon prostheses. Connected t-shirts enable to anticipate epi-

⁷³ Ministry of social affairs and healthcare – Speech on July 4th 2016 - Source http://social-sante.gouv.fr/IMG/pdf/16_07_04_intervention_mt_-_presentation_strategie_e-sante.pdf

lepsy crisis... Today, the citizens learn how to manage and evaluate their healthcare through information produced by connected devices.”

In concrete terms, she notes the arrival of new services without making clear how they appear? How they are produced? Who will produce them? We understand that by the side of traditional medical players, the technologies providers and the patients have a place to win. But which part will take each of the operators in its connected device?

The digital platforms represent an interesting observation ground for the e-health setting up. Will the connecting platforms really give to the patients/users the ability to become independent and active for their healthcare, even skilled for participating to diagnoses, for instance? In that situation, what would they have in common with the patients searching for official medical information? Can we talk about services co creation and co production? Can we consider co innovation? Which confidence in digital data exchanged between patients? Is it so far away from proximity remote medicine? Will this trend carry consequences on the medical professions?

It is absolutely certain that the digital platforms are socio technical devices that call the user' positioning into question, as well as the degree and the nature of his involvement (emotional, factual, pragmatic, medical). The digital platforms are today a world outside the medical sphere, which is protected by its partitions and the problems of interoperability for the information systems, with a closed regulatory framework on information. However, some traditional players are present on digital platforms providing lucrative services in parallel of the traditional system (Epiderm, Directdoc, deuxiemeavis, etc.).

The observation of what is in action within those platforms where healthcare data are exchanged is an important issue for the healthcare system, because if they keep their promise in providing welfare for the patients and lucrative business models for applications publishing companies, the platforms should deeply call into question the traditional healthcare system.

3. Methodology for analysing the on-going digital evolution

In order to understand the process of co-creation in the healthcare platforms, we will first select the information platforms among the different types of healthcare digital platforms; then, we will build a sample of various information platforms for analysing diverse types of provided services. We aim at drawing a first draft of a typology of the interactions produced on the information platforms.

Types of healthcare digital platforms	Objectives	Target audience	Provided services
Healthcare information digital platforms	Information sharing with professionals	General audience	Free services More and more diverse services
Platforms for remote healthcare advice ("télé conseil") or remote medical appointments ("téléconsultations")	Medical caring services offer	Subscribers	Fees for services
Territorial support platforms: plateformes territoriales d'appui (PTA)	Support provided to professionals on a territorial field	Social and medical professionals, patients	Coordination
Healthcare national insurance fund platforms	National public offer	Registered patients	Support for patients Phone advice, coaching Monitoring

Fig. 2: Selection of one type of healthcare digital platforms

We will analyse the evolution in the implication of the patients in relation to their use of ICT.

More and more patients look for information on Internet about their symptoms, their pains, their disease, the causes and the treatments before going to medical consultations.

With the integration of ICT and Internet 2.0, patients interact with other patients on social networks with community websites for sharing experiments about their pathologies; they also look for healthcare coaching and use on line transactions like, orders and payments on line for medicine.

The healthcare platforms correspond to two main types of uses: providing information, especially for the patients (those platforms being mainly websites) or forming frames for new services for the patients and above all for the healthcare professionals. Our communication is placed in the first viewpoint that matches with the rise of the part of the "layperson" which is enhanced by the Internet technologies as analysed in particular by P. Flichy (dialogue between the expert and the layperson).

Theoretically, the non-professionals take action in a non-commercial sphere where they give their opinion and discuss. The exchanged information becomes potentially usable resources, and in some situations the commercial sphere is interested in them. Flichy (2010) holds up as an example the healthcare sector and the exchange websites where the patients search more to exchange information, to be reassured, even to cooperate rather than to replace the doctors.

The platforms can link together different logics, the community logic and the commercial logic (Trompette et al., 2009). Flichy (2014) makes the difference between the "connected individualism" combined with the use of ICT that can be found in the commercial sphere and the community position in which individuals, based on a common interest (here in relation to the disease), put information in the service of the

group. Between them, a large field of possible layout appears for studying in the area of the healthcare information platforms.

Through some examples of healthcare digital platforms, we will present their purposes, the categories of users they address, the services they offer, and the value creation they bring to the healthcare system in helping to broadcast information, to share experiments and organise care.

In order to constitute a representative sample, we will select a range of 8 platforms for covering a complete scope of different types of services and actors.

We will apply an observation grid of several criteria for running an identical interpretation from the observation of the selected platforms: type of platform, launching, main characteristics, users, services.

The characterisation of the different platforms will be achieved through the observation of their leaders (innovators, investors), the type of users and the key factors of the provided services.

We will then try to analyse the interactions produced and deduce some insights such as the type of matchmaking and the degree of the patients' involvement.

4. Answers to patients' needs for Healthcare with ICT

ICT not only make possible to find information about healthcare and disease, but also help to get it through easy ways, with advice for prevention on chats or videos, games that can be browsed. Patients can be better informed and, thanks to new digital possibilities, can be more involved for their healthcare.

For appointments whether at a medical laboratory, with their general practitioner, a medical specialist, or at the hospital, many websites now enable patients to ask them directly, to be confirmed, to make changes, etc.

As for evaluating the services that are provided, they are now asked by e-mail to give their opinion about the quality of their stay in hospital and not only by filling a paper form. How is it possible to check if medical information on Internet is trustable or not? A label called Health On Net (HON) was created to attest certified medical information on Internet, but the French High Healthcare Authority: "*Haute Autorité de Santé*" (HAS) no longer follows it.

4.1. Doctissimo

Two doctors created Doctissimo in the year 2000 and it is the French better-known medical information platform. It belongs to the Lagardère Group since 2008.



Fig.3: A private healthcare platform

Its structure offers several items, “healthcare” or “medicine” can be chosen among them, and other items are wider like “nutrition”. Many articles are accessible and can be selected. Two links enable to connect directly for a medical appointment on Mon-docteur or for ordering medicine on Docti’Pharma. For each heading, it is possible to activate a drop-down menu, so that for “healthcare”, we can access to detailed items as “diabetes” or “throat pain”... On the forum also, items can be selected before launching some discussion. Information can be searched with two main choices: article or medicine. Besides the forum, tests are available: after a general access to the healthcare quiz, different choices appear for very different and specific quiz as “epilepsy”, “tiredness”... A chat on Club Doctissimo requires first creating an account.

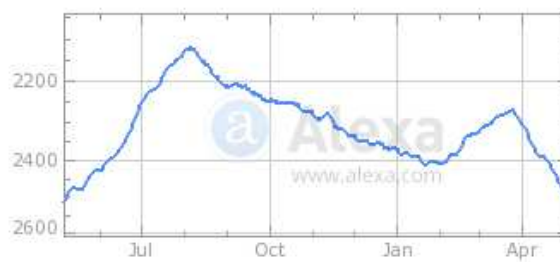
On this platform, which did not get the HON certification, the healthcare information is definitely popularisation, provided among other matters.

On a rating survey about websites frequentation realized by “OJD” on March 2014, Doctissimo takes the 6th rank 8 070 181 people, including 6 439 320 French people, 38 416 549 viewed pages and 4,79 web pages per visit.

How popular is doctissimo.fr?

Alexa Traffic Ranks

How is this site ranked relative to other sites?



Global Rank ?

2,509 ▼ 96

Rank in France ?

113

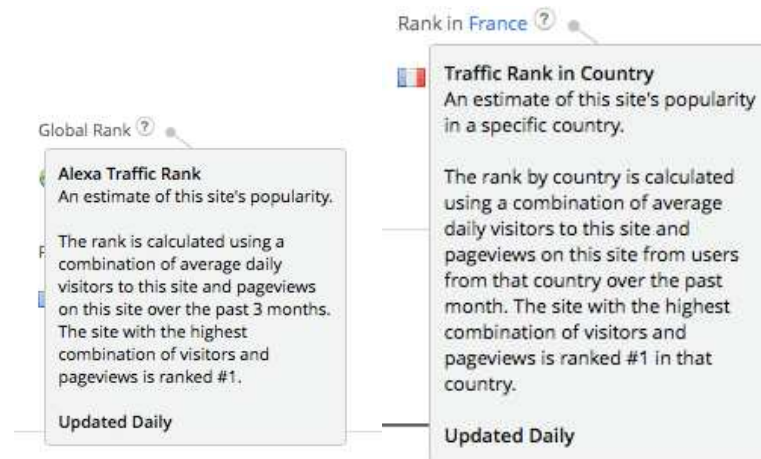


Fig.4: Traffic rank – Source <http://www.alexa.com/siteinfo/doctissimo.fr>

4.2. Medicaments.gouv

This public database is accessible on Internet since the end of 2013. It was realised by the French National Agency for Medicine and health products Security: “*Agence Nationale de Sécurité du Médicament et des Produits de Santé*” (ANSM) in relation with the High Healthcare Authority: “*Haute Autorité de Santé*” (HAS) and the National Union of the healthcare insurance funds: “*Union Nationale des Caisses d'Assurance Maladie*” (UNCAM).



Fig.5: A public database platform

The Internet access is either from the name of the medicine, or from the active substances that compose it. It provides updated information to everyone about medicines that are or were commercialised for the last three years: their composition, therapeutic indications, generic medicine group, active substances composition, presentation for distribution, prescription conditions, price and reimbursement rates, and the medical result, in French called “*Service Médical Rendu: SMR*”.

The Internet publication of such detailed, easy to find, and official information takes part in enhancing the responsible process in self-medication and accurate use of medicine, under the current circumstances where patients are more and more involved for their healthcare.

Furthermore, the frequentation of this platform can lead patients to more implication, as they can directly submit undesirable medicine effects: actually, it is possible to download a form, fulfil a declaration and then send it by e-mail to the centre for drug safety of their region: “*Centre Régional de Pharmacovigilance CRPV*”.

With the « *Medicaments.gouv* » application on smartphone, the flash codes on medicine wrappings can be scanned for direct access to the corresponding information form of this medicine in the data base.

One year after its public diffusion, the database included more than 12 000 references for pharmaceutical specialities and 7 millions of pages had been read by 900 000 people in one year.

4.3. Mondocteur

Mondocteur was launched by a start-up in 2013 and bought at the end of the same year by the “Lagardère Group”: it was integrated in addition to *Doctissimo.fr*, providing new services for doctors with the means to optimise their diary, reducing the number of forgotten appointments and giving the opportunity to replace cancelled appointments. After beginning for Paris only, Mondocteur is now extended to 250 French towns with 5000 doctors’ offices and is said to have 10 millions unique visitors per month.

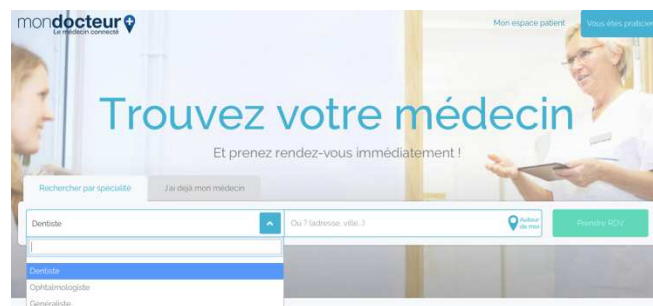


Fig.6: A private medical booking

As connecting on Mondocteur, under the headline “*le médecin connecté*” (“the connected doctor”), the first choice is the speciality amid a long list. After fulfilling the localisation, it is also possible to choose the type of consultation: vaccination, paediatric consultation, medical certificate or emergency. Then, asking for an appointment leads to a map, which displays the places of different doctors’ consulting offices. For each of them, photos and general information are available, with the type of consultation rate: “*secteur 1*”, or “*secteur 2*” where overcharged fees have to be paid.

As clicking in this part, even more detailed information are given on a separate window with the rates of the most frequent medical acts and treatments for each doctor. Much additional information then appears about the selected doctor: spoken languages, training and diploma, resume and publications. Before choosing the day and the hour for an appointment, the reason of the visit has to be chosen in another drop-down list with the following items: disease (fever, pains...), vaccination, paediatric consultation, medical certificate, emergency, annual control, high blood pressure, diabetes, articular pains, asthma, bronchitis, skin problem.

Information about public transports for going to the consultation is available, with distances from the consulting room to the nearer underground or bus stations. After booking, the patients receive by e-mail the confirmation of their appointment; before the consultation, a text message reminder prevents them from forgetting it. This functionality is important as it meets the need of the practitioners, avoiding them spaces in their daytime. A digital space is offered to patients after creating their own accounts.

A significant evolution occurred last April when this booking platform integrated Uber services: it is now quite easy in one click to order a car for going to the appointment: this is directly feasible from the reminder text message received for the appointment, saving from going to the Uber App. Another keynote to point out is the coming up of other comparable services. According to an opinion poll realised by Ipsos last May among French population, the more used apps are those for medical appointment reminders (26%).

4.4. Cancer Contribution

Displayed with a drop down list, the platform is based on four main lines: identity: “*Nous sommes*” (Who we are), information: “*Je m’informe*” (I inquire), implication: “*Je participe*” (I participate in) and the network actions: “*Nous agissons*”(We act).



Fig.7: An associative patients' community platform

Created by a patient, it belongs to the patient's community's type of platforms. Identity is described through four items: our mission, association, ambassadors and partners. The mission presents the aim of gathering on the platform all actors affected by cancer, as well patients, doctors, associations and people with political responsibilities. The objective is to make them participate to the co-construction of a new vision of the cancer and its impacts on society.

The platform exists since 2011 and is managed by an association. Some members are patients' associations as the association for young people, solidarity and cancer: “*Association Jeunes Solidarités Cancer*”. According to the presentation of the platform, there are more than 2500 people in the community, with 100 000 viewed pages per year and 4000 visitors per month.

The heading “*Je m’informe*” (“I inquire”) is composed by three accesses: articles, newsletters or directory. Articles include interviews and videos, and directories lead to book, film, website and blog lists. Three means of implication are proposed on the

heading “*Je participe*” (I participate in”): forum, vote and meetings. The forum is structured around more than 15 existing entries such as: screening, relation between patients and the nursing staff, disease announcement...

For voting, the possibilities are surveys or polls: for instance, patients are asked for a call to participation about survey on oral chemotherapy in the context of a research project. Another example is a survey carried out by a regional cancer treatment centre: “*Centre régional de Lutte contre le Cancer*” on the theme: information seeking about cancer and environment.

“*Nous agissons*” (we act) is the way to present thematic reports, to collect signatures for petitions, and describe the current projects and their results. Opinions and patients’ experiments can be expressed and shared if a personal account has been created on the platform.

The platform is characterised by a wide scope of news and current themes that can be activated in a drop-down structure: patients can have interactions on many of them as they are asked for their experiments.

4.5. MyCurie

The Institut Curie is a public foundation and centre for treatment of cancer. The app MyCurie has been developed for providing the patients of the Curie Institute to get personal information.



Fig.8: A hospital platform for personalised care pathway

Patients access to the MyCurie with either a smartphone, a tablet or a computer. Personal data security has been specially examined for this platform designed for patients in mobility, with access to information from the Institute. The objective fixed upon the development of the app is accompanying every patient along his healthcare pathway. Patients can get medical and practical information as their next appointments, some pedagogic videos or personalised information about their treatments.

After a period of tests by patients, the Curie Institute intends to extend the use of the app to many patients and to add new functionalities. For instance, it is planned to display medical reports, or new specific units for each type of cancer. Some personalised advice and coaching could be added, then, individual information about side effects. Over a second phase, the Curie Institute plans to push information to general practitioners with special access to medical information.

4.6. Comparhospit

This platform is on line since 2010 on the website of the mutual fund group Malakoff Médéric, in order to enable patients to get information for their selection and decision about the choice of a hospital corresponding to their criteria, standards and requirements. The information is posted from public databases such as the annual statistic of hospitals: “*Statistique Annuelle des Etablissements de santé*” (SAE), the national file of healthcare and social structures: “*Fichier national des établissements sanitaires et sociaux*” (FINESS), the medical program for information system: “*Programme de Médicalisation des Systèmes d’Information*” (PMSI) and indicators from the French high healthcare authority: “*Haute Autorité de Santé*” (HAS).



Fig.9: A mutual fund group platform for hospital comparisons (« Tripadvisor for healthcare »)

After the location, a first selection is done through three pull-down menus for choosing medical activity, speciality (surgery, maternity, psychiatry...) and reason. It is also possible to select equipment as a scanner or magnetic resonance imaging (MRI), etc. As results, hospitals corresponding to the criteria are displayed under a banner, with possible access to a detailed form for each structure. A table gives specifications about: the hospital, the average stay duration, the number of stays per year, the rate for ambulatory stays, the level in quality certification with indicators of fight against hospital-acquired infections, the indicators for the improvement of the quality and security of care (score IPAQSS), patients’ opinions and the price for individual room.

ÉTABLISSEMENT	DURÉE MOYENNE DE SÉJOUR (JOURS)	NOMBRE DE SÉJOURS PAR AN	% SÉJOURS AMBULATOIRES	NIVEAU DE CERTIFICATION	SCORE IPAQSS	AVIS PATIENTS	PRIX CHAMBRE INDIVIDUELLE
▲▼	▲▼	▲▼	▲▼	?	?	?	?

Fig.10: Information items for each selected hospital

Every patient can express his opinion. Those who are also clients of the mutual fund group can access to a simulator for an estimation of hospital living expenses and remaining costs for patients.

Other platforms offer comparable services, namely « Hospitalidee »... The French high healthcare agency: “*Haute Autorité de Santé*” has also implemented a platform for collecting patients’ opinion after their hospital stays. Patients receive a form by e-mail and can answer to questions about the welcome in the structure, the support

provided (waiting periods, privacy, pain management), the quality (bedrooms and meals) and the exit preparation. Combining those data, a satisfaction score is calculated and published on the public platform Scopesanté.

4.7. Diabète LAB

In 2015, the French Diabetics Federation: “*Fédération Française des Diabétiques*” decided to launch the “Diabète LAB” for innovation that could be thought, developed and evaluated by the patients, considering that patients are well placed for expressing their needs and that co innovation requires to take into account the e-patients’ ways of thinking through living labs.. The “Diabète LAB” aims to organise the different contributions from doctors, industrials, patients’ associations, federations and health-care authorities.



Fig.11: A living lab with patients’ involvement as experts

The process is organised along three steps: collection of ideas based on the needs, co-construction for developing products and services which could be adapted to the patients’ current needs and uses. Therefore, patients are implicated from the first idea to the prototype; some volunteers can be requested to test innovative devices. Finally, products and services matching the patients’ expectations could get a label.

The “Diabète LAB” is now developing an app for directly collecting the diabetic patients’ needs on smartphones. The functionalities will include glycaemia monitoring, help for preparing medical consultations and dietetic advice.

4.8. Be Patient

The platform Be Patient appeared in France in 2012 with a complete offer on chronic disease management, after Carentity in 2011 and on the model of Patients like me in the United States. As an infrastructure, it offers solutions for improving the patient pathway and provides a global, personalised and participative approach to patients with the use of decision-making tools.

Modules Available



Fig.12: A platform structure for including patients in medical research

The intended goal is to enable chronic patients to meet and exchange about their daily experiments, their disease and treatments, and acquire more information for getting more involved in their healthcare. As helping the patients to follow their disease, prevention of complications might be expanded. Patients can manage their own digital healthcare record booklet, using connected devices like the iHealth tensiometer.

The platform is created as a bunch of complementary services: medical scores, monitoring tools, information centralised from biomarkers, videos, coaching, forums... any help for getting information about chronic diseases and patients' rights. The bunch of services is based on different modules to configure: screening in interaction with practitioners, patients' e-consent for getting information about their care pathway and their treatment, personal health record, remote monitoring for uploading healthcare data to the platform and sharing them remotely, care coordination, uses observatory, etc. It includes customised disease management programs and solutions for patient data analysis.

It has been developed in relation with research for realizing applications centred on digital patients communities and for using shared information in medical research where patients can play a part. Patients can be required as experts and participate to trainings for Patient Therapeutic Education (PTE). Patients can also access to programs managed by healthcare professionals in medical device or pharmaceutical groups or projects for risk management by insurance groups.

Two surveys about remote medicine for heart failure have been carried out with Bepatient in relation with two French hospitals and Alère, a company specialised in diagnosis systems.

5. Interactions between Patients' Needs and Digital Services

Patients willingly head towards services providing direct appointment on line and share their own experiments about their disease. They look for more and more appropriate information and for specialised healthcare social networks or sites dedi-

cated to a disease in particular. Creating their own accounts on platforms, patients can get more customised information services. Broadcasting healthcare and medical reliable information on line as a quality documentary service enables patients to act as more responsible actors. With platforms, ICT have changed the relation between practitioners and patients who go to a medical consultation with previous information.

Patients now tend to make their own medical diagnosis and use information for decision making in self-medication. The concept of participative healthcare becomes widely spread thanks to the use of digital technology. Expressing their needs, testing solutions as experts, and sharing some of their data, patients tend to move towards a deeper implication.

Healthcare insurance companies try to have an effect on healthcare expenses, encouraging prevention and monitoring, providing advice and coaching services to their clients. Making comparisons between hospitalisation conditions also raises awareness on possible choices.

A first draft of a typology of the interactions produced on information platforms is designed as findings of our observations: the healthcare digital platforms could have been classified according to their target audience or the provided services, but this overview points out the degree in patients' involvement for their healthcare as the main factor.

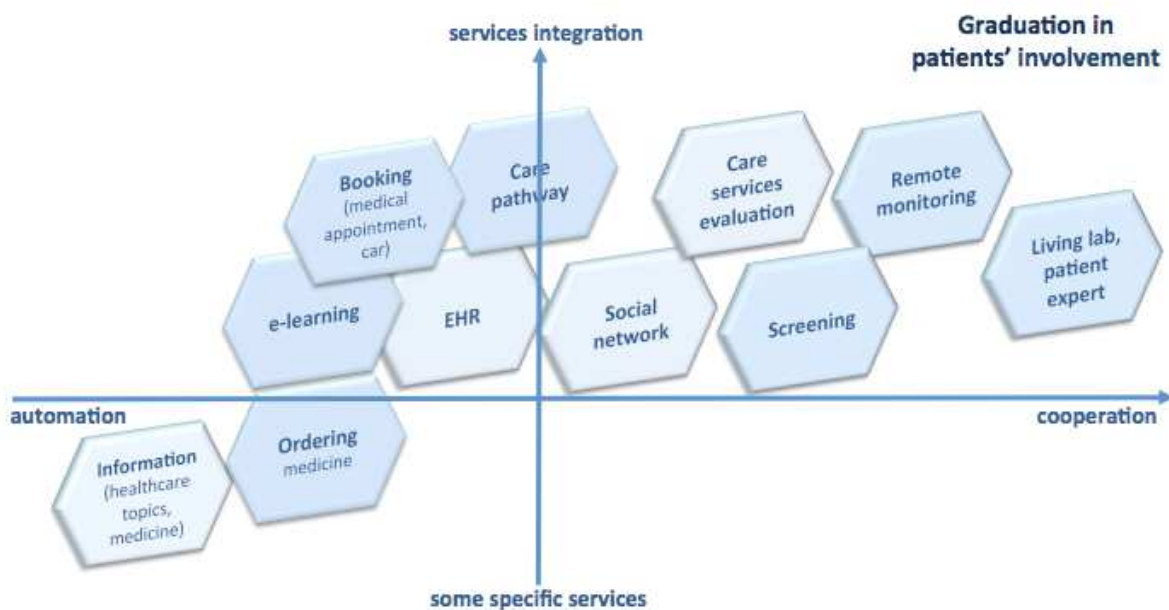


Fig.13: Draft of a typology of the interactions produced on the information platforms

However, this findings process needs to be analysed in depth so that those intermediary results could be confirmed.

6. Evolutions in Healthcare Digital Platforms

Rapid technological evolutions are observed, and they have effects on digital uses. For instance, platforms are more than a group of web pages: they now display more videos, or games with the gamification process; services on digital platforms are now usually accessible from all devices with responsive web design; data can be integrated from connected devices.

Such evolutions take place in a context of lack of legal frame and control for the development of healthcare platforms. Label like Health On Net (HON) is not widely applied, while some companies as Medappcare or DMD have put a position in evaluating apps with an approach of quality label.

Several interrogations appear about current digital uses: How patients determine themselves for choosing a healthcare platform between similar ones? Do they prefer to find a complete bunch of services on one platform? Do they browse different platforms or mainly some of them? What is their browsing frequency? Etc.

Furthermore, some platforms will now gather services from different providers. An example was given with Uber services on Mondocteur. It will also represent an important added value for some public territorial platforms: "*Plateformes Territoriales d'Appui*" (PTA), which will gather different medical booking services.

« Government is a convener and an enabler rather than the first mover of civic action (...) Government as a platform provider created capabilities that enrich the possibilities for subsequent private sector investment. » (O'Reilly, 2010)

7. Conclusion

The main issue from this overview is that thanks to the users' activities, platforms become spaces for convergence of information, communication, knowledge and sociability (Doueïhi, 2011).

Our approach may then open the way to several tracks for search. We could draw some distinctive features in the part played by e-patients currently in the French health system, with the effects of the tendency in appropriation of health topics by patients' associations.

Through different ways in the e-patients' empowerment, we could also highlight the special effect of the patients' emotions and feelings on the evolution of the health system.

Characterizing the innovative concept of e-patient will enable to analyse its interaction with the emergence of different types of web platforms and in specific situations.

The e-patients' needs require new forms of organisation, with more immediate responses and proximity, which leads to territorial fields for innovative experiments, such as the French program for digital care territories: "*Territoires de Soins Numériques*" (TSN) in five French regions.

Thus the on going process of extended health services fields through digital platforms in relation with the patients' expression of needs is deemed to be analysed deeper. And finally some results on the healthcare system improvements can be pointed out especially in the evolution of care pathways approach.

Digital is now fully integrated in the participative healthcare and it creates value, helping patients to take their position in their healthcare pathway and perform an active role.

In the context of a very rapid development of the healthcare information platforms, patients would now need better online tools to make health decisions. A new step and real improvement would consist in providing on platforms better helps to patients for sorting relevant information, which could be really appropriate to their situation, either for diagnosis or for prevention. This approach requires analysing what and how patients are researching on line.

Actually, the relevant issue for the healthcare system actors is not to head towards the regulation and / or the deregulation, towards lucrative or free services, or towards the ICT use or their refusal, but how to use the digital technologies as an opportunity for taking better care of the patients, providing new services to them rather than enduring the technologies and the models proposed by the applications publishing companies. The digital transformation in this sector has to be directed with an analysis of the risks and the issues in relation to the different technologies employed, as it is done for the autonomous car (Ologeanu-Taddei, Morquin, 2016).

Successful platforms empower the users. Platform innovators aren't just market matchmakers using data-driven algorithms. They invest in value creation.

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SERVITIZATION IN ITALY: EVIDENCES FROM THE LAZIO REGION.

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Despite the importance of servitization has been recognized during the last decades by both academics and practitioners around the world, little has been said regarding its adoption by the Italian manufacturing firms. This paper aims to fill this gap through a survey, via a specific questionnaire constructed by adopting the questions used by Baines et al. in 2010 to investigate the UK manufacturers. Findings show the main features and determinants of the servitization strategy among Italian manufacturers. Moreover, a comparison between Italy and UK has been carried out. Although the insights provided by this paper are preliminary, the results analysis allows us to draw an overview of the industrial trends in Italy.

1. Introduction

In recent decades, the trend towards increased services offering by manufacturers and the link between industry and services are two of the major features of the economic development.

As stated in *The Work Foundation's*⁷⁴ *Report "More than making things"* by Sissons (2011), much of the future growth in manufacturing will come from "manu-services", namely by "a broad group of activities that involve combining manufactured goods with services. These activities range from fairly simple combinations of goods and complementary services (such as maintenance and installation) to complex integration of manufacturing and services (which may involve providing services such as development, design and after sales care in close integration with the production of a good)" (p. 6).

The above-mentioned importance of services for the manufacturing firms had already been recognized in the literature since 1988 by Vandermerwe and Rada, who coined the term "servitization" in order to describe the integration of complementary services into the manufacturing firms' portfolio by offering value bundles that consist of both services and physical goods. Starting from them, research on the topic has expanded

⁷⁴ The Work Foundation is the trading name for Landec Ltd, a wholly-owned subsidiary of Lancaster University.

exponentially over the years. However, despite this strong interest, there is still a paucity of studies that empirically analyse this phenomenon. This is especially true if we look at the studies that analyse how manufacturing firms, located in different countries, adopt (or not) a servitization strategy (some exceptions in this sense are the studies by Baines et al., 2010; Lay et al., 2010; and, Szász; Demeter, 2011).

In this respect, it is worth noting that no empirical studies regarding the adoption of servitization by the Italian manufacturing firms have been produced yet. Thus, the main aim of this paper is to fill this gap via a survey. In particular, through the administration of a questionnaire and the analysis of the responses, the paper describes the main features and determinants of the adoption of a servitization strategy services by the manufacturing firms located in the Italian region of Lazio.

The paper is structured as follow. Following this introduction, the research method adopted is described in the second section. The third section reports the findings gained through the survey, which have been synthesized into a set of 15 propositions. The fourth section is related to the results discussion and to the comparison between Italian and UK manufacturers. Finally, the fifth section is devoted to the conclusion together with the limitations of the study and suggestions for future research.

2. Research method

As already stated, there is no empirical evidence regarding the adoption of the servitization strategy by Italian manufacturing firms. It is for that reason that this paper tries to partially fit this gap by investigating the manufacturing firms located in the Italian region of Lazio via a questionnaire.

2.1. Survey

In order to reach the paper aim, the survey methodology has been chose (Babbie, 1990; Fowler, 2013; Groves et al., 2009). The questionnaire used for the investigation has been constructed by adopting (Bourque; Clark, 1994) the questions used in the survey by Baines et al. in 2010, who have expressly authorized the replication of their study and have also provided additional material for the proper conduct of this research.

The questionnaire (see Appendix) consists of seven sections, which are: respondent data, company general information, service offering, service strategy, motivations, organizational changes and future perspectives.

The questionnaire is a self-completed web questionnaire and respondents access to it through their web browser using a hyperlink. This kind of questionnaire has been chose also because it allows having a low likelihood of contamination (or distortion) of respondent's answer (Saunders et al., 2016). The questions were predominantly closed-ended, even though comment boxes were provided for some of them.

The hyperlink related to the questionnaire has been sent by email on April 2016, and responses have been collected over the following twelve-week period through the QualtricsTM online survey tool.

The original target sample was made up of all the manufacturing firms (976 companies) belonging to the Italian Association of *Unindustria* (the Association of Manufacturers and Enterprises of Rome, Frosinone, Latina, Rieti, Viterbo). The manufacturing firms have been identified through the ATECO 2007 classification of economic activities⁷⁵.

At the end of the collection period, 53 questionnaires were received. Looking for completeness and comprehensiveness, only 34 have been actually used. The overall response rate was 3.5% and the questionnaire has been addressed by 20 CEOs and 14 General Managers of the companies surveyed.

3. Findings

Key findings emerging from the survey results analysis are reported through 15 propositions, analysed in the following 8 sections.

3.1. Service offerings

The survey set out to understand the types of services that manufacturers are offering, and according to Baines et al. (2010), it seems to be critically important to distinguish between “protective” and “proactive” services. The former are “simple” services added by manufacturing firms to their portfolio in order to protect themselves by the loss of orders. The latter are more “sophisticated” services used by manufacturers as the basis of their competitive strategy.

Figure 1 illustrates the different services offered by surveyed manufacturers.

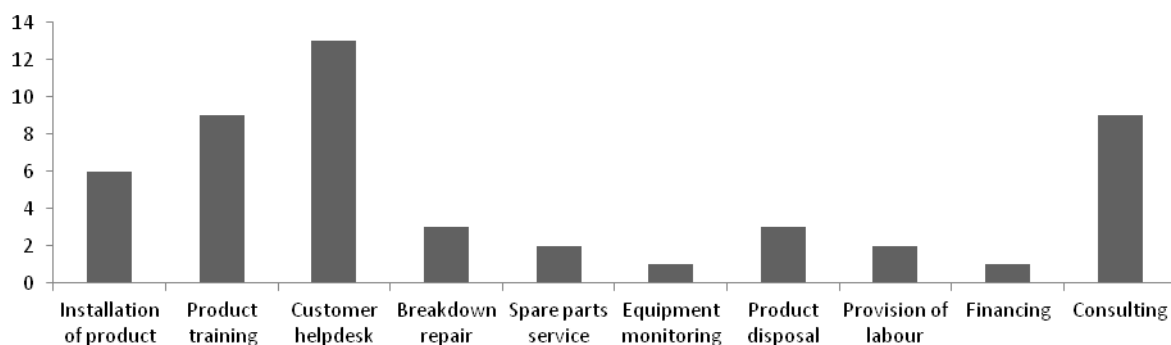


Figure 1. Number of companies offering the different services.

In particular, between the “protective” services, almost all companies surveyed offer: customer helpdesk (64,7%), product training (52,9%), and product installation (35,3%). Whilst, very few manufacturers provide “proactive” services (e.g., only 4 out of 34 offer the product disposal). However, it is interesting to note that, among these more sophisticated services there is one with almost the same popularity of the “pro-

⁷⁵ This classification is the Italian national version of the European nomenclature Nace Rev. 2.

protective” services, namely: consulting. Specifically, 16 out of 34 provide this kind of service.

Findings 1. Almost all manufacturers provide simple services (i.e., protective services), which typically include customer helpdesk, product training, and product installation. Only few manufacturers are able to provide also sophisticated services (i.e., proactive services), except for the consulting service that is offered by nearly half of the companies.

3.2. Maturity of service strategy

In order to understand the maturity of service offerings a set of specific questions has been posed.

The results indicate that respondents consider to have mature (76,5%) – or at least quite developed (23,5%) – service strategies. This claim might seem unrealistic, but only if not properly contextualised. In fact, the maturity in the implementation of a strategy shall be measured in relation to the objectives for which that strategy has been formulated. Thus, due to the fact that the majority of the companies analysed mainly offer only a small portion of the possible services, and in particular the protective ones, it is possible to assume that their strategy is mature only for this kind of services.

Finding 2. Almost all manufacturers (76,5%) consider themselves to have a mature service strategy. This maturity can be considered verified only for the protective services.

3.3. Pricing agreement, risks, and performance

The survey examined the different types of pricing agreements between manufacturers and their customers, along with associated risks and performance measures.

Regardless of the type of service offered (i.e., protective or proactive), the most used pricing agreement is “included in product price”, i.e. the right to use a specific service is automatically acquired by the customer when purchase the product. This type of contract is used to set the price of 9 out of the 14 services offered by the companies. However, sometimes, also “pay per use” and “profit/revenue sharing” are adopted.

Interestingly, only two manufacturers state to take risks previously owned by their customers and, where these risks are taken, they try to mitigate them through liability limitations.

All manufacturers surveyed measure the success of their service strategy, and the most popular methods (20 companies out of 34 use them) are: “customer satisfaction” and “new customer acquisitions”. Moreover, in comparing themselves to other service providers in their industry, almost all manufacturers consider their level of service performance at least over the industry average. This is especially true in terms of: customer satisfaction, profitability, and revenue growth.

All companies surveyed (except two) adopted measures to demonstrate the value of services delivered to customer, and in the majority of cases (59%) this was achieved

by “improvements in product performance”. Moreover, the services value is made visible to customers mainly via combinations of on-site visits, customer satisfaction surveys, and customer workshops.

Finding 3. For the services offered by manufacturers, the most used pricing agreement is “included in product price”.

Finding 4. In almost all cases, the delivery of services does not include for the manufacturer to undertake risks previously held by their customers.

Finding 5. The most popular measures of service business success are “customer satisfaction” and “new customer acquisition”.

Finding 6. The value of services is most often measured through “improvements in product performance” and it is made visible to customers mainly via on-site visits.

3.4. Motivations of manufacturers to offer services

The survey sought to identify the popular factors that prompted manufacturers to provide service offerings. According to the literature on servitization (Baines et al., 2009b; He; Lai, 2012; Oliva; Kallenberg, 2003), these factors have been categorized into four groups: 1) Financial needs and opportunities, 2) Strategic needs and opportunities, 3) Marketing needs and opportunities, and 4) External influences.

The most influencing factors are concerned with strategic motivations. Such factors are: “improving ability to respond to customer needs”, “differentiating the offering from competitors”, and “increasing customization of the offering”. Another relevant factor, instead, relates to financial motivations, and specifically refers to the “desire to increase revenues”. It is worth noting that the motivations that drove companies to adopt a service strategy have remained the same over time.

Finding 7. For most of the respondents (20 out of 34) the main reasons that prompted them to offer services are the need to satisfy their customers and the possibility to differentiate themselves from competitors.

3.5. Motivations of customers to adopt services

The survey investigates the manufacturers’ perceptions related to why their customers are attracted to service offerings.

The manufacturers surveyed believe the possibility to reduce the investments in people/equipment as well as the operating costs are the main factors able to attract customers.

On the contrary, always from the respondents point of view, for customers do not appear to be significant the possibility to reduce their risks. This result is in line with *Finding 4* and may justify why almost all manufacturers surveyed do not undertake customers’ risks.

Finding 8. Manufacturers believe that the possibility to reduce costs and investments are the main reasons why customers are attracted by services.

3.6. Formation of service strategy and offerings

In addition, the questionnaire also set out to test the formation of service strategies and offerings.

The majority of firms (20 out of 34) claimed to have moved into services over ten years ago, and all of them indicated that the decision to pursue a service strategy was initiated top-down.

In response to questions regarding their approach to service design, the majority of the respondents claimed any structured approach, and less than one third claim to always involve their customers in the service design process.

Finding 9. All manufacturers have taken a top-down approach to the identification of a service strategy.

Finding 10. The majority of the respondents claim to have any structured approach to the design of their service offering and only few of them (10 out of 34) always involved customers in the development of service offerings.

3.7. Organizational changes

The extant literature and evidences from previous case study on servitization (Baines et al., 2009a; Brax, 2005; Gebauer; Friedli, 2005; Leoni, 2015) indicate that moving from manufacturer to service provider results in significant challenges in organizational culture and structure.

The survey tested these challenges, confirming that the decision to adopt a service strategy implies some major changes within company.

In particular, respondents claim that major changes have taken place with respect to: acquisition of new skills, people, training, equipment, and product/service range. At the same time, only minor changes have affected capital investment, technology, and culture.

Even though these responses are consistent with what has been already stated in the literature on servitization, they allow us to understand that the decision to provide services can be considered as a duty by companies. In fact, despite the required changes, and the associated costs, companies continue to offer services and to extend their range over the years.

Finding 11. Most manufacturers claim to have experienced major changes, particularly in terms of skills, people, training activities, equipment, and product/service range.

Finding 12. Only a third of manufacturers has had the need to profoundly change their organizational culture during the adoption of the service strategy.

Finding 13. Most manufacturers (71%) claim to have made little changes in terms of capital investments in order to deliver services. Probably, this is related to the fact that the majority of them provide only protective services.

3.8. Service strategy success

The last part of the survey was devoted to the personal opinion of the respondents respect to their service strategy. In particular, they were asked to identify the strengths and weaknesses of their service strategy, as well as future prospects.

All the respondents consider their service strategy sufficiently successful and most of them (70%) identify “quality” as the main strength of their services offering.

It is worth noting that none of the companies surveyed have been able to identify weaknesses in their strategy. In fact, all the problems reported refer to external influences, such as: unfair competition and negative economic situation.

Finding 14. Most manufacturers see their service strategy as successful and a key factor for their future business growth.

Finding 15. Most manufacturers (24 out of 34) identified “quality” as the strengths of their service strategy.

4. Discussion

The overall results of the survey allow stating the following. The Italian manufacturers adopt a service strategy that follows a top-down approach. This service strategy can be considered “mature”, but only because the services offered are primarily “protective services”. Due to the typology of services offered, their price is almost always “included in the product price”. Moreover, manufacturers do not undertake the customers’ risks and usually they do not involve customers in a co-creation process for the service offering design. Despite this, the implementation of the service strategy – even though it is not oriented to a sophisticated service offering (i.e., proactive services) – has required major changes to companies.

In terms of theoretical implications, on the one hand, the survey results confirm that firms moving into service field face difficulties and that the transformation process is not a simple process because it implies changes in company mindsets, capabilities, and structure (Auguste et al., 2006; Gebauer, 2008; Gebauer et al., 2009; 2007; He; Lai, 2012; Neu; Brown, 2008; Oliva; Kallenberg, 2003; Raja et al., 2010; Wise; Baumgartner, 1999).

On the other hand, the survey results are in conflict with what has been stated in the servitization literature on two fundamental points. The first one refers to the transfer of risks from customer to manufacturers. Contrary to the claims by Gubric (2014) and Slack (2005), Italian manufacturers do not undertake risks previously held by customers. The second one refers to the customer role in the servitization strategy. As stated by Vargo and Lush (2008), customer is a co-creator of the service offering, actively involved in the production process. Also this point seems to be not confirmed by the survey results. However, it is possible to consider that, probably, both contradictions are related to the fact that services offered by manufacturers are primarily simple services, i.e., “protective services”.

In terms of practical implications, being the questionnaire used here a replication of the one used by Baines et al. (2010), it has been possible to make a comparison be-

tween Italian and UK manufacturers. In this regard, Table 1 reports the findings from the two papers, showing in the last column if there is a fit between them.

Table 1. Comparison between Italian and UK manufacturers adopting a servitization strategy.

Italy	UK	Results comparison
Almost all manufacturers provide simple services (i.e., protective services), which typically include customer helpdesk, product training, and product installation. Only few manufacturers are able to provide also sophisticated services (i.e., proactive services), except for the consulting service that is offered by nearly half of the companies.	Protective services are offered by almost all manufacturers (95 per cent) and typically include training, helpdesk, and spares. Proactive services are offered by the minority of manufacturers (25 per cent) and typically include systems integration, condition monitoring, and preventive maintenance.	Coincident
Almost all manufacturers (76,5%) consider themselves to have a mature service strategy. This maturity can be considered verified only for the protective services.	Most manufacturers (58 per cent) consider themselves to have well-developed service strategies, although sophisticated service strategies (being less popular) are unlikely to be as mature.	Coincident
For the services offered by manufacturers, the most used pricing agreement is "included in product price".	Most service strategies are based around the outright sale of the product and complimentary service and support contracts.	Partly overlapping
In almost all cases, the delivery of services does not include for the manufacturer to undertake risks previously held by their customers.	In half of all cases, service strategies include the manufacturer undertaking risks previously assumed by their customers. Where manufacturers have increased their exposure to risks, in most cases these are mitigated through contractual (e.g. formal performance agreements) and technological methods (e.g. remote performance monitoring of assets).	Partly overlapping
The most popular measures of service business success are "customer satisfaction" and "new customer acquisition".	The most popular measures of service business success are "customer satisfaction", "profit from services", then "sales" and "customer retention".	Partly overlapping
The value of services is most often measured through "improvements in product performance" and it is made visible to customers mainly via on-site visits.	The value of services is most often demonstrated to customers either by "improvements in product performance" or "monetary savings".	Partly overlapping
For most of the respondents (20 out of 34) the main reasons that prompted them to offer services are the need to satisfy their customers and the possibility to differentiate themselves from competitors.	Manufacturers are mainly attracted to offer services as a means to strengthen customer focus and create revenue growth.	Partly overlapping
Manufacturers believe that the possibility to reduce costs and investments are the main reasons why customers are attracted by services.	Manufacturers believe that their customers are mainly attracted to services as a means to reduce costs, investments, and risks.	Coincident
All manufacturers have taken a top-down approach to the identification of a service strategy.	Most manufacturers have taken a "top-down" approach to identification of a service strategy.	Coincident
The majority of the respondents claim to have any structured approach to the design of their service offering and only few of them (10 out of 34) always involved customers in the development of service offerings.	Less than half of the respondents claim to have any structured approach to the design of their service offering. Most manufacturers have involved customers in the development of service offerings.	Partly overlapping
Most manufacturers claim to have experienced major changes, particularly in terms of skills, people, training activities, equipment, and product/service range.	Many manufacturers have developed additional competences to provide services, particularly technical, communication, and management skills. Most manufacturers claim to have avoided significant restructuring to deliver services, although this is probably only the case for protective services.	Partly overlapping
Only a third of manufacturers has had the need to profoundly change their organizational culture during the adoption of the service strategy.	Most manufacturers (80 per cent) claim to have experienced little internal resistance during the adoption of a service strategy, although this is probably only the case for protective services.	Coincident
Most manufacturers (71%) claim to have made little changes in terms of capital investments in order to deliver services. Probably, this is related to the fact that the majority of them provide only protective services.	Most manufacturers (80 per cent) claim to have made little significant additional capital investments to deliver services, although this is probably only the case for protective services.	Coincident
Most manufacturers see their service strategy as successful and a key factor for their future business growth.	Most manufacturers see their service strategy as successful, being resilient to economic downturns and competitive pressures, and key to future business growth. Almost all companies surveyed (90 per cent) see services to be core to their growth strat-	Coincident

Most manufacturers (24 out of 34) identified "quality" as the strengths of their service strategy.	egy. Many manufacturers (95 per cent) reported "profit before interest and tax" on service sales are frequently higher, or at the very least equivalent, to that on product sales.	Not coincident
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The comparison between results indicates that there are no deep differences between Italian and UK manufacturers in the adoption of a servitization strategy. In fact, as show in Table 1, the results coincide perfectly most of the time. Even when they are only partially overlapping, the differences are not significant. The "no coincidence" exists only in one finding, but this is due to the fact that it is the result of the analysis of the personal opinions given by respondents.

Obviously, the two researches have been conducted in different years (i.e., in 2010 for the UK manufacturers and in 2016 for the Italian manufacturers). Therefore, what it is possible to state is that the Italian manufacturing firms are acting like those UK-based seven year ago. This implies that, in recent years, the situation of UK manufacturing firms may have changed and, therefore, the verified coincidences may no longer be valid.

5. Conclusions

Due to the lack of studies addressing the adoption of the servitization strategy in the Italian manufacturing firms, first of all, this work stands as a first attempt to bridge the *gap* in the current literature.

Even though this paper reports the situation of the manufacturing firms located exclusively in the Italian Lazio region, it is reasonable to believe that they can be considered a representative sample of the Italian reality. Thus, the findings could be considered sufficient and significant at this stage, and able to indicate the direction of industrial trends in Italy.

In fact, although findings are preliminary, the analysis of the survey results allows us to draw an *overview* of the Italian manufacturing firms, allowing us to state that the adoption of a servitization strategy by Italian manufacturing firms can be considered still in its nascent stage.

Moreover, the replication of the study by Baines et al. (2010) allows making a comparison between Italian and UK manufacturing firms with respect to their propensity to adopt a servitization strategy. In general, it is possible to state that there are no significant differences between the two countries.

Obviously, this study has several limitations. First of all, the starting sample can be enriched by extending the number of Italian regions involved in the survey. Moreover, the response rate – even though it corresponds on average to the response rate for this kind of investigations (Saunders et al., 2016) – can be improved (for example, through an extension of the time period devoted to the data collection). Moreover, although questionnaire may be used as the only data collection method, future researches may link it with other methods (i.e., mixed or multiple method research design) in order to obtain more detailed data collection and analysis.

In conclusion, this paper provides first insights related to the relationship between Italian manufacturing firms and servitization strategy and it is a useful starting point for further studies in this area.

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Appendix: The questionnaire

A. Data of the respondent

Name and Surname:
 Company:
 Position:
 Address:
 Phone:
 Email:

B. General information about the company

Industry sector:
 Brief description of the main activities/functions undertaken by the firm:
 Revenue 2015:
 Number of employees (only in Italy) 2015:
 Main customer type:
 o End-consumers/private
 o Other manufacturing firm
 o Public firms

C. Services offered

C1. What services do you offer?

In the table below are reported: in the left hand column, there are a variety of services that manufacturers typically offer; in the top row, there are a variety of pricing arrangements that manufacturers typically use (a brief descriptions of each pricing arrangements is provided below). For each type of service offered by your company, please tick the box(es) that indicate the usual pricing agreements with your customers.

		Pricing arrangements					
Services offered		1. Included in product price	2. Fixed-price contract	3. Pay per use	4. Pay per results	5. Profit/Revenue sharing	Other (please, specify):
		Protective services	Installation of product				
Product training							
Customer helpdesk							
Breakdown repair							
Spare parts service							
Spare parts remanufacture							
Proactive services	Preventive maintenance						
	Equipment monitoring						
	Remote diagnostics						
	Product disposal						
	Provision of labour						
	Financing						
	Advice/Consulting						
Other (please, specify):							

1. Included in product price: by purchasing the product, the customer also acquires the right to use the service during the product lifecycle or an agreed warranty period.
2. Fixed-price contract: the customer is charged a fixed periodic fee for the service regardless of consumption.
3. Pay per use: the customer is charged for each service transaction separately.
4. Pay per results (performance-based contract): the customer is charged a fixed periodic fee for comprehensive services based on assurance of set level of product performance.
5. Profit/revenue sharing: the customer is not charged for the services but is committed to share with the supplier additional profits/revenues obtained through the service.

C2. What is the time period over which the listed services have been offered by your company?

		Service offer duration				
		0-3 years	3-5 years	5-10 years	Over 10 years	
Services offered	Protective services	Installation of product				
		Product training				
		Customer helpdesk				
		Breakdown repair				
		Spare parts service				
	Proactive services	Spare parts remanufacture				
		Preventive maintenance				
		Equipment monitoring				
		Remote diagnostics				
		Product disposal				
		Provision of labour				
		Financing				
		Advice/Consulting				
		Other (please, specify):				

C3. Are your services offered within integrated solutions (i.e., combinations of products and services tailored to specific customer's needs)?

Always Quite often Sometimes Never

C4. To what extent are your service offerings tailored to each customer's specific needs?

High Medium Low

C5. Does your company use Service Level Agreements to measure service delivery targets? (Please, note that SLAs are contracts that specify the levels of availability, serviceability, performance, operation, or other attributes of the service which may be legally binding or informal).

Always Quite often Sometimes Never

C6. Do these SLA's translate into contractual penalties or revenue losses?

Always Quite often Sometimes Never No liabilities

D. Service strategy

D1. What is the status of implementation of the service strategy at your company?

- Mature and under continuous improvement
- Under development
- Initial adoption
- In planning

D2. Is your service strategy the same for all customers?

Yes No

D3. How do you measure the success of your service business? (Tick all that apply)

- Service sales
- Product sales
- La quota complessiva dei ricavi
- Return on investment
- Customer satisfaction
- Customer retention rate
- New customer acquisitions
- Other (please, specify): _____

D4. In delivering your services, do you undertake risks previously taken by your customers?

- Yes. Please, specify: _____
- No

D5. What do you do to mitigate the risks associated to your service business?

Liability limitations Collection of field data Technology investments No specific actions

D6. How do you normally approach the design of your services?

- Product-service design processes Service design processes Product design processes
 No structured approach Don't know

D7. Are customers involved in the design of your services?

- Always Quite often Sometimes Never

D8. What typically attracts your customers to the services you offer?

Please, for each of the value attributes listed below, tick the box that indicates your opinion of its importance to your customers (6 = very important; 1 = very low importance; nr = not relevant)

	6	5	4	3	2	1	nr
Reducing their operating costs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reducing their risks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reducing their investments in people/equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Allowing them to focus on core competences	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improving performance of their products/services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Supporting their activities related to the product	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Disposal/End of life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (please, specify):	<input type="checkbox"/>						

D9. How do you make the value of your services visible to your customers?

- Periodic reports
- On-site visits
- Customer satisfaction surveys
- Customer workshops
- No specific initiatives
- Other (please, specify): _____

D10. What indicators do you use to demonstrate the value of your services to your customers?

- Improvements in product performance
- Improvements in product-related activities
- Monetary savings
- No specific indicators
- Other (please, specify): _____

E. Motivations for services

E1. When did your company start to explicitly adopt a service strategy?

- 0-3 years ago
- 3-5 years ago
- 5-10 years ago
- more than 10 years ago

E2. Where did the idea to adopt a service strategy originate in your company?

- Top-down (e.g., corporate initiative)
- Bottom-up (e.g., business unit)
- Other (please, specify): _____

E3. What are the principal factors that originally drove your company to adopt a service strategy?

Please, for each of the factors listed below, tick the box that indicates your opinion of its importance in driving your company's service strategy (6 = very high importance; 1 = very low importance; nr = not relevant).

Financial needs and	<input type="checkbox"/>
---------------------	--------------------------

opportunities	6	5	4	3	2	1	nr
Desire to increase revenues							
Reduced profits on product sales							
Economic cycles affecting product sales							
Other (please, specify):							
Strategic needs and opportunities							
Improving ability to respond to customer needs							
Increasing customization of your offering							
Differentiating your offering from competitors							
Setting barriers to competitors							
Reducing price-based competition on product sales							
Other (please, specify):							
Marketing needs and opportunities							
Customer pressures							
Increasing customer loyalty							
Other (please, specify):							
External influences							
Availability of supportive technology							
Standards and regulations							
Government incentives							
Other (please, specify):							

E4. Are the motivations that currently drive your service strategy different from the above?

- Most of them (please, specify): _____
- Some of them (please, specify): _____
- Not really

F. Organisational changes for delivering services

F1. What changes/investments have been made in your organisation to deliver services to your customers? (please, tick the relevant boxes below and comment as appropriate)

	Major change	Minor change	No change	Comment
Acquisition of new skills				
Resources (people)				
Training				
Certifications				
Patents				
Facilities				
Equipment				
Capital investment				
Branding				
Joint Ventures				
Technology				
Product/Service range				
Organisation culture				
Other (please, specify):				

--	--	--	--	--	--

F2. How distinct is the service organisation in your company from the product manufacturing organisation? (6 = completely isolated; 1= completely integrated)

- 1 2 3 4 5 6

F3. Does your service organisation engage other companies to deliver its services (e.g., outsourcing functions, partnership, joint venture)?

- Significantly To some extent Not at all Other (please, specify): _____
o

F4. What is the percentage of the staff in your business unit directly employed in services?

- 0-10% 10-30% 30-50% 50-80% Over 80%

F5. Does your service staff receive different training from your product manufacturing staff?

- Yes (please, specify differences): _____
- No
- Other (please, specify): _____

F6. Do you use different reward metrics for your service selling staff and your product selling staff?

- Yes (please, specify differences): _____
- No
- Other (please, specify): _____

F7. Do you use different reward metrics for your service delivery staff and your product delivery staff?

- Yes (please, specify differences): _____
- No
- Other (please, specify): _____

G. Prospects for your services

G1. In your opinion, is the service strategy of your company successful?

- Very much Satisfactorily Not so much Not really

G2. Using your best estimate, please rate the level of your service performance compared to other service providers in your industry. (6= best in the industry; 3 = industry average; 1= worst in the industry; nr/dn = not relevant or don't know).

	6	5	4	3	2	1	Nr/nd
Customer satisfaction							
Profitability							
Revenue growth							
Market share growth							
New service features							
Product improvements							

G3. In your opinion, what are the main strengths of your service business?

G4. In your opinion, what are the main challenges and threats for your service business?

G5. Overall, how do you see the future of your service business?

SHARING THE PIE – AN EMPIRICAL EXAMINATION OF REFERRAL REWARD SHARING ON PEER-TO-PEER PLATFORMS.

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Prior research on the rapidly growing sharing economy tends to focus on digital or underutilized goods, which do not entail any sacrifice for the giver when shared. In contrast, this study investigates money sharing in a referral reward context, which represents a zero sum game. With data from two peer-to-peer platforms with different market structures, this investigation of influential factors reveals that more recommenders create positive cross-side but negative same-side network effects. Contrary to behavioral economics, more than half the recommenders share more than 70% of the reward with referral recipients. Reputation is an important competitive advantage for recommenders; sharing referral rewards on peer-to-peer platforms benefits firms, recommenders, and recipients.

Key words: *Sharing, referral reward, network effects, reputation, money*

1. Introduction

With its foundation in peer-to-peer (P2P) platforms that enable people to disintermediate traditional commercial channels and share resources directly with others, the sharing economy is a rapidly growing economic and technological phenomenon. Worth an estimated \$15 billion in global revenues, it could represent \$335 billion in revenue worldwide by 2025 (PWC 2014). Increasing numbers of companies such as Nike and American Express embrace P2P platforms for new customer acquisition. Although marketing researchers identify the importance of sharing economy platforms (e.g., Belk 2010, 2014; Lamberton; Rose, 2012), we do not know much about the effectiveness of P2P money sharing platforms for customer acquisition, such as those that give firms the opportunity to offer referral rewards.

Instead, most prior research focuses on either digital or underutilized resources being shared on P2P platforms. The digital goods include shared information (Nov, 2007; Roy; Menasco, 2015), pictures (Nov; Naaman; Ye, 2010), software (Ghosh et al., 2002), and music and films (Giesler, 2006; Levin; Dato-on; Rhee, 2004; Zentner, 2006). Underutilized physical goods and services also can be shared, such as cars or accommodation (Galbreth; Ghosh; Shor, 2012; Shaheen; Mallery; Kingley, 2012).

In both these scenarios, people share without making any personal or material sacrifice. That is, digital goods are immaterial, and sharing them does not reduce any resources but instead often adds value to the shared goods (John, 2012). By definition, underutilized goods or services are resources that are not being entirely exploited by their owners and thus represent unused value. Sharing them unlocks their hidden value (Botsman; Rogers; 2011; Fremstad, 2014). Several P2P sharing platforms, such as Airbnb and ZipCar, have established viable, profitable business models by empowering consumers to capitalize on their property to create personal value, earn economic resources, or become a microentrepreneur. In 2013, microentrepreneurs earned an estimated \$3.5 billion worldwide through the sharing economy (*Forbes*, 2013). The average monthly earning for a participant of RelayRides, a U.S. car rental service, is \$250 per month (RelayRides, 2015), and users providing full-time services on TaskRabbit can earn up to \$10,000 per month (Dervojeda et al., 2013). Thus, sharing digital and underutilized goods or services is not a zero sum game; one person's gain is not equivalent to another's loss, and the net change in benefits is null (John, 2012). In contrast, sharing these goods can provide economic benefits to both recipients and sharers.

But various platforms, such as dealdoktor, praemien-teilen24, and freebiestuff, also allow people to share money on P2P platforms, which is deeply interesting and substantively different from sharing digital or underutilized goods. Sharing money is an act of distribution and, pertinently, a zero-sum game that reallocates financial resources (i.e., referral rewards) among players. It requires some kind of sacrifice, because it leaves one player (i.e., the sharer) with less money. This situation thus prompts an important question: What factors influence people's money-sharing decisions on P2P platforms, and what are the results?

Using two-sided network theory and acknowledging the importance of reputation in online transactions (Moreno and Terwiesch 2014), we analyze data from two P2P money-sharing platforms with different market structures. The results reveal that a larger network leads recommenders to offer a greater share of the referral reward to the referral recipient, but it reduces the average number of acquired customers per firm. Moreover, reputation constitutes an important competitive advantage on P2P money-sharing platforms: Recommenders with high reputations acquire significantly more customers even though they offer a smaller share of the reward. Accordingly, some recommenders outperform others and earn more money through money sharing. These results expand marketing literature and practice, by clarifying how people share money on P2P platforms. However, our findings also indicate the need for more research in this domain.

2. Research background

2.1. Referring firms and P2P money-sharing platforms

Firms constantly seek to develop new marketing programs that encourage consumers' word of mouth (WOM) (De Bruyn and Lilien 2008; Gremler, Gwinner, and Brown 2001), including customer referral reward programs. These programs represent "a form of stimulated WOM that provides incentives to existing customers to bring in new customers" (Schmitt; Skiera; Van den Bulte, 2011, p. 47). If a referral successfully leads the recipient to purchase the product, the recommender receives a reward from the firm. Because they are regarded as attractive, effective customer acquisition

tools, these programs appear in various industries, ranging from financial services (e.g., Barclaycard offers 125 Euros for each successful reward) to newspapers (e.g., Der Spiegel offers 90 Euros) to telecommunications (e.g., Deutsche Telekom offers 25 Euros) (Jin; Huang, 2014; Xiao; Tang; Wirtz, 2011). Many recommendations take place within the recommender's social environment, such as to friends, neighbors, family members, or colleagues, but through the relatively new development of P2P platforms (e.g., dealdoktor, freebiestuff, praemien-teilen24, bonusdealer), people can recommend firms to strangers and share any earned referral rewards with them.

With largely similar structures and navigation techniques, the available P2P money-sharing platforms provide existing customers (recommenders) with opportunities to acquire rewards by offering recommendations to new customers (recipients), with whom they will share the rewards. Before participating in any sharing, recommenders must register on the platforms by providing a user name, contact information, and a valid email address. As part of the registration process, recommenders also choose an online pseudonym, which is shown to referral recipients using the platforms. Recommenders also indicate the industry sector and name of the referred firm, the total amount of the referral reward, and the share they will offer recipients. Some recommending customers also signal their reputation or trustworthiness by linking their profile to a profile on external websites, such as eBay or Amazon, that feature favorable reviews. Each profile page also provides some facts about the referral firm (including a link to its website) and information about the referral reward program (e.g., total amount of the reward).

2.2. Insights from behavioural economics

Although sharing money on P2P platforms is a relatively new phenomenon, the process of sharing money has been studied extensively in behavioral economics, particularly in relation to ultimatum games. In simple ultimatum games (Güth; Schmittberger; Schwarze, 1982), a first player (proposer) has some amount of money and must propose a division with an anonymous second player (responder). If the responder accepts the proposed split, the players split the money in the way the proposer suggested. If the responder rejects, neither player gets any money. According to a strictly utilitarian view, the proposer offers the lowest possible amount, and the responder accepts. However, experiments conducted with different incentives show that, almost universally, proposers offer 30% to 50% of the total amount; offers below 10% and above 60% of the total amount are rare. Furthermore, respondents usually decline offers below 30% (e.g., Bolton; Zwick, 1995; Camerer, 2003; Güth; Tietze, 1990; Thaler, 1988).

In ultimatum games with more than one responder, or responder competition games, the results differ significantly. With two responders, their share decreases by an average of 16.5% relative to the bilateral case. That is, the addition of just one more responder has a dramatic impact on the responders' shares. With three additional responders, the share decreases even further to less than 20% (Fehr; Fischbacher, 2002). The reason is likely the decline in rejection probability with more competing responders (Fischbacher; Fong; Fehr, 2005). In particular, if one responder accepts a given low offer, it is impossible for a reciprocal responder to punish the proposer. Therefore, reciprocal responders reject offers less frequently when there is more competition, in the form of more responders.

We also expect a notable change in recipients' behaviors when they interact on P2P platforms. Using the theory of two-sided markets (Rysman 2009) and consider-

ing the importance of reputation in online transactions, we develop four hypotheses reflecting this expectation.

3. Theoretical background and hypotheses development

In two-sided markets, an intermediary provides a platform that enables two user groups (i.e., recommenders and recipients) to interact (Rochet; Tirole, 2003). Previous research on two-sided markets (e.g., Armstrong, 2006; Voigt; Hinz, 2015) indicates that these two groups exhibit two different network effects, namely, cross-side and same-side network effects. Cross-side networks exist if increased usage by one side (e.g., recommenders) influences the utility for users on the other side (e.g., recipients). Same-side network effects arise if a user's utility depends on the installed user base of his or her own user group (Eisenmann; Parker; Van Alstyne, 2006; Lin; Wu; Zhou, 2015). On P2P money-sharing platforms, both types of network effects can emerge, with increasing numbers of recommenders or recipients. However, we concentrate on cross-side and same-side network effects arising from an increase in the number of recommenders.

3.1. Cross-side network effects

On P2P money-sharing platforms, the economic benefit to recipients (i.e., the part of the referral reward they receive from the recommender) depends on the degree of competition among recommenders who are offering referrals to the same firm. Competition leads to increased rivalry in general, such that it forces suppliers to increase customers' utility by lowering prices or increasing product variation (McNulty, 1968). If a single supplier in a competitive market decides to increase its selling price, consumers just turn to the nearest competitor for a better price, so any firm that increases its prices loses market share and profits.

This straightforward market mechanism is particularly applicable to two-sided market platforms that allow buyers to switch easily from one seller to another if doing so increases their utility (Li; Liu; Bandyopadhyay, 2010; Rysman, 2009). Peters and Severinov (1997) show that sellers on auction sites compete for announced reserve prices (i.e., minimum bid for the auction), particularly with more sellers. If a seller increases the announced reserve price, the number of buyers participating in the auction decreases. For example, Anwar, McMillan, and Zheng (2006) find that eBay buyers tend to bid on auctions with the lowest standing bid and switch to lower priced auctions to increase their economic benefits by paying less. Because consumers in competitive two-sided markets can choose among different suppliers, suppliers strive to make better offers than their rivals. Consumers also accrue benefits from each additional seller on the platform (Li; Liu; Bandyopadhyay, 2010). On P2P money-sharing platforms, recommenders compete for transactions with recipients. With more recommenders, competition also increases, such that recommenders must strengthen their competitive status by increasing the utility for recipients, which they do by increasing their share of the referral reward. We thus predict that more competition among recommenders allows recipients to enjoy positive cross-side network effects, namely, greater shares of the referral reward.

H1: The number of recommenders referring a firm relates positively to the amount of money shared with the referral recipient.

3.2. Same-side network effects

Network effects also can emerge within one user group, in the form of same-side network effects. That is, an increasing number of recommenders may affect their own user bases. Such same-side network effects tend to be negative though, because increasing the number of suppliers increases competition, which then reduces individual market shares and profits (Eisenmann; Parker; Van Alstyne, 2006; Yoo; Choudhary; Mukhopadhyay, 2007). Prior research has argued that increasing supplier competition on platforms exacerbates the competition for buyers and even may deter future sellers from joining the platform (Kraemer; Hinz; Skiera, 2012; Li; Liu; Bandyopadhyay, 2010). Wang and Seidmann (1995) show that participation by more suppliers generates negative externalities for other suppliers in an electronic data interchange network, and Riggins, Kriebel, and Mukhopadhyay's (1994) two-stage economic model reveals that in networks, the benefits to participating suppliers decrease as more suppliers join. We thus propose that a multitude of recommenders competing for a given number of potential recipients reduces each recommender's chances of transacting. That is, every new recommender, per firm, increases competition for potential referral recipients.

H2: The number of recommenders per firm relates negatively to the average acquired customers per recommender (referring the same firm).

3.3. Reputation as competitive advantage

In online markets, users engage in transactions with unknown counterparts, so they typically face transaction risks rooted in information asymmetries and uncertainty about the fulfillment of the transaction (Bajari; Hortaçsu, 2004). Trust can mitigate information asymmetries and reduce transaction-specific risks, making it a critical, enabling factor in online transactions in general and P2P sharing in particular (e.g., Dambrine; Jeroma; Ambrose, 2015; Pavlo; Geven, 2004). Analyzing various trust-building mechanisms in online environments, prior research cites reputation as an effective means to signal trust among strangers and enforce cooperation on online platforms (e.g., Jarvenpaa; Tractinsky; Vitale, 2000; Resnick; Zeckhauser, 2002). Gefen (2002) and Dellarocas (2003) argue that reputation strengthens beliefs that sellers will behave in accordance with the expectations of buyers. Resnick and Zeckhauser (2002) also show empirically that a good reputation on eBay encourages transactions and predicts future selling performance. Because reputation is essential for online transactions, in which the parties have little or no prior experience with one another, we expect that on P2P money-sharing platforms, recommenders' positive reputation reduces the perceived risk for potential referral recipients, due to greater assurance that the recommender will complete the transaction as contracted and transfer money to the referral recipient. A reputable recommender thus enjoys a strategic advantage over other recommenders with less positive reputations.

H3: Recommenders with good reputations acquire significantly more new customers than recommenders with poor reputations.

Reputation also should affect the monetary outcomes of sellers, because a seller's favorable reputation increases buyers' willingness to pay (Ba; Pavlou, 2002; Livingston, 2005). Houser and Wooders (2006) show that sellers with better reputations

obtain higher prices on eBay, and Resnick et al. (2006) specify that eBay buyers are willing to pay 8.1% more for goods sold by sellers with high reputations. In riskier online transactions, reputable suppliers likely can generate even higher price premiums (i.e., the monetary amount above the average price received by multiple sellers for a certain matching product), whereas a negative reputation should reduce the purchase price (Ba; Pavlou, 2002). Reputation-based price premiums reflect the buyer's willingness to compensate the seller for lower transaction risks (Rao; Monroe, 1996). Therefore, we predict that referral recipients' trust, induced by the recommender's reputation, reduces perceived transaction-specific risks and allows the recommender to achieve a price premium. Specifically, referral recipients should be willing to compensate for the reduced transaction risk by accepting a smaller share of the referral reward.

H4: Recommenders with good reputations share a smaller part of the referral reward with referral recipients than recommenders with poor reputations.

4. Data collection and variables

To test our hypotheses, we collected primary data from two German P2P platforms, *praemien-teilen24* and *dealdoktor*, that differ in their market structure. *Dealdoktor* is a polypoly, with many-to-many recommender–recipient relations. In contrast, *praemien-teilen24* is a local monopoly, with only one recommending customer per firm and many recipients. In total, we collected data from 701 recommending customers from both platforms (*praemien-teilen24* $n = 137$; *dealdoktor* $n = 564$).

The main independent variables are market type, number of competing recommenders, and reputation. Market type is a binary variable, referring to the two different platforms, such that the monopoly platform *praemien-teilen24* took a value of 0 and the polypoly platform *dealdoktor* was assigned a value of 1. The number of competing recommenders reflects all recommenders referring the same firm in the same program. In the monopoly market, the number of competing recommenders is always 1. Finally, for reputation, we use another binary variable (0 = no reputation; 1 = reputation), reflecting whether recommenders link their profiles on *praemien-teilen24* or *dealdoktor* to external websites (e.g., eBay, Amazon) that summarize their good reviews. On P2P money-sharing platforms, where buyers routinely engage with sellers with whom they have little or no prior interaction, links to websites that provide reviews of the seller represent a means to signal reputation (Jarvenpaa; Tractinsky; Vitale, 2000). These forms of “indirect reputation” (Miu; Halberstadt; Mohtashemi, 2002, p. 283) or “witnessed reputation” (Sabater; Sierra, 2002, p. 478) allow experiences garnered from others in the online environment to serve as a proxy for sellers' reputation. Accordingly, recommenders that link to their own good reviews on eBay or Amazon should be more trustworthy than recommenders without such links.

As the dependent variables, we measure the percentage of the referral reward shared with the referral recipient, number of acquired new customers, and average number of acquired customers per recommender per firm. The percentage shared with the referral recipient is the share of the total referral reward that the recommender offers. The number of acquired new customers equals the total number of new customers that a single recommender acquires for a given firm. We calculate the average number of acquired customers per recommender per firm by dividing the

number of acquired new customers per firm by the total number of recommenders that refer to the same firm. For example, if 10 recommenders acquire 10 new customers for the firm, on average, every recommender acquired 1 customer.

We also include recommenders' gender (0 = female; 1 = male), reward size (total amount of referral reward the firm offers), industry type (five dummy variables), and brand strength (0 = strong brand; 1 = weak brand) as covariates. In accordance with the platforms' structures, we differentiate six industry types: Internet and communication, banking, insurance, news and media, energy, and others. We transform the six industry types into five dichotomous dummy variables, with the others category as the baseline. For brand strength, we differentiate strong and weak brands (e.g., Heath et al., 2000; Keller, 1993). Following prior research (e.g., Ryu; Feick, 2007), we classify leading brands in each industry sector, which are recognized for their high quality, as strong brands (e.g., for the Internet and telecommunication sector, German Telekom and Vodafone are strong brands). Relatively less-known brands with moderate quality instead represent the weaker brands (e.g., UnityMedia or Fonic).

5. Results

We first analyzed a pooled sample using the data from both platforms. The average reward size was 36.93 Euros (approximately \$41). In total, 14 recommenders were not willing to share their referral reward. More than half of the recommenders shared more than 70% of their referral reward with the referral recipients. The most common sharing behavior ($n = 136$) involved between 80% and 90% of the total reward. Eighty-seven people offered shares greater than 90% of the total sum, and seven participants were even willing to give the total reward to the referral recipients. These initial results indicate that people on P2P platforms are more willing to share their money than participants in ultimatum games. People on P2P platforms share 20% more on average than people in simple ultimatum games and nearly 40% more than in ultimatum games that feature competition. Perhaps the lower transaction costs for both parties in splitting the reward on P2P platforms, relative to ultimatum games, suppress greedy behavior by recommenders.

We next examined the influence of the market structure on sharing behavior by conducting an independent t-test to determine the mean difference between monopoly and polypoly platforms. In support of H1, recommenders on competitive platforms ($M = 73.56$, $SD = 17.99$) share more than recommenders in monopolies ($M = 52.10$, $SD = 18.56$; $t(699) = -12.44$, $p < .001$). We also performed additional analyses, using only the data from the polypoly P2P platform. A linear regression with the number of recommenders referring the same firm as the independent variable, the percentage of the referral reward granted to the referral recipient as the dependent variable, and the gender, reward size, industry type, and brand strength covariates revealed that competition on the recommender side ($b = .362$, $t = 5.78$, $p < .001$) influences sharing behavior and explains 20.1% of the variation in sharing behavior. In support of H2 and a negative same-side network effect, the number of recommenders referring the same firm ($b = -.110$, $t = -2.05$, $p < .05$) negatively influences the average number of acquired customers per firm (with gender, reward size, industry type and brand strength as covariates again).

With a pooled data sample from both platforms, we also examined the influence of reputation on the number of acquired new customers and recommenders' sharing behavior. In support of H3, recommenders with good reputations ($M = 10.88$, $SD = 12.72$) acquired more new customers than those with no reputation ($M = .83$, $SD = 4.05$; $t(699) = -10.68$, $p < .001$). Finally, an independent t-test revealed differences in the sharing behavior of recommenders with and without reputations. In support of H4, recommenders with no reputation ($M = 69.82$, $SD = 19.86$) share more than participants with a good reputation ($M = 56.97$, $SD = 20.11$; $t(699) = 3.18$, $p < .01$).

In total across the two analyzed platforms, 259 recommenders acquired 612 new customers for 149 firms and earned 11,992 Euros by sharing their referral rewards. However, the gains on the recommender side are not equally distributed. Five recommenders (1.9% of all recommenders) acquired 75.9% of all new customers and gained 75.8% of all earnings. Nor is the relationship between sharing behavior and acquired new customers linear. The five most successful recommenders shared, on average, 58.3% of their referral reward with recipients, which is less than the average shared amount on both platforms. The linear regression between sharing and acquired new customers thus was not significant. Further investigation of this relationship between sharing behavior and number of acquired new customers is warranted.

6. Discussion

In accordance with the theory of two-sided markets and the importance of reputation in online transactions, this study investigates money sharing on P2P platforms in terms of referral rewards. The results provide initial evidence of the hypothesized cross- and same-side network effects. Furthermore, our study shows that a good reputation is an important competitive advantage for recommenders competing for referral recipients. Some recommenders outperform others, earning more money through money sharing than their direct competitors. Relative to findings from behavioral economics, we determine that more than half of the recommenders shared more than 70% of their referral reward with referral recipients, thereby refuting the established wisdom that proposers typically do not offer more than 60% of the total (Camerer; Thaler, 1995). Our results further reveal that a sizable number of recommenders are content with 20% or less of the split—less than the amount reported in past research (e.g., Fehr; Fischbacher, 2002).

6.1. Theoretical implications

Our results contribute to theoretical discussions in two literature streams. First, this research expands theoretical insights into the sharing economy (e.g., Belk, 2010, 2014) by depicting a new form of cooperation and sharing. We explore cross- and same-side network effects and the role of reputation in the context of P2P money-sharing platforms. To the best of our knowledge, this study represents the first attempt to theorize and empirically test money sharing on P2P platforms. In contrast with the setting in most sharing literature, such that people only share immaterial goods and those that are not being exploited fully (Giesler, 2006; Lamberton; Rose, 2012), money sharing is a zero sum game in which one person's gain is equivalent to another's loss. Thus, this study enhances understanding of the sharing economy and opens up new avenues for relevant research.

Second, this research contributes to research in behavioral economics that analyzes money sharing in game theoretical settings (Fehr; Fischbacher, 2002). Particularly, we extend existing theoretical results by demonstrating that sharing money on P2P platforms (i.e., two-sided markets) with cross- and same-side network effects substantially differs from offline forms of sharing. More than half of the recommenders shared more than 70% of their referral reward with recipients. The most common sharing behavior ($n = 136$) involved 80%–90% of the total reward; in ultimatum games, offers rarely exceed 60% of the total amount (Camerer; Thaler, 1995). These inconsistent results should stimulate further debate about equitable distributions of material payoffs and aversion to advantageous or disadvantageous payoff differences (Fehr; Fischbacher, 2002; Segal; Sobel, 2007). Our results also confirm the notion that economic incentives can facilitate WOM behavior (Hennig-Thurau et al., 2004) and indicate that, in an online environment, increasing the number of recommenders improves the bargaining power of referral recipients, expressed in splits that are more favorable to them ($>60\%$) and more accepted splits ($<20\%$) that ostensibly appear unfavorable or unfair to the recommender.

6.2. Managerial implications

Our results have important practical implications, particularly for P2P money-sharing platforms that seek to design competitive, successful business models. First, recommenders are willing to share a large percentage of their referral reward, so new customer acquisition can be facilitated if firms encourage recommenders to accept seemingly unfavorable splits.

Second, our results offer suggestions for pricing strategies on P2P money-sharing platforms. Neither of the platforms we analyzed charges any fee to recommenders or recipients, but our results show that referral recipients exert strong, positive, cross-side network effects by receiving a large share of the referral reward, while recommenders face same-side network effects that reduce their utility. Platform managers therefore might quantify the observed network effects and charge a transaction fee to recipients to subsidize recommenders who are affected by stronger competition. Then the money-sharing platform could capitalize on positive network effects while mitigating the negative effects.

Third, money-sharing platforms offer external monetization opportunities too, because they are valuable to the referring firms. Managers of customer referral reward programs must work to increase awareness of their referral programs and facilitate the referral process (Schmitt; Skiera; Van den Bulte, 2011). Currently, P2P sharing platforms help them do both: increase the reach of customer referral reward programs and make it easier for recommenders and recipients to participate. Accordingly, platform managers should cooperate with referring firms and (1) charge them a fee for every referred customer when the firm's relationship with the new customer starts on their platform or (2) offer referring firms advertising space on the platform.

Fourth, money-sharing platforms should expend resources to differentiate themselves from relevant rival platforms and strengthen their competitive position. As our study suggests, reputation is an important feature of P2P money-sharing platforms that can foster both successful referral processes and users' monetary outcomes. Implementing a professional reputation mechanism thus should be an effective differentiator that increases users' value perceptions (Eisenmann; Parker; Van Alstyne, 2006).

6.3. Limitations and future research

Although this research makes important contributions, it also has several limitations. The analyses are based on a limited set of variables. Thus, an important next step is to include further important variables in our analyses. For example, we included reward size as a control variable in our preliminary analyses. However, behavioral economics indicates that sharing behavior changes with increasing stakes (Andersen et al., 2011). In particular, sharing a smaller percentage from a large stake can produce more money in absolute terms than sharing a larger percentage of a small stake. Thus, a next research step is to amend our percentage-based results with calculations that include the total amount of the referral reward. Furthermore, our study concentrates on important variables on the recommender side and on cross- and same-side network effects resulting from an increasing number of recommenders. Variables on the referral recipient side are important too, and both types of network effects can emerge from increasing the number of referral recipients. Identifying the magnitude of both network effects for both user groups thus should yield a more comprehensive understanding of the processes and results of money sharing on P2P platforms.

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SMART TOOLS AND SERVICE OPPORTUNITIES FOR CHILD PROTECTION ECOSYSTEM IN THE FUTURE: CASE FAMILY VIEW.

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This paper will focus on the future alternatives of child protection ecosystem with various services in different cases. Four alternative scenarios for the child protection to 2035 were formulated: 1. Promotive 2. Primary 3. Secondary 4. Tertiary. The context of this paper is the changing landscape of societies because of megatrends like digitalization, urbanization, individualization and polarization. These development trends will promote smart but cost effective solutions which can be reached by everyone. Our study will focus on Promotive scenario in child family case in Porvoo region developed in workshops with child protection ecosystem actors during the autumn 2015 and the spring 2016.

1. Introduction: Views to the Future

The concept of megatrend was first time presented by John Naisbitt in his first book (Naisbitt, 1982). According to him a megatrend is a long-term development that affects societies, economies and governments and companies broadly and continuously over time.

The changing landscape of the society is a worldwide phenomenon, where several megatrends can be recognized. Digitalization and globalization will play an important role. Other megatrends like urbanization and polarization will strengthen the development and form new groups called haves and have nots, which is no more defined by nation or country, where you are born but by skills and competences you have.

This development has been seen also in Finland during last decades since the great depression early 1990's. The youth and even younger children from that time have had difficulties to find their place and position in society where their parents probably have lost not only their jobs and money but their self-respect, too. The same development path has been going on since the global financial crisis in 2008 and the new families are now in the so called poverty cap. In Finland the youth guarantee law has been regulated for this, but it is only first aid help to the child families, not the final solution to this problematique. This development is continuing because of the new deal in the economy, where the low skill jobs are replaced by automatization and

human labour force jobs will require more sophisticated and skillful people with high level degrees and life-long learning (see e.g., WEF, 2016).

Future-orientation means focusing on early warning signals, even on weak signals telling the development paths and directions in society not only at meta-level based on statistics but also at national, regional, local as well as at family and individual level, too (see. e.g., Lesca & Lesca, 2014).

The definition of data to use as a basis for decision-making has to be changed (Meristö, 1982): the documented information is not enough, but the information needs also the expressions of worries throughout the whole ecosystem with all its actors. In manual systems and in separate data base systems this is possible only in limited scale. In integrated systems where all the actors have smart devices and access to the shared database including also worries and weak signals from forthcoming events and expectations the proactive and even promotive work is an opportunity to all the professionals and semi-professionals from different backgrounds.

Based on this, one of the key results from our case workshops in Porvoo region is the concept *worry management*. It is similar to the concept of *visionary leadership* (e.g., Nanus, 1992) used in the business context, but in our case the focus is not only in organisations or eco-systems, but especially in individuals and in the signals anticipating their future behaviour examined and discovered by various actors in the (child protection) eco-system (Meristö, Kantola, & Tuohimaa, 2016).

The best opportunities for the worry management in our alternative scenarios are in the Promotive scenario with proactive perspective and online services. That's why we have selected that Promotive scenario as a base line for our visionary concept design in this paper (Leppimäki et al., 2008).

The smart tools and service opportunities will be described based on case work in Porvoo region (Case Porvoo) in the workshops having as participants different actors from institutional and civil society side as well as from NGOs and semi-professional individuals with experience. The Case Porvoo is a part of the larger multidisciplinary research project called MORFEUS (01/2015–06/2017) run by Aalto University and Laurea University of Applied Sciences, aiming to study and develop wellbeing services' multi-actor ecosystems. The project is financed by Tekes – the Finnish Funding Agency for Innovation.

The project is citizen-led by nature, and the service ecosystem is studied and developed by looking into the set of services that a specific case example family reconstructed for the project is using. The research partners comprehensively represent wellbeing service actors in Uusimaa region in Finland from the municipality sector and the producers of wellbeing services from the private sector and from the third sector as well. In the project, actors of the ecosystem i.e. companies, public and third sector organizations offering wellbeing services are mapped and the relations between them will be explored – in this paper especially in services and service network related to child protection in Porvoo region in Finland.

The focus of the content is on preventive child protection with the help of the methods of future studies, especially with scenario methodology called action scenario approach (e.g., Meristö, 1989, 1991). In this paper, Case Porvoo will use the future-oriented workshops to produce the information needed not only today but for the future service requirements concerning the service ecosystem, its actors and hubs as

well as the relations between them. Also, the alternative future scenarios are used as a platform to create visionary concepts for future wellbeing services and business models in the child protection sector, but also in order to create flexibility to the service design to meet the challenges in the rapidly changing world. The main research problem in the Case Porvoo is how the scenario planning can support the development of service ecosystem and the future-oriented child protection services and how to implement the results to the practice not only from the service providers' viewpoint but especially from the case family's viewpoint, too.

The objectives of the paper are as follows:

- 1) To present alternative future scenarios for child protection ecosystem,
- 2) To describe benefits and pitfalls in each scenario,
- 3) To describe the relationships between different actors in the ecosystem, including bottlenecks and success factors,
- 4) To promote smart tools and solutions which help the case family and the family members to get support and empowerment in various phases in the virtual world from the ecosystem actors.

2. Action Scenario Approach as a Methodology

Methodological framework consists of futures research, action scenario approach and visionary concept design combined to participatory design process based on action research paradigm. Our visionary framework will bring a unique perspective to the ecosystem development and to the information modelling in child protection in the context of Tekes funded MORFEUS project run by Aalto University and Laurea University of Applied Sciences together with several public, private and NGO actors.

Scenario working is a method within the field of futures research (Masini, 1993; Bell, 1997). Scenario working includes mapping alternative futures, identifying factors and development paths leading to different future outcomes. The action scenario approach incorporates also the evaluation of the significance of the scenarios for the user. Finally, based on the evaluation necessary actions are suggested (Malaska et al., 1984; Meristö, 1989)

The quality of scenarios is not measured by the ability to reveal the future outcomes but by the ability to affect the decisions that are made. Even good scenarios will not be useful if no actions will be based on them. Scenarios are a part of the strategic planning process that has to be an on-going activity (Meristö, 1991).

The action scenario approach is a result of several decades of work with different companies' strategic planning. The framework has been built by Tarja Meristö based on experiences from numerous case studies during 1979-2016 (e.g., Meristö, 1983, 1991). Scenarios are descriptions of different futures. Besides including the description of the competitive environment with factors like economy, politics, and technology etc. the approach also incorporates the process of development. Scenarios are different from forecasts, as scenarios are usually not measured by their probability of occurrence. Scenarios are not either exact descriptions of the future; they are rather

verbal descriptions of both qualitative and quantitative nature. Our framework is based on a multiple scenario approach i.e. at least two alternative scenarios are constructed. Furthermore, each scenario leads to various possible choices of strategies.

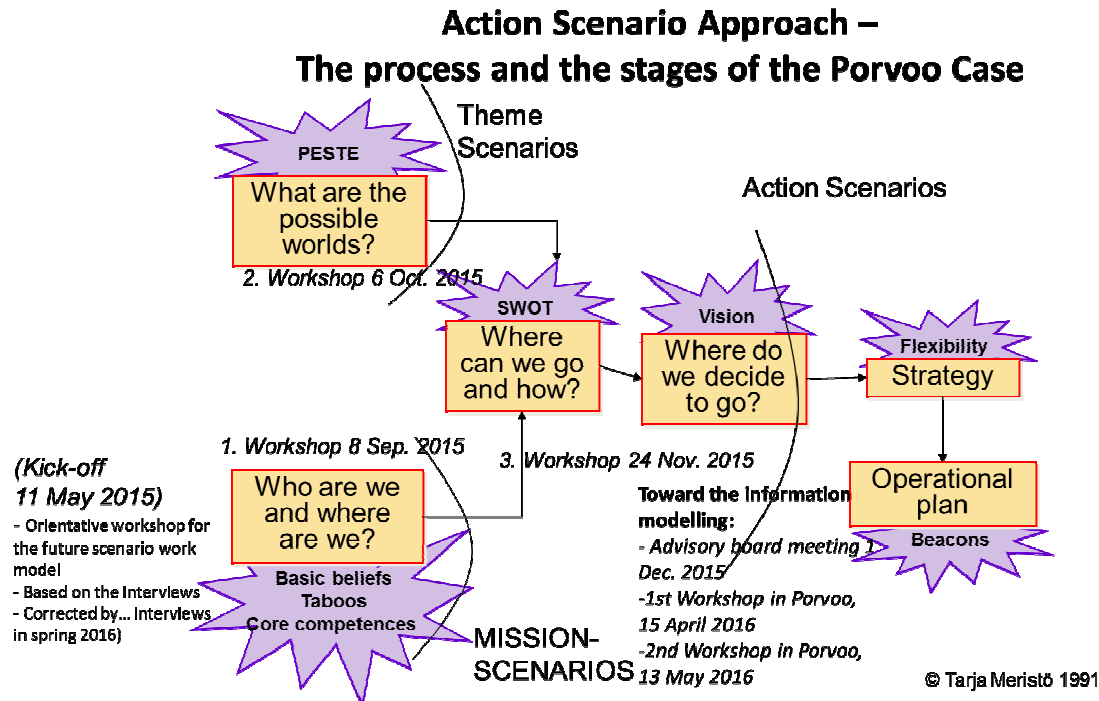


Figure 1: Stages and Timing according to Action Scenario Approach in Case Porvoo.

The action scenario approach (Meristö, 1991) consists of six consecutive stages: Who and where are we? What are the possible worlds? Where can we go and how? Where do we decide to go? Choice of strategy. Action plan.

The process is carried out in the following order. First, the basic beliefs, general assumptions, and taboos of the actor are identified. After the first stage the mission scenarios are constructed. The mission scenarios describe the mission and the vision of the actor. Second, the driving forces are collected by using a PESTE-analysis, where PESTE stands for Political, Economic, Social, Technological, and Ecological factors (e.g., Meristö, 1983).

Based on the second phase, issue scenarios are constructed. Issue scenarios picture the external events in the future, which will have an effect on the actors' future outcomes. In the third phase, the actor decides where they want to go and how. After the third phase the issue and mission scenarios are extended into action scenarios. Action scenarios bind the external future events and their consequences to the actor by using scenario descriptions and navigation marks. A SWOT analysis can be used in this phase. Fourth, the target group considers its risk profiles and visions the probable and preferable futures. Next, the action scenarios and strategic tools are used to choose a certain strategy. Then, actions are taken based on the chosen strategy. Finally, follow-up of the process is done by barometers, in order to ensure the continuity of the process. As a result of the follow-up, chosen strategies can be changed or the entire process can be started again from the beginning.

The action scenario process is always subjective to its nature. Generalized scenarios cannot be done in the action scenario process. Action scenarios need to have an actor, which participates in the process of scenario development. The actor will have an effect on the selected topics, issues, and variables. The objective of the process is not to create scenarios on a special issue but to accomplish decisions and strategy formulations as well as encourage actions based on the scenarios.

The choice of a sufficiently long time scope is important in action scenario process. The time scope in scenario planning is clearly longer than in normal strategic planning. A longer time horizon enables a view "beyond". Changes that do not even show weak signals yet should be included in the model. However, the time scope must not be too long either, the relevance to business shall remain all the time.

3. Context of the Case - Child Protection Ecosystem

The context in the Case Porvoo **is an illustrated child family**, which was constructed for the case family by the project team in the very beginning. The case family has a 39 years old mother suffering from mood disorder, 30 years old father living at the moment in another city and suffering from drug addict and mental health problems and five children (two daughters 23 years and 4 years and three sons 17 years, 13 years and 2 years). The two youngest children were born in the marriage, common mother and father. The four youngest children are living at the moment with the mother and the oldest daughter lives on her own. The child protection reports, taken into custody, the problems with police, and worry expressed by the day care and the maternity clinic are familiar in this case family with only a few supportive friends and relatives.

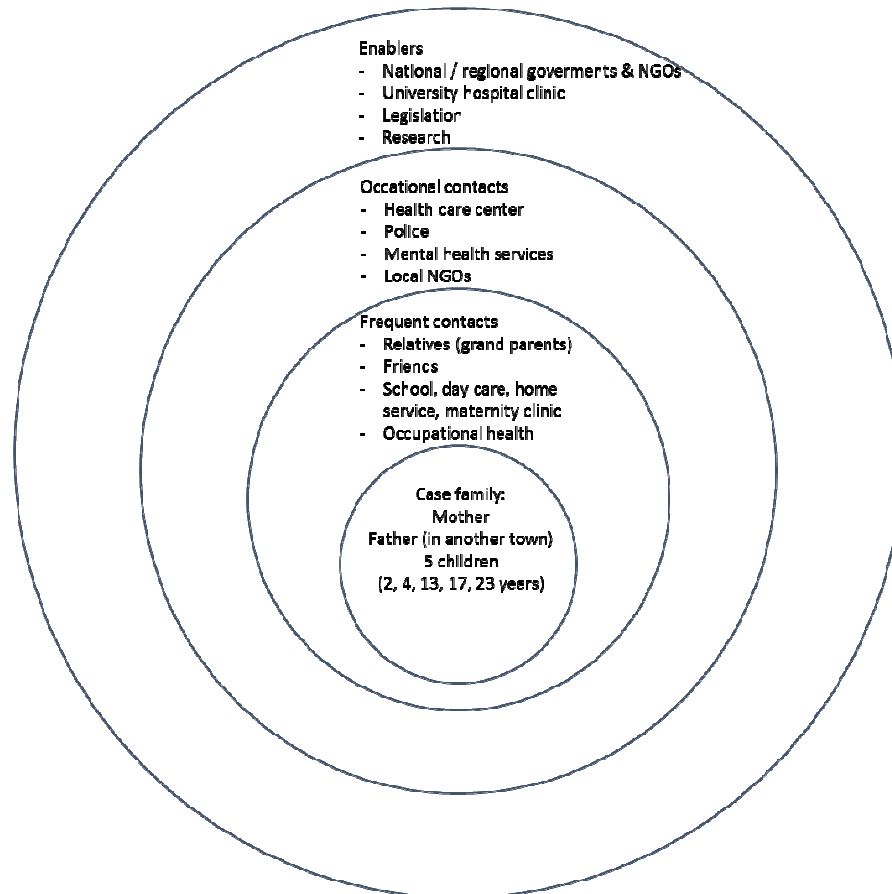


Figure 2: Child protection ecosystem with its actor groups and positioning for the illustrated case family.

The case family in real life context consisted of a father with two children from previous marriage (a daughter 10 years living with her mother and visiting the family every 2nd weekend and adult son), a mother 40 years (currently pregnant) with 3 children from previous marriage (sons 9 years, 13 years and 14 years living with their father and visiting the family every 2nd weekend) and their common 2 year old son. The parents had been together four years and married two and half years before the interview.

The parents belonged to the low-education and low-income social class. They had no permanent jobs and as a result had financial difficulties. The family had only a few supportive friends and relatives. The parents considered their family as a quite normal and they described their everyday life as peaceful and filled with basic routines. The child protection customership began as a result of mother's ex-spouse's announcement and led to mother's three sons being taken into custody and consideration of charges. At the moment of interview the sons were living with their father, the child protection customership had been valid for two years and was about to end.

The child protection system for the case family parents showed up as a multi-actor ecosystem with no clear lead or co-ordination. The ecosystem working with case family in Porvoo consisted of several circles around. By using the stimulated interview (Cicourel et al., 1974; Jokinen & Pelkonen, 1996; Kantola, 2010) the parents were asked to place all the actors in the circles, starting with their family members in

the middle. The parents placed frequent contacts such as day care, maternity clinic and occupational health care and closest relatives especially father's brother and sister in the first circle. Grandparents and friends were placed in the second circle. Their role was essential for empowering especially the mother but also all the family members to strengthen them as subject in their own life. The next circle consisted of regularly basis actors with various roles such as social security centre, health care centre, school health and school as such and child protection unit. The outermost circle included multiple local, regional and national organizations such as police, family counselling, youth counselling and University Hospital clinic. These all can be seen as enablers for the wellbeing ecosystems and services.

The case family had not received other help except income support before child protection intervention. Their understanding and attitude towards the child protection system was very negative in the beginning but turned to more positive during the process. Especially the mother was happy with the mental support given to her and she didn't want to end the relationship with the child protection.

As mentioned by the parents the preventative measure could have been a health clinic parental-type activities, family coach or other support person to provide mental support, advice and tips on everyday practices. Also someone seeing the whole picture with all different problem areas and providing low-threshold help early enough to one of the areas could have saved the family from child protection customership.

Their own understanding of possibilities within the ecosystem was limited to the current organization model. The parents couldn't imagine any other way to organize the support and help. Also, their attitude towards outside help was negative, they felt that they should stand on their own. As an improvement their idea was to bring together different actors to entities that are managed through a single contact. They also pointed out the need for a smooth flow of information between different actors in the ecosystem.

Digitalization and smart services could ease up the information flow within the service ecosystem. The e-services and support could overcome the emotional and attitudinal barrier that occurred also with the case family. The help could be reached whenever they felt for it. It could lower the threshold to seek help, and on the other hand act as preventive method for the heavier forms of service. However, the level of involvement e.g. in the e-services could be low for the case family due to the fact of low education and income level followed by lack of suitable e-devices and e-skills.

4. Data collection and analysis

Data produced during the research process is qualitative and quantitative by nature. Thematic interviews among regional actors in Porvoo from child protection field were run in spring 2015 by research group. Series of future-oriented workshops with representative actors from child protection were facilitated. Visionary knowledge was completed by web-surveys among participants and project's board members. Research data includes also the constructed ecosystem for a family being a customer in a child protection process.

Four alternative scenarios for the child protection were formulated: 1. Promotive (proactive, virtual), 2. Primary (proactive, face to face), 3. Secondary (reactive, face

to face), 4. Tertiary (reactive, virtual). SWOT analysis and action alternatives for each scenario were constructed, too.

By using visionary concept design, smart services and tools have been developed for the case family for the living in the scenario 1. Flexibility for the other scenarios will be generated through what if -questions.

The primary data collection comprises the well-documented discussions of the future-oriented workshops based on documented work in small groups and written memos from the facilitated sessions. Also the web-based surveys to the participants between every future-oriented workshop will form a part of the primary data. Background data for the work will consist of well-documented interviews among the actors in the Porvoo region before the series of intensive future workshops. Complementary data collected from the Steering Group of the entire research project MORFEUS both through web-surveys and in one mini workshop was used, too. The timetable for the data collection is as follows.

- An Orientative Workshop, focus on the shared vision: 11th May 2015 (three hours)
- The First Future Workshop, focus on the present situation: 8th September 2015 (three hours)
- The Second Future Workshop, focus on the alternative scenarios: 6th October 2015 (three hours)
- The Third Future Workshop, focus on action alternatives in each scenario: 24th November 2015 (three hours)
- Two Conclusive Workshops: One with MORFEUS Steering Group, focus on information modelling, 1st December 2015 (one hour), another one with preventive child protection actor from Porvoo city, 15th April 2016 (two hours).
- Interviews of the child protection experts (special kindergarten teachers and school social workers) at the City of Porvoo were made during the spring 2015. The interviews were audiotaped and written to memos.
- Group theme interview of the Director of Social and Health Care at the City of Porvoo and the Development Manager of Social and Welfare at the City of Porvoo, 5th March 2015
- Theme interview of the Manager of Child Family Work at the City of Porvoo, 29th April 2015
- Theme interview of the Planner of the Competence Center of Social and Welfare in Porvoo area, 6th May 2015.
- Thematic workshop 13th May 2016 in Porvoo – focusing on service opportunities from different viewpoints and from various customer groups.
- An interview of the child protection family, focus on a child protection service ecosystem from their own viewpoint, Spring 2016.

The data analysis includes different methods depending on the nature of the collected information, including qualitative and quantitative approaches as well as facts

and visionary knowledge that were e.g. used as a basis for the visionary concept design when developing new concepts and services for proactive child protection in Porvoo ecosystem.

5. Results: Smart Tools and Service Opportunities in Alternative Scenarios

The ecosystem working with case family in Porvoo consists of several circles around. In the middle of the circle are the family members with their friends and relatives. Their role is essential for empowering especially the mother but also all the family members to strengthen them as subject in their own life. In the following circle there are multiple public and third sector services with various roles. First, daily contacts such as day care and school and on regularly basis actors like maternity clinic and other specialized support activities. The outermost circle includes multiple local, regional and national organizations. These all can be seen as enablers for the wellbeing ecosystems and services. In the present transformation phase their role as enablers is complex.

The information modelling for the child protection ecosystem was constructed based on the data produced during the scenario process including workshops and web surveys as well as interviews among local actors. The workshops consisted of multiple actors of child protection services in Porvoo including the Manager of Child Family Work in Porvoo City, the Planner of the Competence Center of Social and Welfare in Porvoo area, the Experience Expert and the various workers from the Substance Abuse Treatment Unit, the Manager of Maternity Clinic, the School Social Worker, the Specialist Psychiatric Nurse from Porvoo Hospital, HUS (The Hospital District of Helsinki and Uusimaa) and the researchers and students from Laurea UAS. In the final session one student from Aalto University participated to the workshop as well.

The Wellbeing Service Information Modelling (*WIM*, see Meristö, Kantola, & Tuohimaa, 2016) for child protection ecosystem includes four phases, each focusing on the perspective of their own (compare to BIM, Building Information Modelling, Kerosuo et. al., 2012; see also Miettinen & Paavola, 2014). The first phase in the WIM extends until the pregnancy, even the time before that including the forthcoming parents' childhood experiences as well. The second phase focuses on the early warning signals and worries threatening the wellbeing of children without customer relationship with official child protection. The critical issue is on one hand the fear of losing a child and on the other hand on the professional side the privacy policy is an obstacle for information exchange between different actors. The third phase is an official child protection process includes the child protection report, estimation of protection needs and finally the actions for supporting the wellbeing of family with children. The critical point is to maintain the family relationship in spite of the child protection situation. Finally, the fourth phase includes check points for progress of empowering and wellbeing as a family and as individual family members. The lifelong wellbeing path without worries is the vision including hope for the future. WIM makes visible all the actors involved the child protection, relationships and information flows between different actors and the bottle necks still waiting for solutions. WIM provides an open and shared context for all actors to support families with children. WIM will base on weak signals and preventive worry expressions and will help in decision making un-

der uncertainty. The flexibility needs for the uncertain future will be covered by what if questions based on alternative scenarios.

We will provide a future-oriented framework for ecosystem development and data modelling. The uncertainty concerning the future will be presented in the form of alternative scenarios for the next 20 years, having in the focus wellbeing services for the families with the need of child protection. The main focus is in Promotive scenario, where the child ecosystem operates proactively and virtually. Smart tools and services for the case family and for the actors in the ecosystem have been illustrated in the workshops during the scenario process.

Scenario 1. called Promotive is proactive and mostly network based scenario. Service supply and demand as well as all service activities will happen here virtually. Virtual city Porvoo uses as a main tool the wellbeing map in the net. That will help all the citizens to estimate their own wellbeing position and situation, including the benefits and pitfalls concerning their wellbeing at the moment. The need for the services and products to improve the wellbeing of each individual will be mapped. Also for the guidance activities there is an App, too. Each person will have a wristband on his or her arm to control the physical health and wellbeing. If needed, the system will remind them from the support needed. The message will reach not only the person needed help, but those actors guiding and caring in the ecosystem, too. First aid call button is also in the use and easily available: How can I help you today? There is always a real person who will answer the questions. This App is a real enabler for the help 24/7 anywhere, anytime.

All the family members in our specific case family will have the solutions of their own. E.g. **for the youth** in the family there will be a wellbeing game set, where they can win movie tickets, if they are succesful enough in following the wellbeing game and find the right solutions and behave as the circumstances require. They can also win virtual money for the other games, where the young people have an opportunity to practise their skills e.g. for health living and living habits or to learn carrier planning or any other useful skills and competences fort he everyday life now and in the future. **Smaller kids** have also in use very useful virtual tools for their speech training and other activities to support their upbringing and education.

For the parents like for tired mothers and for long-distance fathers there will be also different kind of services online. E.g. peer support for mothers and fathers but also for reconstituted families (or stepfamilies) will be provided in the form of net-based groups, often supported by the elements of gamification. In our case family the father lived in another city, and in the virtual world the communication not only with the professional actors, but also with the children and mother is more fluent with less bad feelings and emotions compared to the face-to-face situation with the mother.

For the professional and semi-professional actors from public, private and from the thisd sector this Promo scenario include a seamless proactive path to take care of the customer family and ist individual members. Just on time, just for the right purpose and need the services will be provided and coordinated, in keen co-operation with the customer, who is an active subject with the right to be selective, too. The network meetings among different professionals will be arranged in co-operation with the customer. The customer does not have to run from the meeting to meeting, but she or he will meet all the professionals at the same time, not

necessarily in the same place, when working virtually. (Worth to notice: the real-time service guidance in the net is working already today, see www.koppari.fi//porvoo.)

Promo scenario is very strong in many ways. It is cost effective, works over municipality barriers and it exploits the third sector, too. For the families it is open 24/7, it is low threshold activity and individual, too. It also leaves the role of subject to the family members themselves. Weaknesses include to this scenario, too. If the family is not active, the service providers might have difficulties to contact and help them. Also for the family and its individual members this promo scenario might automate the contacts too much and there will be a lack of the personal communication. If the family is not very used to virtual communication and tools, they can drop out of the system. Threats in this scenario are related to the decrease of the wellbeing not only in the family but also in the region. Real time services on demand as well as community based co-operation are the opportunities that should be developed further to reach all the benefit from this scenario.

Shared vision for all the actors including the family in the scenario 1 Promo is: The wellbeing of the families with the children is guaranteed proactively in the net-based ecosystem. In the ideal case, there will be not at all the signals of bad being or at least the early warning signals will work like worries as data to improve the situation before the signals will strengthen or lead to the catastrophe. Steps towards this vision are as follows: 1. Motivation and education for virtual life and work at all levels in the society. 2. Service providers developing their services and guidance at network basis together with all the actors and customers, too. 3. Proactive, health-oriented and empowering approach at all levels. 4. Real-time guidance and impact estimation, too. 5. Self-responsibility as a goal in education from the very beginning. The working group in the case work estimated that it will take time approximately one generation i.e. 18-20 years to reach these steps towards the vision described above. Meanwhile, the development work for smart tools will continue to meet then the new world. In the next Figure is the summary of those characters and features that are essential in different scenarios, when preparing smart tools for service opportunities recognized and needed in these possible worlds. Focus in our paper is in the scenario number 1 called Promo scenario.

The ecosystem for the real case family is described (see Figure 2 with ecosystem for illustrative case family). Based on the stimulated interview of the real family the ecosystem consists of several circles around. In the middle of the circle there are the actors of occupational health care, child health clinic, day care and the relatives. In the following circle there are friends and grandparents. The second outermost circle includes the actors from social and health care services such as child protection, school, health care center and school health care.

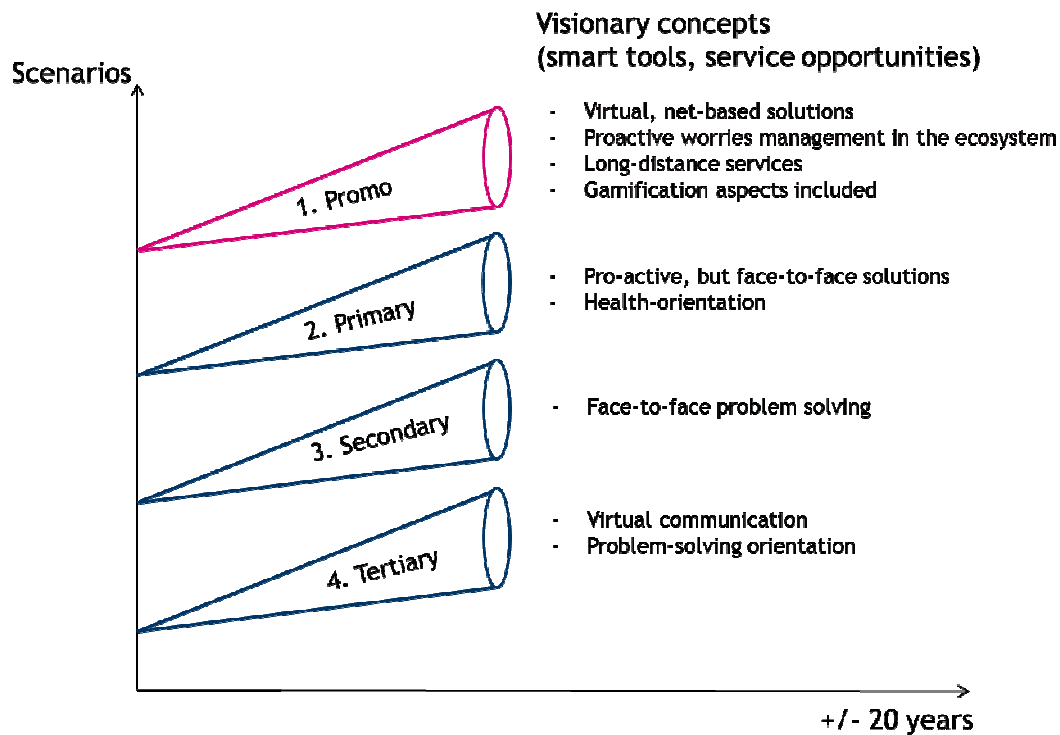


Figure 3: Service opportunities in alternative scenarios, focus on Promo scenario with smart tools.

The medical specialist, youth services, family counselling and police were placed into the outermost circle. If all the actors in the ecosystem will have an access to the data base including real-time weak signals i.e. worries about the family and its individual members, the promotative and proactive approach will work virtually in practise, too. In our terms, the *worry management* will work then over the whole ecosystem fluently. All the motivation tools and alternative devices for different users and user groups are needed, of course. Access, skills and motivation (Viherä, 1999) are the key elements of the citizen –centric information society and they are a key for the successful and continuous work in Promo scenario world, too.

6. Conclusion / Discussion

Our paper focuses on multidisciplinary and multi-client participatory work done in the field of child protection in the City of Porvoo in Finland during the years 2015–2016. The aim of the study was to create alternative future scenarios for the seamless child protection path among public, private and NGO actors as well as the individual citizens. The collaboration across the boundaries between different organizations but also between different disciplines was established in the series of facilitated futures workshops. Participants represented local organizations in Porvoo region from different viewpoints concerning child protection and wellbeing of child families, including preventive work in this field, too.

Three gaps in real life work were recognized, namely knowledge cap (rational/data), understanding cap (wisdom) and attitude cap (emotional/emotions, behaviour). Link-

ing these three together with smart devices and by building trust throughout the whole ecosystem will bring us closer to the Promotative scenario world, where families and their individual members are subjects of their lives and where professionals really can act proactively based on worries and weak signals expressed by anyone in this network. Visionary leadership called in this context as worry management will really bring futures research and future oriented thinking a living part of everyday child protection ecosystem and it's proactive management. When the description of the whole ecosystem is in the net, all actor can easily imagine new opportunities and co-operate in new way not yet known.

The future-oriented workshops in the Case Porvoo have has an essential role for creating shared future scenarios and the vision, too (Meristö, 1991) in multi-voiced (see Kantola et al., 2010; Kantola, Lassila, & Sipilä, 2011) way in the child protection ecosystem. Nevertheless, not enough attention has been paid on facilitating the multivoicedness of collaboration (Johansson et al., 2010; see e.g., Kantola et al., 2014) between the various project partners as well as the researchers in the context of developing activity and practices in child protection sector in the region.

In this presentation we will focus on how the wellbeing ecosystem and its information in the field of child protection can be made visible by modelling this complex system by using future oriented scenario approach as a methodological framework for participatory design. As one result, this participatory process with facilitated workshops including visionary elements has strengthened the commitment to the future-oriented co-operation between different actors. Also, the voice of the final customer has heard in the way that will help them to involve the wellbeing service process proactively and thus to involve boundary spanning activities as complex innovations (see Tuohimaa, Ranta & Meristö, 2015).

The future oriented scenario approach taking care of weak signals can also be seen as an enabler in listening *worries as a knowledge* and perceiving information modelling also from the viewpoint of *worry management* (Kantola & Meristö, 2016).

The interdisciplinary future oriented work done in child protection ecosystem in Porvoo area became significant in its situational and temporal context. The new Social and Welfare Act (1301/2014) and the Act for Changing the Child Protection Act (1302/2014) emphasize a benefit of the customer and a proactive way of child protection activity. All this is happening in the advent of a Finland's social welfare and health care reform. Committing of the everyday actors to the multidisciplinary and bottom-up and local development together with new boundary conditions is necessary. It is question of knowing in practice and co-creating knowledge in/of/for practice (see e.g. Nicolini, 2011; Orlikovsky, 2000, 2002) and learning in/as/between networks, as well (see Alasoini, 2008).

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SOCIAL INNOVATION AND THE ENVIRONMENT: HOW DO SOCIAL INNOVATIONS ADD TO CHANGE TOWARDS SUSTAINABILITY?⁷⁶

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Most social innovations are, in essence, service innovations with a social purpose. Windrum et al. (2016) identify three areas in which the conceptual understanding of social innovations is further specified beyond that of service innovations: incentives, empowerment and imitation. Based on this, the research questions of this paper are: In how far does the social innovation case presented in the following show these additional qualities that distinguish social innovation from mere service innovation? How does this generate additional quality to change towards sustainability? The results build on case study research in the area of social innovations with an environmental impact. Change, operationalized in the various forms of impact of the social innovation project, is enhanced by the additional features of social innovation.

1. Introduction

Numerous environmental challenges stand to negatively affect the lives of billions of people around the world. This paper focuses on social innovations with the potential to reduce the environmental stress caused by human activities. Such social innovations could address several environmental challenges such innovations to reduce CO2 emissions, more resource efficient production and consumption or the protection and conservation of nature.

There are a variety of definitions that emphasize differentiated aspects of social innovation. The Bureau of European Policy Advisers defines social innovation (SI) as *relating to new responses to pressing social needs and creating new social relationships or collaborations. Hence, social innovations are innovations that are social in both their ends and their means* ([BEPA, 2010](#)).

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The SI DRIVE project outlines a comprehensive working definition for the first phase of the project in order to refine it in the course of the project on the basis of empirical evidence. Social innovation is seen as

- a new combination or figuration of practices in areas of social action;
- prompted by certain actors or constellations of actors;
- with the goal of better coping with needs and problems than is possible by use of existing practices.

Despite the variety of definitions, for this paper I would like to add

- solving needs is a first order goal (intentionality). Per definitionem needs must be satisfied for human beings in order to avoid serious physical or mental harm, where harm also comprises barriers to individual aspirations or social inclusion. In this sense, needs are objective, universal and transcultural (Hodgson, 2007: 7)

The field is practice-led. The aspiration to cover all aspects of the rich variety of social innovation projects we can find in practice explains the multitude of definitions that exist.

Intentionality seems important as many innovation projects have some social impact as a wider effect. But it is worthwhile thinking if innovation projects explicitly set up to solve social problems (e.g. of marginalization, of social determination etc) encounter barriers in a systematic way as patterns instead of viewing them as the product of singular achievements and pure luck.

Change, in this paper, is operationalized in making explicit the various forms of impact the social innovation project, generates. In general, the empirical study of (social) change is based on qualitative research, which includes normative evaluations and value judgements ([Wilterdink, 2014](#)). This is often done in the form of case studies like in the present research.

So this paper presents a case study exemplifying the area of repairing, re-using and extending the life-time of products. After presenting the case in brief (section 4.2.1), an overview of the service innovations and related innovations is presented (section 4.3). After this, change is operationalised in the form of different impacts of the social innovation (section 4.4). In section 5. Discussion, the social innovation case is discussed along the three dimensions that distinguish social innovations from mere service innovations (incentives, empowerment and imitation). Section 6 concludes.

2. Conceptual Background

2.1. Social innovation from an economic perspective

Most social innovations are, in essence, service innovations with a social purpose. The line of argument that relates the literature on service innovation to social change follows along three steps: First, the service innovation literature develops the special properties of services ([see Gallouj and Savona \(2009\) for an overview](#)) and – as a consequence - of service innovations, thus, providing a general analytical foundation for this discussion. Second, in this stream of literature, innovation scholars are mainly

concerned with the challenge of grasping the differences between service innovation and social innovation as a particular form of services. Third, this has implications for the discussion on social change, which is actually not part of the service innovation literature because it is not concerned with social change as such. In this regard, the literature is usually restricted to matters of the diffusion of service innovations.

2.1.1. Discussion of service innovation in general in contrast to social innovation in particular

Although social innovations are basically new services, and services incorporate person-to-person interaction in development and/or delivery (note: services may also integrate the interface of technology-to-person interaction), the term social innovation is rather reserved to services that have additional qualities. The [OECD LEED Forum on Social Innovations \(2000\)](#) and the [European Commission \(2011\)](#) emphasised the connection between services and social innovation. Social innovators seek to develop new services that improve the quality of life of individuals and communities in labour market integration, social inclusion, health and wellbeing, education, and environmental challenges. In other words, social innovations are a sub-type of service innovation with a specific purpose. Still, service innovation and social innovation remain rather separate subfields ([Gallouj & Djellal, 2010](#); [Harrisson, Klein, & Browne, 2010](#); [Reinstaller, 2013](#)).

[Windrum, Schartinger, Rubalcaba, Gallouj, and Toivonen \(2016\)](#) argue that it makes sense to elaborate on the special features of social innovation, instead of arguing all service innovation equals social innovation because it is interactive in some form. [Windrum et al. \(2016\)](#) identify three areas in which the conceptual understanding of social innovations is further specified beyond that of service innovations:

Incentives. In the service innovation literature social innovation is a special type of service that does not conform to business rationality in that it is not driven by profit motives, but by principles of inclusion and well-being. This does not imply that commercial service innovations do not induce well-being, yet they are incentivised by expected profits whereas social innovation is incentivised by value created to society as a whole rather than to private individuals (i.e. *externalities*) ([see also definition by Phills, Deiglmeier, & Miller, 2008](#)).

Empowerment. Social innovations differ from commercial service innovations in that they seek to empower citizens. Where the consumption of commercial services is driven by demand based on prices, income, and preferences, the use of social innovations is more based on needs (which are different from demand, see [Hodgson \(2008\)](#)). Social innovations attempt to assign new roles and relationships (e.g. between the citizens and the state) to individuals or groups in need, they develop assets and capabilities and/or the more efficient and environmentally sustainable use of existing assets and resources (cf. [Chiappero & Von Jacobi, 2015](#); [Science Communication Unit, 2014](#)).

Imitation. In innovation economics it is seen as given that fast imitation undermines economic returns of innovators. Hence, low appropriability regimes provide disincentives for innovators to engage in innovative activities, which results in less innovation and, therefore, a loss to society. In contrast to that, social innovators often seem to encourage imitation and the rapid dissemination of their problem solutions. The key to this problem is probably that weak competition and the scarcity of solutions in the

areas of social innovation needs to be compensated for: When needs of a group or parts of society are overwhelming, and solutions to solve the needs are scarce, ideas to solve the needs are rather promoted (once they finally exist) by the actors, instead of being withheld for better commercial exploitation.

Based on this, the research questions of this paper are:

- In how far does the social innovation case presented in the following show these additional qualities that distinguish social innovation from mere service innovation?
- How does this generate additional quality to change towards sustainability?

3. Data and Methodology

The research leading to this paper comes out of the project Social Innovation: Driving Force of Social Change (SI-DRIVE), which investigates empirical data on more than 1000 social innovations in seven major policy areas. 70 of these 1000 social innovations are further scrutinized in in-depth case studies.

The following results build on one case study (RUSZ) in the area of social innovations with an environmental impact.

In the section Discussion selected features of this social innovation case (=case results) are contrasted

- to the existing conceptual literature in the field, and
- to results of the mapping of the 1000 social innovation cases (=mapping results).

4. Case Results

4.1. Practice field: Repairing, re-use, extending life time of products

There are a number of activities aiming to repair, re-use or extend the life time of different products taking place in a number of European countries. These are for instance repair-café's where people meet and exchange knowledge and help each other to repair broken products. Generally there is a focus on electrical and electronic equipment (EEE), but there are examples of other things such as clothes or toys as well. In some cases social innovation projects in this practice field combine the aim to repair and re-use articles with other societal impacts, for instance in the field of employment by hiring people who have difficulties to get a job on the 'regular' job market.

Relation to challenges: This practice field primarily addresses the challenge to achieve higher resource efficiency, often in combination with employment and educa-

tional aspects (e.g. providing opportunities for long-term unemployed or disabled people to repair electronics).

Role of RUSZ

RUSZ was constitutive for establishing the practice field of repairing, re-using or extending the life time of products in Austria. The below processes and features became effective in establishing the initiative and the practice field.

4.2. Case study results: Repair and Service Centre (RUSZ)

4.2.1. The social innovation project in brief

The overarching topics of RUSZ are the saving of resources, waste prevention, and waste management in general (*ecological goals*). RUSZ provides independent and reliable repair services for electronic household products of all sizes, ranging from radios to washing machines. RUSZ also conforms to *social goals* in that it creates jobs for disadvantaged persons and supplies household goods at reduced prices for the poor. Furthermore, RUSZ operates on the market and wants to ensure financial stability (not for profit), create places of work and contribute to regional added added (*economic goals*). ([R.U.S.Z. GmbH, 2016a](#))

Table 1: The time line of innovation undertaking

1996	First idea
1996	<ul style="list-style-type: none"> ✓ Writing of concept ✓ Negotiations with investors, contractors (Vienna Adult Education, AMS) ✓ Finding/renting premises, equipment
1998	Foundation of RUSZ, with support of Vienna Adult Education and AMS, starting with 15 transit employees
1999	Foundation of Vienna Repair Network
2003	Foundation of DRZ (Disassembling and Recycling Center), including TrashDesignManufaktur, also with support of Vienna Adult Education and AMS
2008	End of contract with AMS (140 employees before end of contract)
2008	Separation from Vienna Adult Education
2008	After closing of business, re-opening of business six months later
2016	23 employees (May)

Source: Based on interviews and desktop research.

The founder of RUSZ was employed at Eco-Counselling Vienna. This is an organization that provides independent and customized practical information about the many dimensions of a sustainable life-style for private households, enterprises and communities. From his employment at the Eco-Counselling Vienna he knew that the fastest growing type of waste was electronic waste. The idea of repairing electrical and electronic appliances was then hinged to a social mission, i.e. re-employing long-term unemployed, so that the final concept serves ecological as well as social goals with a business operating not-for-profit on the market.

This concept was attractive to the AMS (=Public Employment Service Austria) and corresponded to the financing scheme of social-economic businesses (SÖB). SÖBs manufacture products or offer services at market prices. An important feature is that

in addition to being contracted by the AMS, part of the total revenues of the company is generated through sales. The AMS is the central point for mediating the transit employees to the SÖBs. SÖBs roughly correspond to the notion of WISEs (= work integration social enterprise) on the European level ([bdv Austria, 2009](#)).

RUSZ grew in significance over the years – other organisations were founded (DRZ) and networks established, on the local (Vienna Repair Network) and national (REPAnet), additionally the RUSZ founder is very active within the European level network (RREUSE).

Within 10 years RUSZ grew from 15 employees to 140 employees. By the end of 2007, the AMS contract ended. After the end, RUSZ became independent in the form a combination of association (today merely for project handling) and a limited company for the operative business. This end of contract with AMS had severe consequences in terms of loss of employees, closing down business for half a year and consequently loss of customers. However, in May 2016 RUSZ has 23 employees who have repaired 9000 devices in 2015 (Interview E).

4.3. Dimensions of the novel solution

4.3.1. New services (product innovation)

Repair services: „The innovation was not that we offer repair services, the innovation was that we offer independent and reliable repair services.“ (Interview E).

RUSZ offers reverse logistics services, which comprise the acquisition of used products (=supply), subsequent disposition decisions and reprocessing and finally re-marketing of reprocessed products ([Lechner & Reimann, 2015](#)). The white goods department is responsible for repair and maintenance of big household appliances like washing machines, dishwashers, laundry driers, electric kitchen stoves. It estimates costs of repair, provides technical advice, acquires spare parts necessary for repair and disposes of the device in case of damage beyond repair. In the department of brown goods, similar services are supplied for electronic entertainment devices (TV, DVD etc.). The grey goods department repairs and upgrades old computers and notebooks and sells them at low price to non-profit organisations, old people's homes, student homes etc. (Meissner & Pladerer, 2005)

Product Service Systems (PSS): RUSZ also offers PSS to customers who do not want to own their devices (e.g. students). RUSZ owns and maintains these first-hand washing machines, 26 at the moment (2016). An annual check ensures technical functionality of the device. In case of breakdown, RUSZ offers repair (or renewal) within three working days (Interview E).

Repair café: Repair cafes have diffused from the Netherlands through Belgium, France and Germany to Austria. The repair and service center R.U.S.Z offers repair cafes every Thursday, in order to give the opportunity to repair devices for which it would not be economical to offer repair services. Guests can fix toasters, blenders, irons, hairdryers, coffee filter machines, lamps and other electrical devices that can be carried in one hand. RUSZ offers a complementary infrastructure, like tools, and - coffee and pastries. Technically experienced personnel with different expertise is always present. ([Vienna Municipality, 2016](#))

4.3.2. New process services (process innovation)

Transport services: RUSZ collects and delivers appliances from and to private households. Delivery includes a short on-site information about the device on part of the technician.

Training on the job: In the first 10 years, implemented as a SÖB, employment at RUSZ was limited to 12 months. During this time transit employees were trained and coached to be able to cope with the requirements of a regular jobs. In 2004, the training of 44 transit employees was done by 15, 25 key employees (Eisenriegler 2004, cited in [Meissner and Pladerer \(2005\)](#)).

4.3.3. New technologies

Energy upgrading of devices: RUSZ developed an energy saving method “Tuning washing machines”, which increases the energy efficiency category of washing machines from C to A. This is achieved in reducing the total water consumption in the process of washing, which in turn limits the energy demand for water heating ([Lechner & Reimann, 2015](#)). It is technically possible to adapt this technological innovation to dishwashers ([R.U.S.Z. GmbH, 2016a](#)).

Standardisation: R.U.S.Z together with the Austrian Standards Institute and other partners, has issued the eco-design label for durable and easy to repair new electrical appliances (ON Rule ONR 192102). The first appliances distinguished with this new label of excellence are already on the market. ([R.U.S.Z. GmbH, 2016a](#))



Competence center: Beside repair service, RUSZ is active as a competence center for consumer protection, social economy and sustainability. ([R.U.S.Z. GmbH, 2016a](#))

4.3.4. Organisational innovation

A social pedagogic department: A social pedagogic department was implemented with a focus on crisis intervention, debt settlement, vocational training and appraisal interviews ([Meissner & Pladerer, 2005](#)). Basically, a social pedagogic department belongs to the structural characteristics obligatory in SÖBs contracted by the AMS (hence, new to the firm, not new to the market). Also training in German language, debt counselling and support in withdrawal from drugs of all kinds (mostly alcohol, but also e.g. heroin). The social pedagogic department as a structural characteristic is part of the model of a SÖB. It is responsible for coaching and initiation of job placement. “A lot happened there so that we were able to reintegrate people and send them to job interviews.” (Interview E)

Also the initiation of the repair network Vienna, the foundation of additional firms (DRZ, Trash manufacture) caused the spread of the new approach, repair instead of replace. See chapter on impacts.

4.4. Generating change: The impact of the social innovation

4.4.1. Employment and re-integration

Social goals include the re-employment of longterm unemployed and/or people with special needs. At the beginning success was defined by the AMS. 30 per cent of the transit employees had to find jobs in the regular job market in their transit phase. RUSZ soon managed to have a share of 75 per cent of transit employees entering the regular job market.

Over ten years (1998 until end of 2007) 400 long-term unemployed were acquired as transit employees at RUSZ, 300 of them could be placed in unlimited employment contracts ([R.U.S.Z. GmbH, 2013](#)).

4.4.2. Waste avoidance

RUSZ gets around 1200 white goods and 2000 brown and grey goods donated per year which are repaired and reprocessed ([R.U.S.Z. GmbH, 2013](#)). In sum, 9000 devices were repaired in 2015 (a large amount is owned not by RUSZ) (Interview E).

Pladerer et al. (2001) estimate that in their survey year (2000) 155 bis 160 t of old electrical appliances were serviced and an ecological backpack 2.500 tons could be reduced in total for all kinds of appliances ([Meissner & Pladerer, 2005](#)). For washing machines the ecological backpack of water reduction accounts for 7.700 m³. Almost 75 t metals, 12 t plastics and 40 t glass and cement could be avoided, additionally reductions were achieved with avoiding waste of all other types of repaired and re-processed devices.

Until 2016, it is estimated that RUSZ has prevented more than 10,000 tons of waste from electrical and electronic equipment (WEEE) since 1998. Following estimation results, by repair measures the lifetime of electric equipment is extended by 25 %. According to the MIPS concept (material input per unit of service) of Wuppertal Institute 20.000 tons of material inputs are prevented each year ([Interreg IVC project, 2016](#)).

4.4.3. Firm foundations

In 2003 a new firm was founded (Dismantling and repair centre, DRZ), which is a specialized organization disassembling and recycling appliances or sending them to RUSZ in case of possible reuse ([Meissner & Pladerer, 2005](#)). From this time onwards, the DRZ acquired appliances directly from the Vienna waste management ([Wien Energie-Magazin für Unternehmen, 2014](#)), whereas RUSZ acquires from private customers. Both make then decisions about repairing and reprocessing, recovering spare parts and disposing of waste ([Lechner & Reimann, 2015](#)).

DRZ is also a SÖB, like RUSZ, under the auspices of the Vienna Adult Education and contracted by the AMS. The DRZ has a department specialized on designing furniture, decoration and jewelry out of electronic waste – the TrashDesignManufaktur. This is done together with people who have sought employment for longer than six months ([TrashDesignManufaktur, 2016](#)).

4.4.4. New networks - regional

The Vienna repair network was founded in order to be able to draw on the distributed competences of repair service providers and thus be able to repair not only white goods, but all kinds of goods. In 1999, the Vienna Repair Network was launched with 23 companies and meanwhile counts around 80 specialist companies. ([Reparaturnetzwerk Wien, 2016](#))

4.4.5. New networks – national

The establishment of the Repair Network Vienna was followed by the creation of three other repair networks in Austria (www.repanet.at). RepaNET was part of a development partnership within the EQUAL Community Initiative, part of the European Union's Structural Funds. RepaNET aims at connecting SÖBs, private service providers, public and private waste management facilities and other interested enterprises and organizations on regional and national level with one another in order to provide repair, rental and related services to increase re-sale significantly. A further goal is to impact on policy makers to alter the legal and economic conditions towards favoring longer product lives. The RUSZ founder is responsible for the foundation of this national network, he is currently part of the steering committee ([RepaNET, 2016](#)).

4.4.6. New networks – European

RREUSE has an office in Brussels and wants to exert influence so that a second life of devices becomes standard ([RREUSE, 2016](#)).

Box 1: RREUSE

RREUSE represents social enterprises active in reuse, repair and recycling. They want the EU and national governments to move from promoting just recycling and waste management to putting secondhand first. Approximately 77,000 employees and over 60,000 volunteers and trainees work within 30 member networks across 17 EU countries and one in the USA. The main activities of our members include collection, sorting and redistribution of used textiles and clothing, collection, repair and reuse of electrical and electronic waste (WEEE), furniture and other bulky waste, home and community composting projects, charity and second hand shops, collection and recycling of paper, cardboard, wood, plastics, paints, metals, books and toys, awareness raising campaigns, international projects, exchange of best practice and business support.

Source: RREUSE (2016)

4.4.7. Institutionalisation

Institutionalisation follows different pathways. One is that the RUSZ founder serves as consultant to the Austrian Ministry for the Environment on the topic of planned obsolescence, which led to a statement of the Austrian Ministry in the High-level group on planned obsolescence on the EU level (Interview E).

Another pathway is the Austrian standard (ONR 192102) for durable and easy-to-repair goods which was implemented in Austria, also promoted by the RUSZ founder. This standard is rather unusual so that it gained a lot of attention in Europe and was presented by the interviewee at 5 different large events within 6 months on the topic

of the circular economy. A similar standard will now be developed by CEN/CENELEC, already commissioned by the EC (Interview E).

4.4.8. Prizes

RUSZ won different prizes over the years.

2016, Nomination for Trigos, category: social entrepreneurship. From Vienna University of Economics and Business ([Trigos, 2016](#)).

2013, Environmental prize from Vienna municipality ([R.U.S.Z. GmbH, 2016b](#)).

2009 Climate Protection Prize from Austrian Ministry of Life and Environment and Austrian Broadcasting Corporation (ORF) ([R.U.S.Z. GmbH, 2016b](#)).

2009 Winner of Social Business Award “Ideas Against Poverty” ([Ideen gegen Armut, 2016](#)).

2007 Winner of the Energy Globe Austria Award, category water ([Energy Globe, 2016](#)).

5. Discussion

5.1. The case as a social innovation

5.1.1. Incentives

RUSZ was incentivised by a win-win situation of re-integrating people into the regular job market who have difficult employment histories and at the same time promoting the social practice of having devices repaired instead of thrown away and added to the amount of waste. Although there was a strong social demand (unemployment) for the former service, the latter (repair) was more assumed or latent demand. It was perceived by the initiator as a tension or societal challenge (kickstarted by statistics on amounts of electronic waste).

Table 2 shows that this may be the case for the majority of social innovation projects in environment. Although the sustainability aspects are more and more in the focus of discussions and offerings, many social innovation projects promoting sustainability aspects operate on an agenda which is beyond concrete and local demands. Initiators of such projects start on the basis of assumed or latent demand that may become explicit and – in case of success -translate into actual demand as soon as service offerings take concrete form. Thus social innovation projects have an important role as they provide real feasible alternatives to the existing ways of doing things.

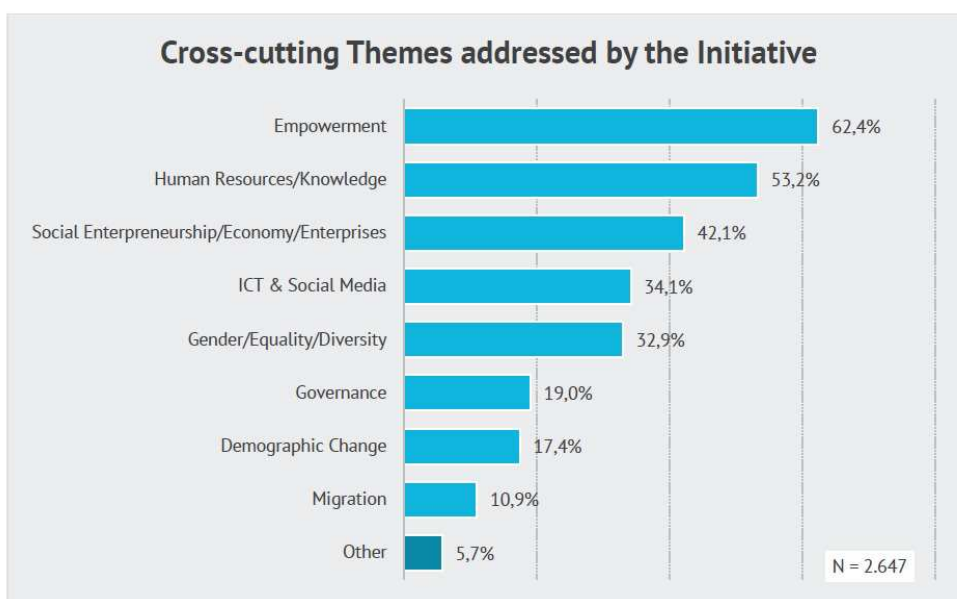
Table 2: Incentives, level addressed

	Education	Employment	Environment	Energy Supply	Transport & Mobility	Health & Social Care	Poverty Reduction
	%	%	%	%	%	%	%
Social Needs	72,3	67,5	59,8	64,9	57,0	82,5	77,8
Societal Challenge	51,0	55,3	71,7	87,0	47,7	62,3	64,4
Systemic Change	48,1	18,7	45,7	24,7	19,5	29,9	29,4

Source: [Howaldt, Schröder, Kaletka, Rehfeld, and Terstriep \(2016\)](#)

5.1.2. Empowerment

The notion of empowerment has gained interest in several disciplines. As a general concept, it is characterized by following a strength-oriented perception in contrast to a deficit-oriented perception. In social work, empowerment presumes active, collaborative roles for client–partners, instead of viewing clients as weak, passive and ineffectual ([DuBois & Krogsrud Miley, 2005](#)). In health care, patient -empowerment is seen as central when it comes to chronic diseases like diabetes, where the patient does 95 per cent of diabetes care and manage their diabetes on a daily basis between other goals, family demands, jobs and other contingencies that make up their lives ([Mitchell Funnel & Anderson, 2000](#)). For [Anderson \(2011\)](#), “empowerment is not a technique or a strategy but a philosophy. We define empowerment as the discovery and development of one’s inherent capacity to be responsible for one’s own life”. This occurs when people have the knowledge to make informed decisions, are able to implement those decisions, and then evaluate their choices based on the outcomes ([Anderson, 2011](#)).

**Figure1: Cross-cutting themes**

Source: [Howaldt et al. \(2016\)](#)

Originally coming from community psychology, the concept of empowerment has spread widely and is now also common in the discourses around civic engagement. Although empowerment has several dimensions, they all refer to informing about otherwise hidden features (which is crucial for informed decision-making), viable options and consequences, provide feasible alternatives.

In the mapping of social innovation initiatives within the SI DRIVE project empowerment was referred to in 62 per cent of all initiatives (Figure). However, considering that the next category – Human resources/knowledge – also refers to learning, which is essential in terms of empowerment as building up knowledge is crucial in order to be able to make informed decisions, a lot more initiatives probably incorporate issues of empowerment.

In the RUSZ case empowerment takes several forms:

Empower citizens (demand): One necessary insight was that people/households are actually unwilling to dispose of goods because of minor damages. Culture and values of preserving nature, avoiding waste and prolonging the use of goods exist, but shrivel without the necessary supply of services. So there is actually latent demand for repair services in case of just a broken switch or similar problems, but without the existence of repair services and moreover, without the information of the existence of repair services, appliances are passively stored in people's homes because they do not have the skills to repair themselves and not the knowledge about easy options of repair. In the case of RUSZ, media contributions about repair services immediately rose awareness and demand, before this latent, became apparent.

Empower citizens (competences): The most important feature of the repair cadfe is to empower citizens for self repair (Interview E).

Empower small repair firms (supply): A further insight was that craftsmen exist to carry out all these necessary repair services, however they are often small businesses in backyards, not visible to the public. "These craftsmen are often ingenious technicians, but quite bad at two things: self-marketing and account staff." ([Wien Energie-Magazin für Unternehmen, 2014](#)) Repair networks and a repair hotline helped to solve at least the self-marketing problem and, again, helped to engage otherwise passive resources – this time on the supply side, in making skills and competences available for the public.

Reduce asymmetric information: Furthermore RUSZ is very engaged in the discourse on planned obsolescence. This is based on competences of RUSZ: Repair service technicians are also the most likely to be able to detect (purposefully) in-built technical weaknesses.

"Purposeful obsolescence exists whenever manufacturers produce goods with a shorter physical life than the industry is capable of producing under existing technological and cost conditions; or whenever manufacturers or sellers induce the public to replace goods which still retain substantial physical usefulness." (Gregory 1947, cited in [Hübner \(2013\)](#)). For [Slade \(2006\)](#) planned obsolescence is defined as "an assortment of techniques used to artificially limit the durability of a manufactured good in order to stimulate repetitive consumption" ([Anderson, 2007](#)).

Conceptually, a basic ingredient to planned obsolescence is asymmetric information ([Akerlof, 1970](#)). At first, only manufacturers know about differences in quality of fea-

tures unobservable to the buyers of goods. In informing a wider public about quality differences that are not easily observed by lay people, this is a crucial function of empowerment and enables consumers to make more informed decisions. A basic ingredient for more information and hence making consumers take the responsibility on the basis of informed decisions are labels. The eco-design label for durable and easy to repair new electrical appliances (ON Rule ONR 192102) shall distinguish appliances in making otherwise hidden differences in quality (durability) apparent.

Challenge incumbent business models: The subsector of repair services of electronic devices is populated by service suppliers affiliated to large producers of these electronic devices. Staff of the large producers (that in case of bigger devices like washing machines also pays local visits) is equipped to either carry out the necessary repair services or sell a new device. In the case of selling a new device there are generally price reductions so that clients do not have to pay 1. Travel cost, 2. Estimate of cost, 3. Repair services and 4. the new device in case the old one cannot be repaired.

Hence, in terms of prices repair services do not only compete with other repair services, but also with the purchasing price of buying a new device. As repair services are inherently labour-intensive, whereas production of new devices is often less labour-intensive, firms may encourage staff members to carry out less repair but instead sell more products in order to increase labour productivity, and in the end profits.

An accelerated cycle of buying-using-discarding a product inflicts additional cost upon society in terms of increased waste, energy and environmental cost of production and transport of products. As (at least) parts of these costs are not paid for by the producers and covered by the prices new devices can be bought for. They are external costs that have to be carried by others than the producers (*negative externality*), which is termed a market failure in economic theory.

5.1.3. Imitation

From the mapping of social innovation initiatives we can see (Figure) that imitation actually takes place and makes initiatives spread. The point here is, however, that in contrast to businesses, social innovation initiatives actually want their solutions to be imitated because competition is weak in areas of burning social problems.

RUSZ is an exemplary case here as in the practice field of repairing, re-use and extending the life-time of products, **competition is weak** among repair service providers. Actually, firm entries are welcome in case they provide independent and reliable repair services. (Interview E) Protection of intellectual property hardly occurs, rather knowledge and practices are spread among the like-minded. However, competition is fierce with retailers of electronic devices and their associated repair services which are seen as affiliates of the sales department. They are the real competitors because due to differential taxation of labour and energy, new appliances may be supplied at low prices that hinder (labour-intensive) repair services systematically.

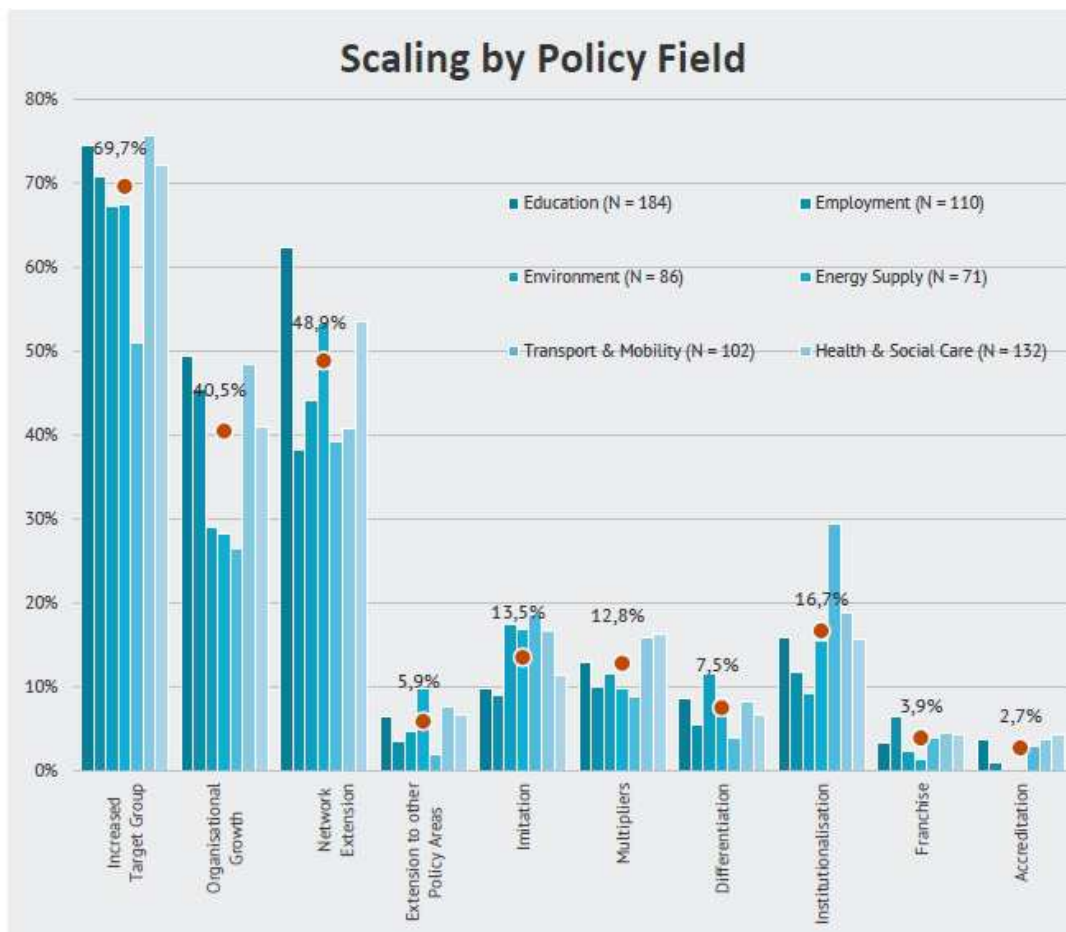


Figure 2: Scaling

Source; Taken from: [Howaldt et al. \(2016\)](#)

Protection of innovative solution

The firm name RUSZ was protected with a trademark years ago, but it was not renewed; as it causes additional cost and there does not seem the necessity to protect. There are no copyrights, patents or industrial designs. “We did not even protect our tuning of washing machines because apparently no one else is able to do it. We had to open our own laboratory for testing because big research organisations were not able to test according to this particular standard specification. So why bother? (Interview E)

Happy about competitors

“To be frank, I am happy about competitors – as long as they provide independent and reliable repair services. We have information in the internet about how to become a member of the Vienna repair network, and in that case a lot of information about how to do it is available. [...] In the last years, so many interested firms addressed us that at the moment we develop a handbook on social franchising in order to be able to make our complete know-how public.” (Interview E)

6. Conclusions

It seems that especially these three additional qualities of social innovations compared to service innovations in general – relating to incentives, empowerment, and imitation -, also yield special conclusions for the connection between social innovation and (social) change.

First, considering the direction of social change it is worthwhile thinking of innovation projects that are explicitly set up to solve social problems (e.g. of marginalisation, of social determination etc.) encounter barriers in a systematic way instead of viewing them as the product of singular achievements and pure chance. Intentionality is important considering that many innovation projects have some social impact as a wider effect.

Second, the very active roles of empowered citizens strengthened by social innovations may have an impact on new social practices guiding social change. They are able to make more informed decisions which hopefully contributes to bias tensions apparent in the system to smoothen more in favour of people and nature.

Third, imitation is a key aspect in the rapid dissemination of new service ideas and practices which are likely to accelerate change. In practice, the dissemination of new ideas and practices is challenging. This is due to two characteristics of social innovations. First, they tend to be very local in nature. Second, there is often a lack of codification ([Harrison et al., 2010](#); [Windrum, 2014](#)).

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STRATEGIC MATTERS OF THE CUSTOMER CO-CREATION IN SERVICE INNOVATION

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The paper analyses customer co-creation in service innovations. Despite plenty researches on co-creation, the studies on customer co-creation in creating and implementing service innovations are fragmentary. Referring to integrative literature analysis, the paper searches the answer for two research questions: (1) what and how firm resources and capabilities can facilitate the customer co-creation in service innovation and (2) what strategies and methods may be used for learning from and with customers for co-creation of service innovation. The performed study allows drawing the conclusion that the customer co-creation within the context of service innovation needs more research because current level of abstraction is too remote from theoretical insights and practical application.

1. Introduction

Global economy is transitioning from goods to service or solution-oriented, thus service innovation is widely recognised as a key source of competitive advantage (Chae, 2012). Service innovation is a combination of technology innovation, business model innovation, social-organizational innovation, and demand innovation, with the objective of improving existing services (incremental innovation), creating new value propositions (offerings) for stakeholders (customers, employees, shareholders, partners, communities, government, etc.), or creating new service systems (radical or transformational innovation) (Martin et al., 2016; Yen et al., 2012; Bishop et al, 2008). Russo-Spena; Mele (2012) describe the innovation as a co-creation process within social and technological networks in which actors integrate their resources to create mutual value. Thus the innovation is not an outcome (e.g. new service), but it is the process that involves discovering new ways of co-creating value through more effective participation in resource integration. Thus more and more firms expand their innovation activities through co-creation (Mahr et al., 2014) as the practice of developing systems, products, or services through collaboration with different stakeholders (Ramaswamy, Guillard, 2010). Customer co-creation describes the joint creation of value by the company and the customer, which occurs during service delivery and consumption (Prahalad; Ramaswamy, 2004). Service innovation, in contrast to product innovation, heavily engages customers in the innovation process. Due to this particular role of customer in service development and delivery, the organizations should

develop their collaborative competence in order to move away from treating the customer as a source of information, and towards perceiving the customer as an active contributor with knowledge and skills (Witell et al., 2011).

Co-creation has gained the attention of researchers; theoretical and empirical works have blossomed in different topics: the processes and tools (Hsieh; Hsieh, 2015; Durugbo, Pawar, 2014; Russo-Spena; Mele, 2012; Witell et al., 2011; Payne et al., 2008); the benefits (DeFillippi; Roser, 2014) and “dark side” of co-creation (Heidenreich et al., 2015; Gebauer et al., 2013; Verhoef et al., 2013; Plé et al., 2010), co-creation’s experience (Verleye, 2015; Jaakkola et al., 2015; Carù; Cova, 2015; Ramaswamy, 2011); the contribution for brand development (Wang et al., 2016; France et al., 2015), etc. Despite growing interest in co-creation, the researches on customer co-creation in service innovation are scarce (Frow et al., 2015; Bogers et al., 2010) and many questions are unanswered. Organisations should pay more attention to strategic matters of customer co-creation, e.g. to identify the most advantageous co-creation opportunities; to uncover and measure the impact of co-creation on innovation performance (Frow et al., 2015); to cope with complexity of selection and evaluation of the customers’ ideas (Bayus, 2013); to manage firm’s innovation strategy when customers are involved in new product or service development (Chandler; Vargo, 2011; Hoyer et al., 2010); to develop co-creation strategies (Hsieh; Hsieh, 2015), to reinforce co-creative mind-set and skill set of managers (Ramaswamy, 2009), to deeper understand how employees, especially frontline staff, contribute to co-creation for new service success (Santos-Vijande et al., 2016), etc. Co-creation changes the way companies think about strategies and operations (Ramaswamy; Gouillart, 2010; Prahalad; Ramaswamy, 2000). Even though co-creation with customers is becoming an important competition strategy, the role of the customer in service innovation remains underdeveloped (Sjödin and Kristensson, 2012; Alam, 2011; Ostrom et al., 2010) as well as the current understanding of the critical resources and activities to develop new services is inadequate given NSD’s importance as a service competitiveness driver (Menor et al., 2002).

The **aim** of this study is to enrich the understanding of strategic concerns of customer co-creation in service innovation and outline the future research lines. In particular, this inquiry tries to find out how the customer is enabled by organisation to take part in co-creation of service innovation. Two research questions are the following:

RQ1: what and how firm resources and capabilities can facilitate the customer co-creation in service innovation?

RQ2: what strategies and methods might be used for learning from and with customers for co-creation of service innovation?

The rest of the article proceeds as follows. First, the methodology and research design used collecting and analysing the relevant scientific articles concerning the customer co-creation in service innovation is described. Subsequently, the results are presented, and the key findings are discussed. The article concludes with the final remarks and outlines of future research.

2. Methodology and research design

This study uses an integrative literature review and addresses to strategic concerns about the customer co-creation in service innovation. As the method of integrated literature review requires clear naming of databases, time of search, the conduct of the search, data set, and selecting criteria (Callahan, 2010; Taracco, 2005). The literature search in our study was carried out by the article authors during the spring of 2016 utilizing the digital library resources of Kaunas University of Technology: *Academic Search Complete* and *Business Source Complete* (EBSCO Publishing), *Science Direct*, *Emerald Insight*, and *Web of Science* databases. In order to include appropriate articles in the review process, the title, abstract or keywords had to have the keywords combinations “customer co-creation”, “customer cocreation”; “customer as co-creator” and “service innovation”, “new service development”, “service development”. The articles selected follow the following three criteria: (1) the articles which were published in peer-reviewed journals, (2) the articles with accessible full text, (2) the articles presenting the studies which were carried out exceptionally in service industries, and (3) the time period of articles’ publishing (2006 - 2016). Working papers, the viewpoints, conference proceedings, the dissertations, the books chapters, the articles in press as well as articles not published in the English language or published before 2006 were excluded. It should be noted that our study focuses on the customer co-creation (not co-creation in general) and service innovation as an output and a process (the new service development or service development). The investigation refers to innovation in general; innovation in product-service system; e-service innovation as well as customer co-creation with online communities was excluded.

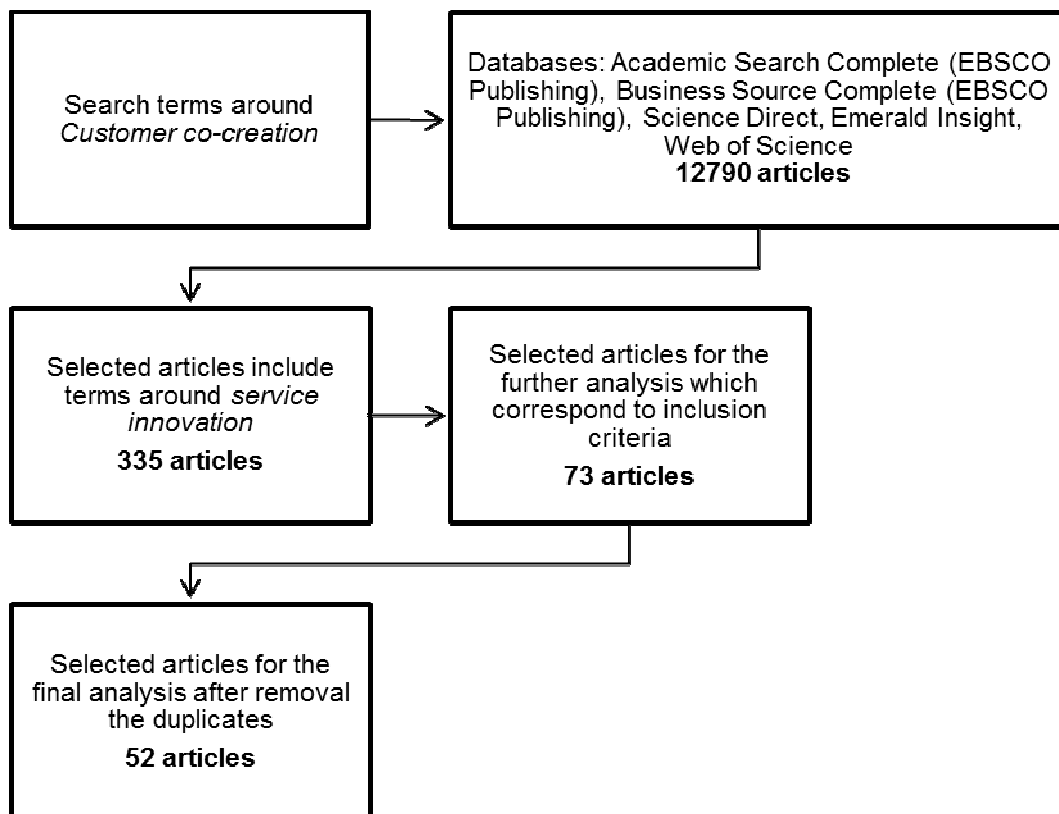


Figure 1 presents the pathway and number of articles remaining after each step of the selection.

Out of 52 articles selected for the final analysis 13 articles were theoretical / conceptual and 39 presented data of empirical researches. Most empirical researches were performed in B-2-C sectors (health care, tourism, accommodation, retail services, etc.); from B-2-B sector knowledge intensive business services, engineering services, telecommunication services, etc. were analysed.

3. Main findings and discussion

3.1. Organisation's resources and capabilities as facilitators of customer co-creation in service innovation

The understanding of value co-creation has been transformative in the business field. Companies are reconsidering themselves to handle the challenges in customers being more active, having open and easy access to information, and often desiring more interactive experiences with organisations (Sharma et al., 2014). Customers are widely recognised as co-creators and resource integrators, thus co-creation with customers for service innovation is essential. Hence, the organisation needs to provide resources which customers can unfold and leverage during the co-creation in service innovation. Moreover, due to complexity of services the organisation should develop the knowledge and skills required for more effective resource integration during co-creation and prepare the means by which customers will be engaged in service innovation. Emergence of a collaborative perspective on co-creation has emphasized the importance of different resources and their integration (Plé, 2016). Resources can be financial, physical, legal, human, organisational, informational, and relational (Hunt et al., 2002). Rusanen et al. (2014) name the creativity, knowledge, experience, and skills as resources. Innovation studies stress the significance of resources that reside outside, not inside, of the firm. This means an organisation should find and co-opt the resources from customers, partners, suppliers, etc. According to Rusanen et al. (2014), in service innovation studies the information, knowledge and technology are usually cited as external resources when other types of resource are seldom identified or elaborated. Based on multiple case studies findings, Rusanen et al. (2014) derive a three-dimensional theoretical model that discloses how service innovation resources – general information, ready-made resources, confidential information and tacit knowledge – are accessible through different types of relationships – social contact, arm's length relation, close exchange relation and development relation. Moreover, their investigation provides a comprehensive picture of resource's access for service innovation using the absorption, acquisition, sharing and co-creation as access strategies. Plé (2016) accentuates 12 types of potential customer resources that may be used in co-creation process: informational, emotional, physical, financial, temporal, behavioural, relational, social, cultural, and role-related (role size, role awareness and role clarity), customer ability and customer willingness. The author proposes a conceptual framework which demonstrates that service employees may integrate or not integrate the customer's resources depending on employee/customer interaction context, employee's own emotions, cognitions, and action. Thus the developing of the employees' abilities to analyse and understand the context of interactions is the imperative for service firms. Improving service employees' skills to analyse this context correctly and rapidly might

ameliorate the process of customer resource integration and increase the level of value or diminish the risk of value destruction. Heidenreich, Handrich (2015) reveal the customer's willingness as the resource to co-create in technology-based services (TBS). They define the willingness of a customer to co-create (WCC) as a condition or state which a customer is prepared and likely to create value together with the company by actively engaging in the service provision and consumption of TBS. Heidenreich, Handrich (2015) prove that WCC represents a key mediator between antecedent predictors – innovation characteristics and individual differences – and the probability of TBS adoption. Knowing the drivers of TBS adoption is meaningful for a firm success, especially for TBS, which demand particularly customers to co-create the service. Many researches emphasize the significance of communication with customers and within the organisation, but the investigation that employs the communication theories for deeper understanding of customer co-creation has been infrequent. This dearth was partly diminished by study of Gustafsson et al. (2012). They look at customer co-creation as a communication process that is frequent, bidirectional, and face-to-face for creative problem solving or innovation. The research findings show that communication frequency, direction, and content have a positive and significant effect on success of incremental innovation. For radical innovation, communication frequency has a positive effect, but the content, on the contrary, has a negative significant effect on service success. Gustafsson et al. (2012) pay attention to that in combining the co-creation and innovation it is important to choose relevant methods which differ depending on what innovation, incremental or radical, is developed. Thus in order to ameliorate the service innovation success, an organisation should be spent more time communicating with customers. Hsieh, Hsieh (2015) emphasize two-way communication that helps the acquisition of customer's knowledge. They propose new construct of dialogical co-creation and emphasize that dialogue is the essence of co-creation. The dialogue refers to learning and communication between companies and customers as two equal problem solvers rather than to merely listening to customers. According to Hsieh, Hsieh (2015), the dialogic co-creation influences the customer relationship strength (relational resource), valuation of knowledge (informational resource), and capability of customization (organizational resource) and facilitates the service innovation. Thus organisations that intend to develop service innovation should adopt a dialogic co-creation to interact with customers.

For successful customer co-creation an organisation should contains the multiple capabilities. Helfat (2003) defines capabilities as organisational abilities to perform a co-ordinated task, utilising resources for the purpose of achieving a particular final result, e.g. service innovation. This means that the capabilities and performance are interlinked. Carrol; Helfert (2015) argue that capabilities are no longer an internal issue to generate the change and business value. Nowadays growing number of service firms employ increasingly more and more external resources, thus service innovation requires intra- and inter-organisational cooperation. Dynamic and complex environment in which operate service businesses requires the dynamic capabilities. According to Kindström et al. (2013), the dynamic capabilities are routines within the firm's managerial and organizational processes that seek to gain, release, integrate and reconfigure resources; as the result, the dynamic capabilities are change-oriented. Dynamic capabilities not only adapt a firm's resource to evolving customer demands and market tendencies, but also allow firms to shape their environment through innovation and collaboration with their customers (Teece, 2007). By applying dynamic capability theory in co-creation context Sharma et al. (2014) investigate the

role of organisational capabilities to support customer participation in health care service innovation. They disclose four organisational capabilities and classify them into categories around the customer and provider spheres identified by Grönroos and Voima (2013). The customer activation and organisational activation are linked to organisation's capability to motivate and arrange both actors to come together and integrate the operant as well as operand resources to co-create service innovation. On the one hand, an organisation needs to identify and mobilise customers, understand their explicit and implicit needs, and enhance customers' skills in order that they would be able to integrate resources. On the other hand, an organisation must provide a supportive leadership and relevant resources. Interactive capabilities are the base of effective dialogue between the organisation and the customers. Interactive capabilities are necessary to propel the customers in dialog, enhance the development of their skills, and provide them aid and opportunity to create value and learning through the interaction. The last category of capabilities identified by Sharma et al. (2014) is learning agility that demonstrates the organisation's capability to systematically react to the opportunities identified and implement emerging innovations' solutions. In other words, an organisation needs this type of capabilities for being flexible and constantly adapt the changing needs of customers.

As it has been mentioned above the creativity is important resource for service innovation. Giannopoulou et al. (2014) try to answer the question how an organisation can reinforce creativity in developing the innovative services. Any innovation requires creativity; therefore the creativity is an integral part of service development. It is noteworthy that creativity covers all aspects of the service innovation process starting from an idea and finishing the launch of a new service. Giannopoulou et al. (2014) synthesised creativity reinforcing practices in order to propose capabilities enabling strengthen creativity in NSD process. The involvement of creative customers was mentioned as good practices for creativity. The research shows that having direct client interaction is seen as important source of new ideas for service innovation. Moreover, it is really important to involve the customer as early as possible in the ideation stage to fuel the creation of prospective solutions. Jaakkola et al. (2015) accentuate the significance of collaborative capabilities that are obligatory for resource integration and a great impact on shaping customer experiences. Service experience can be influenced by customer and other multiple actors, during and beyond service environment, and be shaped by moments from past and future. Jaakkola et al. (2015) provide insights for firms in relation to why and how to facilitate service experience co-creation. The firms should perceive the complexity of customer experience for capturing and employing these inputs to facilitate innovation, learning, and strategic planning. Chuang; Lin (2015) indicate the importance of the cooperation capabilities as firm's abilities to cooperate with customers and partners in accumulating and exchanging knowledge, formulating strategic decisions, or providing specific services. Tsou, Chen (2012) point out those cooperation capabilities encompass the absorptive capacity, coordination capability and relational capability. The latter is exclusively important for service innovation. Hence, to be competitive, an organisation should manage skilfully the resources and capabilities in co-creation processes and enable service innovation (Kim et al., 2015) as well as to translate customers' participation in co-creation activities and their efforts into new capabilities for organisation (Tseng; Chiang; 2016).

3.2. Strategies and methods used for learning from in with customers for co-creation of service innovation

Customers are recognised as a valuable and the biggest source for gaining direct and reliable market intelligence as well as for testing and launching new services (Kristensson et al., 2008; Sigala; Chalkiti, 2007), improving the new product performance (Feng et al., 2014). Therefore obtaining in-depth knowledge and understanding of the customers' needs and wants is a necessary resource and a major determinant of service innovation success (Sigala, 2012). Customer involvement and customer engagement are considered most often used methods to get the external knowledge and integrate resources (Feng et al., 2014; Jaakkola; Alexander, 2014). An involvement, in general, is a fuzzy concept that encompasses many different meanings (Solomon, 2002) and becomes even more complex when used as an umbrella conception for many similar but different words, e.g. customer participation, customer integration, customer engagement and more (Dadfar et al., 2013). Most frequently customer involvement is defined as degree to which customers are included to participate in shaping the end service/product that they receive (Boyer, Verma, 2010). Similar to meaning of involvement (customer involvement) is the term of engagement (customer engagement). According to Chen et al. (2016), an engagement is the creation of experiences that allow companies to build deeper, more meaningful and sustainable interactions with customers. Brodie et al. (2011) define customer engagement in value co-creation as the level of a customer's motivational, brand-related and context-dependent state of mind characterized by specific levels of cognitive, emotional and behavioural activity in brand interactions; Higgins; Scholer (2009) claim that customer engagement is a state of being involved, occupied, fully absorbed or engrossed in something, generating the consequences of a particular attraction or repulsion force. Despite some differences between customer involvement and customer engagement both concepts are used to define the participation of customer in co-creation process in reviewed articles.

Customer integration provides visible benefits for innovation such as provision of novel ideas, cost reduction, validation of service design, increased willingness to pay and market acceptance, learning from and with customers (Homburg; Kuehnl, 2014; Edvardsson et al., 2012). At the same time, during customer integration in NSD an organisation can face many costs, e.g. identifying and incentivizing appropriate customers, capturing and converting customers' future need for innovations, higher co-ordination efforts and increased workload of NSD team, concerns of secrecy and ownership of intellectual property, risk of serving a niche market, etc. To avoid the situation when the costs outweigh the benefits an organisation should determine the optimum level of customer integration practice (Homburg; Kuehnl, 2014). According to Edvardsson et al. (2013), the benefits of customer co-creation are influenced by the way in which NSD is organised. They uncover the significant contribution on NSD performance of interaction between customer co-creation and integrated NSD development team. This means NSD project managers should look at the individual competencies of the members of team and how they interact with customers throughout entire NSD process. Kristensson et al. (2008) propose the key strategies required for the successful involvement of customer in the co-creation of new technology based services (TBS) and delineate the function of each of them. As authors mentioned, the co-creation involving the customer obliges to rethink the traditional view on strategy when a company attempts to acquire the knowledge about customer value. The

companies should finish producing value in products/service and expecting that this may be exchanged to their customers.

Edvardsson et al. (2012) draw attention how customer integration can be managed using different methods within service development. Based on two dimensions, "situ" (insitu and exsitu) and "context" (incontext and excontext), which are linked to the SDL concepts of "co-creation" and "value-in-context", four use information modes (*the correspondent, the reflective practitioner, the tester and the dreamer*) and them relating methods were presented. These investigators make a distinction between static and dynamic (interactive) methods but stress that customer integration should provide information that concerns the resource contexts (static information) and mechanisms (dynamic) in use situations. Furthermore, they advocate using of duplex method to assure the learning from and with customers. According to Melton, Hartline (2015), to make customer co-creation of radically innovative service an organization should focus on customer involvement in the design phase and supplement traditional marketing research methods (e.g. surveys and focus groups) with techniques that build an understanding of how the customer creates value-in-context. The authors propose using ethnographic methods for observing how customer use services in context and better understand how the service might be transformed for increasing the benefits or improve customer efficiency and productivity. Moreover, service organization should utilize the innovator's toolkit or provide customers materials with which to experiment and devise new product concepts. Two valuable methods to involve customers in new service development based on dialogue are presented by Konu (2015a; 2015b). The first, Delphi method, was used for developing new product in nature-based tourism, the second one, ethnography approach, for testing the forest-based wellbeing tourism product. The results show that the Delphi method is suitable for involving customers in the front-end stages of the NSD process due to providing the rich information for the idea generation and evaluation phases. Konu (2015a) put attention that the Delphi technique's iterative nature makes it possible for customers to contribute to the process in several stages of NSD and also change and evolve their views and recommendations. According to Konu (2015a), the Delphi technique has allowed getting few very innovative ideas. Usefulness of ethnography approach for NSD was proved by during the study in forest-based wellbeing tourism. Konu (2015b) study's findings show that an ethnographic approach brings versatile and detailed information that benefits different stages of NSD and the advancement of the service concept, improvement service process and development service system. Elg et al. (2012) used diary method when studying co-creation in health care. This study shows that knowledge available in customer diaries is not limited to ideas. Learning from a diary-based method may include summary report and learning narratives. As researchers note, these learning methods give knowledge about the value creation at patients' home or in their interactions with other health care institutions. This means that using of a diary method health care providers can understand the individual patient from a holistic perspective. Witell et al. (2011) note that proactive market research technique's enable customers more say and more effective contribute in generating novel ideas. They give customers to develop their own needs (value-in-context) whereas R&D personnel develop ideas for others. Mahr et al. (2014) pay attention to the choice of communication channels in customer co-creation during innovation process. Their study examines the differences between co-creation via face-to-face, voice-to-voice, and bit-to-bit channels. These channels differ by "richness" or ability to transfer the message comprehensively and "reach" or ability to cross geographical and temporal boundaries. The authors state that the

channels increase or decrease the effectiveness of customer co-creation depending on the nature of involved customer.

Success of service innovation depends on innovativeness and quality of ideas generated by customers. Thus the suitable customers should be selected. What customer – lead or ordinary – is more valuable for co-creation in service innovation in sense of learning? Usually, a lead user has been shown as the highest potential to provide attractive innovation ideas. The main argument of this statement is that they are ahead of market trend (Nijssen, 2014; Mahr et al., Carbonell et al., 2012) and experience problems before others or ordinary customers do. Moreover, lead customers are treated as wishing to explore ways to develop solution of particular problem in cooperation with company. Thus, the positive effect of involving lead users in NSD on service newness and service advantage was indicated by Carbonell et al. (2012). Lead users are familiar with conditions that lie in the future for most others, thus they can help firms acquire need and solution information that will be useful for new services. Schuhmacher; Kuester (2012) put attention to lead user characteristics (in detail, ahead-of the-trend, dissatisfaction, consumer knowledge, use experience, involvement, intrinsic motivation and extrinsic reward) which turn people into suitable participants to develop innovative service. According to Schuhmacher; Kuester (2012), firms should design their idea contests or, in general, the innovation on closed - membership policy. This means that only people who meet specific characteristics should be admitted. On the contrary, Kristensson et al. (2008) suggest that heterogeneous group of users should be involved in generation of ideas of new service development. Similar position is demonstrated by Mahr et al. (2014). As mention the researchers, integrating multiple customers with different characteristics ensure the dynamics of relationships. At the same time they propose a purposeful rotation of co-creating customers and innovation project members to minimize negative effects of knowledge overlaps due to close relationships. Some menace concerning NSD project team was identified by Carbonell et al. (2015) also. They ascertain that team members with prior experience are more likely to disclose, advocate for and discuss options and ideas related to prior projects and less likely to use the feedback coming from customers involved in NSD for project-related decisions. The authors suggest that recording and reviewing of customer information with others inside and outside the NSD team can lead to greater information use.

In summary it is possible to state that organizations facilitate customer co-creation in creating service innovations by enabling different resources and abilities. It is possible to achieve expected results, i.e. success of service innovations, by involving suitable customers and using the methods that enable involvement of customers not only into ideas' generation but also integration into the entire process of creating a new service.

4. Final remarks and future research lines

Customer co-creation in service innovation is rich, complex, dynamic field, in which new approaches and contributions constantly emerge. Thus, the space remaining for future research is quite vast. On the basis of the analysis, we would like to conclude with the following lines for future research.

First, future research should deeper explain the co-creation from a strategic perspective and identify the most advantageous co-creation opportunities.

Second, more attention should be paid to evaluation of the influence on customer co-creation in service innovation of different organisational variables, e.g. including resource and capabilities development, leadership, communication, learning, etc. The benefits and costs/risks of customer co-creation as well as possible constrains of customer co-creation should be presented more clearly. Moreover, future studies could refer to how cultural factors (e.g. employee and customer from different cultural backgrounds) and market dimensions (competitive intensity, market uncertainty, etc.) affect the customer co-creation and service innovation performance.

Third, more attention should be paid to customers' selection and examine how customers' attributes influence the resource integration during co-creation of service innovation; how customer should be trained for limiting the possible value destruction, etc.

Fourth, future research should involve the broader spectrum of services and find out peculiarities of customer co-creation in B-2-C and B-2-B sectors. More attention should be paid to customer co-creation in technology-based services (TBS). The customer co-creation in new TBS development should reduce uncertainty raised by technological changes and using of new technologies for service innovation.

Fifth, it is also necessary for more longitudinal, large-scale investigation on customer co-creation in service innovation. Thus so far most investigation has been based on the case studies or experiments. In order to make it possible, first of all it will be necessary to operationalize main constructs.

To sum up, the customer co-creation within the context of service innovation needs more research because current level of abstraction is too remote from theoretical insights and practical application (Perks et al., 2012; Grönroos; Ravald; 2011).

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SUSTAINABILITY REPORTS BY SERVICE SECTOR COMPANIES IN THE DECADE OF CLIMATE CHANGE.

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In this paper, we analyze the evolution of the main indicators of Sustainability Reports registered in the Global Reporting Initiative (GRI), particularly by companies from the sectors where the literature recognizes a greater possibility for green investments. Many companies belong to the service sector; Transport, Waste management, Water utilities, Education, Health, New Technologies related to Renewable Energy; and other sectors such as Agriculture, Construction, Energy or Infrastructure. Through descriptive and predictive statistical techniques, such as decision trees, we obtain evidence that the economic crisis has not had a negative effect on the development of sustainability reporting. Furthermore, we can confirm a steady increase in reports from companies in these sectors that are ever more transparent and of better quality.

1. Introduction

A formal definition of Corporate Social Responsibility (CSR) is the following: A set of obligations and commitments, legal and ethical, national and international, along with interest groups, arising from the impacts of the activities and operations of organisations, results in social, occupational, environmental and human rights. That is, CSR affects the very management of organisations, both in their productive and commercial activities, and in their relationships with interest groups (stakeholders). It influences all types of organisations, public or private or non-profit, in all their dimensions and performance as well.

Consequently, issues related to CSR would be **sustainable development**, management of **economic, environmental and social impacts** of business operations and underwriting **profitability**, not only for shareholders but also for other interested parties whom the company's activity affects.

A **triple goal** for businesses could be outlined as: to be economically viable, socially beneficial and environmentally responsible. That is, the objectives of sustainable development would be **environmental protection** (prevent and reduce environmental pollution and promote sustainable production and consumption), **cohesion and equality** (promoting a democratic society, cohesive, healthy, safe and just, that respects **fundamental rights** and cultural diversity), **economic prosperity** (development towards being prosperous, innovative, knowledge-rich, competitive and envi-

ronmentally friendly), and **fulfil our international responsibilities** (to ensure that internal and external policies of the European Union are consistent with sustainable development).

Focusing on the aspect of **sustainable development**, The World Commission on Environment and Development, in its report "Our Common Future" known as the Brundtland Report, published in 1987⁷⁷, coined the famous definition of **sustainable development** as "one that meets present needs without compromising the ability of future generations to meet their own needs".

The environmental impact of economic activity on our planet is manifested in various aspects. One of these, which has unfortunately been highlighted in recent years, concerns climate change. There are numerous references to climate change and strategies for its mitigation based on various sectoral actions for fighting together against environmental deterioration.

The adoption of the Paris agreement, in the Conference of the Parties Twenty-first session in Paris, 30 November to 11 December 2015, recognizes that climate change represents an urgent and potentially irreversible threat to human societies and the planet and thus requires the widest possible cooperation by all countries, and their participation in an effective and appropriate international response, with a view to accelerating the reduction of global greenhouse gas emissions.

To achieve an accelerated reduction of global greenhouse gas emissions, important and controversial political decisions must be taken, and companies will also have to play a leading role. Apart from strategic decisions on their market positioning, companies need to take decisions regarding investments, systems of responsible and sustainable management and the extent of collaboration.

One of the most important initiatives for sustainability has been the **Global Reporting Initiative (GRI)**. The American Coalition for Environmentally Responsible Economies (CERES), along with the Programme of the United Nations for the Environment (UNEP), created this project. GRI began in 1997, published the first guide in 1999 and the final version in 2000 (www.globalreporting.org).

GRI is a process multistakeholder. It is an independent institution whose mission is to develop guidelines and disseminate globally applicable sustainability. These Guidelines are for voluntary use by an organization when preparing a report on the economic, environmental, and social dimensions of its activities, products, and services. It's the main international standard report for the development of CSR or sustainability. The philosophy underlying this information tool is the triple account of results or Triple Bottom Line in its English terminology. This involves talking about sustainability.

In this work we have accessed the sustainability reports database published by the GRI from 1999 to 2015, and we analyze the main indicators contained therein.

⁷⁷ <http://www.un-documents.net/wced-ocf.htm>

2. Objectives

Two main lines of action should be taken that we believe will be the keys to success in the strategy to combat climate change and environmental degradation. These are green investments and socially responsible policies in the business world. The literature supports that there are great opportunities for businesses in CSR and green investments, in areas such as Infrastructure investment required for sectors such as Agriculture, Transport and Water, Construction, Energy, Infrastructure, Waste Management, Water Utilities, Education, Health, and New Technologies related to Renewable Energy.

In this paper we analyze responsible management policies from different companies from all the sectors, but particularly from the sectors where the literature recognizes a greater possibility for green investments. This analysis will be undertaken utilising the main indicators of the sustainability reports registered by GRI.

Therefore, our main working hypothesis will be:

H1) Obtain evidence that the economic crisis has not had a negative effect on the development of sustainability reporting.

H2) Analyze the content of the main indicators of the sustainability reports of the database GRI, to verify fulfillment of the most important quality requirements, such as transparency, flexibility, comparability and participation of the stakeholders.

H3) Verify that in the sectors where the literature recognizes that there are greater possibilities for green investments as a result of climate change, an increase in the quantity and quality of sustainability reporting is occurring despite the economic crisis.

3. Methodology

On the one hand we carry out a review of the literature analyzing the advantages and disadvantages of CSR and the benefits for businesses of implementing sustainable management.

On the other hand, we analyze the evolution of the main indicators of Sustainability Reports registered in GRI, in general on all the sectors, and particularly on the sectors companies in which the literature recognizes greater chance of green investments, to compare the relationship between the different indicators through descriptive statistical techniques, and some predictive, such as decision trees.

Decision trees are predictive models to solve problems of discrimination in a population segmented to finally obtain a reliable classification into homogeneous groups, according to the variable interest (Perez, 2016: 599).

They are predictive models because the segmentation of the population is made according to the values of the variable of interest, that playing the role of the dependent variable in the predictive model in the tree (qualitative variable). The assignment of a population to a segment element is performed according to the values of the independent variables of the model.

Therefore, what it is done is select the explanatory variables that are more discriminants for the dependent variable and construct a decision rule for allocating a new individual or class to a value of the dependent variable.

However, this method does not consider simultaneously the set of explanatory variables, because examines them one by one, looking first the x_j variable that best explains the dependent variable y . This would define a first division of the sample into two subsets called segments. After, the process it is repeat in each of the two segment, looking the second explanatory variable, and so on until the process ends with a previously established statistical norm.

In our case we will try to know what kind of indicators of sustainability reports have been more likely to be carried out by companies. The first selection could be done by company size. A second selection could be done because of the ranges of years of publication. A third of the region of the company. And finally in reason of sector. This technique is intended to apply to each of the main indicators that represent the highest quality in the preparation of the reports of sustainability. Prior to this, there will be conducted a descriptive analysis in which the evolution of the preparation of reports under the GRI methodology globally, for each of the main indicators contained in the GRI database is displayed.

4. Bibliographic review

The growing attention to issues of sustainable consumption is a natural outcome of decades of work on cleaner production and ecoefficient industrial systems. It represents the final step in a progressive widening of the horizons of pollution prevention a widening which has gone from a focus on production processes, to products (eco-design to lower product impacts), then to product-systems (incorporating transport logistics, end-of-life collection and component reuse or materials recycling), and to ecoinnovation (new products and product-systems designed for win-win solutions for business and the environment) (UNEP, 2002).

Also from international organisations important recommendations have been published to promote sustainable development and help curb climate change (World Bank, 2010).

Meanwhile, the Human Development Report (UNDP, 2013) affects virtually the same issues as those highlighted by the World Bank. That is, it highlights the rise of the South, and what they call the "drivers" for more effective development: a developmental dynamic state, the ability to connect with global markets and the promotion of social inclusion and human development of large amplitude. That is to say, trade relations between Southern countries are increasing, although the need for international cooperation to carry out all the policies is still needed, mainly in areas such as education, health and the environment, not to mention the great infrastructure investments. All of this represents a wealth of opportunities for innovative companies and for generating clean and sustainable technologies.

The Lalonde Report –A New Perspective on the Health of Canadians (Canadian Government, 1981)– pointed out the existence of the so-called counter-forces which constitute the dark side of economic progress. They include environmental pollution, city living, habits of indolence, the abuse of alcohol, tobacco and drugs, and eating

patterns. The report emphasised that physicians, surgeons, nurses and hospitals together spend much of their time in treating ills caused by adverse environmental factors and behavioural risks. It confirmed that self-imposed risks and the environment are the principal or most important underlying factors in each of the five major causes of death between ages one and seventy. So, unless the environment is changed and the self-imposed risks are reduced, the death rates will not be significantly improved. It presented the first proofs and measures of the total effect of air pollution on health, establishing a direct cause-and-effect relationship between air pollution and sickness.

With Lalonde's Report, a new line of research was opened and it continues nowadays. Currently, the World Health Organisation (WHO) promotes a number of studies on the relationship between environment and health (N. Bruce et al., 2014).

Outdoor air pollution is a major environmental health problem affecting everyone in developed and developing countries alike. WHO estimates that some 80% of outdoor air pollution-related premature deaths were due to ischemic heart disease and strokes, while 14% of deaths were due to chronic obstructive pulmonary disease or acute lower respiratory infections; and 6% of deaths were due to lung cancer.

A 2013 assessment by WHO's International Agency for Research on Cancer (IARC) concluded that outdoor air pollution is carcinogenic to humans, with the particulate matter component of air pollution most closely associated with increased cancer incidence, especially cancer of the lungs. An association has also been observed between outdoor air pollution and increase in cancer of the urinary tract/bladder (Loomis et al., 2013).

The speed with which the increases in disease incidence have occurred in recent decades rules out genetic factors as the sole plausible explanation. Environmental and other non-genetic factors, including nutrition, age of mother, viral diseases and chemical exposures, are also at play, but are difficult to identify. Despite these difficulties, some associations have become apparent. Since human studies can show associations only, not cause and effect, it is important to use both human and animal data to develop the evidence for a link between exposures to endocrine disrupting chemicals (EDCs) and human disease. Even so, it may never be possible to be absolutely certain that a specific exposure causes a specific disease or dysfunction due to the complexity of both exposures and disease aetiology throughout the lifespan (WHO, 2013).

Most sources of outdoor air pollution are well beyond the control of individuals and demand action by cities, as well as national and international policymakers, in sectors like transport, energy waste management, construction, and agriculture.

In Martín, J.A., Pérez, C. and Navarro, J.L.(2016), it's analyzes the relationship among CO2 emission, mortality rate, and green investments, the later estimated by the volume of investment in R&D. Theirs estimates showed in both cases a positive and statistically significant relationship between CO2 emissions and these two variables, mortality and R&D investments.

Regarding the service sector, we believe that their contribution to climate change must be analysed through the transport subsector, because the growth of economic activity and the transport models (Alcántara, V. & Padilla, E., 2005) are two main factors behind the increase in CO2 emissions worldwide. Some studies estimate its

contribution between 13 and 25% of total CO₂ emissions in the world (Comisión de Transportes del Colegio de Ingenieros de Caminos, Canales y Puertos, 2010). These figures can be corroborated with the series offered by the World Bank⁷⁸, which reports that emissions in 2010 reached 33,615 million Metric Tons of CO₂, of which 5,811 were generated by the transport sector (including domestic aviation, road and rail transportation of people and products). These modes represented in 2010 over 17% of total emissions, excluding marine bunkers and international aviation. This question was analyzed by Martín J.A. and Navarro, J.L. (2014).

Regarding green investments, the IMF has provided a macroeconomic definition of green investment. A recent IMF Working Paper by Eyraud et al. (2011) refers to green investment as “the investment necessary to reduce greenhouse gas and air pollutant emissions, without significantly reducing the production and consumption of non-energy goods”. It covers both public and private investment. There are three main components of green investment. These are low emission energy supply (including renewable energy, bio fuels and nuclear), energy efficiency (in energy supply and energy consuming sectors), and carbon capture and sequestration (including deforestation and agriculture).

Dramatic upgrades in technology, skills, policies and business models, along with an aligned public consciousness, are needed for the transition to a green growth pathway. Infrastructure investment required for sectors such as agriculture, transport, water and power under current growth projections stands at about US\$ 5 trillion per year to 2020 (The World Economic Forum-WEF, 2013). Additional investment needed to meet the climate challenge—for clean energy infrastructure, sustainable transport, energy efficiency and forestry—is about US\$ 0.7 trillion per year.

Another interesting approach is based on knowledge of the opinion of companies regarding the implementation of sustainable management strategies in times of crisis like the present. As a result of the financial circumstances, many companies have been forced to curtail their spending, including that related to Corporate Social Responsibility (CSR), since it generates more costs (Fernández-Feijóo Souto, B., 2009; Orlitzky, Schmidt, & Rynes, 2003). Other firms think that some CSR initiatives could be delayed or cancelled due to the financial crisis (Njoroge, J., 2009). However, at the same time, the global financial crisis also provides wide opportunities for responsible companies in terms of brand reputation, employee satisfaction, economic efficiency and improved productivity.

Although social initiatives represent an additional financial cost, in times of crisis, we recommend the implementation of CSR in seven areas of consensus: innovation, workplace environment, stakeholder participation, business strategy, market orientation, investor confidence and internal revision (Fernández-Feijóo Souto, B., 2009; Porter, M. E. & Kramer, M. R., 2002).

Karaibrahimoglu (2010) investigated the performance of CSR in the period 2007 (before the financial crisis) and 2008 (the beginning of the crisis in the American market) from the perspective of stakeholders. The study used a sample of 100 firms randomly selected from the "Fortune 500" ranking. The performance analysis was

⁷⁸ <http://datos.bancomundial.org/indicador/EN.CO2.TRAN.MT>

done by means of a content analysis of non-financial annual reports. The results show a decrease in CSR projects due to the financial crisis. This decrease is greater in the U.S. than in Europe.

However, Giannarakis and Theotokas (2011), using a transformation in the levels of implementation of the GRI for evaluating the responsible performance of 112 companies in 2007-2010, obtained an increase in the performance of the responsible companies before and during the financial crisis, except for the period 2009-2010.

The results of the work of Jacob (2012) show that the financial crisis of 2008 had a clear impact on CSR initiatives in many companies, due to the exceptional pressure that companies had to face to survive; with massive layoffs and cuts in spending on community involvement programs. However, not all the impacts of the crisis were negative. Some areas related to CSR were boosted and were reinforced after the crisis, such as corporate governance, environmental policies and compensation policies. The companies gave more importance to issues related to interest groups that they perceived as the most influential. Therefore, a subject such as environmental policies constituted a risk if the "green investors" were to decide to withdraw their support.

Jacob shows that social risks affecting the business reputation are explicitly presented in the annual reports with direct reference to environmental and human rights issues. The supply chain management and the risks associated with compliance with codes of business conduct are also highlighted in these reports. The importance of social risks and their impact on the reputation of companies is usually made explicit in internal reports, but not in published annual reports on CSR practices.

From the consideration of CSR practices in a context of strategic positioning of companies, Fernandez-Feijoo (2009) combines the concepts of CSR and crisis, concluding that, in times of crisis, CSR can go from being considered a threat to becoming an opportunity. The idea is that the economic crisis accentuates certain business needs that can be solved by the implementation process of CSR. Such needs include innovation, the work environment, the role of stakeholders, business strategy, market orientation, investor confidence and a deep inner revision.

The implementation of responsible practices requires an innovation process that is the key to achieving long-term survival of the company, which is perfectly compatible in periods of crisis. At the same time, CSR provides a desirable work environment where motivation and corporate culture permit facing periods of crisis. CSR creates an alliance with stakeholders that reorients the perceived risk of these crisis periods to the company. From the point of view of business strategy, CSR reinforces the process. CSR strengthens transparency and communication of the company, allowing it to fortify its market position. Transparency and communication prevent distrust of investors, something critical in times of crisis.

In short, the development of CSR implementation processes in businesses compel an internal revision of identity, modes of operation, and attitudes towards responsible values in times of crisis, with the guarantee of their survival. However, we can find various business reactions; some opt to strengthen responsible practices as a strategy to combat the crisis; and others, on the contrary, seek to reduce the costs associated with CSR in the short-term to meet the challenges imposed by the financial crisis (Yelkikalan, N. & Köse, C., 2012).

What this crisis has clearly shown is that CSR is a phenomenon that is here to stay. This is not a fad or a temporary trend. CSR is increasingly linked to the business strategy of strengthening businesses in the long run. The partnership strategy with stakeholders provides a distinctive character to traditional competitive strategies. We cannot expect CSR to be the only solution for crisis; neither can the adjustment processes on employment or wages be avoided. However, it is important to evaluate its cumulative positive effects on relationships with other social and economic agents, as well as in relation to the protection and preservation of the environment.

Focusing on the content of sustainability reports prepared by the GRI methodology, the analysis has three areas: GRI Index and profile, GRI Principles and GRI Indicators (GRI, 2002-2015).

In the first two, GRI Index and profile and GRI Principles, we evaluate the quality of information provided on CSR management systems in the enterprise. In the final GRI Indicators, we evaluate the quality of content in terms of CSR provided in the documents examined.

The Global Reporting Initiative indicators are:

Economic performance: Customers, suppliers, etc.

Environmental performance: Raw materials, energy, water, biodiversity, etc.

Social performance - labour practices.

Social performance - human rights.

Social performance – society.

Social performance - product liability.

The Global Reporting Initiative principles are: Transparency, Inclusiveness, Auditability, Completeness, Relevance, Sustainability Context, Accuracy, Neutrality, Comparability, Quality and Periodicity.

There's a old debate, even today, regarding the requirement that companies generate mandatorily sustainability reports. The results of the second global survey on attitudes of stakeholders to the information CSR (Pleon, 2005), shows that more than 60% of the sample believed it would be good that CSR was incorporated into the annual financial reports, among other reasons for this would imply recognition of the importance of social and environmental aspects for the company, and forcing to report on these aspects to companies that otherwise would not.

For a sustainability report to be useful to all potential users, the information you collect must meet the requirements of relevance, reliability and verifiability. It is also important that the information collected is relevant in social and environmental terms and accessible to potential readers.

The importance of the sustainability report GRI is that it's an international voluntary standard, which provides information on the economic, environmental and social dimensions of their activities. In its development, the most demanding level is the "A +", which rests on transparency and third party verification, in order to balance flexibility in developing and achieving greater comparability among informants. All these requirements are those positively valued the different stakeholders in the Pleon

2005 survey. In this survey 65% felt it was a step towards standardization in order to provide comparability, in addition to its flexibility (57.8%) and the possibility of use as a benchmarking tool (49%).

5. Results

5.1. The main indicators of Sustainability Reports registered in GRI.

The main indicators contained in the database GRI sustainability reports are:

External Assurance: All of the information related data points below is taken from the available assurance statement found in the Report.

Level of Assurance: (is the complementary information)

1. Limited/ moderate
2. Reasonable/ high
3. Combination: Both a Limited/ moderate and Reasonable/ high level were applied to (different parts of) the report
4. Not specified

Integrated: Indicates whether or not the report includes both non-financial and financial disclosures, beyond basic economic information. Organizations self-declare whether or not their report is integrated.

Stakeholder Panel Expert Opinion: Indicates whether there was formalized input to or feedback on the report provided by a panel of stakeholders or expert(s).

Within these indicators, there are references to other international standards, whose compliance by companies complements and reinforces rather broadly management sustainability. These standards are the following:

Codes of Conduct for Multinational Enterprises OECD (OECD, 2011). They are a set of voluntary principles and standards for companies adopted by adhering government, which is expected to multinational companies adhere.

The intent of these rules is to ensure that the activities of the Empre-sas are in harmony with government policies, strengthen the con-bond mutual between enterprises and the societies in which they operate, improve the climate for foreign investment and the contribution to enhance the sustainable development.

Among its main principles and basic commitments, is included contributing to sustainable development, respect human rights of those affected by their activities, encourage local capacity, promote the training of local human capital, refrain from seeking or accepting exemptions not covered by the legal framework of the country, to support and uphold good corporate governance principles and best practices, promote employee awareness of company policies and compliance with them, refrain from discriminatory or disciplinary action against employees who make good faith,

management reports or audits, encourage business partners to apply principles of corporate conduct compatible with the Guidelines and refrain from any improper involvement in local political activities..

Code of Conduct Global Compact United Nations (UNGC). The Global Compact of the United Nations or Global Compact is an initiative of ethical commitment, free secondment by companies, civil and labor organizations aimed at integration into the strategy and operations of the signatories, ten principles related to Human Rights Labor, Environment and Combat Corrupción. On the origins was an initiative of UN Secretary General Kofi Annan during the World Economic Forum in Davos in January 1999.

Management System Certification SA8000. It is a voluntary standard that specifies a number of criteria associated with the concept of social responsibility of the companies in its aspect of working conditions. It was developed by a group of experts in 1997, convened by the Council on Economic Priorities Accreditation Agency, CEPAA. By Social Accountability International (SAI) is being directed from 1998.

Its various clauses are based on the Universal Declaration of Human Rights, the UN Convention on the Rights of the Child, and in a series of Conventions and Recommendations of the International Labour Organization (ILO).

This rule is related to issues such as child labor, forced labor, Health and Safety at Work, Freedom of Association and Collective Bargaining, Discrimination, Discipline, Working Hours and Compensation.

As a complement to the above, the Standard SA8000 states that the company must take to turn a social management system (SMS) based on ISO 9000 and ISO 14000 standards, which revolve around questions as defined policies by the management of the company, appointment of representatives of the company for compliance with the standard, planned-cation and application of the rule, control of suppliers and subcontractors, external communications and record keeping.

Generation Tool, Audit and Information Assurance Standard AA1000. It is a tool developed by the Institute of Social and Ethical Accountability in 1999, as a model of continuous improvement, which aims to help improve and strengthen accountability and sustainability of organizations, through engagement with stakeholders. It is a system designed for internal and external audits, being a supplement to the GRI guidelines.

It is based on the fundamental principle of inclusivity of aspirations and needs of the participants in all stages of the process, to identify and understand the social, economic and environmental impact of the organization, the commitment to consider and respond to the aspirations of stakeholders and the commitment to communicate their decisions, actions and impacts to these stakeholders.

5.2. Descriptive analyzes of the main indicators of Sustainability Reports registered in GRI.

In Table 1 we present the sustainability reports of the database GRI sector and years of publication, that we have divided into different ranges, in order to clearly visualize the effects before and during to the current financial crisis. As can be seen from this

table, and also by the Figure 1 accompanying, the highest percentages of growth in sustainability reports is produced from 2013, doubling all previous periods, in almost all sectors, although in general, the increase was evident, despite the aforementioned crisis. The GRI database, contains 32,183 reports spread over 38 sectors, along 16 years, in the five continents of the world.

In Table 2 and corresponding Figure 2, this division is made by regions, with the largest production of sustainability reports in Europe (38.4%), followed by Asia, Latin America and the Caribbean, North America, Oceania and Africa .

In all the cases a significant increase was observed in production of sustainability reports in the middle years of the current financial crisis.

Two graphics (1 and 2), in which is show the evolution of the publication of the memoirs, in PDF format, or HTML. Although not an indication of quality of memory, the mere fact that they are published indicates that companies assume a commitment to transparency, because if any faulty or false information is discovered, it could mean a loss of prestige if the fact is published on social networks. As can be seen, these publications have increased during the years of the financial crisis, as happened with the preparation of sustainability reports in general, which could indicate that the companies have used such publications as synonymous with quality.

5.3. Predictive analyzes of the main indicators of Sustainability Reports registered in GRI, through the statistical technique of decision trees.

In the first group of decision trees it is used as the dependent variable External Assurance, in which all of the information related data points is taken from the available assurance statement found in the Report. As independent variables we use the variables: region, sector and ranges (publication period) (Tree 1).

The probability that sustainability reports have been elaborated with external validation of its content is 27.9%. The regions are the best predictor of this rate, with 40% for Latin America & the Caribbean and Asia (28.5% guaranteed memory); 40.5% for Europe and Oceania (33.4% guaranteed memory) and 19.4% for Northern America and Africa (15.4 guaranteed memory).

Descending level in the tree by region, for node 1 in the region Latin America & Caribbean and Asia, 29.5% is done with these quality criteria, and over 50% were made from the middle years of the financial crisis 2011-2012.

In the case of the second node, Europe and Oceania, the best predictor is only the sector without the influence of the processing period. The most important sector is Healthcare Products, Automotive and others (29% with 31% of reports with guarantees); Healthcare Services, Construction, Aviation, Waste Management (3.2% with 36.6% of guaranteed memory); Forest and Paper Product, Energy, Water utilities and Railroad (4.3% with 43.1% of reports guaranteed memory).

In the third node, North America and Africa, highlights the sector Automotive, Aviation and others, with 15% of reporting (15.7% guaranteed memory).

When used as independent variables other international indicators (Tree 2), the best predictor of that 27.9% that are made with external guarantee, is the SAE3000 and AA1000AS indicator for the memory group who choose the first indicator, complementing with the UNGC, based on the UN Global Compact.

In the second group of decision trees (tree 3 and 4), Integrated is used as an independent variable, that Indicates whether or not the report includes non-financial and both financial disclosures, beyond basic economic information. Organizations self-declare whether or not Their report is integrated. The independent variables are the same.

In this case the percentage of sustainability reports with financial information included, amounts to 14%, and also the regions are the most important predictors of this rate. The percentages of importance (with percentage of reports with financial information in parentheses) are: 14.3% Latin America & the Caribbean (10.2%); 37.4% Europe (14.8%); 12.9% Northern America (4%); 24.4% Asia (5.2%); 4.1% Oceania (17.5%). Here they are established the years of publication memory as the next most important predictor, mainly in the central periods of financial crisis. Finally the sectors, highlighting all but Automotive, Utilities and Energy are the best predictor in Latin America & Caribbean; Railroad, Universities, Healthcare products, Forest and Paper Products, Energy, Construction, Aviation and Waste Management in Europe; Tourisme Leisure, Healthcare Products in Asia; and Automotive, Railroad and other traditional sectors in Africa.

If we now use as independent variables international indicators, we find that ISO and OECD are doing the best predictions, and within OECD, the reference to ISO.

In the third group of decision trees (Tree 5 and 6), Stakeholder Expert Review Panel Information is the variable used as an independent variable. The results show that the proportion of reports with this warranty is 7.7%. The next most important predictor are the regions, which include a first group in Latin America & the Caribbean, Europe and Northern America, with 63% (7,1 Stakeholder Panel); Asia with 20.4% (11.3% Stakeholder Panel) and Oceania and Africa, with 10% (2% Stakeholder panel).

The sectors are the following predictors, but only for the first regional group, highlighting the group of Tourism sectors, Automotive, Universities, Aviation, Agriculture and Railroad (48.2 %), followed by the group of Energy Utilities, Healthcare Services, Healthcare Products , Forest, Water Utilities, Construction and Waste Management (10%).

If we refer to international indicators, in these memories the main predictor is AA1000AS, followed by ISO and OECD.

6. Conclusions

Through the bibliographical analysis, we have accessed important studies by different specialists, and reports from international organizations, which confirmed that the increased attention to environmental issues is the result of decades of work and the promotion of sustainable development by international organizations such as the United Nations (UN) or the World Bank.

It can also be confirmed that climate change and economic development are causing major health problems in the population. In fact, some studies show that emissions of greenhouse gases into the atmosphere are causing a significant increase in mortality in the world, and that many of these changes are already having a greater effect in the more developed societies and countries. This could be considered a "boomerang effect" of uncontrolled economic development.

All this has led international organizations to promote what is called "green investments", which are those needed to reduce greenhouse gases, without reducing the production and consumption of non energy goods. In this global shift towards sustainability some sectors are better suited to this type of investment than others. These sectors are Agriculture, Transport, Water, Energy and Forestry, where increasing annual investments of more than \$ 5 billion a year are planned until 2020.

Sustainable management criteria of CSR is something that is starting to become consolidated in business, despite the economic crisis. This is confirmed by some of the studies that we have accessed. This implies that these forms of management are reflected in the Sustainability Reports, which also helps to improve the image of businesses. Despite the economic crisis, there has been a clear increase in the number of sustainability reports made and published. This is indicated by the studies reviewed, but is also confirmed by the GRI data with which we worked. This data consists of 32,183 reports spread over 38 sectors, over 16 years from all five continents. There has been a steady increase in reports since 2000, and an increase and a concentration of more than 50% since 2013. These are good indicators. This would confirm the first hypothesis of our work (H1), and a part of the second (H2), as the increase in reports and verification by external agents is an important step towards transparency and comparability of reports.

We analyzed three main quality indicators contained in the GRI reports: External Assurance, Integrate and Stakeholder Integrated Information Expert Review Panel, which we have treated as variables of interest (dependent) in our predictive models. These variables assure us that reports are reviewed by independent third parties, or that they include relevant financial information above and beyond that normally required, or that a panel of experts has analyzed the activities of the company. All these variables have been placed in relation to other independent variables, such as the sector, the year of reporting, region or international quality indicators.

The results show that only 27.9% of the reports that are produced are audited by external agents, 14% have significant economic information incorporated and only 7.7% have a Stakeholder Expert panel. This would indicate that we have not yet developed sustainability reports with proven and tested quality in all parts, which makes us doubt the complete fulfillment of the second hypothesis (H2). However, the mere fact that they are published indicates that companies assume a commitment to transparency, because if any faulty or false information is discovered, it could mean a loss of prestige if the event is published on social networks.

Regarding the regions, more sustainability reports clearly occur in Europe (38.4%), followed by Asia (25.5%), Latin American and the Caribbean (12.9%), North America (12.5%), Africa (6.5 %) and Oceania (4.1%). However, when we look at the percentages of sustainability reports made to guarantee external validation, the order of the regions changes somewhat. In this case we find Europe (40.5%), Latin Ameri-

ca and Caribbean (40%), Oceania (33.4%) , Asia (28.5%), Northern America (19.4%) and Africa (15.4%).

In respect of the sectors, including those where, according to the literature analyzed, greater green and sustainable investments are being made, many sustainability reports come from the service sector. The evolution of these reports follows the same general behavior pattern described above. The majority of sustainability reports come from the Energy, Construction and Healthcare sectors, together with those related to Transport. We can therefore confirm our third hypothesis (H3).

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Appendix

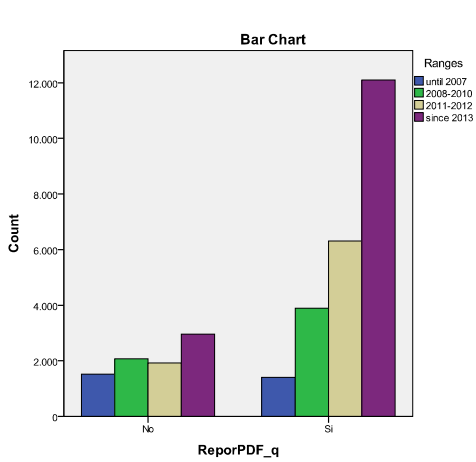
Table 3 Sustainability Reports by all the Sectors

		Ranges				Total
		until 2007	2008-2010	2011-2012	since 2013	
Agriculture	Count	23	60	83	172	338
	% within Sector_q	6,8%	17,8%	24,6%	50,9%	100,0%
Automotive	Count	88	114	181	348	731
	% within Sector_q	12,0%	15,6%	24,8%	47,6%	100,0%
Aviation	Count	52	97	137	254	540
	% within Sector_q	9,6%	18,0%	25,4%	47,0%	100,0%
Chemicals	Count	108	210	297	528	1143
	% within Sector_q	9,4%	18,4%	26,0%	46,2%	100,0%
Commercial Services	Count	47	121	170	326	664
	% within Sector_q	7,1%	18,2%	25,6%	49,1%	100,0%
Computers	Count	25	60	76	171	332
	% within Sector_q	7,5%	18,1%	22,9%	51,5%	100,0%
Conglomerates	Count	86	194	227	411	918
	% within Sector_q	9,4%	21,1%	24,7%	44,8%	100,0%
Construction	Count	83	199	274	462	1018
	% within Sector_q	8,2%	19,5%	26,9%	45,4%	100,0%
Construction Materials	Count	79	121	198	371	769
	% within Sector_q	10,3%	15,7%	25,7%	48,2%	100,0%
Consumer Durables	Count	39	73	83	133	328
	% within Sector_q	11,9%	22,3%	25,3%	40,5%	100,0%
Energy	Count	210	425	529	1018	2182
	% within Sector_q	9,6%	19,5%	24,2%	46,7%	100,0%
Energy Utilities	Count	193	360	374	620	1547
	% within Sector_q	12,5%	23,3%	24,2%	40,1%	100,0%
Equipment	Count	83	152	202	381	818
	% within Sector_q	10,1%	18,6%	24,7%	46,6%	100,0%
Financial Services	Count	384	751	977	1913	4025
	% within Sector_q	9,5%	18,7%	24,3%	47,5%	100,0%
Food and Beverage Products	Count	155	341	510	920	1926
	% within Sector_q	8,0%	17,7%	26,5%	47,8%	100,0%
Forest and Paper Products	Count	78	106	138	214	536
	% within Sector_q	14,6%	19,8%	25,7%	39,9%	100,0%
Healthcare Products	Count	80	137	188	352	757
	% within Sector_q	10,6%	18,1%	24,8%	46,5%	100,0%
Healthcare Services	Count	12	35	96	219	362
	% within Sector_q	3,3%	9,7%	26,5%	60,5%	100,0%
Household and Personal Products	Count	73	73	97	185	428
	% within Sector_q	17,1%	17,1%	22,7%	43,2%	100,0%
Logistics	Count	40	137	180	332	689
	% within Sector_q	5,8%	19,9%	26,1%	48,2%	100,0%
Media	Count	28	68	104	192	392
	% within Sector_q	7,1%	17,3%	26,5%	49,0%	100,0%
Metals Products	Count	66	132	186	328	712
	% within Sector_q	9,3%	18,5%	26,1%	46,1%	100,0%
Mining	Count	136	268	376	573	1353
	% within Sector_q	10,1%	19,8%	27,8%	42,4%	100,0%
Non-Profit/ Services	Count	35	144	193	363	735
	% within Sector_q	4,8%	19,6%	26,3%	49,4%	100,0%
Other	Count	157	421	699	1228	2505
	% within Sector_q	6,3%	16,8%	27,9%	49,0%	100,0%
Public Agency	Count	33	118	141	242	534
	% within Sector_q	6,2%	22,1%	26,4%	45,3%	100,0%
Railroad	Count	19	40	52	117	228

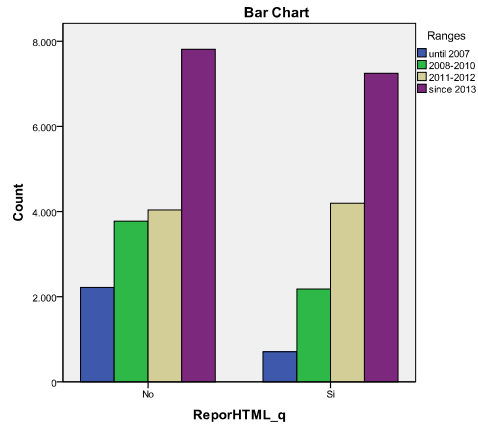
	% within Sector_q	8,3%	17,5%	22,8%	51,3%	100,0%
Real Estate	Count	23	124	257	501	905
	% within Sector_q	2,5%	13,7%	28,4%	55,4%	100,0%
Technology	Count	96	164	225	426	911
Hardware	% within Sector_q	10,5%	18,0%	24,7%	46,8%	100,0%
Telecommunications	Count	140	224	266	443	1073
	% within Sector_q	13,0%	20,9%	24,8%	41,3%	100,0%
Textiles and Apparel	Count	18	57	104	194	373
	% within Sector_q	4,8%	15,3%	27,9%	52,0%	100,0%
Tobacco	Count	42	22	14	25	103
	% within Sector_q	40,8%	21,4%	13,6%	24,3%	100,0%
Tourism/ Leisure	Count	15	69	135	273	492
	% within Sector_q	3,0%	14,0%	27,4%	55,5%	100,0%
Toys	Count	0	5	8	7	20
	% within Sector_q	,0%	25,0%	40,0%	35,0%	100,0%
Universities	Count	9	30	77	113	229
	% within Sector_q	3,9%	13,1%	33,6%	49,3%	100,0%
Waste Management	Count	20	43	65	141	269
	% within Sector_q	7,4%	16,0%	24,2%	52,4%	100,0%
Water Utilities	Count	48	85	100	175	408
	% within Sector_q	11,8%	20,8%	24,5%	42,9%	100,0%
Retailers	Count	100	180	220	390	890
	% within Sector_q	11,2%	20,2%	24,7%	43,8%	100,0%
Total	Count	2923	5960	8239	15061	32183
	% within Sector_q	9,1%	18,5%	25,6%	46,8%	100,0%

Table 2 Sustainability Reports by Region

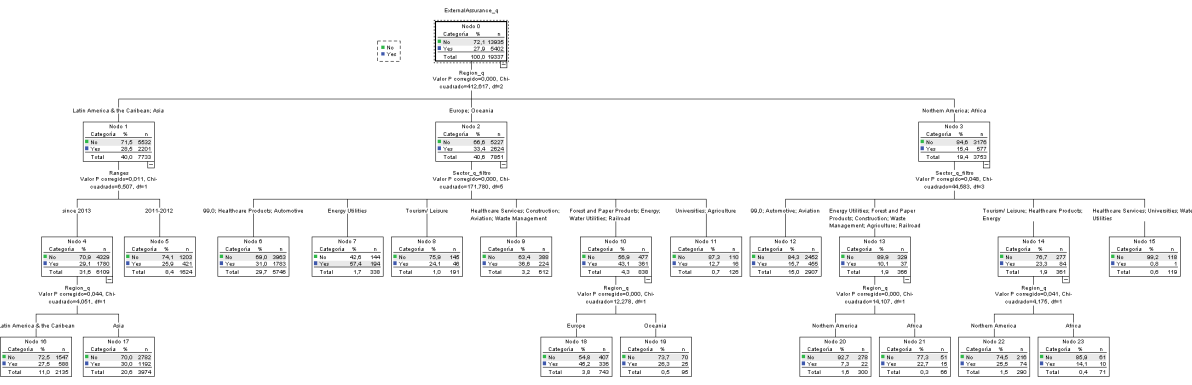
		Ranges				Total
		until 2007	2008-2010	2011-2012	since 2013	
Asia	Count	596	1550	2084	3974	8204
	% within Region_q	7,3%	18,9%	25,4%	48,4%	100,0%
	% within Ranges	20,4%	26,0%	25,3%	26,4%	25,5%
Europe	Count	1354	2434	3012	5548	12348
	% within Region_q	11,0%	19,7%	24,4%	44,9%	100,0%
	% within Ranges	46,3%	40,8%	36,6%	36,8%	38,4%
Latin America & the Caribbean	Count	233	769	1013	2135	4150
	% within Region_q	5,6%	18,5%	24,4%	51,4%	100,0%
	% within Ranges	8,0%	12,9%	12,3%	14,2%	12,9%
Northern America	Count	418	677	1066	1893	4054
	% within Region_q	10,3%	16,7%	26,3%	46,7%	100,0%
	% within Ranges	14,3%	11,4%	12,9%	12,6%	12,6%
Africa	Count	146	239	732	978	2095
	% within Region_q	7,0%	11,4%	34,9%	46,7%	100,0%
	% within Ranges	5,0%	4,0%	8,9%	6,5%	6,5%
Oceania	Count	176	291	332	533	1332
	% within Region_q	13,2%	21,8%	24,9%	40,0%	100,0%
	% within Ranges	6,0%	4,9%	4,0%	3,5%	4,1%
Total	Count	2923	5960	8239	15061	32183
	% within Region_q	9,1%	18,5%	25,6%	46,8%	100,0%
	% within Ranges	100,0%	100,0%	100,0%	100,0%	100,0%



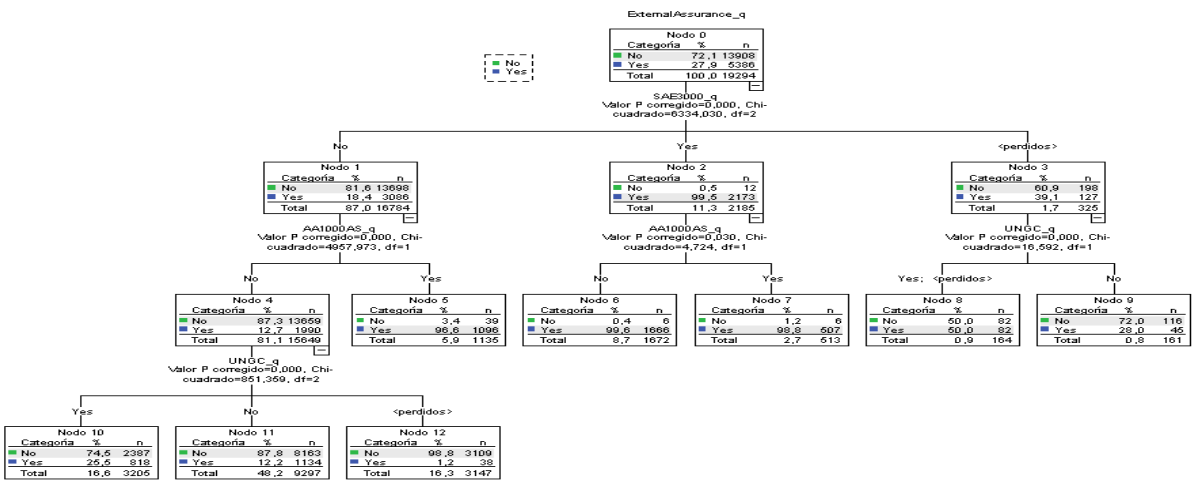
Gráf 1 Sustainability ReportsPDF



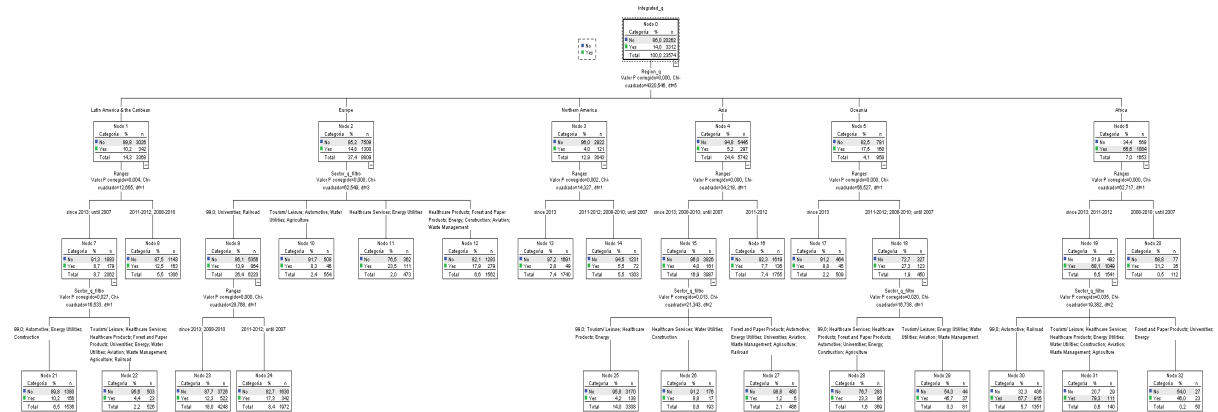
Gráf 2 Sustainability ReportsHTML



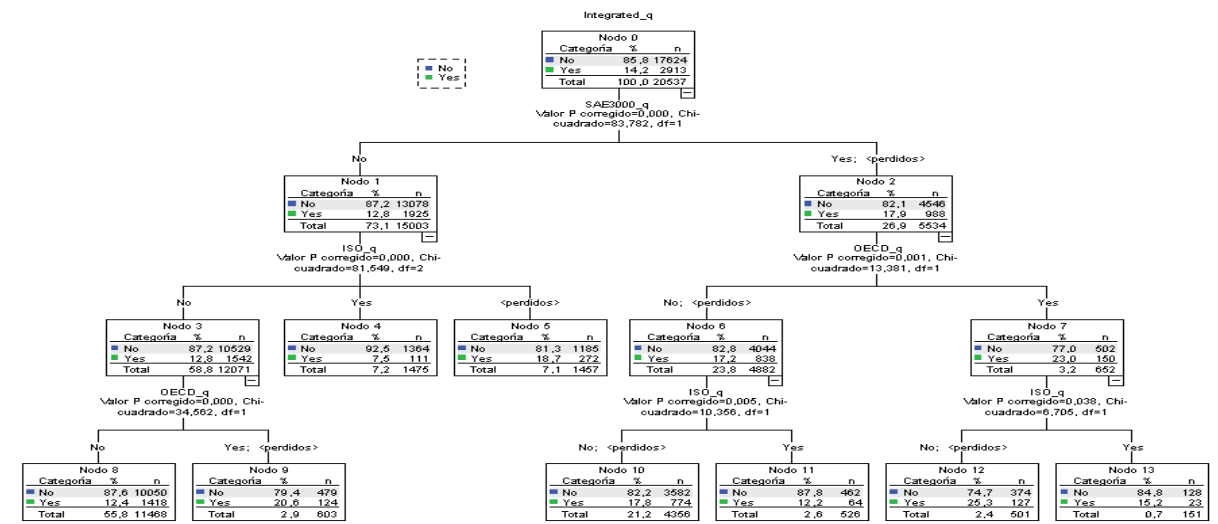
Tree 1 Sustainability Reports with External Assurance, by region and years



Tree 2 Sustainability Reports with External Assurance, with other international indicators



Tree 3 Sustainability Reports with integrated economic information, by region, sectors and years.



Tree 4 Sustainability Reports with integrated economic information, with other international indicators



SUSTAINABLE TOURISM AND THE MATERIALITY OF ACCOMMODATION SERVICES

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The paper analyzes the materiality of accommodation services based on the perspective of the life cycle concept for products. Thus, it focuses on the inputs and outputs, generated throughout the life cycle of a given product, which are later related to the environmental characteristics in NBR 15401 – the Brazilian sustainable tourism certification standard for accommodation businesses. Adherence to sustainable tourism principles and practices may be analyzed by relating measurable product inputs and outputs (services offered by accommodation businesses) to three environmental requirements from NBR 15401: “solid waste, effluents and emissions”; “energetic efficiency”; and “conservation and management of water use”.

Key-words: materiality of services, accommodation services, life cycle concept, environmental requirements

1. Introduction

Sustainable tourism must benefit local communities socially and economically, raise awareness and support environmental conservation (UNEP and UNWTO, 2005). It is additionally a topic that has been largely discussed in various studies (Miller, 2001; Gössling, 2002; Font and Harris, 2004; Ayuso, 2007; Sims, 2009; Bramwell, 2011; Buckley, 2012; Weaver, 2014; Pulido-Fernández, Andrades-Caldito and Sánchez-Rivero, 2015).

From the 1990s onwards, tools such as eco-labels and sustainable tourism certification standards have gained wider use (Font, 2002; Rattan, 2015). These tools can assist in the understanding of service materiality by exposing the requirements for the sustainability of focused activities.

For a substantial time, several characteristics have been attributed to the service sector, in order to distinguish its activities from those of the primary and secondary sectors of the economy. Among them, the idea of the immaterial nature of services deserves to be highlighted (Kon, 2004; Miles, 2005; Howells, 2010) and may be related to the belief that services do not cause negative impacts on the environment.

The definition of the service sector seems to have emerged by virtue of an exclusion process: activities that did not fit into the characteristics of the primary sector (agriculture, extractive) or secondary (industry) were classified as services. Thus, some definitions underwent an emerging and consolidating process. In addition to the idea that all services were immaterial, they were also considered inseparable, perishable, variable, and only small- or medium- scale investment applicants, among others (Gummesson, 2010; Metters, 2010).

Regarding the supposed immaterial characteristic of services, Hill (1977) had already recognized that although services are not physical objects, their production often involves the same physical transformation processes required in the production of goods. Lovelock (1983) presented a classification scheme of services into four categories: tangible actions on people's bodies (such as airline transportation); tangible actions on goods and other physical possessions (such as janitorial services); intangible actions directed at people's minds (such as education); and intangible actions directed at people's intangible assets (such as investment banking). Therefore, attention should be paid to the fact that there are tangible aspects to many (or maybe all) services.

Despite indications (Lovelock, 1983; Hill, 1997) that the material aspects of services had been recognized for a long period of time, one of the most accepted concepts had been the immateriality of services, in order to distinguish them from goods (defined as tangible assets). However, this understanding has led to failures in measuring the sector's economic and environmental performance (Gallouj and Savona, 2009).

This idea of the immateriality of services, as well as other features initially assigned to them, has been challenged. Services, after all, have been recognized as being causes of adverse environmental effects. Thus, approaches proposed by the service economy seek to understand the nature of services, focusing on their material aspects (Gadrey, 2000; Gallouj and Savona, 2009; Gadrey, 2010; Gallouj and Djellal, 2010; Gummesson, 2010; Fourcroy, Gallouj and Decellas, 2012; Djellal and Gallouj, 2013; Djellal and Gallouj, 2015a; Djellal and Gallouj, 2015b).

According to Gadrey (2010), the estimation that services consume fewer natural resources than other activities is erroneous due to its not taking into account the material characteristics of most services. The advantage attributed to services with regard to CO₂ emissions by sector of the economy is due to the fact that only those emissions associated to buildings' heating, cooling, lighting, and sometimes energy consumption, related to the use of technical tools, are taken into account, which does not represent the totality of material resources required.

The same author points out that there is a false idea that the economy is becoming more dematerialized due to the expansion of the service sector. In fact, services have shown more and greater aspects in which materiality is easily identified (Djellal and Gallouj, 2015a). Touristic activities are part of the service sector and involve displacement, and often, transportation. Therefore, they are associated with the negative environmental impacts of greenhouse gas emissions. In the literature, measurements of the materiality of services performed at the sectorial level, emphasizing direct and indirect carbon emissions can be encountered (Fourcroy, Gallouj and Decellas, 2012; Ge and Lei, 2014). Djellal and Gallouj (2015b) say that service inter-

activity implies a tangible aspect, which may be related to the co-production process or to the development of information and communication technologies.

In Brazil, the service sector accounts for over 70% of the Gross Domestic Product (GDP) (the World Bank, 2016) and the country is among the 10 nations in which the Travel and Tourism sector has the highest contribution to its GDP, in absolute terms (WTTC, 2016a).

Accommodation services are one of the largest formal job-creating sectors in Brazilian tourism, second only to food services (MTUR and IPEA, 2015). They are particularly important for tourism, since visitors can only be classified as tourists if their trip includes an overnight stay (UNWTO, 2008). Furthermore, many accommodation businesses in Brazil are located in regions of delicate environmental balance, areas of natural beauty and historical cities, affecting the environment in which they exist (Gonçalves, 2004).

Because of the importance of these service providers, accommodation businesses are a target of one set of the Global Sustainable Tourism Criteria (GSTC), which were created regarding Hotels and Tour Operators (GSTC, 2016). In Brazil, the NBR 15401 certification standard was developed for accommodation businesses and published by the Brazilian Technical Standards Association (ABNT) (Espinha, 2010).

In the above context, this paper presents the preliminary results of an exploratory research study that approaches accommodation services from the sustainable tourism criteria and standards perspective. The aim is to analyze the service materiality of accommodation services with emphasis on the concept of the product's life cycle.

For this purpose, this paper seeks to clarify the inputs and outputs generated over a product's life cycle (good or service) – specifically in accommodation services – by using the analytical framework proposed in the Guide for addressing environmental issues in product standards (ISO Guide 64:2008), based on the literature review. The inputs refer to the use of resources and the outputs are air emissions, noise emissions, discharge of effluents and waste generation. Hence, the paper situates materiality characteristics in the environmental requirements of NBR 15401, the Brazilian sustainable tourism certification standard for accommodation businesses (ABNT NBR 15401, 2014).

Building on this introduction, section 2 discusses the emergence of sustainable tourism criteria and standards; section 3 presents an interpretation for service materiality characteristics from the life cycle concept, highlighting the environmental performance of accommodation services. Subsequently, the final considerations are presented.

2. Sustainable tourism: criteria and standards

The discussions around sustainability in tourism are the result of the observation that this activity (tourism) causes damage to the environment and local communities when it is unregulated. Thus, it must be pointed out that while tourist companies compete for the use of resources within the places where they are located, simultaneously, tourist products depend on the quality of the environment in those very places (Rattan, 2015).

In the Mohonk Agreement, conducted in 2000, sustainable tourism was defined as that tourism which seeks to minimize its socio-cultural and environmental impacts, while at the same time, provides economic benefits for the communities and countries in which it operates. Five years later, a document from the World Tourism Organization, in partnership with the United Nations Environment Program (UNEP and UNWTO, 2005), stated that sustainable tourism does not correspond to a touristic typology, because all types of tourism must endeavor to be sustainable. Therefore, the document also argues that the pursuit for sustainable development implies a balance between the three pillars of sustainability: economic, social and environmental.

Regarding the criteria designed to boost the sustainable development of the sector; the World Travel & Tourism Council, in partnership with the World Tourism Organization and the Earth Council, created Agenda 21 for the Travel and Tourism Industry. In this document, the areas that were considered critical to the performance of companies are: waste minimization, reuse and recycling; energy efficiency, conservation and management; waste water management; hazardous substances; management of fresh water resources; transport; land-use planning and management; involvement of staff, customers, communities in environmental issues; design for sustainability; and partnerships for sustainable development (Council of Europe, 2002).

In 2010, the Global Sustainable Tourism Council was established to promote sustainable tourism practices around the world, based on the minimum requirements that travel companies must seek to achieve in order to conserve cultural and natural resources (UNWTO, 2015). These criteria are organized into four pillars, namely: sustainable management, socioeconomic impacts, cultural impacts, and environmental impacts.

Simultaneously to these definitions and criteria, certification standards focused on the tourism sector have emerged. The development of these certification systems is important for allowing the parties directly interested in this activity to exercise some influence, something that is not possible when using non-specific sector certifications – such as ISO 14001 – that could, for example, certify a company even if it were involved in a legal dispute or conflict with local communities and environmentalists in tourist destinations (Sasidharan, Sirakaya and Kerstetter, 2002). This is important since disagreements with local communities that retain traditional ecological knowledge that diverges from scientific expertise are not rare, and require an understanding of the local context by the decision makers, in order to avoid new problems when trying to solve an existing one (Lamers *et al*, 2016).

Examples of certifications developed for the tourism sector are: Blue Flag, for beaches and marinas, considered by Font (2002) as being the first evidence of touristic

environmental certification; and Green Globe, a certification for a wide range of travel and tourism organizations, that gained independence from its origins as a program of the World Travel & Tourism Council in 1999 (Font and Harris, 2004). These certifications, originating in Europe, have been adopted in many countries.

Besides the above, standards designed to meet various countries' local demands, such as The Green Certificate for rural tourism in Latvia (The Green Certificate, 2016); the ECO Certification for hotels in Malta (MTA, 2016); and the NBR 15401, the Brazilian sustainable tourism certification standard for accommodation businesses (ABNT NBR 15401, 2014); also deserve to be highlighted. The emergence of national certifications are especially important for developing countries since certifications from international agencies that are appropriated to the enterprises of developed countries may not address local social and cultural issues (Rattan, 2015).

Accommodation services represent an important touristic segment since the very definition of a *tourist* requires that visitors spend at least one night at the destination (UNWTO, 2008).

Regarding sustainable tourism certification standards, it must be highlighted that a great number of standards set specific sustainability requirements for lodging facilities: Green Globe, Green Key, Green Hospitality Award, Eco Certification, and Green Certificate etc.

Tourism, in general, and the activities of accommodation businesses, specifically, are part of the service sector, which in turn represents a significant portion of current economic activity. In Brazil, the service sector as a whole accounts for 70.8% of Gross Domestic Product (GDP) (The World Bank, 2016), and the country is among the 10 with the greatest absolute contribution from its travel and tourism sector to its GDP (WTTC, 2016a). On a global scale, tourism accounts for 9.8% of the world GDP (WTTC, 2016b).

Brazil is considered a pioneer in publishing a sustainability standard for accommodation businesses by a nationally recognized organization. This standard is the NBR 15401 – Accommodation Businesses – Sustainability Management Systems – Requirements (Espinha, 2010).

The environmental issues surrounding accommodation businesses must continue to receive increasing attention, especially in destinations with a delicate environmental balance, as more information is acquired about the potential negative impacts generated by businesses. A contribution is presented by Sealey and Smith (2014) in a study of recycling in tourism businesses located on a Bahaman island. Their research revealed that only one resort was able to generate up to 35% of the total solid waste produced directly and indirectly on Exuma island within a period of three years.

Certification standard NBR 15401 is noticeable in the Brazilian context, as it proposes to set minimum performance criteria for accommodation businesses to receive certification from the implementation of a sustainability management system based on environmental, sociocultural and economic requirements (ABNT NBR 15401, 2014).

Therefore, it can be said that initiatives such as the NBR 15401 are important in seeking to understand accommodation businesses, as a whole, to be a potential cause of significant negative environmental impacts.

3. Accommodation services in the perspective of a product life cycle

Accommodation businesses are designed to provide, as their main service, temporary lodging (Brazil, 2008). However, the additional services offered by accommodation businesses can vary according to the type of establishment. In Brazil, the CADASTUR, a registration of individuals and companies working in the tourism sector, considers 10 categories for accommodation business registration: hostels, condo-hotels, flats, urban hotels, jungle lodges, farm hotels, historic hotels, inns, resorts, and bed & breakfasts (CADASTUR, 2016).

Although many of these businesses offer food services for breakfast, 24h reception, towel and bed linen change, and room cleaning, these services are not common to all types of accommodation business. Some hostels, for example, do not offer any of these services but have a communal kitchen for guests to use.

Other services offered by accommodation businesses are: laundry; free internet access; recreation (often in swimming pools); bars and restaurants; complementary services (beauty salons, convenience stores, car rental, travel agents etc.); safe-keeping of valuables; and room service etc. Some establishments also provide a mini refrigerator (minibar) in the rooms, parking and air conditioning (MTUR, 2016).

Several issues related to the environmental performance of accommodation businesses can be identified in the literature, as shown in table 1.

Table 1: Relevant issues to the environmental performance of accommodation businesses

Energy consumption	<p>The hotel industry consumes significant amounts of energy as an important touristic segment (Chan, 2012).</p> <p>The energy consumption of different types of accommodation includes heating, air conditioning, cooking, cooling, lighting, cleaning [...] as well as the energy required to provide necessary assets to maintain the flow of tourists (computers, televisions etc.) (Gössling, 2002).</p>
Water consumption	<p>The hospitality segment is a major consumer of natural resources (energy and water) and a major waste and pollutants generator, as well as a contributor to the change of natural landscapes (Oliveira and Rossetto, 2014).</p> <p>The more rooms are occupied, the more electricity consumption will increase (Cheung and Fan, 2013).</p>
Fossil fuel consumption	<p>Fresh water demand is a function of the number of rooms, likely occupancy rate, number of people working and/or living in the hotel, size of the pool, kitchen, laundry etc. (Lamei, van der Zaag and Imam, 2009).</p>
Chemical consumption	<p>Guests have expectations that their needs will be met in excess, resulting in water consumption and production of food waste being above average (Wyngaard and De Lange, 2013).</p> <p>Cooking gas consumption, diesel for generators, fuel for vehicles and refrigerators, as well as the use of paper, electricity, water and food waste generation are some of the CO₂ emission sources (Cheung and Fan, 2013).</p>
Other consumption types	<p>Hotels have a high consumption of chemicals related to the maintenance of pools and gardens etc. (Zorpas <i>et al</i>, 2012).</p>
Solid waste generation	<p>When industrial food is used, there occurs the disposal of different types of packaging (Pistorello, Conto e Zaro, 2015).</p> <p>Some entrepreneurs/managers are concerned with the final fate of the printed paper, ink cartridges and batteries used in businesses activities (Freitas and Almeida, 2010).</p> <p>The hotel industry is composed of several enterprises that consume natural resources such as food, paper, water and energy, that are essential for daily activities (Felix and Santos, 2013).</p>
Effluents generation	<p>Most hotels, from simple to luxurious, offer food and beverages (Subbiah and Kannan, 2011).</p> <p>Changes in the way food is produced and consumed in the hospitality industry are necessary to substantially reduce waste generation (Pirani and Araf, 2015).</p> <p>The solid waste generated includes plastic, paper, wood, glass, organic waste (kitchen), old durable goods, electrical and electronic equipment, dangerous, dust, metals, packaging, batteries, biological treatment waste etc. (Zorpas <i>et al</i>, 2012).</p>
Air emissions	<p>Organic waste is a significant component of the waste generated by the hospitality industry (Pirani and Arafat, 2015).</p>
Noise emissions	<p>If current waste management operations are not improved, the increasing amount of waste generated by the hospitality sector will lead to a significant increase in the ecological footprint of this sector (Lamei, van der Zaag and Imam, 2009).</p> <p>Some lodging facilities dump their sewage generated into the sea without any</p>

treatment (Kocasoy, Mutlu and Alagöz, 2008).

The organic/wet waste released by hotels causes greenhouse gas emissions (Singh, Cranage and Nath, 2014; Cheung and Fan, 2013).

Waste management benefits include the reduction of carbon emissions due to the reduction of the transport of waste (Pirani and Arafat, 2015).

It is possible to control noise internally and externally, by using sound insulation, replacing noisy equipment, restricting motor vehicle circulation (Sousa and Eusébio, 2013).

Services, together with goods, require raw material inputs to assure their provision (Daly and Farley, 2004). Therefore, the production and consumption of services (which often occur simultaneously) require inputs, and consequently, generate outputs (air emissions, discharge of effluents, solid waste etc.).

Those aspects affecting the environmental performance of accommodation businesses can be interpreted through the concept of a product life cycle, according to the analytical framework in the Guide for addressing environmental issues in product standards (ISO Guide 64:2008). Thus, Figure 1 seeks to clarify the inputs and outputs present during the life cycle – considering the simultaneous stages of production and consumption of accommodation services.

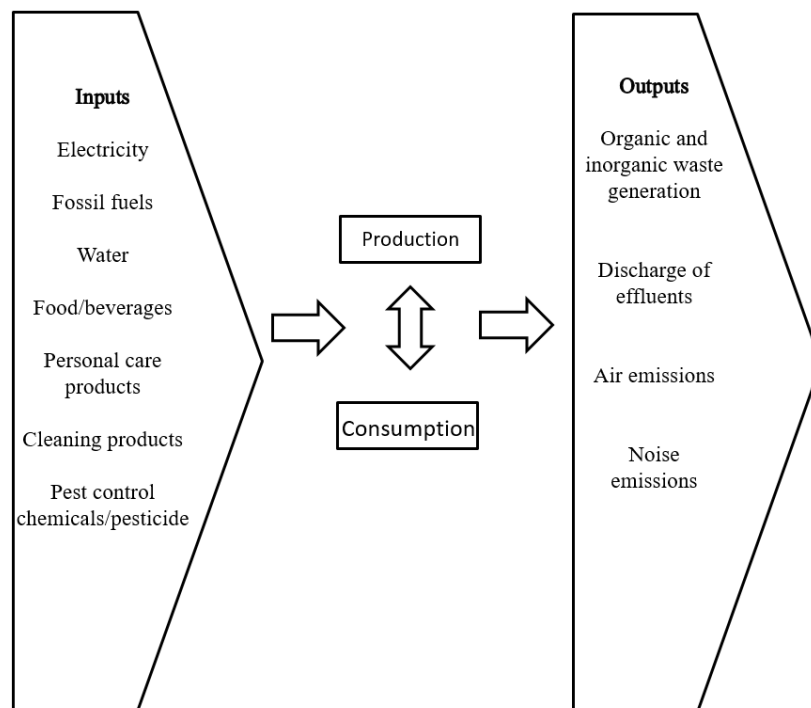


Figure 1: The life cycle concept applied to accommodation services

Source: Adapted from ISO Guide 64 (2008)

Subsequently, the paper seeks to elucidate the inputs and outputs of accommodation services, relating them to the NBR 15401 certification standard's environmental requirements (NBR 15401, 2014).

Regarding inputs, according to ABNT Sebrae (2012), the guide developed in order to direct accommodation businesses in the implementation of a sustainability management system according to NBR 15401; electricity consumption is especially linked to the reception and to the room cleaning. However, electricity is essential for the functioning of all accommodation areas (laundries, kitchens, restrooms etc.). The search for the energy efficiency of accommodation businesses includes a preference for renewable energy sources (ABNT NBR 15401, 2014).

The consumption of fossil fuels is linked to vehicles and gas engine equipment. Whenever possible, less environmentally harmful fuels must be used (ABNT Sebrae, 2012).

Water consumption is mainly associated with restrooms, kitchens, laundry and housekeeping services, as well as gas consumption (ABNT Sebrae, 2012).

Regarding food and beverage consumption, the importance of using locally produced food is highlighted in order to reduce the transport required and to offer more fresh food to guests. Canned drinks must be also eliminated. Whenever possible, returnable glass bottles must be chosen (ABNT Sebrae, 2012).

The consumption of chemical products is linked to the use of personal care products, cleaning and pest control. Accommodation businesses must conduct periodic inspections to ensure the utilization of products within their use-by date. Besides this, personal care products must be biodegradable and cleaning products must be neutral, non-corrosive, non-toxic and biodegradable (ABNT Sebrae, 2012).

Regarding the outputs – which means the environmental aspects of a service in focus – according to ABNT Sebrae (2012), it is possible to understand that a portion of the effluents is generated in laundries, bathrooms and kitchens, as well as with housekeeping services. Apart from this, it is important to highlight that among the establishments certified by NBR 15401, it is possible to find laundries, pools and spas that are also sources of effluent discharges.

Waste generation takes place mainly in the restrooms, kitchens and reception areas, as well as through housekeeping services (ABNT Sebrae, 2012). The examples presented by NBR 15401 are disposable packaging, and organic waste (NBR 15401, 2014). Furthermore, until now all accommodation businesses certified by NBR 15401 have their own restaurant, which means that organic waste is a significant part of these accommodation businesses' outputs.

Another kind of waste considered by ABNT Sebrae (2012) is 'toxic waste and pollutants'. They correspond to that waste which requires special care until its proper disposal. Examples of such waste are batteries.

Finally, air emissions are linked to vehicles used by accommodation services, as well as to their accommodation facilities and equipment. Noise emissions are associated with machinery and equipment, entertainment activities and accommodation facilities (ABNT NBR 15401, 2014). It must be highlighted that some of the certified businesses have their own recreational areas, contributing to noise emissions.

Finally, the inputs and outputs generated by accommodation services are related to three environmental requirements from NBR 15401: “solid waste, effluents and emissions”, “energetic efficiency” and “conservation and management of water use”.

The approach proposed in this paper was useful for the empirical interpretation of service materiality characteristics, found in the use of natural resources and environmental aspects. It also allows for the incorporation of the different stages of a product’s life cycle beyond those discussed here (production and consumption): resource acquisition, end-of-life, and transportation.

Moreover, by focusing on the inputs and outputs that can be measured, the concept of a life cycle paves the way for the life cycle assessment (LCA), which may contribute to bridging gaps related to the measurement challenges for service materiality characteristics. LCA evaluates a product’s potential impact by considering energy and material flows for the identification and quantification of environmental inputs (consumption of natural resources) and outputs (emissions to the air, water and soil) associated with a product throughout its life cycle.

4. Final considerations

The services offered by accommodation businesses are potential causes of adverse environmental effects. Due to this, these enterprises have received attention in discussions about sustainability in tourism and specific criteria for accommodation businesses, as a set of the Global Sustainable Tourism Criteria (GSTC Criteria) has been developed (GSTC, 2016). It is also possible to note the emergence of certification standards that define sustainability requirements for accommodation businesses, such as NBR 15401 – the Brazilian sustainable tourism certification standard for accommodation businesses (ABNT NBR 15401, 2014).

The focus on product life cycle has been useful to understand the evolution of tourist products and destinations (Moss, Ryan and Wagoner, 2003; Weiermair, Peters and Schuckert, 2007). In this research, it is suggested that the life cycle concept can help to improve the understanding of service materiality characteristics.

The paper sought to clarify the inputs and outputs generated throughout the life cycle of accommodation services. The approach based on product life cycles allows for the interpretation of service materiality characteristics considering different stages (production and consumption) and integrating environmental issues.

The identified inputs are: electricity, fossil fuels, water, food/beverages, personal care products, cleaning products, and pest control chemicals/pesticide. The identified outputs that are related to accommodation services and represent their environmental aspects refer to discharge of effluents, air emissions, noise emissions and waste generation – especially organic waste, since although the essence of accommodation businesses is to provide a temporary lodging service, many also offer food services. This organic waste, in turn, also contributes to atmospheric emissions.

Finally, adherence to sustainable tourism principles and practices may be analyzed by relating measurable inputs and outputs of the product (services offered by accommodation businesses) to three environmental requirements from NBR 15401:

"solid waste, effluents and emissions"; "energetic efficiency" and "conservation and management of water use".

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SYSTEMATIC INNOVATION AND SERVICE OFFERING DEVELOPMENT IN A KNOWLEDGE-INTENSIVE PROJECT ORGANIZATION

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The main aim of this paper is to describe how to design systematic innovation management and service offering development in a knowledge-intensive project organization (KIPO). We have focused on the alignment of customer demand and competence management utilizing the Service-Dominant Logic (SDL) principles and framework. The most significant difference between the industrialization driven product marketing and globalization driven service marketing can be seen in the definition of value creation, and exchange (integration) of resources. The industrial revolution came about in order to create efficiency in scale, whereas the digital revolution is scaling creativity and creating inter-industry competition. Customer interface owners are winners in this change, where customer-oriented service design is in the key role, and the value chain becomes pull-directed. SDL is giving a sound foundational framework for understanding value co-creation and dynamic resource integration in the service-dominant business. In SDL framework value is provided as operant resources (competences, skills, knowledge), and value co-creation requires a change in the dominant business logic from 'making, selling and servicing' to 'listening, customizing and co-creating'. However, there is very limited amount of literature regarding practical implications how the value co-creation can be aligned with systematic competence development. In the customer-oriented dynamic business environment it is important, that knowledge intensive project organizations understand not only the current, but also upcoming needs of customers, to develop and provide them the right expertise at the right time. This kind of information asset can be managed with Competence Management Systems (CMS).

1. Introduction

Digitalization and increasing size of service sector in all developed economies around the world are driving the need towards more service oriented marketing and business logic, simultaneously increasing the importance of knowledge-based occupations (Starbuck 1992, Castells 2010). As a baseline for service marketing we can see, that customers consume service, regardless of whether they buy goods or services, and marketing shall be seen as relationships, networks and interactions (Grönroos, 1979; Gummesson, 1999). Service science is seeing service systems as

value creational configurations of people, technology, value propositions and shared information.

Service-dominant logic (SDL) implies that value is co-created with the consumer rather than embedded in output, and core competencies like knowledge and skills are competitive advantages (Vargo and Lusch 2004; Vargo and Lusch 2014; Grönroos and Gummerus 2014). In traditional goods-dominant business logic the product is the driver of new opportunities for the firm, whereas SDL suggests that competitive advantages are created by the experiences the customer has over time, and products are only delivery vehicles for services (Vargo and Lusch 2008; Vargo, Maglio, and Akaka 2008). This means more than simply being consumer oriented; it means collaborating with and learning from customers, wide encountering interface for understanding the end-user value determination, and being adaptive to customers' individual and dynamic needs.

For KIPOs in the described service-dominant and dynamic business environment it is very important to not only understand the current and future needs of customers, but also the resource integration interface, providing them with the right experts at the right time (Teece 1997). Therefore, the KIPOs need to develop innovation and service offering based on the interests and competences of their employees in order to match them with the customer demand, as well as to guide competence management on an individual and organizational level (Collins 2001). This kind of information asset (Goodhue et al 1988, Wang et al 1998) can be managed with Competence Management Systems (CMS) (Alavi and Leidner 2001, Lindgren et al 2004).

However, there is very limited amount of literature regarding practical implications on how the value co-creation can be aligned with systematic competence development (Niemi and Laine 2016). The main aim of this paper is to describe competence management system design principles in the service-dominant business environment.

Action Design Research (ADR) (Sein et al 2011) is practice-inspired research, resulting in a theory-ingrained artifact. In line with ADR methodology, this research consists of four stages:

1. Problem formulation,
2. building, intervention, and evaluation (BIE),
3. reflection and learning, and
4. formalization of learning.

In this research we have closely followed and lead a publicly traded management, design & technology consulting company case organization to understand its business environment following SDL since 2011, and to design and implement a CMS including organizational and technological artifacts during an R&D initiative from January 2013 to June 2016.

In the ADR we learn the importance of aligning systematic innovation and competence development with customer demand utilizing SDL. The usefulness of CMS Design Principles (DPs) will be proven in the case organization, which gains significant business benefits from the guided emergence of organizational and technological artifacts utilizing the DPs. In the ADR we learn that is essentially important to visualize the customer demand to all employees in order to facilitate lean thinking (Wom-

ack and Jones 2010). DP “Alignment with Customer Demand” is needed to stress the importance of synching the innovation and competence management efforts with external environment. CMS should help the company to align how its economics work best (customer demand) with what it can be best at in the world (competence) and what most interests its employees (passion) (Collins 2001).

2. Literature review

2.1. Service Dominant Logic and competence management

It was stated already 15 years ago that value co-creation with the customer will replace the traditional goods exchange process because of the internet and collective knowledge of the available solutions (Prahalad and Ramaswamy 2000). In this configuration customers are part of the enhanced resource integration network; they co-create and extract business value and are simultaneously collaborators, co-developers, and competitors. A few years later Vargo and Lusch (2004) introduced SDL through ten foundational propositions (FPs). They saw “service” as the application of competences that benefit each other (co-creation), and as the focus of economic exchange. This thinking led to a shift from operand resource exchange to operant resource exchange (e.g., competencies, knowledge, and skills). Within this logic the operant resources are the fundamental source of competitive advantage. Products are just a distribution mechanism for the service provision.

The eight original Foundational Premises (FPs) of Service-dominant logic (Vargo and Lusch 2004), were later expanded to ten FPs (Vargo and Lusch 2008), and translated to four core axioms (Vargo and Lusch 2014). These axioms were centered on:

5. The application of resources in reciprocal service exchange (Vargo and Lusch 2004),
6. the integration of intangible and dynamic (i.e., operant) resources that create new resources (Vargo and Lusch 2004, 2008),
7. the cocreation of value through interaction and collaboration within networks of actors (Vargo and Lusch 2008), and
8. the importance of the context through which value is created and evaluated uniquely by a beneficial actor (Chandler and Vargo 2011; Vargo, Maglio, and Akaka 2008).

Service-dominant logic and its core axioms provide a solid framework for further exploring the role of context in exchange and value creation in the modern, digitalized and globalized business and society.

Rather than focusing on a multitude of different intermediaries within global supply chains (e.g., supplier of materials, manufacturer, retailer), S-D logic views all actors as resource integrators and cocreators of value. For example, a multinational fashion apparel company may consider many internal and external actors in different countries (e.g., supplier, manufacturer, wholesaler) in the value creation process, which is represented by the outcome of a finished garment. In an international context, this

traditional, linear model suggests that value is created by “producers” in one or more countries and destroyed by “consumers” in another country (Normann 2001). However, a service ecosystems view offers a more networked, interconnected, and recursive notion of value creation. In this view, all stakeholders are interconnected through shared institutions and the provision of service, and value creation occurs throughout the network at each exchange encounter, rather than at the end of the Value chain (Porter 1985), (see figure 1).

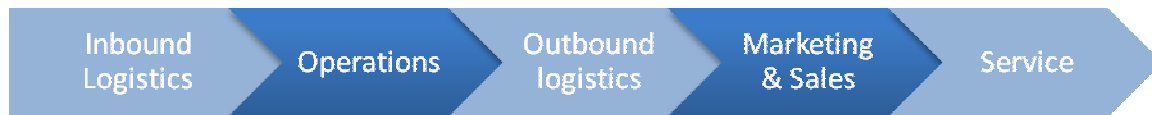


Figure 1: Value chain (Porter 1985)

Later Akaka, Vargo, and Lusch (2013) elaborated S-D logic and its service ecosystems view (Vargo and Lusch 2004, 2008, 2011) in the International Marketing discipline. They applied a service ecosystems approach to reconsider central constructs in International Marketing— exchange, resources, value, and explored the complexity of context from a service ecosystems lens by articulating how micro-, meso-, and macrolevel interactions relate and evolve.

Assumption that value is defined and co-created with the consumer, where core competencies are the competitive advantages (Vargo and Lusch 2004) leads to requirement for wide cross-organizational collaboration between the supplier and customer. Turning marketing logic from “making, selling, and servicing” to “listening, customizing, and co-creating” requires alignment between marketing, development, and delivery organizations, and makes traditional value chain (Porter 1985) thinking pull-directed. Also Slywotzky (1996) is presenting similar approach in his appreciated value migration theory, describing how a company selects its customers, defines and differentiates its offerings based on the selected customer needs, defining the tasks it will perform and configuring its resources based on those.

SDL is also claiming that all actors (individuals, firms, nations) are fundamentally doing the same core activities in engaging with resource integration, exchanging service for service, and acting simultaneously as consumers and producers (Vargo and Lusch 2014). Edvardsson et al. (2012) further studied resource integration and value co-creation, suggesting that value is contextual and reliant on structure, which is iteratively changing itself with every instance of resource integration.

In the customer-oriented dynamic business environment it is important, that KIPOs understand not only the current, but also upcoming needs of customers, to develop and provide them the right expertise at the right time (Teece 1997). Based on SDL, this need shall be seen as operant resources (skills, competences, processes). Lindgren et al. (2004) argued that interest is the most important element (not historical competence) when designing competence management systems. According to them customer demand is, of course, also important but that the knowledge-workers themselves should be aware of demand, and how the demand will evolve in the future on their own expertise area. On the other hand, Collins (2001) argued that the company must focus on the intersection of competence, passion, and demand. Therefore,

Niemi and Laine (2016) introduced a design principle “alignment with customer demand” in order to stress the importance of strategic leadership of the knowledge-intensive company.

All this is leading to conclusion, that suppliers’ value proposition has to be aligned with customers’ strategic needs, which needs are dynamic and in constant change together with the the resource integration structure, requesting transparent collaboration through suppliers’ and customers’ organizations. Value is seen as an operant resource (like core competencies), and value stream has to be pull-directed. Therefore, competence management is a key factor in creating operational excellence for the company.

2.2. SDL and Lean thinking

Lean thinking is having its roots in Toyota Production System (Ohno, 1988). Lean thinking was studied, explained and popularized by Womack and Jones (1996) and later explained in more details by Liker (2004). Principles of Lean thinking are; 1) identify value (value is defined by beneficiary, pull-direction), 2) map value stream (seamless resource integration with customer), 3) create flow (cross-functionality, culture), 4) establish pull (co-creation with customer), and 5) seek perfection (iterative development). As discussed before, value and value creation definitions are difficult if not impossible to unambiguously define, but Lean is describing value creating process capable (value), available (value streams), adequate (perfection), flexible, flowing, and pulled. (Womack and Jones, 1996) In the other words in Lean thinking firms just have to think the created value from its customers’ perspective, learn, iterate, improve, and revisit the value definition.

Applying SDL means that the firm is not only restricted to making value propositions but also gets opportunities to actively participate in value creation with its customers, although value is always determined by beneficiary (Vargo and Lusch 2008). In the other words in value co-creation the supplier processes can be seen as a value steam, where core competences are the value particles, which are pull driven, bridging SDL to Lean thinking. Again, based on Lean thinking the suppliers’ efficiency can be measured with value density (level of competency), and value stream density (optimizing utilization rate of value creating actions) (Kuula, Niemi, and Haapasalo 2015). In pull-directed value creation customer is defining the need, but obviously the value proposition is still required for creating the required trust and engaging the customers. Anyhow the whole value architecture—including the delivered product and/or service, the revenue model, and the resources—have to interactively deliver and co-create the proposed value (Kuula et al. 2015).

Blank (2003) introduced later so called Lean Startup – approach for probing the ideas and needs from the customer already in the very early phase of the product/service development. Based on this, Ries (2011) presented so called Build-Measure-Learn – loop for probing the customer needs, pains and determination of value , answering question “how can we learn more quickly what works, and discard what doesn't”. This process is measuring value creation from customers’ perspective, and then learn whether to persevere or pivot the idea. Testing value creation in the lean startup model is done through the iterative, continuous, and cross-functional minimum viable product (MVP) development process.

Also Haeckel's (1999) Sense-and-respond - centred view is bridging Lean thinking and Lean Startup philosophy to the Service Dominant Logic foundation. Main idea in Sense-and-respond – approach is to cultivate relationships that involve the customers in developing customized, competitively compelling value propositions to meet specific needs.

2.3. Innovation management

Service innovation in the SDL framework is broadened to involve three different elements; the service ecosystem, the service platform, and value co-creation (Lusch and Nambisan 2015). The study saw that a common worldview, architectural alignment, and the structural flexibility of organizations were required for co-creative service innovation. Service innovation in this paper is focusing on co-created service innovation for the benefit of the customer, and requirements it set to supplier.

DTI (2007) defines that "Innovation is the successful exploitation of new ideas". Or according to Drucker (2002) it is "the means by which the entrepreneur either creates new wealth-producing resources or endows existing resources with enhanced potential for creating wealth ". Keup et al (2012) identified six major research themes in strategic innovation management: 1) major intended and emergent initiatives, 2) internal organization adopted, 3) senior managers and ownership, 4) utilization of resources, 5) performance enhancement, and 6) external environments. In this paper we are focusing on the adopted internal organization and how to align it with external environments.

The logic of innovations needs to be understood in order to comprehend the dimensions of the required changes. (Christensen 2010, Govindarajan and Trimble 2010, Suikki et al. 2006). In 1983 Schumpeter (1983, 1912) already connected innovation to economic exchange. He defined innovation as the foundation of business improvement and the success of an organization. Christensen (2010) has dedicated his life to studying the sustainability of business and how this intimidates unpredictable, disruptive innovations. Christensen (2010) defined the difference between sustainable and disruptive innovation in his book *The Innovator's Dilemma* (Christensen 2010). In this paper we don't use this classification, although focus in the followed customer cases have been in sustainable innovation.

Tidd and Bessant (2013) mapped the innovation space: (each dimension can vary from incremental to radical): 1) Product / service: changes what the organization offers, 2) Process: changes the way of creation or delivery, 3) Position: changes the context in which the services are introduced, and 4) Paradigm: changes the underlying mental models which frame what the organization does. On the other hand, Drucker (1985, 2002) identified the sources of innovation: 1) unexpected occurrences, 2) incongruities, 3) process needs, 4) industry and market changes, 5) demographic changes, 6) changes in perception, and 7) new knowledge. Our case organization is supporting its customers in the field of business- and service design, technology and information management, and therefore this study is focusing in offering and process development.

Teece (1997) introduced the dynamic capability framework: Sense, Seize, Transform. "the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments". Dynamic capabilities can be

distinguished from operational capabilities, which pertain to the current operations of an organization. Dynamic capabilities, by contrast, refer to “the capacity of an organization to purposefully create, extend, or modify its resource base” (Helfat et al., 2007). This framework was taken as the backbone to the described Competence Management System (CMS) development.

Earlier research has identified best and worst practices for innovation management. Tidd and Bessant (2013) defined the model of innovation process: 1) Search: how to find opportunities, 2) Select: what and why are we doing, 3) Implement: how to make it happen, and 4) Capture: how are we going to reap the benefits. McGrath (2010) argued that with new business models, experimentation is key, and this discovery driven approach can take place both within firms and across industries. This itself may offer another source of competitive differentiation, as some firms develop superior capabilities at experimentation and consequently can build better models more quickly than their slower counterparts. Govindarajan and Trimble (2010) argued that an innovation initiative is best organized as a partnership between a dedicated team and the group that handles ongoing operations. This should help to mitigate possible tension between innovation team and core operations. Martin (2011) argued that the innovation initiatives need to have innovation catalysts, who act as internal champions. They should help and work with managers throughout the organization. Thomke and Reinertsen (2012) identified six myths hindering new product development: 1) high utilization of resources will improve performance, 2) processing work in large batches improves the economics of the development process, 3) stick to the original “great” development plan, 4) the sooner the project is started the sooner it will be finished, 5) the more features we put into a product, the more customers will like it, 6) we will be more successful if we get it right with the first time. It is easy to see how this is linked with Lean Thinking (Womack 2010) and Lean Startups (Ries 2011).

3. Methodology

3.1. Action Design Research

Sein et al. (2011) defined that Action Design Research (ADR) should result in a theory-ingrained artifact that is intended to solve a practical business problem. In line with ADR method, our research consists of four stages (see Figure 2). We have repeated stages 1-3 several times and, eventually, moved on to stage 4 and published our findings in the form of scientific research papers.

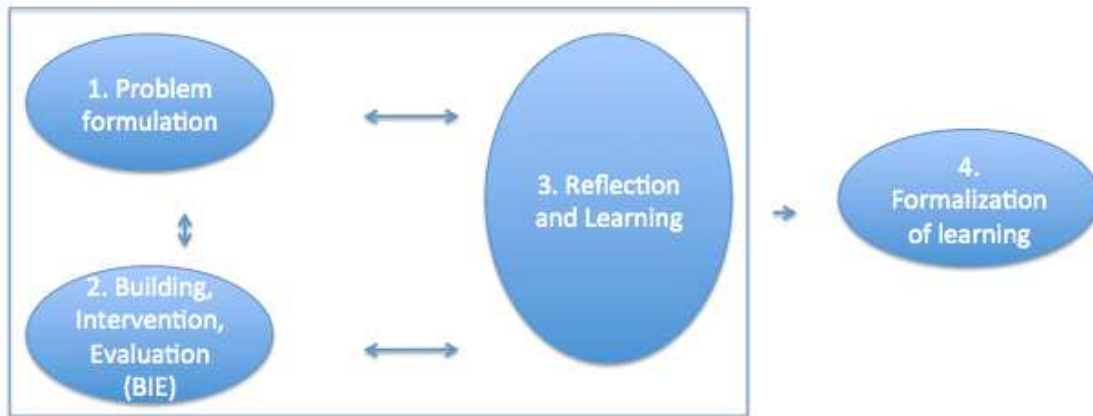


Figure 2: Action Design Research stages (Sein et al. 2011).

During the ADR in 2013-2016 we have implemented a competence management organization and software solution in a single case organization. One of the authors presented revised competence management system design principles in another article (Niemi and Laine 2016).

3.2. Research & Development program in Siili Solutions PLC

Siili Solutions PLC (case organization in this research) was founded in 2005 and provides design and technology services to major business-to-business customers. The sales revenue is estimated to reach €50M in 2016 and it has over 400 employees with sites in Finland, Germany, and Poland. The last years it has grown rapidly, simultaneously maintaining steady profitability: the average annual revenue growth has been over 40% with about 10% EBITDA from 2010 to 2015.

Siili started a Research & Development program in 2013 with focus on competence management. There have been three organizational interventions and five technological interventions (see Figure 3) and the total budget exceed €2M.

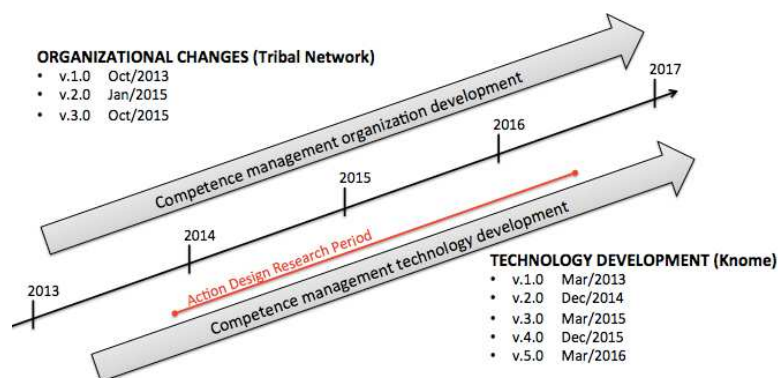


Figure 3: The organizational and technological interventions during the R&D program

3.3. The research team and progress

The first author is the Chief Executive Officer and the second author the Chief Development Officer of the case organization. Therefore, they have acted as “involved re-

searchers” and there has been another scientist as “outside researcher” to ensure the objectivity of the results (Walsham 1995, 2006). Besides these three scientists, the research team consisted of three members of Siili Solutions PLC’s service development organization, as well as numerous software engineers who have taken care of the development of the competence management software.

The research started in October 2013 when the second author interviewed 40 persons (employees, customers, partners) during three months and utilized dynamic capability framework (Teece 2009) to describe the current state in the case organization. The second round with 20 employee interviews was done in May-June 2015 in order to publish the interim findings. The last round of findings evaluation was done with confirmatory workshops in August 2015, and May-June 2016. In addition to these formal sessions, there have been numerous exploratory workshops among researchers and other Siili employees. The researchers have also encouraged all the employees to submit development ideas using an online collaboration tool and a dedicated email address. The researchers utilized also a lot of secondary documentation: management reports, process guides, intranet material, software quality & version control tool content, and public material like press releases and annual statements.

The research design and progress is described in more detail in Niemi and Laine (2016).

4. Results

As a KIPO, Siili needs to be able to constantly match customer demand with the correct skills and experts. As a growing organization (recruited 102 experts on 2015) this matching is very dynamic, and foreseeing upcoming needs and to be recruited expertises as well. The sales cycle from initial contact until closing the deal, is three months on average, and simultaneously the recruitment cycle, from initial contact to the first day at work, is also about the same three months. In order to sustain competitive advantage, Siili needs to forecast customer demand in the short term and long term, and to understand and develop its own competence pool.

Siili has iteratively improved its competence management in order to meet current and future customer demand since 2011, but in 2013 this development was named as strategic initiative, and therefore found more formal process, responsibilities and targets. The following descriptions are based on real life situations in a knowledge-intensive project organization during 33 months.

4.1. A description of the study

Siili has described its internal processes as a value stream, where core competences are the value particles, and suppliers’ efficiency can be measured with value density (level of competency), and value stream density (optimizing utilization rate of value creating actions) based on Lean thinking (Hines et al., 2004; Liker, 2004; Womac; Jones, 2003). Service Development organization is at charge of value density, whereas business development organization is responsible for value stream density, Figure 4 (Kuula, Niemi, and Haapasalo 2015). Therefore, the competence manage-

ment is serving value creation through organization. Customer liaison process is targeting to short iterations in activity cycle, and to rapid prototyping cycles in service innovation for identifying the real value creation opportunities and best practices with the minimum waste of resources.

CUSTOMER	Emotion	Cognition	Behaviour
Onstage (co-creation, creating pull)	Introduction Creating trust	Service Innovation	Engagement
Backstage (resource integration)	Customer Selection	Service Execution	Identifying key actors
Support (service exchange)	Identification of Value	Cross- Functionality	Value Stream
SUPPLIER	Learn (Ideas)	Build (Service)	Measure (Data)

Figure 4. Lean SDL Encountering framework (Kuula et al. 2015).

Silli's business model is based on co-creation with customers, meaning that the consultants take part in projects mostly at customer premises. This way of working is challenging from an employer's point of view as: 1) it is extremely difficult to gain an overview of the current competences of employees and lead the development of competence management as a dynamic capability, 2) employees do not necessarily experience any connection with their employer but connect with the customer organization and team member colleagues instead, 3) there are five main service offerings and dozens of sub-offerings, which are very difficult to match with the thousands of competence combinations of employees.

The initial current state analysis with DCF (Teece 2007) conducted from October to December 2013, recognized two important development issues: a need for the systematization of the competence management as a dynamic capability and linking it with customer needs in the design of the service offering.

4.2. Competence management organization

Silli had grown rapidly since 2010 and there was a growing need to take the next step in the development of leadership and organization in the beginning of 2013. There were four Business Unit Managers (BUMs) who were directly managing over 100 consultants. Most of the employees were working at the customer premises and

had very limited contact with the rest of the Siili organization. Moreover, there was practically no any structure or practices for competence management.

Tribal Network 1.0 with matrix organization was launched in fall 2013 to formalize the new leadership model and kickoff the competence management activities. However, the main goal of this structure was to strengthen the Siili culture and to improve communications between consultants and the company leadership. In fact, this new model improved many of the current challenges, but the research team already identified the next improvement items regarding competence management.

Dynamic Competence Capability framework was launched by the R&D organization in the beginning of 2014. The aim was inspired by Teece's (2007) DCF:

1. Sense new competences for evaluation,
2. seize the formally chosen competences for learning and commercialization,
3. transform; that is to say, to continuously align the tangible and intangible assets in order to ensure sustainable competitive advantage.

Tribal Network 2.0 was launched in the beginning of 2015 because Siili had grown record-fast in 2014 and the headcount amounted to almost 330 employees. This time the goal was to formally align the DCC practices with the organizational structure and way of working. One of the major changes was to give the ownership of tribal network to the R&D function from HR even though the BUMs still had to formal line management responsibilities. Moreover, a competence development manager was nominated in order to coach the tribal leads. It was recognized, that in this kind of knowledge intensive professional service organization it was better to focus on subject-matter competence, as in tribal network 2.0, whereas the tribal network 1.0 was more HR-driven.

Tribal Network 3.0 was launched in order to strengthen the co-operation between competence management and operational business in the end of 2015. The R&D organization was given the formal line management responsibility for all the employees, but was required to start working more closely with the BUMs.

Tribal Network 4.0 was launched in August 2016 in order to link customer demand and employee interests more explicit. This new customer pull-driven approach is described in more detail after the competence management technology stages in the next section.

4.3. Competence management technology

Competence management is a key function to all professional service providers. Most of the companies are still seeing service as an operand commodity, but Siili understood the operand nature of its offering already 2011, finding a sound framework for transparent value creation from SDL in 2012. Building on top of these theoretical frameworks Siili created a service vision for a new competence management tool in the beginning of 2013. The vision was inspired by SDL and the hedgehog concept (Collins 2001), and the aim of the tool was to locate the focal point of customer demand, employee competence, and employee interest. Siili dedicated a team of five consultants to develop the tool.

Tool named KnoMe version 1.0 was launched in spring 2013 to provide complete transparency on the stored competence data for all employees. The first version of the tool included CVs, basic search, and a functionality to print out the CVs for sales purposes. The main focus was on technology skills and project history of each employee.

In fall 2014 the next iteration of KnoMe kicked off as the development, again as part of the DCC initiative. There were several reasons:

1. The company had grown so much that it started to be impossible for anyone to remember individual-level competences, and competences wanted to separate from experts,
2. company size and high profitability allowed an increased investment in R&D
3. there was a need to replace an inadequate commercial HR application at one of the acquired companies, and
4. company was preparing first international operations.

KnoMe version 2.0 was released at the end of 2014 after a significant development effort. It was the first true competence catalogue including information on the ongoing and latest projects as well as a solid architecture that enabled continuous delivery in short one-week development and release cycles. KnoMe version 3.0 was released at the beginning of 2015 to support the new Tribal Network 2.0. After the go live each employee was able to see who belonged to which tribe immediately after the employment contract was signed. KnoMe version 4.0 was released in December 2015 and supported the new organization launched in October 2015 and included completely renewed user interface as well an early release of customer and project management. KnoMe version 5.0 was released in the beginning of 2016 launching integration with the ERP system that contained the master data and realized working hours of each customer and project.

In summer 2016 Siili launched a new development phase aimed at deploying customer pull-driven service development way of working. Competence management organization and system were both serving well the needs they were developed for, but the service development organization itself had receded from operational activities and customer work. As earlier presented, according to SDL customer is determining the value and it is requesting wide and transparent collaboration through organization. Therefore, innovation team kind of approach cannot be used for more than temporarily driving the change. In the next section we discuss the expected results from the new way of working and compare them with the theories presented in the literature review section.

5. Discussion: pull-driven competence development

Based on SDL, in the service economy neither product nor service creates value on its own—value is co-created with the customer. In the other words value is embedded in the value creation processes rather than provided as a service to the customer. Co-creation allows for customized services (products) while still taking advantage of economies of scale. As also presented in the literature review, based on both, SDL

and Lean philosophy the created value is based on operant resources, and customer determine value of the offering. Based on Lean thinking, in service co-creation the supplier processes can be seen as a value stream, where core competences are the value particles, and suppliers' efficiency can be measured with value density (level of competency), and value stream density (optimizing utilization rate of value creating actions). In practise this means, that value stream has to be pull directed, and traditional value chain (Porter 1985) has to begin from the customer needs. This is leading to the facts, that for service integrator the competence management is a key function for the company and its profitability, competence management system can be seen as the enterprise management system, and product/service development has to liaise with the customer, understanding the value determination and value creation process of its customers.

This research is part of practice-inspired ADR, which started in Finland already 2011, and where studied professional service provider company was recognizing the competence management as a key competitive advantage 2013 based on theories of SDL and Lean Thinking. Company was defining its value chain first based on Porter (1985), translating it to own functions (figure 5). The organization and competence management systems are evolved and improved, and this evolution has opened the practical implications to researchers.



Figure 5: Value Chain, SILLI

For simplifying the value chain, and aligning it with the organizational responsibilities and SDL, Company was integrating some functions together. Outcome was the baseline for the upcoming activities and measurement of the value stream (figure 6).



Figure 6: Simplified Value Chain

Original approach for service development and competence management was based on productized service solutions in 2011. Two years later the studied company recognized that both service development and competence management are the key factors for competitiveness and profitable growth as the resource integrator based on SDL in service economy. Company understood that it has to be able to shorten the distance between the customer needs and its expertise acquisition, and connected service development organization directly to the customer interface. Value proposition was based on hypothesis and existing expertise, but approach was always

technologically agnostic and co-creative with the customer. This approach is described in figure 7.

Develop (Learn, Measure)



Propose (Hypothesis, Build)

Figure 7: Value based competence management

Iterative development of service development and competence management organization and tools were described earlier, but the latest phase of development is still in process. Anyhow this study has already now proved that the competitiveness of the company can be iteratively improve with ADR, service-dominant logic can be seen as a sound framework for studying value creation in the service economy, and operant resource management is a key factor in improving the value stream efficiency of the company.

6. Conclusion

Digitalization and increasing size of service sector in all developed economies around the world are driving the need towards more service oriented marketing and business logic, simultaneously increasing the importance of knowledge-based occupations. Service-dominant logic (SDL) implies that value is defined by, and co-created with the consumer rather than embedded in output, and core competencies like knowledge and skills are competitive advantages. Knowledge-intensive project organizations (KIPO) need to develop innovation and service offering based on the interests and competences of their employees in order to match them with the customer demand, as well as to guide competence management on an individual and organizational level.

In this paper we looked into an innovation management and service offering development initiative in a knowledge-intensive project organization Silli Solutions PLC. We have conducted an action design research program focusing on competence management during 2013-2016. In the program we have designed, implemented, and evaluated a competence management system including organizational interventions. The design was guided by previously published theories such as service-dominant logic (Vargo & Lusch 2004, 2008) strategic management (Collins 2001), and competence management system design principles (Lindgren 2004).

6.1. Theoretical contribution

According to Hevner et al. (2004), design science research should explicitly present the theoretical contribution in order to differ from regular system development and consulting assignments. We have designed, implemented, and evaluated a competence management system in a case organization to understand how to systematically design and develop innovation management capabilities. The management of the case organization has evaluated the design, appreciates the results, and the organization has grown profitably during and after the research period. Therefore, this action design research is a “weak market test” realization of market-based research validation (Kasanen et al. 1993), because there is one case organization using the designed construction and appreciates the usefulness.

6.2. Practical contribution

(Sein et al. 2011) defined that ADR should result in a theory-ingrained artifact that is intended to solve a practical business problem. The case organization needed first to systematically manage its competences and later on to align this management with customer demand and innovation management. In this paper we have described the design and development program with organizational and technological interventions in the case organization, which could be useful for other companies facing similar challenges.

Finally, our research provides new evidence how scientific theories can be applied in authentic professional services context and help KIPOs in systematic innovation management and service offering development.

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TECHNOLOGY AS A SERVICE ENABLER IN RETAIL ENVIRONMENTS.

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The brick and mortar retail environment is currently under transition due to potential new technological innovations. The purpose of this paper is to classify and organize the accumulated knowledge about technology based retail services (TBRS) as revealed in the scientific literature. This paper presents a systematic and comprehensive review of major literature on TBRS. This study was conducted in Elsevier Scopus and led to a sample of 67 peer-reviewed articles published between 2003 and 2016 worldwide. Altogether, 32 different TBRS were identified. As far as the authors are aware, this paper provides the first systematic review of TBRS literature, which not only helps to organize retail based services but also identifies seven basic technologies underlying current TBRS.

1. Introduction

In today's economy, information and communication technologies (ICT) play a vital role not only in enabling firms to achieve operational excellence but also in facilitating strategic competitive advantage (Gastaldi & Corso, 2012). The ongoing digitalization also has a tremendous impact on retailing (Brynjolfsson & McAfee, 2014). Historically, technological innovations have played a major role in shaping the retail landscape (Varadarajan et al., 2010). Internet-based technologies fostered online and multichannel retailing, revolutionized the supply chains and facilitated the communication between customer and retailer (Varadarajan et al., 2010). Interactive ICT are also reshaping the competitive brick and mortar retail environment; for instance by transferring more power to customers. The increased deployment of ICT changes communication and purchase-related processes, and significantly affect retailers' businesses (Varadarajan et al., 2010).

Although a large body of research on in-store retail technology has been conducted in the scientific literature, most of them focused on radio frequency identification (e.g. Bayraktar, Yilmaz, and Yamak (2010), Bhattacharya (2015), Thiesse and Buckel (2015) or Wong et al.(2012)) and on self-service technology (e.g. Anitsal and Paige (2006), Forbes (2008) or Kaushik (2015b)). Little effort has been made to compile cutting-edge research on retail services supported by technology. Therefore, the objective of this paper is to identify and organize the accumulated knowledge in the field of technology based retail services (TBRS) by providing a systematic review of major literature and an overview of the scientific state of knowledge in that field for

both, academics and practitioners. In other words we ask two questions: “Is there a broad agreement on what TBRS exactly are?”, and “Which kinds of technologies are TBRS based on?” This paper will help to stimulate further interest in this area. A specific search framework is developed to identify relevant literature, which is subsequently analyzed from multiple viewpoints. Discovering what is already known about the topic can indicate fields for further research as “little can be gained by reinventing the wheel” (Leedy & Ormrod, 2010, p. 51).

The paper is organized as follows: First, TBRS are defined. Second, the methodology of the conducted systematic literature review is presented. Third, an analysis of the articles and general descriptive findings are shown. Fourth, the 32 different TBRS identified in the literature are presented. Fifth, seven basic technologies underlying current TBRS are presented. Finally, some concluding remarks are presented, several avenues for future research are shown and some research limitations are evinced.

The literature on retail business shows the positive impact that the adoption of ICT has on creating competitive advantages, as well as on increasing retail productivity (Romero & Martínez-Román, 2015). According to Varadarajan et al. (2010) there are three different types of retail technologies. The authors classified technologies as (i) infrastructure technologies such as electricity or escalators, (ii) broadcast communication technologies, for instance radio or catalogs and (iii) interactive technologies such as hyper-text technologies or smartphones. For the remainder of this paper, only interactive technologies will be taken into account when referring to technologies.

While TBRS can be generally viewed as services that are executed in-store and facilitated by technology, a formal definition is useful to guide academic discourse. Therefore, we offer the following definition derived from Varadarajan et al. (2010):

Technology based retail services refer to methods, tools or devices that allow several stakeholders (customers, computers and machines and organizations) to engage in retail communication facilitated by interactive technology.

Technology is transforming the brick and mortar retail sector and will continue to do so. Consequently, competitiveness in this sector will be increasingly determined by the retailers’ ability to incorporate TBRS in their businesses (Romero & Martínez-Román, 2015). In order to identify relevant TBRS, a review on existing interactive retail technology is necessary.

2. Methodology

The goal for this study is to identify and organize a representative sample of TBRS articles by providing a systematic review of major literature and an overview of the scientific state of knowledge in the field of TBRS. To reduce subjectivity and arbitrariness, a replicable, systematic, and transparent search framework was developed (Leedy & Ormrod, 2010, p. 31; Tranfield, Denyer, & Smart, 2003). The search framework, consists of six phases and is based on the work of Newbert (2007), who modified the approach of David and Han (2004).

The first step adopted the traditional pearl growing technique to develop relevant keywords (Schlosser, Wendt, Bhavnani, & Nail-Chiwetalu, 2006), because no consistent term exists to describe retail technology or technology-based services in brick and mortar retail environments. This iterative method generates new relevant terms under which other applicable articles can be found. Pearl growing starts with a specific set of documents relevant to TBRS. This set is reviewed for additional key words, descriptors, and terms to use in a subsequent search. An internet-based search in Scopus was conducted with the keywords "Technology Enabled", "Technology Enhanced" and "Technology Mediated". All keywords have been enhanced with the word "Retail" to ensure reliability and to be restricted to title, abstract and keywords. The search identified fourteen different articles. These articles were studied in depth to determine synonymous terms. These keywords were used in a subsequent search for additional keywords, descriptors and terms and led us to a set of 54 different search terms.

In the second phase, the 54 search terms were used to develop one search string to identify relevant literature. Search words were used in their singular form. The search words have been used in common spellings (for example "self-checkout", "self checkout", "self-check-out" and "self check-out") and their common abbreviations (for example "QR Code" and "Quick Response Code") to cover all different ways of writing. Furthermore, the search words have been used in their British English spelling as well as in their American English spelling (for example "visualisation" and "visualization"). These adjustments led to a search string containing 64 different search terms.

In the third phase, the search was conducted by using Elsevier Scopus as the largest citation database of peer-reviewed literature. To ensure reliability, each search term was enhanced with "retail" and "brick and mortar". The search was restricted to title, abstract and keywords and conducted on May 18th in 2016. This resulted in documents where at least one of the terms appeared in the title, keywords or abstract. The search was not case sensitive and led to a sample of 1.676 articles (see Figure for the stepwise article elimination).

Elimination of duplicates in the fourth phase reduced the sample by 263. Limitation to published journal articles reduced the sample to 563 articles. This criterion is used as a proxy to ensure high-quality work since these articles were subject to a thorough review process (David & Han, 2004). Articles that were reviews of books, conference papers, dissertations or unpublished working papers rather than a scientific paper were excluded, as journals represent the highest level of research (Nord & Nord, 1995). Only journals published in English were included.

However, this systematic search in Elsevier Scopus database is conducive to false positives as it not only captures publications that contain the terms used in the search string. It is possible that there are publications that simply contain the terms used in the search string separately from each other. This is why in the fifth phase the titles of all articles were read to ensure thematic relevance. Afterwards, the abstracts and conclusion of all remaining articles were read to eliminate irrelevant ones. To further ensure relevance, all remaining articles were screened for their substantive context and empirical content. All articles dealing with retail technology but not in-store were marked as irrelevant.

All selected articles were read and reviewed in their entirety in phase number six. The search yielded 67 TBRS articles from 51 journals. Although this search was not exhaustive, it serves as a comprehensive base for an understanding of TBRS research (Ngai & Wat, 2002).

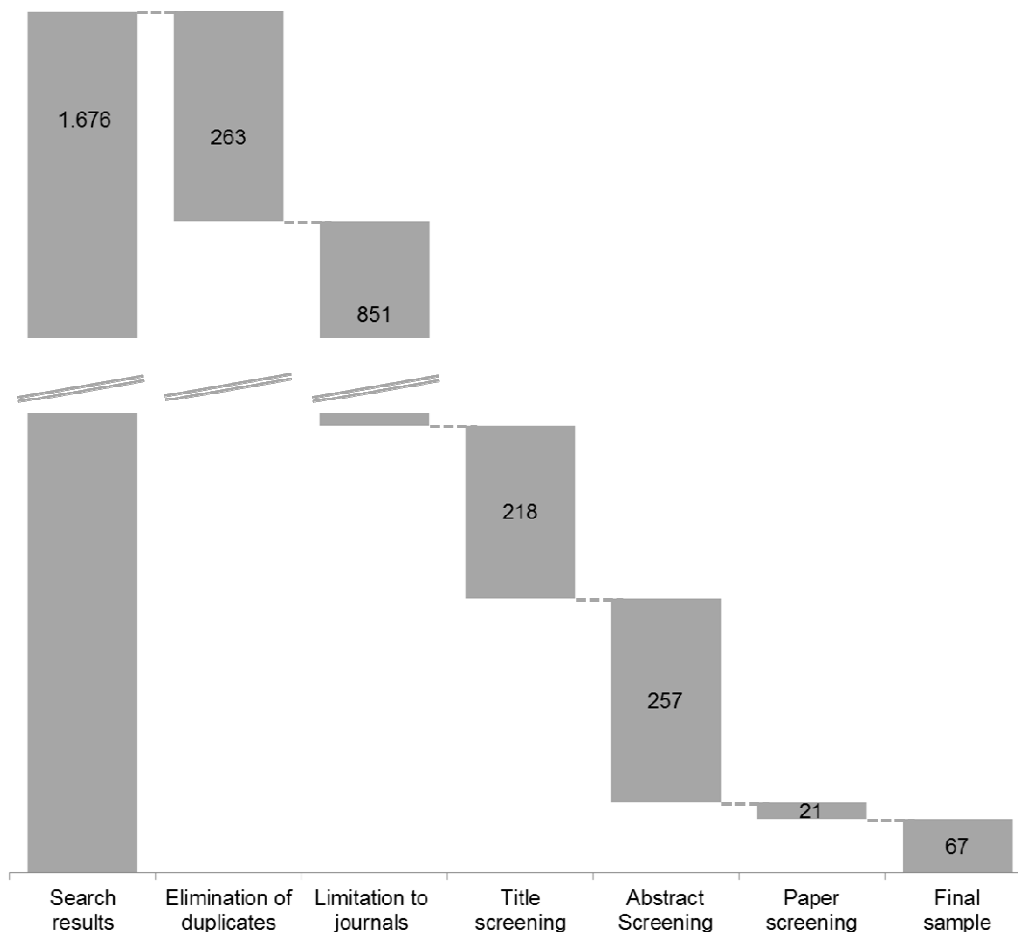


Figure 1 Framework of stepwise article elimination

3. General descriptive findings

The 67 identified articles were published in 51 journals; most journals (40) published one article. This could indicate that the subject of TBRS is not yet considered to be part of a specific area of scientific literature. The journals publishing two or more articles are responsible for a total of 27 papers, which represents 40% of the sample. The outcome is published in academic journals covering various fields, such as retailing and marketing (e.g. Journal of Retailing and Consumer Services, Journal of Relationship Marketing), economics and management (International Journal of Production Economics or Journal of Product Innovation Management) but also psychology and mathematics (e.g. Journal of Consumer Behaviour or Mathematical Problems in Engineering) (see Table 1).

Table 1 Analysis of published journal articles

No. Of articles	Journal
4	International Journal of Production Economics
3	European Journal of Information Systems, International Journal of Retail and Distribution Management, Services Marketing Quarterly
2	IEEE Pervasive Computing, International Journal of RF Technologies: Research and Applications, Journal of Business Research, Journal of Retailing and Consumer Services, Journal of Services Marketing, Journal of Technology Management and Innovation, Production and Operations Management
1	Academy of Marketing Studies Journal, Amfiteatru Economic, Annales des Telecommunications/Annals of Telecommunications, Asian Social Science, Assembly, Assistive Technology, Computers in Human Behavior, Computers in Industry, Electronics and Communications in Japan, Engineering and Technology, IEEE Transactions on Industrial Informatics, Industrial Management and Data Systems, Information Display, Information Systems Research, International Journal of Ambient Computing and Intelligence, International Journal of Business Information Systems, International Journal of Business Performance Management, International Journal of Digital Content Technology and its Applications, International Journal of Mobile Human Computer Interaction, International Journal of Multimedia and Ubiquitous Engineering, International Journal of Operations and Production Management, International Journal of Research in Marketing, Journal of Business and Industrial Marketing, Journal of Consumer Behaviour, Journal of Direct, Data and Digital Marketing Practice, Journal of Marketing, Journal of Marketing Management, Journal of Product Innovation Management, Journal of Relationship Marketing, Journal of Service Research, KSII Transactions on Internet and Information Systems, Marketing Intelligence and Planning, Mathematical Problems in Engineering, Mondo Digitale, Personal and Ubiquitous Computing, Sensor Review, Sensors (Switzerland), Simulation, Telematics and Informatics, World Academy of Science, Engineering and Technology
67	Total

The International Journal of Production Economics published the most articles (four) in the field of TBRS. Three papers were published in the European Journal of Information Systems, the International Journal of Retail and Distribution Management and the Services Marketing Quarterly. These four leading journals are responsible for 13 articles or almost 20% of the sample.

Table 2 summarizes the results of the analyses of the reviewed literature. To identify research approaches used in the literature, the articles were classified by their research nature (empirical versus theoretical). Out of all articles, a total of 39 were empirical works such as surveys, case studies or interviews. Twenty-two were non-empirical studies, mostly consisting of reviews. According to Marasco (2008) and Olsen and Ellram (1997), there is a third category, which includes both empirical and theoretical work. Publications in this category typically develop theoretical models that have been tested empirically. This category is represented by six articles.

Table 2 Analyses of Classified Articles Category

Category	No.	%
Research nature of articles		

Empirical articles	39	58.2
Theoretical articles	22	32.8
Empirical and theoretical articles	6	9.0
Number of Journals publishing		
1 article	40	59,7
2 articles	7	10,4
3 articles	3	4,5
4 articles	1	1,5
SJR indicator of journals		
<0.500	28	41,8
0.501 - 1.000	14	20,9
1.001 - 2.000	12	17,9
>2.000	11	16,4
na	2	3,0
Number of authors per article		
1 author	14	20,9
2 authors	18	26,9
3 authors	21	31,3
4 authors	8	11,9
>4 authors	6	9,0
Countries of corresponding authors		
USA	50	28,1
UK	27	15,2
Italy	16	9,0
Germany	15	8,4
Japan	12	6,7
Others (<12 articles per country, 16 countries)	58	32,6

NOTE: Number of journals = 51; number of articles = 67;
SJR = SCImago journal rank; na = not applicable

About 97% of the articles have a SCImago journal rank indicator, out of which 43% had an impact factor of 0.500 or less. Whereas 11 articles were published in journals with an impact factor of more than 2.000. The best ranked article is published in the Journal of Marketing with an impact factor of 7.332. The open-access SJR indicator was used as it is based on Scopus data and therefore lists numerous journal titles (Falagas, Kouranos, Arencibia-Jorge, & Karageorgopoulos, 2008).

A total of 157 authors worked on the 67 identified papers. The most represented author was John A. Aloysius who published 4 articles. Eleftherios Alamanos, Charles Dennis and J. Joško Brakus published three articles together. Bill C. Hardgrave, Eleonora Pantano and Frédéric Thiesse have also published three articles. Nearly 21% of the reviewed papers were single authored; the sample has a median of three authors. Only one article was authored by eight people.

Analysis of the geographical distribution shows that most TBRs research is done in North America, Europe, and Japan. Several authors collaborated across national

borders with colleagues from other countries. Authors came from 21 different countries. Most articles were published by US American authors (21), followed by the United Kingdom with 8 articles. German authors contributed to seven publications and Italian authors to six. These four countries were responsible for 42 articles, or nearly 63% of the sample.

To give a sense for chronological progression of TBRS research, Figure presents the number of articles published in each year until 2016. This figure shows that the field of TBRS is relatively new to scientific literature, with publications commencing in 2003. Very little activity took place until 2005, as only four papers appeared in scholarly journals. In the following five years (2006 to 2010), 22 papers were published. Thirty-nine of the 67 identified articles, or 58%, were published in the years between 2011 and 2015; eleven articles, 16% of the total sample, were published in the peak year 2013. The contraction in 2016 is caused by the fact that the search was conducted in May 2016 and therefore could not cover all articles published in 2016. Overall, the trend reflected in figure 2 indicates the development of a new and growing field.

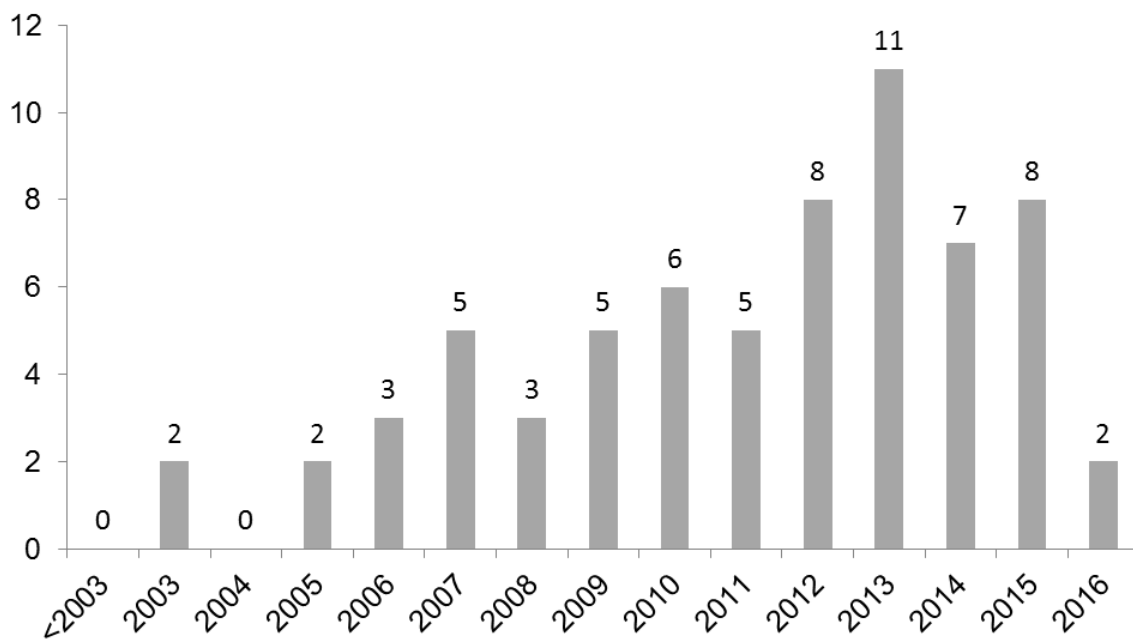


Figure 2 Number of articles published per year

4. Classification of TBRS

The underlying classification framework is based on the conducted literature review with respect to TBRS, and was derived and developed from existing frameworks of Pantano and Viassone (2014) and Romero & Martínez-Román (2015). Pantano and Viassone (2014) stated that ICT used in brick and mortar retail environments can be classified into three large categories according to their technical characteristics: (i) in-store totems, (ii) mobile applications and (iii) hybrid systems. All of these categories have in common that they are somehow used by customers. Romero & Martínez-

Román (2015) added a fourth category which comprises TBRS that enhance capabilities of retailers through computer applications. As shown in Figure 3, the framework consists of four different categories in which all 32 identified TBRS are carefully classified.

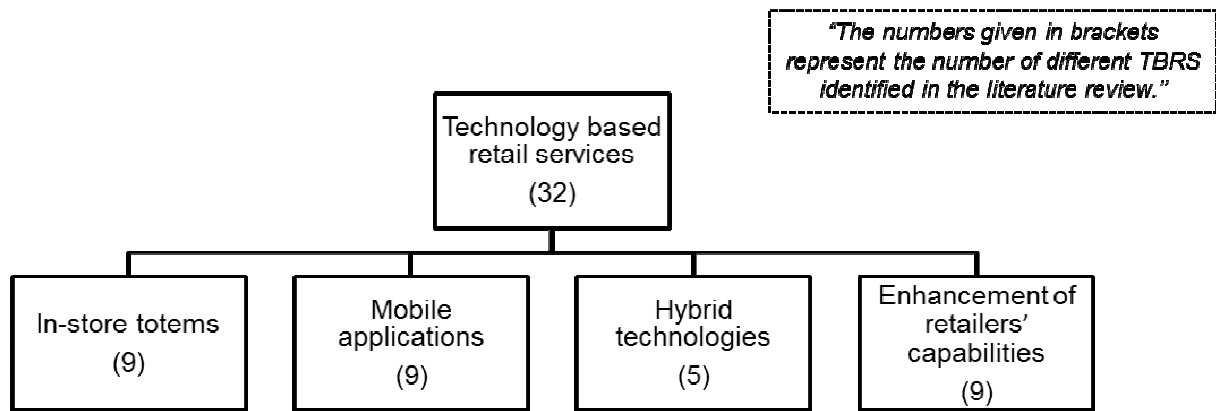


Figure 3 TBRS classification framework

4.1. In-store totems

Technology based retail services belonging to the first category are shown in Table 4 and contain non-movable technologies applicable to the point-of-sale (POS). Such TRBS can be self-service technologies with interactive contents “that enable consumers to produce a service independent of direct service employee involvement” (Elliott, Hall, & Meng, 2013) or other services which enrich the shopping experience.

Table 4 In-store totems

TBRS	Brief description
Augmented reality (stationary)	Augmented reality (AR) is a camera-enhanced view of a real-life environment, where virtual elements are merged with the physical world. One possible AR application allows customers to view themselves wearing different outfits. <i>(Bodhani, 2014; Cuomo, Tortora, & Metallo, 2014; Demirkan & Spohrer, 2014; Todd, Rogers, & Payne, 2011; White, Schmidt, & Golparvar-Fard, 2014)</i>
Information kiosk/ terminal	An information kiosk/ terminal is a computer terminal which delivers product or other relevant information to customers without the assistance of an employee. <i>(Dennis, Michon, Brakus, Newman, & Alamanos, 2012; Forbes, 2008; Helena Chiu, Fang, & Tseng, 2010)</i>
Intelligent scale	The intelligent scale for fruit and vegetables is equipped with a camera and identification software. Customers only place the product on the scale. Based on surface structure, size, color, and thermal image, the scale automatically recognizes the goods, weighs them and prints out the price label. <i>(Loebbecke, 2007)</i>
Interactive multimedia kiosk system	Whereas information or photo kiosk systems are devoted to a single task, an interactive multimedia kiosk is a multi-tasker. It allows consumers to retrieve information as well as conduct transactions such as buying gift cards. <i>(Helena Chiu et al., 2010)</i>
Photo kiosk	A photo kiosk offers instant print services for customers. <i>(Kaushik & Rahman, 2015a)</i>
Self-checkout	A self-checkout allows customers to process their own purchases themselves instead of

	<p>using a cashier-staffed checkout. One employee can help several customers at the same time through the checkout process instead of checking out each customer separately.</p> <p><i>(Anitsal & Paige, 2006; Dean, 2013; Elliott et al., 2013; Hassan, Sade, & Rahman, 2014; Keeling, Keeling, & McGoldrick, 2013; M. Li, Choi, Rabinovich, & Crawford, 2013; Loebbecke, 2007; Smith, 2005)</i></p>
Smart/ magic mirror	<p>A smart/ magic mirror provides customers with a range of extra services such as a 360-degree view of outfits or allows them to virtually try on different clothes. By means of simple gestures, the customers can change outfits, colors or styles, while the clothes themselves change or adapt according to the customers' sizes, shapes and gestures.</p> <p><i>(Bodhani, 2014; Cuomo et al., 2014; Migliano & Pantano, 2015; Novotny, Dávid, & Csáfor, 2015; Frédéric Thiesse, Al-Kassab, & Fleisch, 2009; White et al., 2014; Wong et al., 2012)</i></p>
Vending machine	<p>A vending machine is usually a turnkey ready solution which provides customers with products and services anytime and anywhere. Consumers typically select products using touch screen interfaces and pay for purchases.</p> <p><i>(Anitsal & Paige, 2006; Demirkan & Spohrer, 2014; Konomi & Roussos, 2006; Zentes, Morschett, & Schramm-Klein, 2011)</i></p>
Virtual reality	<p>Virtual reality replicates an environment and simulates customers' physical presence e.g. customers can be put in a fashion show to watch clothes being presented.</p> <p><i>(Cuomo et al., 2014; Demirkan & Spohrer, 2014; Laria & Pantano, 2012; Pantano & Laria, 2012)</i></p>

4.2. Mobile applications

The second category contains a wide variety of applications for customers' own mobile devices and is shown in **Table 4**. These applications, for example, offer information about shop-products, provide interactive contents and services for enriching customers' in-store experience or allow mobile payment (Romero & Martínez-Román, 2015). Even if Kaushik and Rahman (2015a) state that "mobile applications and all e-services are [...] manifestations of SSTs" we stick to the classification of Pantano and Viassone (2014) and count them separately.

Table 4 Mobile applications

TBRS	Brief description
(Electronic) personal shopping assistant	<p>A personal shopping assistant (PSA) is a mobile device that provides in-store information and checkout services for consumers. A PSA adds convenience to consumers without deploying costly staff for presales information. There is also an alternative where shop employees are given a PSA to support customers in their shopping processes. PSA manifestations can also be 2D or 3D onscreen representations of sales persons (also referred to as Avatars).</p> <p><i>(Evanschitzky, Iyer, Pillai, Kenning, & Schütte, 2015; Keeling et al., 2013; Kowatsch & Maass, 2010; Loebbecke, 2007; Schaller & Mueller, 2009)</i></p>
Augmented reality (mobile)	<p>Augmented reality is a camera enhanced view of a real-life environment, where virtual elements like additional product information or view of different product types, are merged with the physical world. This occurs on a mobile device.</p> <p><i>(Cuomo et al., 2014; Todd et al., 2011; White et al., 2014)</i></p>
Automatic checkout	<p>An automatic checkout charges customers' accounts automatically when customers pass through the checkout stations. No additional product scanning is necessary.</p> <p><i>(Bhattacharya, Petrick, Mullen, & Kvasny, 2011; Hassan et al., 2014; Kasiri, Sharda, & Hardgrave, 2011; Kourouthanassis & Roussos, 2003)</i></p>
Digital receipt	<p>A digital receipt is not only paperless, but can also be customized e.g. to highlight key promotions, savings summaries or personalized content specific to customers.</p> <p><i>(de Kerviler, Demoulin, & Zidda, 2016)</i></p>
Mobile	<p>A mobile checkout is an app-based solution to enable customers not only to use their mobile devi-</p>

checkout	<p>ces in-store to scan products, get reviews and buy products, but also to checkout items themselves.</p> <p><i>(Aloysius, Hoehle, & Venkatesh, 2016; Groß, 2015; Schaller & Mueller, 2009; Schröder & Bach, 2013)</i></p>
Mobile coupon	<p>The customers get the coupons on their mobile devices for example by scanning a Quick Response (QR) code. A mobile coupon can be location- and time-specific and personalized. For example, retailers can offer a coupon for children that is directly linked to a specific product category such as books and therefore cannot be used for purchasing video games.</p> <p><i>(Albăstroiu & Felea, 2015; Demirkan & Spohrer, 2014; Dennis et al., 2012; Groß, 2015; Lam, Ng, Wang, Ho Chuen Kam, & Wai-Hung Tsang, 2015; Pousttchi & Hufenbach, 2013; Sang Ryu & Murdock, 2013; Schaller & Mueller, 2009; Strohbach & Martin, 2011)</i></p>
Mobile information	<p>Mobile information is a service (often app-based) to enable customers to use their mobile devices in-store to scan products, get reviews or additional and specific product information.</p> <p><i>(Albăstroiu & Felea, 2015; de Kerviler et al., 2016; Kourouthanassis & Roussos, 2003; Kowatsch & Maass, 2010; Lam et al., 2015; Sang Ryu & Murdock, 2013; Schaller & Mueller, 2009; White et al., 2014)</i></p>
Mobile payment	<p>Mobile payment is a payment for goods, services and bills with a mobile device through a digital wallet by taking advantage of wireless communication technologies. A mobile payment is also possible at both, (i) self-service terminals like vending and ticketing machines, and (ii) manned POS terminals.</p> <p><i>(Albăstroiu & Felea, 2015; Aloysius et al., 2016; Arvidsson, 2014; de Kerviler et al., 2016; Demirkan & Spohrer, 2014; Schaller & Mueller, 2009)</i></p>
Mobile recommendation agent	<p>A mobile recommendation agent supports customers with relevant information and suggestions that might be of interest at the POS (e.g. recommendations for in-store purchase situations regarding alternative or complementary products).</p> <p><i>(Aloysius et al., 2016; Demirkan & Spohrer, 2014; Groß, 2015; Kowatsch & Maass, 2010; Pousttchi & Hufenbach, 2013)</i></p>

4.3. Hybrid technologies

The TBRS in the third category are based on retailers' own technologies but can often be carried around by customers. The main advantage of these TBRS (see Table) is the capability of providing additional information for supporting consumers' in-store experience through timesaving or entertainment (Pantano & Viassone, 2014).

Table 5 Hybrid technologies

TBRS	Brief description
Digital signage	<p>Digital signage consists of screen displays which are often digitally controlled, showing video material. Content typically includes advertisements, information, entertainment and news. Digital signage can also act as a customer experience provider.</p> <p><i>(Bodhani, 2014; Demirkan & Spohrer, 2014; Dennis, Joško Brakus, & Alamanos, 2013; Dennis, Joško Brakus, Gupta, & Alamanos, 2014; Dennis et al., 2012; Kamei et al., 2012; Strohbach & Martin, 2011)</i></p>
Helper robot	<p>A helper robot works as an agent to support activities for in-store customers. A helper robot can undertake different employee tasks like welcoming customers, guiding customers to desired products or providing detailed information about specific products or promotions.</p> <p><i>(Kamei et al., 2012; Keeling et al., 2013; Kulyukin, Gharpure, & Coster, 2008)</i></p>
Smart cart/ trolley	<p>A smart cart/ trolley is an evolution of the traditional shopping trolley. It is an intelligent shopping cart equipped with technology that makes customer shopping faster and more convenient. A smart cart/ trolley can for example, display the total price of all products in a shopping cart or guide the customer to wished-for products.</p>

(Kasiri et al., 2011; Kourouthanassis & Roussos, 2003; Migliano & Pantano, 2015; Shen, Zheng, Li, & Xu, 2015; Van Ittersum, Wansink, Pennings, & Sheehan, 2013)

Smart dressing/ fitting room	A smart dressing/ fitting room is equipped with technology that can for instance, automatically detect which items a customer takes in to try on and suggest what the customer should try next or which accessories would fit accordingly. (Kasiri et al., 2011; Konomi & Roussos, 2006; Frédéric Thiesse et al., 2009; Wong et al., 2012)
Smart tagged garment	Electronic screens recognize a smart tagged garment and display production information or show a video of a model wearing the smart tagged garment walking on the catwalk. (Novotny et al., 2015; Wong et al., 2012)

4.4. Enhancement of retailers' capabilities

In this category all TBRS, which enhance and facilitate retailers' capabilities, are added. A summary of these TBRS is shown in Table 6

Table . To note, the following TBRS are often RFID-based (Hardgrave, Aloysius, & Goyal, 2009).

Table 6 Enhancement of retailers' capabilities

TBRS	Brief description
Anti-counterfeiting	While present projection technologies e.g. holograms are being copied by product pirates, the use of (item-tagged) RFID might provide an additional safety level to recognize counterfeit products. (Angeles, 2007; Gaukler, 2011; Smith, 2005; Frederic Thiesse & Michahelles, 2006; Weber, 2003)
Anti-theft	Theft can occur as employee theft or shoplifting. RFID tags on items can appear as anti-theft device as they for example, trigger an alarm or notify store personnel as soon as an RFID tagged item exceeds a predefined threshold. (Aloysius, Deck, & Farmer, 2013; Chen, 2012; Condea, Thiesse, & Fleisch, 2012; Friedewald & Raabe, 2011; Hardgrave, Aloysius, & Goyal, 2013; T. Li, Wu, Chen, & Yang, 2012; Loebbecke, 2007; Rekik, Sahin, & Dallery, 2009; Röcker, 2010; Frédéric Thiesse et al., 2009)
Avoiding out of stock situation	Retailers often have a lack of visibility on their inventories. RFID tagged items can help retailers know where exactly items are stored in the backroom, which ones are possibly misplaced and which ones are available on the shelves. (Bertolini, Ferretti, Montanari, Rizzi, & Vignali, 2012; Bhattacharya et al., 2011; Bruzzzone & Longo, 2010; Condea et al., 2012; Forbes, 2008; Gaukler, 2010; Hardgrave et al., 2013; Kasiri et al., 2011; Kourouthanassis & Roussos, 2003; Rekik, Sahin, & Dallery, 2008; Smith, 2005; Frédéric Thiesse et al., 2009; Frederic Thiesse & Michahelles, 2006)
Checkout	The checkout process was significantly facilitated with the introduction of the 1D barcode in 1974. The checkout process could be further optimized by using a scan tunnel system. Customers only have to place their products on a conveyer belt and the tunnel scans all barcodes, regardless which direction they are facing. (Dean, 2013; Elliott et al., 2013; Frédéric Thiesse et al., 2009; Frederic Thiesse & Michahelles, 2006)
Customer price discrimination	RFID tags or mobile payment applications enable retailers to price discriminate customers based on their purchasing intentions (revealed through the items put in the shopping cart). Bundling could be such a price discrimination tool. (Aloysius et al., 2013; Pousttchi & Hufenbach, 2013)

Dynamic/ automatic pricing	<p>A dynamic/ automatic price sign/ tag offers cost savings in implementing automatic price changes. Signs and tags for initial prices or price reductions are usually handled manually. With the help of electronic shelf tags, all prices can be updated automatically while simultaneously reducing manual execution errors, which then lead to an improved customer service.</p> <p>(Aloysius et al., 2013; Kasiri et al., 2011; Kowatsch & Maass, 2010; Röcker, 2010; Zhou, Tu, & Piramuthu, 2009)</p>
Inventory inaccuracy improvement	<p>Inventory inaccuracy indicates the circumstance that physical inventory differs from that in the warehouse management system and leads to great losses for retailers. RFID tagged items help retailers to easily control their inventory. RFID is more effective in reducing inventory inaccuracy in product categories that have higher sales volume and greater variety.</p> <p>(Bertolini et al., 2012; Bhattacharya et al., 2011; Chen, 2012; Hardgrave et al., 2013, 2009; Kasiri et al., 2011; Konomi & Roussos, 2006; Rekik et al., 2008; Zhu, Hong, & Lee, 2013)</p>
Smart shelf	<p>A RFID enabled smart shelf provides real-time inventory visibility on the store floor and detect incorrectly placed items. It also can recognize when expiration dates will be exceeded and inform the staff accordingly.</p> <p>(Al-Kassab, Ouertani, Schiuma, & Neely, 2014; Kasiri et al., 2011; Konomi & Roussos, 2006; Loebbecke, 2007; Röcker, 2010; Frédéric Thiesse et al., 2009; Frédéric Thiesse & Buckel, 2015; Weber, 2003)</p>
Software system	<p>A software system to enhance retailers' capabilities can occur in various types. A decision support system can support retailers in analysis of the store layout or optimal space allocation. The coordination and information exchange between retailers and their suppliers is facilitated by software for collaborative planning.</p> <p>(Bruzzone & Longo, 2010; Frederic Thiesse & Michahelles, 2006)</p>

5. Classification of basis technologies

The review revealed that all 32 TBRS –although varied– are based on seven different technology categories (see Figure 3).

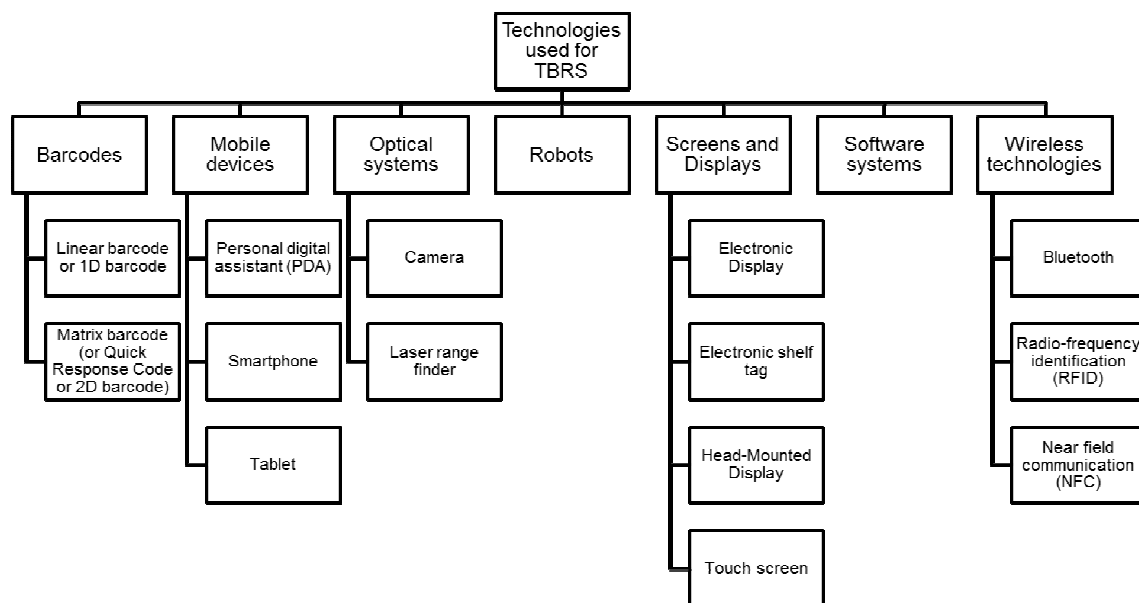


Figure 3 Identified technology categories and their manifestations

A barcode is a machine-readable representation of data. There are typically two different kinds of barcodes used in the retail environment: (i) the linear or 1D barcode and (ii) the matrix or 2D barcode which typically appears as a QR code. Manufacturer and product information is encoded in one-dimensional barcodes in lines and spaces. The encoded information also appears as an Arabic number. While it was introduced in 1974 for the retail industry, nearly all products are equipped with a unique GS1 linear barcode at present (Dean, 2013; Kourouthanassis & Roussos, 2003; Frederic Thiesse & Michahelles, 2006). The QR code (abbreviated from Quick Response) is a two-dimensional (height, width) matrix barcode developed by Toyota owned Japanese firm Denso Wave in 1994. The QR code can contain a wide array of product content, such as URLs or images. (Albăstroi & Felea, 2015; Dean, 2013; Sang Ryu & Murdock, 2013). Two dimensional barcodes have two significant advantages compared to 1D barcodes, (i) the ability to store letters and other characters and (ii) greater information storage capacity. Both technologies still require user involvement to scan the barcodes.

Mobile devices are small computing devices such as PDAs, smartphones and tablets, with smartphones being the main mobile device used by nearly one-third of the world population (eMarketer, 2014). According to de Kerviler, Demoulin, & Zidda (2016) mobile devices are used for two main reasons by customers: for information inquiry and for purchase transactions. Furthermore, mobile devices can also be used by retail employees to support customers in their shopping process (Loebbecke, 2007).

Optical systems are mainly used for security and surveillance purposes or as human position tracking systems respectively to track customer routes (Kamei et al., 2012).

Robots can be used as helper robots. Helper robots can undertake different employee tasks like welcoming customers, guiding customers to desired products or providing detailed information about specific products or promotions. Helper robots can appear in different forms: obvious as a robot like Ubiko (from Japanese manufacturer Tmsuk) or concealed as a robotic shopping cart (Keeling et al., 2013; Kulyukin et al., 2008).

Screens and displays vary from small to big and can be stationary or portable. Electronic displays are generally used for digital signage showing video material. The usage of electronic screens is not new to the retail environment, but since they are remotely controllable, they are an effective and widely used communication medium (Dennis et al., 2012). Electronic shelf tags are used for price management (e.g. mitigating pricing errors) and to provide customers with various additional information such as promotional offers (Jones, 2009; Renko & Druzijanic, 2014). Head-mounted displays are used to create immersive augmented or virtual reality experiences. This encompasses the ability to enhance the view of a physical, real-world environment with a projection of contextualized information (augmented reality) as well as complete virtual shopping (virtual reality) (Cuomo et al., 2014; Demirkan & Spohrer, 2014; Todd et al., 2011; White et al., 2014). Touch screens are usually applied in self-service technologies such as information kiosks or vending machines to empower customers to fulfill different tasks without the assistance of an employee.

Software systems are usually used to support retail store management and have three main functionalities: namely (i) store layout analysis, (ii) item and shelf mana-

gement and (iii) store monitoring (Bruzzone & Longo, 2010; Renko & Druzijanic, 2014).

There are four different wireless technologies mainly used in the retail environment. Bluetooth is often used for mobile payment solutions or as indoor mapping technology e.g. to locate positions (de Kerviler et al., 2016; Shen et al., 2015; Strohbach & Martin, 2011). MIT's Auto-ID Center was the key driver to the success of RFID (Frederic Thiesse & Michahelles, 2006). RFID is widely used in retail environment, mostly for better inventory management, in-store (including anti-theft and out-of-stock situations) and backroom (cf. Loebbecke (2007) or Novotny et al. (2015)). Near Field Communication (NFC) is a short-range wireless connectivity technology and a specialized subset of RFID technology that is often used for mobile payment solutions (Novotny et al., 2015; Pousttchi & Hufenbach, 2013).

6. Concluding remarks and implications for further research

In reviewing the literature on TBRS published until 2016, a total of 67 articles were identified from a broad cross section of relevant academic journals. Consistent with the early stages in the development of a scholarly body of work, 63% the literature on TBRS has been exploratory and descriptive and focused on particular technologies (mostly RFID and various self-service technologies). While such contributions are needed in the early stages of a field, perhaps the greatest problem scholars face is the lack of research conducted to date. The study aimed to classify and organize the accumulated knowledge on TBRS as revealed in the scientific literature, whereby a classification framework consisting of four groups was used.

This serves as guidance for both, practitioners and academics and has several implications:

- Although many TBRS neither originated in the retailing sector nor were developed primarily for the retailing sector, they have substantial effects on retailing (Varadarajan et al., 2010)
- Technology based retail services do not only provide opportunities to retailers. They also can lead to completely new retailing business models and corresponding competitors.
- The great variety of journals (covering various fields, such as retailing and marketing, economics and management or psychology and mathematics) indicates that the subject of TBRS is not yet considered to be part of a specific area in scientific literature.
- Retail employees traditionally used technology to better serve customers, while nowadays customers have also started using TBSS options to serve themselves (Anitsal & Paige, 2006).

There is no doubt that TBRS research is still in its infancy and will flourish in the future. Therefore, future research is particularly needed on the benefits and barriers of TBRS. It is also important that future studies seek to enlarge the identified technology categories as new technologies like "Beacons" (Bluetooth low energy proximity

sensing technology) arise. Such studies should strive to gain deeper insight into the application of TBRS and to reveal relationships between TBRS and the technology they are based on.

Research limitations result from the selected review approach. First, the number of articles is limited to the selected search method because only published journal articles were included in the review. Although these articles are generally considered to be of the highest level of quality (Ngai & Wat, 2002), relevant knowledge concerning this topic could also be found in conference papers, doctoral dissertations and/or textbooks. Second, although it is believed that the right keywords were used other articles on this subject could exist under different labels. Therefore, no claim is made for completeness or exhaustiveness of the topic. Third, the chosen classification framework should not be regarded as perfect and offers space for improvement. The authors are aware that not every research article is included in this study. Nevertheless, this literature review is a representative and comprehensive body of scientific literature in TBRS.

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THE CINDERELLA STORY – A SKILLED WORKER´S NEW CHANCE IN THE DIGITALIZATION OF SERVICES

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The aim of the paper is to analyse how backstage service employees may rise from invisibility to active agency when their work changes and even disappears during the digitalization of services. Our case study is of an intervention process aimed at envisioning future digital services and new work. The analysis is based on employee interviews on the future work horizons, and two workshops organized to support co-creation of the future service and work. Our main finding is that invisible backstage service workers may face a similar developmental pattern to that of “Cinderella” when finding their way in the digital era. Employees need to have a new kind of active agency in order to shift into new roles in which human expertise is crucial. Managers should be alert to involve employees designing their new job descriptions when technology replaces human work.

1. Introduction

“In the fairytale of Cinderella, a girl is exploited as a servant by her family but enabled by a fairy godmother to attend a royal ball. She meets and captivates Prince Charming but has to flee at midnight, leaving the prince to identify her by the glass slipper that she leaves behind.”

Digitalization embraces almost every aspect of contemporary work and ranges from local care services to highly specialized cloud services. Thus also the contents and arrangements of work change in concert with the digital development. New types of business start-ups, entrepreneurship and flexible forms of work have moved towards each other. The insecurities in societal and economic developments have given rise to new forms of employment with need for increased flexibility by both employers and employees. The characterisation and theoretisation of the new work and new employment forms are still much under way. (e.g. Frey and Osborne 2013; Brynjolfsson & McAfee 2014).

The current process of transition into the digital era is radically changing the service context in our societies. For clients, services become ubiquitous, constantly available, smart, and globally reachable. This new service context is not only changing client experience; it also has a profound influence on how frontstage and backstage work is organized (Ostrom and al. 2015). The introduction of new technology can

have significant effects on the work lives and careers of employees, not only by replacing manual service work, but also by offering them new developmental horizons (Stam, Stanton and Guzman 2004). We would like to ask: How are service workers actually involved in designing (their) new job descriptions in the digital era? And what kind of opportunities do they have to develop their skills for future service work? Should the organizations support the empowerment of their employees such as in the fairytale of Cinderella a godmother intervenes into routinized everyday life before the royal ball?

This study highlights the workplace and job level consequences and opportunities of digitalization in health care organization and contributes to the employee-driven and human-centered perspective in the digitalizing care service context.

2. Agency of employees in transition

In the complex and digitalized service environment, the frontline employee's role, which represents dyadic client-employee interactions, is in transition. As IT-enabled innovations turn the clients operators of their own services, it reinforces the diminished role for employees (Rust and Huang 2014). For individual worker, building new work role and crafting a new job in the rapidly changing labor market is not an easy task. In this paper we use agency as theoretical concept to explore the emergent motivational state of employees as 'scouting' for new competence, responsibility and role/relations. Agency can be seen as human potential to establish and pursue different projects in life (Archer, 2000). It includes forming interests towards the society, as well as having resources and capabilities to pursue goals in interaction with other people (Archer, 2003). The relational view of agency emphasises interconnected nature of peoples' lives; people need each others' support and resources when navigating in the social world, and the relations between them influence their choices and possibilities (e.g., Donati & Archer, 2015). Changes in agency can be traced in (transformational) speech, discussions and interactive (work) situations, as employees discursively and habitually perform previously unused voice or action (e.g. Halford and Leonard 2005).

However, as service employees' face-to-face servant role may seemingly fade away when the technological interface pushes them into back offices, these employees may be given the opportunity and space to form new agency and adopt new roles and relations. The employees may become innovators of new services based on their deep experience with clients; enablers, helping and training clients use the technology; differentiators, giving the genuinely empathetic and personal face on the surface of the service, or co-ordinators, handling the integration and building bridges between different offerings (Bowen 2016).

Employee-driven perspectives on innovation have been widely discussed recently (e.g. Høyrup et al. 2012). However, research and intervention efforts have scarcely focused on how, in practice, frontline employees may change into service innovators or designers of their own work (Hasu, Saari and Mattelmäki 2011; Saari, Lehtonen and Toivonen 2015). Workplace-level intervention methods and tools to enhance employee innovation, and especially the process and outcome assessment of interventions have been reported scarcely (Nielsen 2013; also Watanabe, Fukuda and Nishimura 2015). Case studies so far indicate that empowering and allowing employ-

ees to apply their customer know-how and ideas to service innovation increases pre-conditions for development, improves services, and positively influences their well-being (Hasu and al. 2014; Honkaniemi, Lehtonen and Hasu 2015).

Only a few studies have captured workers' positions, experiences and subjectivities anchored in place, space and time (Halford and Leonard 2005) in the implementation process of a new technology. One sensitive, ethnographic analysis of a nurse and doctor implementing the use of the neuromagnetometer (MEG) in the clinical activities of a hospital laboratory unfolds as the story of an employee being both an insider and an outsider, struggling with the unfinished software, and working as an invisible actor for the developers (Hasu 2005, Star 1991). In the ethnographic interviews Doctor Sara indicated she was a step ahead of the technology developers in concretizing the emerging measurement service for the patients. However, several and continuous problems in using the program and not being taken seriously, finally made her resign from the task (Hasu 2000). This shows how unofficial and fragile the agency of the employees might be during the technological implementation process. Social service professionals' resistance to mobile reporting has been seen as contradicting their primary motivation, which is to help their clients. If the new technology takes too much time from interaction with the clients and if it is experienced disturbing the way of being able to operate autonomously, the employees tend to resist it (Stam, Stanton and Guzman 2004). Unfortunately, IT-systems and mobile applications designed to employees appear to be more cumbersome inside organizations, than they appear to the clients.

Mobile technology has been considered a device to control and make employees objects of managers' surveillance in e.g. in home care work (Vuokko 2008). This contains a risk of losing the autonomy of individual work situations and may have serious risk for employees' motivation, particularly if the reporting to the managers with unfinished technology starts to dominate the mundane service work. These studies raise up important hints on why implementation of a new technology is such a subtle process. However, we think we should also analyse how backstage workers could be more involved in designing their new work, when part of their work is being digitalized.

3. Medical documentation service as a case

Our case context is the largest specialized medical care organization in Finland; more specifically, one of its sub-units responsible for various internal support services for hospitals operating under the organization. The particular service unit in question provides word processing services for the entire hospital district (five hospitals) and employs 300 typists who type approximately two million medical texts per year, dictated by almost 3000 medical doctors and other clinical personnel. Word processing of medical texts are integral part of medical records and documentation in specialized care.

The current phase of development is the implementation of a new medical documentation service for doctors who perform medical dictation as part of their patient work. Recently, after the manual dictation process, which used several hundreds of specialized typists located in hospital clinics (decentralized process), was replaced by a more digitalized and integrated (centralized 'typing factory') process including also

opportunity to work from home, the number of typists considerably decreased. Currently, the digitalization of medical documentation is intensifying in the organization, through the adoption of speech recognition technology, which aims to make doctors the users of the system and will eventually reduce typist work, and, consequently, the number of typists to a minimum.

In the health care sector, speech recognition can be technically implemented in front-end or back-end of the medical documentation process. Front-end speech recognition is where the provider (doctor) dictates into a speech-recognition engine, the recognized words are displayed as they are spoken, and the dictator (doctor) is responsible for editing and signing off on the document. Back-end or deferred speech recognition is where the provider (doctor) dictates into a digital dictation system, the voice is routed through a speech-recognition machine and the recognized draft document is routed along with the original voice file to the editor (typist/doctor), where the draft is edited and report finalized. Deferred speech recognition is widely used in the industry currently (https://en.wikipedia.org/wiki/Speech_recognition).

At the time of our study, neither typists nor medical personnel were familiar with speech recognition technology. From 18 interviewed doctors in our case study, only one had used speech recognition during a test project in 2014. Attitudes towards the system among doctors were heterogeneous, partly negative but partly also positive. Image of front-end speech recognition dominated. Doctors did not know about different ways to apply the automated system. Positive future expectations included increased time saving, improved patient care and documentation quality. From the point of medical work and documentation, most important future opportunities that doctors anticipated were wireless/ mobile work, multi-location work/ work without standard office, fast operations, full digitalization (without paper documents), just-in-time work, patient-centeredness and simplicity. However, what seems to be unclear for all stakeholders was the question of how to differentiate and categorize different user groups, and how many types of process variations should be offered.

4. Methods and analysis

First, we analysed how transformative agency is emerging, by interviewing the typists. In the interviews, the typists were asked to predict the future horizons for manual transcription work from the employee's perspective, when automatic voice recognition was about to replace routine manual work. We identified the alternative horizons of the typists through content analysis of nine individual or group interviews. These interviews took place before the intervention (workshops), and their purpose was to explore how the typists saw their current work and its future. The special focus of the analysis was on what motivates the interviewees in their work, and how they foresee their future work. Interviews were also used for informing the design of intervention workshops, in which employees, managers and other involved stakeholders together participated to construct a vision for the future service and work.

Then, we analysed workshop discussions, in which the typists were asked to create an inspiring story of their future work, when their current service had become majorly digitized. We analysed the discussions in two voice-recorded and partly video-recorded workshops. The workshops tasks were to 1) construct a shared vision of the future, and 2) create an inspiring story of one's future work and expertise when

the service had been digitized. We analysed the two workshops as an ethnographic narrative, which resembled, in a metaphorical sense, the developmental pattern of the Cinderella story. The narrative interprets the significant intervening roles and the consequences of the employees' actions and speech turns. We present excerpts from the public speeches after the group works as a samples of output from the intervention.

5. Findings

The results of the analysis indicate the hidden potential of the backstage workers. They are motivated to design alternative futures for their work, if they are allowed to be involved in designing them. We identified four different developmental horizons from the interviews. The workshop discussions and their consequences indicated that if the typists were given subtle support, they could rise from a humble workers' role into designers of their own jobs. In the following three sections we present the empirical findings in detail.

5.1 Change horizons of the employees

The analysis (in table 1) outlines four different developmental horizons interpreted from the employees' conceptions. These are: 1) quality control editor, 2) ICT bridge-builder, 3) clinically oriented worker, and 4) efficient homemaker. These developmental scenarios are not mutually exclusive, and may even be realized simultaneously, depending on how the digitalization of the service proceeds.

Quality control editor and ICT-bridge builder appear quite clear and obvious job horizons, if the speech recognition technology replaces mechanical typing work. Becoming a clinically oriented worker and finding a new role in care value chain would probably need exploration of the clinical work processes at hospitals and expertise in health care. The efficient homemaker represents the current organizing of the typists' work, in which digitalization has enabled doing work at home. This may realize also in the future, if the typists change into editors. It should be noted that we do not take a stand on how many jobs may disappear after the speech recognition technology is implemented. These job horizons are potential zones of proximal development, which either are grasped or not.

Table 1: Motivation and developmental horizons of the typists

Typist type	Motivation	Change horizon
Quality control editor	Ambitious in terms of quality and rapidity of the service Appreciates independent work without interruptions	Eagerness to learn and take part of speech recognition projects, expects editing work to be a positive and more accountable alternative to typing
ICT-bridge builder	Has good ICT skills and perceives grievances in usefulness, likes independent work, but is happy to guide others as well	May become a lead user or trainer of the speech recognition system to peers and MD's
Clinically oriented worker	Is interested in contents of the dictations, wants to learn more on medical details, experiences herself as a part of the care process	May potentially discover new work between MDs and the patients, interested to specialize into medical glossary, humanization of the current typing factory
Efficient home-worker	Thinks that mobile working is combined well with hobbies or family life. Virtual connections to peers is not a problem	Ergonomics and security could be improved and social support at work

5.2 Towards a shared vision

The aim of the first workshop in January 2016 was to construct a shared vision for the future experiment in the case organization. For inspiration we provided the group a beginning of a sentence to continue on, such as: In 2025, when you dictate your patient information as a Medical Doctor We also provided four scenarios of the future typist's work constructed from the interviews to be further worked on.

In the first workshop, the group was heterogeneous. There were 6 typists, 3 supervisors and 3 persons from other involved organizations (called godmothers or godfathers), who supported the discussions, and 2 researchers either facilitating or observing. It is worth noticing that it is not very common that basic level workers such as typists are invited to organization or innovation development projects and participants in workshops. The group was obviously too big to include all the participants into discussion. The discussion started by wondering whose point of view they should focus on. Two young male typists; called John and Hans (pseudonyms) began to lead the discussion, while all the other typists mainly listened without intervening. The supervisors were silent in the first half of the discussion, however they became active when there was a pressure to conclude the results.

The topic chosen was how the work of the medical doctor (MD) changes, when the speech-recognition system becomes a mundane tool. The group figured: He has more time to patients. The typists raised up a practical procedure into consideration: Does the MD put the patient data by himself into the different systems in the future?

Hans: So as it has been referred that dictaphones have been in use, and secretaries used to type the speeches. So previously, it was a straightforward process, in which the MD dictated and someone typed it to the paper. Nowadays, there are so many ICT-systems and they integrate into different ways, that the MDs should remember by heart what codes he should use, in order to shift the data into right places in right time, so if the MD could...

Godmother: How has it changed?

Hans:...just concentrate into care work and then explain it, without a need to bother how the system processes the information.

John: We face the problem, which you said and which is the fact, that it is the MD, who is finally him- or herself responsible of it. That cannot be outsourced ever for any reason, but that makes it a small kind of bottleneck into the process in any case.

In the workshop discussion, the future work of typists was hardly dealt at all. The observer tried to remind it: Researcher: What is going to happen to the employee, to the typist?

John: That was thrown away.

This comment referred either to the inspiration card that was supposed to stimulate thinking of future typist's work or that the work would disappear as a job. A supervisor raised up the patient perspective very strongly: "after 10 years, everything works from the patient point of view. The patient enters his information to the systems or he is measured from his body and the data then shifts automatically to the systems." This was an ambitious and a futuristic vision. The discussion moved into the patient experience. A typist raised up again a point from his experience into the discussion. The patient does not usually understand MD's language, as he described:

Hans: When the personal data of the patients is entered to the database, is it available for the patients as well? Or do we need a feedback system in which you may ask additional information? I have said many times that every time my acquaintance visits a doctor and then arrives. I ask what did the doctor say? The reply is: I don't know.

Godmother: Or he does not remember.

Hans: They speak so different language.

John: Exactly.

Hans: Can the patient consult virtually or by mail that my patient data says this, can I get some additional information about it?

Interestingly, the typist recognizes another bottleneck, in which new advice giving work could be needed.

A godmother and a godfather were promoting the discussion all along by questioning or supporting comments, such as:

Godfather: In this phase, do we really want to get rid of the typist's work? Whose task is this streamlining? Do we focus it to the MD work or to the assistant work?

Godmother: When you said that the doctors speak such language, that the patient do not understand what has happened. It is a challenge. What does the digitalization then bring, in order to make it clear?

Godmother: Help each other, please help now.

When the facilitators pushed participants to compress the perspective into one single vision, the group figured out the concept of effectiveness. They formed the vision at first: "Digitalization as a tool to more effective care." A typist added: "and better relationship between doctor and the patient." The concept of digitalization disturbed many as a formulation, so finally, after an intervening speech of a godfather, the vision turned into: "Open patient data improves care relationship and the effectiveness of the care." Hans who wrote the vision was chosen to make a pitch-speech of it. The typist was obviously nervous, but somehow assertive when it was his turn to make the speech in public.

Hans's oral presentation: The Medical Doctor does not use his time into dictating the previous cases, but just dictates the fresh research findings, the care plan and the admission note for example to x-ray. And the speech-recognition produces the text into the computer screen as fast as he dictates it. He corrects a few words, which the machine had misheard. The text then shifts into our unit, where a careful office worker takes care that the information is put into the right places. Probably the MD has left a sentence, which is open to interpretation with double meaning. And he denotes it, that this is open to interpretation, that could you please complement. It is not delayed though, although it is denoted and will be checked out.

The pitch speech was a convincing, customer-oriented description, unfolding how the patient gets better treatment and better care relationship, when he is himself responsible of entering his own patient data into the system. What was surprising in the speech, was that the new role of a typist as a kind of quality inspector emerged into the speech, without formulating it in the previous discussion. The supervisors were keen to listen to the speech, and did not want to add a word.

5.3 A story of the future typist in action

In the second workshop, organized in March 2016, the aim was to accelerate the future service experiments that were chosen after the first workshop. The main task was to envision and construct a story which concretizes the experiment and actualizes the future vision, and in which the workers and service users act in their future roles. We provided two tools: 1) a profile form to fill in personality description of a typical worker and a typical user, and 2) a story template, in which employees were asked to write the beginning, the solution (middle) and the grand finale of the story. Typists were organized this time to their own group in order to be able to deepen their understanding of their future work. The group consisted of four male typists and one female typist, a researcher, a godmother and a godfather.

In the beginning of the conversation employees mentioned that typists did not have any educational requirements to their job at the present. The problem of the story was chosen to be a situation in which the speech recognition system misinterprets

the amount of the drug in the prescription. The group started to discuss whether the editor could correct the mistake without bothering the doctor. This would demand both to extend employees' liability and to increase their knowledge on medicine, as the following excerpt shows:

Typist 1: How should I write? Speech recognition misinterprets the speech of MD and the patient have been prescribed a wrong medicine. Somehow like that.

Godmother: The system simply makes a mistake. But then, this is the problem, but how it is solved?

Typist 1: Let us assume that the editor [typist] discovers the mistake. The patient does not know the proper dosage.

John: It is the editor's task to notice it.

Godmother: Our task was to think about your role in the situation.

John: Editor's task is to notice the mistake.

Godmother: The editor discovers the mistake, and what does he do then?

Typist 2: We should extend our responsibility.

John: So, should we extend the editor's responsibility just like that? What it takes?

Typist 2: Currently in some units the typists are allowed to correct a bit.

Typist 1: Oh, is there an official authorization?

Typist 2: Small mistakes may be corrected in some places.

Typist 1: I would like to correct or add too, when I am very sure about it, but I can't, I am not allowed to.

Typist 2: There are different practices.

Godmother: In our case, we should think about the trammels and the good experiences.

Typist 2: If our knowledge increases, then the responsibility can grow.

The conversation indicated that in some contexts the typists were allowed to correct minor factual mistakes, but usually the doctor had to check every ambiguity by him/herself. Obviously, this slows down the information flow to the patient. A godmother made questions all the time to promote the discussion, but also provided space for the solutions of the workers. In the discussion, peer support was recognized as important in order to gain good quality texts.

Along the workshop a young female typist Sandra silently wrote down new areas of expertise into the worker profile description form. She volunteered, when we asked the public presenters of the stories. John and Sandra together stepped forward to present the story to other groups. The culmination of the story was that the editor was shown to be authorized to correct a mistake, which requires medical expertise.

John's oral presentation: I do not need to bother the doctor Pekka. He can continue playing golf. We have a trained editor who can immediately say that this is up the spout (there's a clear mistake). He can check out the original dictation and find out that the speech recognition system has recognized it wrong and it should be something else. He can correct it himself, without bothering any other person. Probably he can consult his colleagues in the case (waving his hands back and forth) and ask for help. And the case is very quickly taken care of without having to bother the doctor. If there is a bigger problem then, in that context, he consults a doctor. Such relatively trivial cases, but not trivial for the patients, but trivial in terms of using time for the trouble, can be solved in this same utopia in a jiffy. (The audience gave a big round of applause)

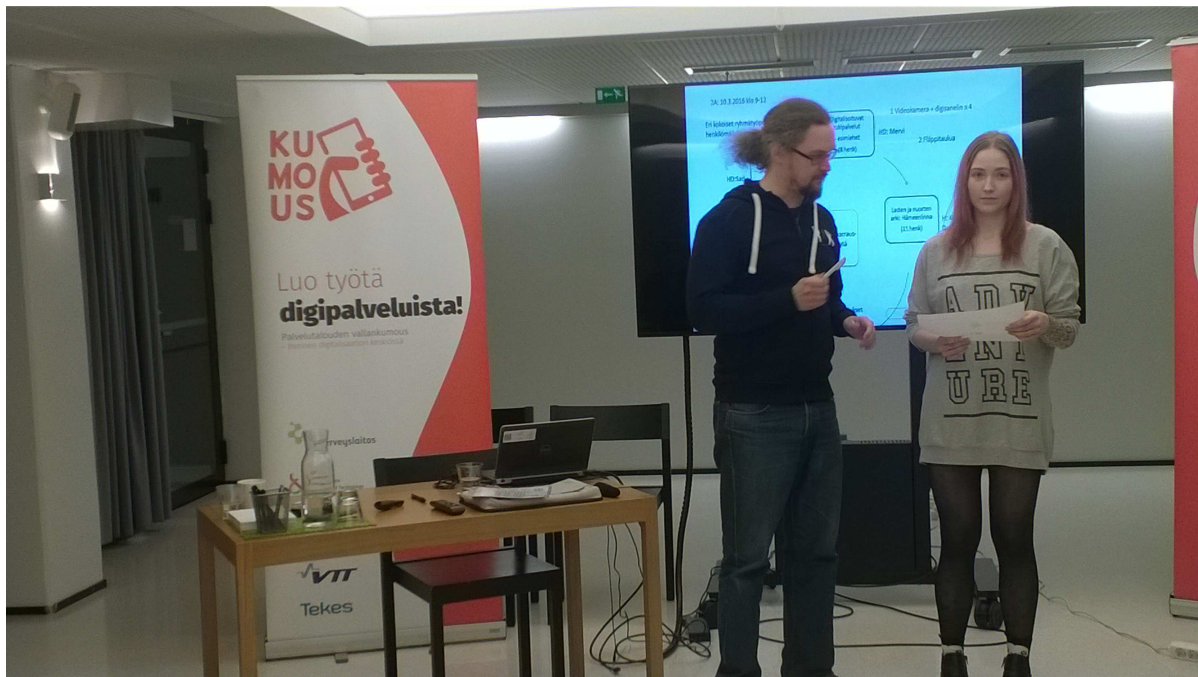


Figure 1: John and Sandra, typists, presenting future editor's actions (in the text we provide only part of John's speech as an example)

The analysis of the workshops demonstrated how subtle intervention and outsider discussants may play a significant role in encouraging usually invisible workers to innovate. The full potential of workers may not become visible if they are not encouraged to use their personal voice. The story revealed also how anticipating how a future worker would act raises up the old borders of the current job descriptions to be crossed in the future.

We reflected on the outcome of the workshops with the head of unit in late March 2016. He told that he was positively surprised on how sophisticated job scenario the typists had presented in the workshop. As a result of workers' empowerment, the managers decided to involve the workshop participants into the development projects designing future documentation service.

6. Conclusion and discussion

In this paper we highlighted the workplace and job level consequences and opportunities of digitalization in health care organization. The results contribute to the employee-driven and human-centered perspective in the digitalizing care service context, in particular internal support services in hospitals.

Previous research literature on the digitalization of services tends to focus on the changing role of the customer and customer needs. The employee's role as a potential innovator of her/his future work and changing services is neglected. The paper shows that the backstage worker can and must be involved in constructing future service work, even in such a case when the service work in its current form is disappearing as it becomes digitally automatized.

Developmental actions and projects in service organizations should not only be concerned with future customer and employee experience, but should also design customers' and employees' future paths symmetrically. When services become increasingly digitalized, it does not change the fact that both customers and employees are resource integrators in value co-creation process (Edvardsson, Tronvoll & Gruber 2011). In both positions the change is rather radical though. It demands new kind of active agency and readiness to adopt a new role without clear pre-descriptions and certainty of the future service.

Our analysis indicated that positive and empowering atmosphere, in addition to questions and visioning tasks guiding into the potential future roles in the workshop process may lead employees into the insight of their future job descriptions. Godfathers of godmothers from other organizations may act as mentors in the process. Collaborative design in the workshops brought into daylight the relational aspects of agency, which emphasises interconnected nature of different practitioner groups. Participants were able to become aware of each others' support and resources, and understand how the relations between them influence their choices and possibilities (e.g., Donati & Archer, 2015).

We agree with Bowen (2016) in stating that strategic human resource management should focus on specifying the future employee roles and competencies essential to customer value creation and success of the IT-based service innovations. Shifting into new roles such as innovator, enabler of coordinator, or in our case such as quality control editor, may need active agency from the employees, but also future-oriented training for increasing capabilities for adopting new roles.

Management needs to be alert to providing service workers with opportunities to foresee new kind of work roles and tasks in time, when their jobs are at stake as a result of major renewals in the service process. The task of managers is to identify the often hidden capacity of the service workers, and to involve them in official development projects. As in the story of Cinderella, when Prince Charming had to search for the owner of the glass slipper.

To sum up, we identified that when services are digitalized and current jobs are at stake, employees may find new agency such as Cinderella who was raised up into new role in the fairytale. However, we need encouraging actions from the managers and even outside intervenors, such as a fairy godmother, in order to trigger it.

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THE CORE TASK APPROACH TO MODELLING THE DYNAMICS OF VALUE CO-CREATION AND INNOVATION ACTIVITY

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The purpose of this paper is to contribute to the topical managerial challenge and the need for alternative methodological approaches to understanding complex and dynamic value creation and innovation activity in daily business practice among actors. We share the epistemological intent of making explicit the social construction of value co-creation and innovation by applying practice-based approaches. Specifically, the relevance of the Core Task Analysis (CTA) approach is examined theoretically and demonstrated empirically by structuring the emerging shared activity system in terms of new value creation activities of actors in the manufacturing industry. Finally, both the scientific and practical contributions are critically discussed.

1. Introduction

While seeking ways to understand and support complex value creation and renewal, both service and innovation research have shared a growing interest in collaborative, systemic and practice-based approaches (Russo Spina et al., 2012; Kallio et al., 2017; Mele et al., 2017). In innovation research, paradigmatic transitions have been approached as shifts 1) from a closed to a more open innovation logic, combining inbound and outbound resources, and 2) from a narrow view of innovations as product- and technology-based to seeing them as more systemic and multidimensional, requiring different innovation logics with strategies and activities, whether incremental or radical in nature (e.g. Francis & Bessant, 2005; Chesbrough, 2011).

Furthermore, Mele and colleagues, (2017) and Kallio and colleagues (2017) have examined these ongoing changes from a philosophic viewpoint, highlighting transitions from economic, technological, and positivistic views towards collectivistic, process-oriented and interpretive paradigms (e.g. Tronvoll et al., 2011; Greer and Lei, 2012; Lusch & Nambisan, 2015). The experimental, co-constructive, uncertain and iterative nature of innovation activity is thus highlighted (Ellström, 2010; Edvardsson et al., 2011; Sorensen et al., 2013; Vargo et al., 2015).

In daily business in order to sustain competitiveness, the imbalance between the requirements for change and daily work become critical in service encounters among actors. In these situations, the change in activity should be co-constructed and actualized as a new type of collaboration in terms of speech, interaction and emerging novel practices. Essential to this is how novel situated-awareness and action are utilised as a source of mutual value creation and renewal in a sustainable and competitive manner.

The purpose of this paper is to contribute to that topical managerial challenge and the need for alternative methodological approaches to understand complex and dynamic value creation and innovation activity in *daily business practice* among actors (e.g. Elström, 2010; Lusch & Nambisan, 2015). Here, we share the epistemological intent of making explicit the social construction of value co-creation and innovation by applying practice-based methods (cf. Corradi et al., 2010; Edvardsson et al., 2011; Mele et al., 2017). Practice-based studies have attracted growing interest in service innovation research by providing relevant approaches to challenge traditional ontological and epistemological premises (cf. Corradi et al., 2010; Russo Spena et al., 2014; Lappalainen et al., 2014; Mele et al., 2017).

By applying the practice-based Core Task Analysis (CTA) approach developed by Norros with her colleagues (e.g. Norros, 2004; Norros & Nuutinen, 2002; Reiman, 2007), we offer a new insight for the theoretical discussion by structuring the emerging *shared activity system* in terms of the new value creation activities of actors in the manufacturing industry. Thereby, we aim to *demonstrate* how this theoretical and methodological approach elucidates the situated and socially constructed general logic of action, and provides ways for capturing value co-creation that overcomes organizational boundaries. This shared activity system is studied as a source as well as a realization of renewal.

In that way we not only contribute methodologically and empirically to the acknowledged need for applying multi-method practice-based approaches, but also claim that we should pay more attention to the epistemological and ontological assumptions of our research, as well as making them more explicit. The paper has been structured as follows; in section two we present the theoretical grounds for the CTA approach with linkages to practice-based studies. In the third section, the empirical design is described and in the fourth section, the chosen empirical findings are summarized in order to illustrate the relevancy of the CTA approach. Finally concluding remarks are presented in section five.

2. Theoretical background

Recently, an ambitious theoretical and conceptual examination has been made in order to build linkages between the economic, business and social aspects of value creation and innovation in different levels of an ecosystem (e.g. Edvardsson et al., 2011; Russo Spena et al., 2014; Vargo et al., 2015; Mele et al., 2017). Increasingly, innovations are understood to be created in social and working activities embedded in everyday business practice in and between organizations. The experimental, emergent, uncertain and iterative nature of innovation activity is highlighted. Thus innovation activity is seen more or less as a continuous practice embedded in dynamic and interactive value co-creation processes with customers, end users and

other value network parties. (e.g. Ellström, 2010; Sorensen et al., 2013; Lusch and Nambisan, 2014; Russo Spena et al., 2015.)

However, there are still topical needs for a specifically *methodological exploration* and for *empirical studies* that more deeply elaborate on the complex and multifaceted nature, structure and activity of value co-creation and innovation (e.g. Calborg et al., 2013; Kallio et al., 2017).

To narrow the research gap, we see that the practice-based approach developed by Norros with her colleagues (e.g. Norros, 2004; Norros & Nuutinen, 2002; Reiman, 2007) has much to offer in studying the dynamics of complex value creation and renewal. The approach provides conceptual and methodological tools to understand the co-construction of situated activity and knowledge, and thus the development of work practices. In the following we briefly review the related and recently extended practiced-based theoretical debate and give an overview of the roots of the CTA approach.

2.1. Practice-based views on value creation and innovation

Schultze and Orlikowski (2004: 87) argue that the practice approach ‘highlights how macro-level phenomena such as inter-firm relations are created and recreated through the micro-level actions taken by firm members’. Manifold practice-based studies in organizational research (PBS) have again attracted growing interest, with a move towards a more explicit acknowledgement of practice as epistemology, as reviewed by Corradi and colleagues (2010).

They summarized the following three dimensions built into a concept of practice:

- 1) the set of interconnected activities to stabilize collective action and a common orientation.
- 2) the sense-making process that supports the accountability of a shared way of doing things and allows the continuous negotiation of the meanings of practice by practitioners.
- 3) the social effects generated by a practice in connection with other social practices. This is the dimension of the reproduction of practice. (Corradi et al., 2010: 247.)

In their recent article, Mele and colleagues (2017) examined the extended multidisciplinary interest in the practice-based school of thought by identifying three different research streams that contribute to a practice-based view of innovation or renewal. When comparing our application of the Core Task Analysis approach against these three main streams, we see linkages with the first two. First, Mele and colleagues (2017) present the studies based on “*classical works of human knowledge and learning*” such as the “communities-of-practice” literature (Lave and Wenger, 1991), the theory of practice and reflective practice (Argyris & Schön, 1974), pragmatic philosophers (e.g. Dewey, 1910), cultural historical theories of activity (Leontjev, 1978, Vygotsky, 1978, Engeström, 1999), as well as more recent work on organisational change and organisational culture (Tsoukas & Chia 2002). The core of scholars come from social sciences, focusing on social, contextual and the situated nature of

human knowing and acting as their starting point for the innovation approaches or criticism against mainstream innovation research (Mele et al., 2017; Kallio et al., 2017). As the CTA approach has roots in cultural historical theories of activity and pragmatic philosophy, it shares the same kind of foundation but has been developed in the other direction described in the next section.

Second, Mele and colleagues (2017) identify researchers who represent “*the service innovation research and managerial tradition of iterative and interactive scholars*” but are recently supplementing their argumentation with practice-based approaches regarding the logics of innovation. Among these scholars the widely adopted theoretical argumentation has been focused on a Service-dominant logic (S-D logic). According to S-D logic, value is always reciprocally co-created, and thus contextually interpreted and experienced by the beneficiaries, such as providers, customers and end-users (e.g. Vargo and Lusch, 2008). Recently, in the S-D logic debate an increasing interest in the social construction of value co-creation processes has emerged, stressing social interaction as the basis of the service exchange and service innovation shaped by values, competences, knowledge and related expectations modified by the cultural history of all the parties involved (e.g. Edvardsson et al., 2011; Lusch & Nabisan, 2015). When highlighting the role of relationships, knowledge and the dynamic nature of the resources, we can see the linkages between the S-D logic and the CTA approach. Furthermore, as in the CTA approach, renewal is seen in the S-D logic debate as a co-creational and continuous process taking place in complex and interdependent systems (cf. Norros, 2004; Vargo et al., 2015).

2.2. The Core Task Approach - combining systemic and situated views

The practice-based approach developed by Norros and her colleagues (e.g. Norros, 2004; Norros & Nuutinen, 2002; Reiman, 2007) has much to offer in studying societal meaning and the dynamics of value co-creation as a source of renewal. The CTA approach (Core Task Analysis) is based on a systemic notion of human activity. Situated actions are conceived from an ecological, human-environment interaction perspective. (Norros, 2004; Norros & Nuutinen, 2002.)

The approach has its roots in the cultural-historical theory of activity (Engeström, 1999; Leont’ev, 1978; Vygotsky, 1978) and the pragmatist conception of habit (e.g. Kestenbaum, 1977; Norros, 2004). They both share the premise that contradictions and disturbances in situational activity function as drivers of change, and thus of innovation. When sensing contradictions in their habits of action in situational interaction, actors constantly adapt their behaviour accordingly. In keeping with pragmatist philosophy, habits are not perceived narrowly as repetitive and retaining function; rather they are seen as enabling a constant evaluation of environmental conditions against set targets. Accordingly, the human–environment interaction is characterised by affordances and habits. *Affordances* are interpretations from the environment, thus contextual features for the attainment of useful results. *Habits* are learned ways of acting, and reflect the logical–general nature of human thinking, creating a continuity of activity and thus a basis for the concept of practice. Both affordances and habits express the meaning of the interaction. Furthermore, the concept of habit allows for extracting the habitual meanings as formative principles that both *explain and*

predict the specific course of action. (Norros, 2004; Norros & Nuutinen, 2002.) In that way the habits are seen as the basis of contextual and purposeful activity.

However, to accomplish behavioural change (operationally and conceptually), both individual and shared reciprocal experiencing, reflective thinking and experimenting are called for as the main mechanisms (Engeström et al., 1999; Miettinen, 2000). In particular, the activity theory of Engeström highlights conscious, object-oriented activity; when the actors are able to re-conceptualize the activity with a wider horizon of possibilities and collaboratively change their way of acting accordingly, the comprehensive change takes place (Engeström et al., 1999).

We follow the argumentation of Norros (2004) that the cultural-historical theory of activity provides concepts for systemic analysis on the development of activity. Actions are analysed through a socio-technical activity system with six inter-related elements. The first three elements describe: actor(s) who work(s) with certain tools and mediating artefacts around the object of an activity. The activity takes place in activity systems with certain rules, community and division of labour. A change in the activity is derived from either internal or external tensions that call for changes in some or all of the elements in the activity system, as described in Figure 1.

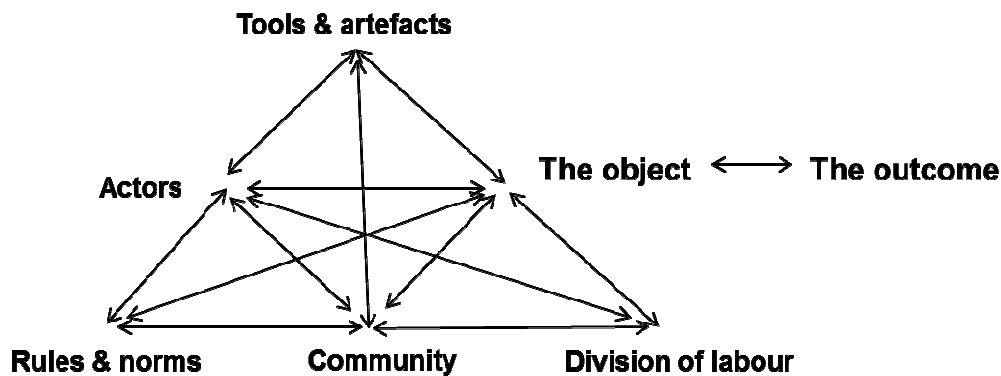


Figure 1. Inter-related elements of the activity system (Engeström et al., 1999).

Furthermore, the systemic analysis helps to define critical functions in terms of environmental dynamism, complexity and uncertainty and finally the core task demands of the target studied. *Dynamism* refers to the temporal dimension and related demands, while *complexity* relates to multiple, reciprocally connected influencing elements and systemic relationships. *Uncertainty* refers to characteristics of the available knowledge for situated decision-making, which is always somehow limited or insufficient (in unexpected events of activity). (Norros, 2004; Nuutinen, 2006; Reiman, 2007.) The core task is defined as “such a content of work, characterized through the objective and outcome-critical intrinsic constraints of activity that actors should take into account in all situations when determining the relevance of situated goals and conditions for the attainment of aimed objectives” (Norros, 2004: 146).

Finally, by studying situational and social activity, we are able to elaborate on the societal meaning and dynamics in terms of how actors interpret, co-construct and manifest in their action the expanded object of activity, and renewed tools or management practices both at an individual and system level. Thus findings related to the core-task demands represent both the enacted capability (i.e., as expressed in the inter-

views or observed by the researchers) and potential capability (i.e., as inferred or suggested by the researchers or interviewees) inherent in peoples' situational acting (Norros, 2004; Norros, 2014). Due to the interactive nature of value creation as our research focus, collaborative structures are essential as the basis for value creation and renewal in daily operations.

Both the model of activity system and the CTA approach have been applied in a variety of contextual settings (e.g. Hasu & Engeström, 2000; Kerosuo, 2006; Kallio & Lappalainen, 2014). The latter has its roots in examining safety critical organizations such as nuclear power plants, but the strength of comprehensive and systemic analysis frames has been acknowledged, further developed and applied across industries (e.g. Norros, 2004; Nuutinen, 2006; Reiman, 2007; Norros & Nuutinen, 2009; Norros et al., 2013; Savioja, 2014). The empirical and methodological novelty of this paper is to extend the scope of the analysis from an organizational or professional activity to networked activity across organizational boundaries by modelling *renewed networked value creation of actors as a shared activity system* (see Figure 1).

3. Empirical Design

3.1. Empirical context of the case study

Our empirical study focused on elaborating on complex Lean change in the manufacturing company facilitated by their long-term (equipment) supplier in order to integrate their resources in a more competitive and innovative manner in their value network in the industrial ecosystem. Nowadays the widely adopted and studied Lean approach has again increasingly aroused interest across industries. According to recent literature reviews (Stone, 2012; Samuel et al., 2015), the approach has inspired various academics and practitioners, but it has also faced strong critiques focus particularly on the applicability of operative shop-floor level methods in different industries and particularly outside of mass production. However, the main premises that look to understand the dynamic mutual value creation in a systemic manner, and not just the strategic and operative aspects but also the value chain and network aspects, seem to be still relevant, and thus topical for our research context too (e.g. Hines et al., 2004). Furthermore, the Lean approach reflects the two fundamental balancing drivers: standardization and renewal in value creation, as well as the related tensions and obstacles.

A long-term, multimethod case study was conducted between February 2014 and June 2016 that included annual in-depth interviews of key actors and focused observations with mini interviews in order to model the *emerging new, general logic of activity as well as a shared activity system of three actors in the value network*, and the related tensions and interpretations.

Actor A is a family-owned SME company, providing high quality solutions for the machine, metal and plastics industry, specializing in flexibility and time-critical approaches to enhance the competitiveness of customers. The solutions range from components, complete tooling solutions, design service, and technical solutions for whole supply chain management. The company is known for its pioneering attitude in

traditional industrial sectors and for having strong competence in different business sectors, with international expertise too.

Actor A has been collaborating with **Actor B** for over ten years. The privately owned SME company operates as a contract manufacturer in the plastics industry. They provide design and technical support, production of injection moulded plastic parts and assembly for the needs of electronic, medical and manufacturing industries. The relationship between Actors A and B started with moulds and has progressed to a deeper collaboration by combining strong knowhow and negotiation power with a shared value proposition for end customers. Furthermore, Actor A has facilitated Actor B in the change towards Lean management in order to promote their competitiveness in the value networks of the plastics industry. This latest phase of collaboration will be our research focus. In the Lean change their mutual goal was to boost the performance of Actor B by co-constructing and adopting the lean-based operation model step by step within two and a half years.

Actor C is a global player in welding in various and demanding application areas and industries. The family-own company has built their competitiveness on user-experience-based innovation and operation excellence of high-tech welding solutions with lifecycle service. The company has a long history of collaboration with both Actors. Over time Actor A has become as an important partner in designing injection moulds and managing complex mould projects in regard to the plastics components of welding equipment. Actor B has been a trusted contract manufacturer in plastic products and thus played the role of networked integrator of both material and mould suppliers, such as for Actor A. In order to respond to tightening global competition Actor C has boosted co-development activities throughout the value chains with a number of chosen actors. One of the current networked projects focused on logistics practices involving also Actor B, with mutual synergies due to ongoing Lean change.

3.2. The research process followed by CTA methodology

Empirical data were gathered by applying CTA methodology, which provides a framework for interdisciplinary studies of technologically, in highly mediated operational environments characterized by complexity, dynamics and uncertainty (Norros, 2004). Firstly, in-depth interviews were conducted with Actor A and B in two different timelines during their collaboration in the Lean change process from September 2013 to December 2015. The purpose of the interviews was to understand co-construction of core tasks of parties with new demands and possibilities as well as to elaborate on the shared activity system operating among Actors A, B and C. Interviewees represented all organizational levels and key roles, such as owners, development/operation managers, sales as well as production workers. Altogether, eleven interviews were conducted between January 2014 and November 2015. Interviews took approximately one and half hours. In addition to notes, they were tape-recorded and later transcribed.

In keeping with the main principles of the CTA methodology, the qualitative analysis was based on modelling *iteratively* Actor A and Actor B as the two interrelated activity systems in terms of renewed core task demands taking into account constraints and possibilities. As a starting point, the framework of the main elements of the activity system, as shown in Figure 1, was applied in order to identify roughly the expanded object of both Actors and related changes in each element of their interrelated activity

systems. More specifically, the analysis of Actor A was targeted to the extended expert and consultative service as an integrative characteristic of their diverse business activities. The analysis of Actor B was focused on adopting the Lean approach as the paradigmatic and systemic change. The results of the analysis were deepened in order to define critical functions in terms of environmental dynamism, complexity and uncertainty, and finally the renewed core task demands of both Actors.

In the next phase, situated (episodic) encounters were selected for deeper analysis and participatory observation (Norros, 2004). In our cases, such relevant and interesting research targets concern the ongoing Lean-based change process and related business dynamics among the Actors. The situated co-construction was observed in the actual work situations of actors from the viewpoint of several work roles. More specifically, we conducted participatory observations targeted at assembly workers and the production manager in the site of Actor B in one afternoon June 2015. The observation protocol was derived from the previous analysis phase, focusing particularly on *indicators of new practice*, which functioned as a rough hypothesis. During the observation, researchers asked some questions related to the object of the work at hand, with consideration of critical conditions as well as the changes towards the Lean approach. In addition to the notes of two researchers, the episodes, of approximately half an hour each, were tape recorded and later transcribed. The aim of using participatory observations was to elaborate on *how the actors communicate, co-construct and manifest in their action the expanding object* of their work and the required changes in the core tasks from an individual and activity system perspective. Thus the observation episodes provided us with *illustrative examples* in order to iteratively structure, test and elaborate further in our analysis.

Finally, as a synthesis we structured the *shared activity system* in terms of an extended object between Actors A, B and C. For that purpose, in June 2016 we conducted complimentary interviews with Actor C who was selected to our case study as the common (end) customer of the companies A and B. In addition, to test our interpretations, we arranged evaluative workshops for the interviewees, who we have identified as key actors in companies A and B.

4. Results

Based on theoretically grounded empirical illustration we demonstrate the methodological relevance of the Core Task Analysis approach to making sense of the complex and dynamic social construction of mutual value creation and renewal. For that purpose, we chose *empirical examples* from the two main different phases of the analysis for the current study.

4.1. The model for the renewed Core Task with emerging indicators

In the following we present briefly the essence of the Core Task model of Actor B in order to demonstrate with the conceptualization of CTA approach of how Lean principles have been co-constructed and gradually manifested in the different levels of activity system.

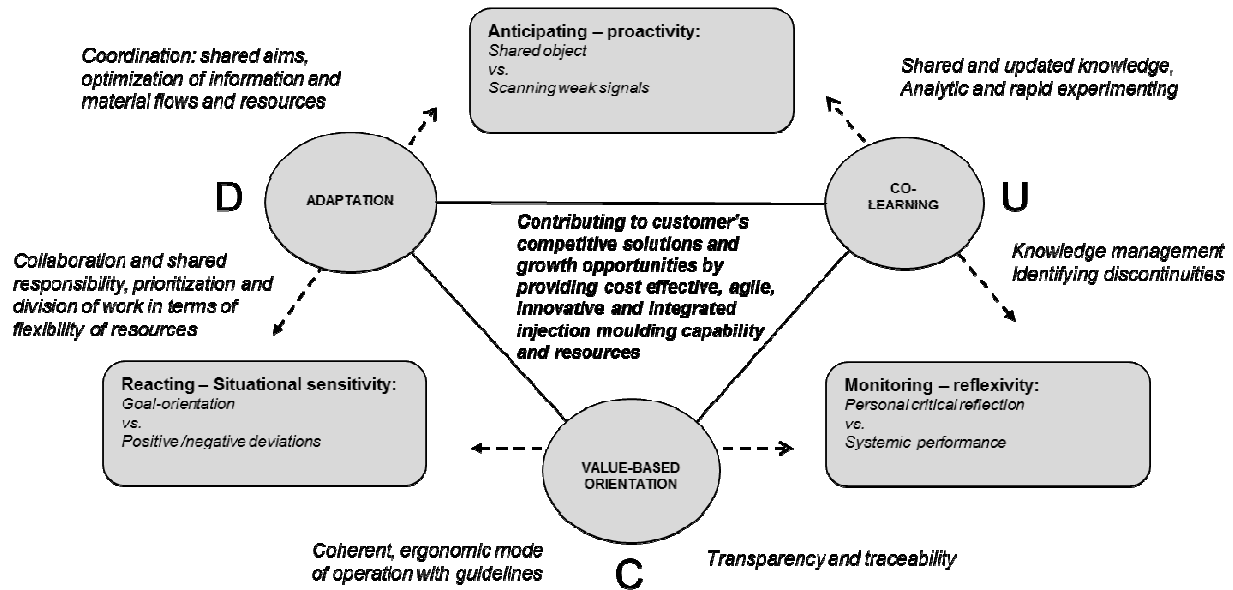


Figure 2. The model of the renewed Core Task for Actor B (cf. Reiman, 2007; Norros et al., 2013; Norros, 2014).

As summarized in Figure 2, the object of Actor B has been defined so as to contribute to customers' competitive solutions and growth opportunities by providing cost effective, agile, innovative and integrated injection moulding capabilities and resources with networked partners. This enables them to achieve increased flexibility and effectiveness in their chosen value networks and growth opportunities with global pioneers.

Critical core-task demands are elaborated on as follows. First, *Anticipating – proactivity*: shared understanding of value creation based on injection moulding capabilities, related resources and a Lean-based operation model in a manner conducive to productivity, safety and well-being. In addition, continuous proactive foresight unto changes and related impacts in operating conditions are called for to enable dynamic and purposeful resource and action planning. Second, *Reacting - situational sensitivity*: situational activity and related decision-making that are driven on the one hand by a shared object and goals, and, on the other hand, by a situational sensitivity to positive and negative deviations or discontinuities. Third, *Monitoring - reflexivity*: dynamics of the environmental complexity together with related uncertain, the multiform and typically mediated information call for continuous monitoring, critical assessment and reflection of the performance in relation to pursued goals, outcomes and effectiveness individually and collectively.

Further, we identified so-called *indicators* of the emerging and renewing core-task demands in work practices, with so-called instrumental or balanced demands (see Figure 2). From a value creation perspective, it is a question of co-constructing a new logic of action. In Table 1 we have demonstrated the multilevel interrelated demands of the Core Task model of Actor B as emerging change in the value creation logic based on Lean approach.

Table 1. Structure of Core Task model demonstrated empirically considering Actor B

"Instrumental" demands	Work practice demands	Examples of indicators of Lean approach (as indicators of renewed core task)
DYNAMISM: Systemic and self-organized ADAPTATION in the short and long term	Coordination: shared aims, optimization of information and material flows and resources	Focusing on visual operating mechanisms, such as production layout enabling pull control, tables for fine-tuning human resource allocation and Kanban system.
	Collaboration and shared responsibility, prioritization and division of work in terms of flexibility of resources	Renewed committed steering board, extend work roles enhancing multi-skilfulness and flexibility, 5S procedures to ensure tidiness and minimize loss and ineffectiveness.
COMPLEXITY: VALUE-BASED ORIENTATION as main driving mechanism	Coherent, ergonomic mode of operation with guidelines	Processes enabling effective information and material flows and standardized procedures to ensure real time quality and inventory management throughout the value streams.
	Transparency and traceability	Visual material handling and digitalized information flows as well as documentation of activities and deviations
UNCERTAINTY: CO-LEARNING embedded in systemic practice	Knowledge management (analysis/synthesis), Identifying discontinuities	Continuous visual management and real-time monitoring enabled by advanced and optimally utilised ERP-system and other communication platforms
	Shared and updated knowledge, Analytic and rapid experimenting	Collaborative experimenting of alternative solutions to enhance renewal such as value stream mapping, targeted analysis, practical experiments and agile adoption of renewed practice

As Table 1 shows, there are emerging manifestations of a more value-based, agile and transparent operation model that characterizes Lean principles, but has been co-constructed in situational activity and related decision-making, taking gradually form of actor (i.e. company) specific, dynamic and multidimensional practice. On that basis, current strengths and development targets were also defined to guide the ongoing change process.

When analysing the Lean change process as a comprehensive change in the Core Task of the organizational actor we aim to highlight the following issues. *First, the expansion of the object from a systemic perspective.* Based on interviews the key persons seem to share the expanded object characterized by a proactive, systemic and value-based Lean approach. Essential to it is how it is communicated to all staff as a kind of frame of reference for reflection and guidance in the dynamic and complex change. The systemic change is characterized by two fundamental balancing drivers, standardization and renewal in value creation, as well as the related individually and collectively experienced opportunities and threats. When the main confusion and resistance was overcome, the extended work roles and flexibility in terms of human resources were gradually taken into practice in different forms. One of the interviewees represented a kind of the role model for shop floor employees regarding multi-skilled and flexibility between value creation activities. Furthermore, she took an active part in co-constructing new practices with management tools and facilitating others in adopting the change demands at hand. Her orientation reflects the renewal potential of an individual employee in dynamic resource integration, rather than the anticipated threat of an impersonalised and monotonous work role. Thus the example highlights the self-directing and systemic nature of the emerging value-creation logic with related demands in all work roles and activities.

Second, changes in the value creation logic related to the operation model and critical demands. The co-constructive nature of the renewed core task with demands and particularly those practical indicators (as guiding principles) were understood by key persons. A continuous reflective and experimental development orientation was

gradually built in daily practice, while systemic monitoring called for more consideration. Tools were developed to enable visual and real-time information and material flows, but the operation model still needs further development regarding flexibility and purposeful reaction to deviations. Strong internal tensions and several layout changes restrained the identification and co-construction of emerging indicators of the Lean-based value creation model and practice at the individual and activity system levels. It is essential to a comprehensive change that the emerging indicators of the renewed generic logic of action as shared representatives of the meaningful and pursued object of action are elaborated on so as to facilitate staff to interpret situational actions and make purposeful decisions. In that way individual and mutual learning and thus commitment to collaborative change, or innovation in daily practice is enhanced.

Third, deepening relationship between Actor A and B in value network as shared activity system. Based on the interviews, it was seen that Actor A has played an important role in the renewal process of Actor B. We summarized the role as strong contextual insight into the Lean approach, framing the pursued operation model and facilitating co-development. These dimensions actually characterize the core task of the extended expert and consultative service of Actor A as an integrative characteristic of their diverse business activities. In the collaboration between Actor A and B, the core task manifested in challenging the current underlying assumptions and related practice as well as communicating Lean principles in order to reframe collaboratively the renewed operation logic, and thus also the core task demands. Furthermore, Actor A facilitated practical experiments focusing on adopting Lean principles and the co-development of concepts and tools to manage the renewed value creation logic. Challenges were faced in co-defining the indicators of the emerging Lean model and mutual roles during the change process. While it was a question of radical change in value creation models (and related demands both within Actor B and between Actors), learning and facilitative methods seemed to be experienced as radical too, causing mutual tensions and resistance. In spite of this, as indicated in Table 2, the renewed practices have been gradually taken into use on a daily basis. The contribution of Actor A covered from key-person sparring to systemic support for the complex and dynamic change, aiming to enhance the mutual competitiveness in the shared activity system and in the overall ecosystem.

4.2. Dynamics of the shared activity system of Actors A, B and C

Based on the perspectives of all three actors in Figure 3 we have tentatively drafted the ongoing dynamics of the shared activity system of Actors A, B and C.

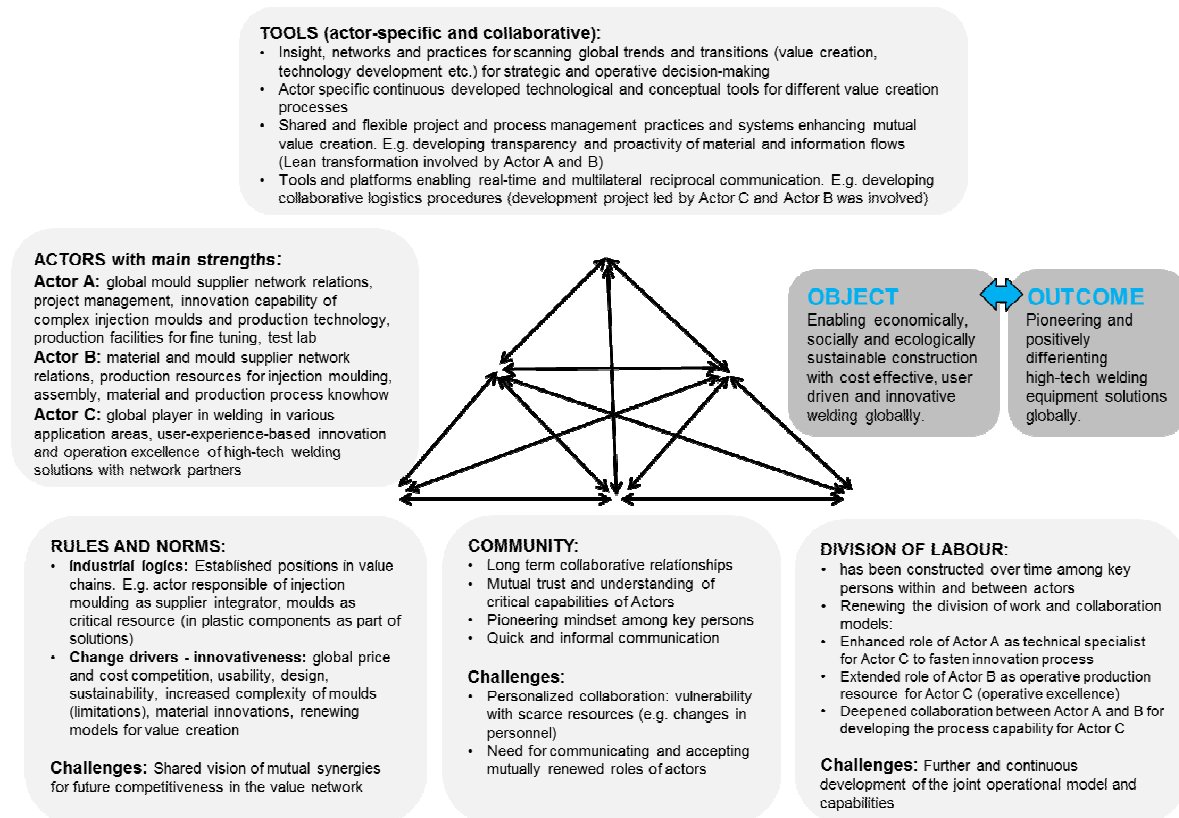


Figure 3. Summary of the dynamics of the shared activity system.

As modelled in Figure 3, in order to sustain competitiveness in the midst of tightening global competition, there seems to be a continuous search for new value creation opportunities with collaboration modes among Actors (with their value networks). Consequently, traditional mechanisms with their established rules in the industrial ecosystem have been challenged. Actor C seems to develop the division of labour and collaboration practices in the direction of direct multilateral collaboration among chosen actors to enhance cost effectiveness, transparency and optimal resource integration throughout the innovation and value creation activities. Here the innovation and global project management capability of Actor A appears to be highlighted, while the production and process capability of Actor B is emphasized. In addition to the critical actor-specific resources, adaptation and proactive insight, personal relationships with strong know-how and mutually flexible practice are seen as crucial in a complex, dynamic and fast cycled business environment.

5. Concluding remarks

Based on the theoretically grounded empirical illustration, we have demonstrated the methodological relevance of the Core Task Analysis (CTA) approach for making sense of the complex and dynamic social construction of mutual value creation and renewal. The CTA approach can be summarized as having three main purposes; First, to *understand the object of activity* by examining the intentions and related critical demands. This is done by framing or modelling the core task with its multilevel demands for dynamic assessment and reflection in relation to situational conditions and in terms of potentials and restrictions. Second, the aim is to *interpret the shared*

meanings and intentions among actors so as to elucidate the motivations and reasons for the actions taken. Those conceptions of actors reveal the way of thinking behind the realized and observable actions. Thus by combining the two we are able to draw conclusions on the current or emerging practices. Third, that the *general logic of human action* can only be understood and elaborated in its situational and cultural historical settings (Norros, 2004; Norros & Nuutinen, 2002; Reiman, 2007).

Having roots in the cultural historical theory of activity and the pragmatism paradigm the CTA approach seems to share the same kind of epistemological and ontological assumptions with two practice-based schools of thoughts and their approach to innovation as follows. First, focusing on the social, contextual and the situated nature of human knowing and acting as a starting point for renewal and learning as collective practice with mediated (and also renewed) tools and artefacts (Mele et al., 2017; Kallio et al., 2017). Second, it highlighted the complex value creation and innovation as a dynamic co-construction process between actors as active resource integrators (e.g. Edvardsson et al., 2011; Lusch & Nabisan, 2015; Vargo et al., 2015). Furthermore, they all refer to the *interpretive* (or dialogical) approach to innovating and renewing in the systemic sense. Thus in order to capture and change the general logic of action, the underlying contextual institutional logics must be understood (cf. Norros, 2004; Tronvoll et al., 2011; Chandler & Vargo, 2011; Vargo et al., 2015).

In addition to examining the theoretical roots and linkages of the Core Task Analysis approach, we *demonstrated empirically* the application of the approach in a Lean change process as the context for modelling the renewing of actor-specific core tasks based on changes in value creation within and between focused Actors. Furthermore, we elaborated on the ongoing dynamics within value network of Actors as the shared activity system.

Various applications of both the activity system model and a further developed CTA approach have already indicated a strong theoretical and empirical basis (e.g. Hasu & Engeström, 2000; Norros, 2004; Nuutinen, 2006; Kerosuo, 2006; Reiman, 2007; Norros & Nuutinen, 2009; Norros et al., 2013; Savioja, 2014; Kallio & Lappalainen, 2014). The novelty of our paper was to build linkages between the CTA approach and topical debate on whether practice-based approaches have something to offer in building bridges between the economic, business and social aspects of value creation and innovation in different levels of the ecosystem. Thus the empirical and methodological novelty of this paper is to model *renewed networked value creation of actors as a shared activity system*.

Based on our theoretical and empirical examination, we conclude that the CTA methodology appears to provide a relevant approach to understanding and elaborating on the complex and dynamic social construction of value creation and innovation activity across organizational boundaries. Furthermore, the approach enables a comprehensive analysis of two fundamental balancing drivers, standardization and renewal in the contextual setting of value creation.

Thus from a *managerial perspective*, the CTA approach with the empirical illustration provides *evaluation frameworks* to support complex renewal processes within and between companies. More specifically, the empirical study, by elaborating on change dynamics and the implications of the topical Lean approach from the perspective of the systemic and social re-construction of human activity, provides a *practical example and a frame for reflection*. Basically, due to the comprehensive nature of the

analysis, the approach may appear time and resource consuming. However, when familiar with the idea of the analysis, the conceptual frames can be applied in alternative ways, such as critical /complimenting perspectives to support collaborative innovation and renewal across organizational borders.

In terms of validity assessment of qualitative empirical case studies, the *credibility* of the methodology and empirical illustrations has been ensured by opening up the research process with theoretical grounds phase by phase. The role of the researchers has been more interpretive than emancipative. *Dependability* of the analysis and empirical findings has been tested via critical discussions and feedback loops with interviewed key persons. While having a main aim of narrowing the identified methodological gap in (service) innovation research, the *transferability* is seen rather in a methodological than empirical sense. (cf. Guba & Lincoln, 1994.) This opens up possibilities for researchers to apply the approach in different contextual settings.

Finally, in the paper we not only contribute methodologically and empirically to the acknowledged need for applying multi-method practice-based approaches, but also claim that we should pay more attention to the epistemological and ontological assumptions of our research, as well as making them more explicit. In that way we enable better their critical assessment and thus both scientific and practical impact (cf. Mele et al., 2017).

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THE CUSTOMER EXPERIENCE... IS THERE AN APP FOR THAT? A CONCEPTUAL UNDERSTANDING OF THE CUSTOMER EXPERIENCE WITH M-COMMERCE MOBILE APPLICATIONS.

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This paper examines the customer experience in relation to high street retailers' m-commerce mobile applications. The aim of the research is to gain an understanding of the variables capable of influencing the customer experience during use of high-street retailers' m-commerce mobile applications, resulting in the development of a conceptual customer experience with m-commerce mobile applications model. From a review of the literature the paper illustrates a number of hypothesised relationships. In contrast to the e-commerce environment with regard to flow theory, this research suggests that customers are conscious of the length of time spent completing an activity on an m-commerce mobile application, thus should customers perceive to spend longer than necessary using the application, it will result in a negative customer experience. Additionally, we suggest that smartphone screen-size may play a moderating role on the customer experience. This research investigates mobile applications as a service delivery channel for high-street retailers, while understanding the variables capable of influencing the customer experience.

1. Introduction

Mobile applications (apps) continue to emerge as a powerful and ubiquitous service delivery channel due to retailers' ability to offer a variety of products and services through such channels to consumers (Garg and Telang, 2013). The rapid advancement of mobile technology and the subsequent service innovation deriving from it is causing consumer behavior to evolve in terms of how consumers interact and utilise service delivery channels that are accessible to consumers anytime, anywhere (Shankar et al, 2016). The number of smartphone users is expected to continuously grow to reach 80% of the world's population by 2020 (Ericsson, 2015), while at the same time consumers' willingness to use mobile commerce (m-commerce) is witnessing a rapid growth that is beyond expectations (Criteo, 2014). Due to the increase in the number of smartphone users and the willingness to adopt mobile commerce, marketers are increasingly using mobile to meet the demands of such consumers (Shankar et al, 2016). Retailers in particular are allocating large

percentages of their marketing budget in order to enhance the customer experience through mobile applications (WARC, 2015).

Traditional high-street retailers (brick and mortar) have encountered numerous strategic challenges and opportunities over recent years. First was the introduction of e-commerce websites that challenged the existence of many high street retailers with numerous well-known brands exiting the market (Reynolds, 2000). However, over the years, high-street retailers who have continued to compete have adapted their strategy to include an online presence through an e-commerce website (Martin et al, 2015). The Internet continues to be an essential factor in the evolution of the retail landscape. Numerous high-street retailers have gone on to take significant advantage of what the channel has to offer (Klaus and Nguyen, 2013) including the expanded reach, reduced costs, lower barriers geographically, as well as 24/7 availability (Christodoulides et al, 2012).

More recently numerous high-street retailers have further adapted to an Omni-channel retail strategy, Omni being the Latin for 'every', where high-street retailers operate multiple service delivery channels including, in-store, website and on mobile app (Piotrowicz and Cuthbertson, 2014). The term 'mobile app' has become a popular abbreviation for mobile applications amongst industry professionals, academics and consumers over recent years. Mobile applications are associated with software that is downloaded to a smartphone's operating system from an online store platform such as the iTunes store or the Google Play Store (Garg and Telang, 2014; Purcell et al., 2010). From a marketing perspective, mobile apps are defined as software that is downloadable to a mobile device, which prominently displays a brand identity, often via the name of the app and the appearance of a brand logo or icon, throughout the customer experience (Bellman et al, 2011). The added benefit for retailers, unlike websites, is that mobile apps can utilise the hardware and features of the smartphone to deliver a tailored experience to users, i.e. scanning of bar codes through the use of the built in camera function or offering location specific content through the use of GPS. Thus, mobile apps are also seen as end-user software applications that are designed for a mobile phone operating system and extend the phone's capabilities by enabling users and app providers to perform specific tasks (Purcell et al, 2010).

However, due to the nature of mobile devices, consumers are now presented with a different interface and size of device to interact with. Thus, during an experience with mobile devices, interfaces have shifted from computer mice to touchscreens (Brasel and Gips, 2014). Therefore, the interface change may subsequently change the response of consumers using and viewing content with a different set of variables influencing the customer experience. High-street retailers are adopting 'm-commerce' at an exhilarant rate and clearly part of the Omni-channel strategy (Brynjolfsson et al, 2013). Mobile applications can be seen as an important part of m-commerce, yet we have little understanding on what influences the customer experience during use of m-commerce mobile applications. . Previous research has focused on the scope of mobile marketing (Shanker and Balasubramanian, 2009), mobile service delivery (Kleijnen et al, 2007), the mobile interface (Venkatesh et al, 2012), mobile browsing (Adipat et al, 2011), how mobile applies to retailing (Shanker et al, 2010), the demand for mobile apps (Garg and Telang, 2013), mobile advertising (Andrews et al, 2015) and mobile shopping (Wang et al, 2015).

This paper however, aims to add to our theoretical understanding of mobile applications through exploring the variables capable of influencing the customer experience during use of high-street retailers' m-commerce mobile apps. Mobile apps offer consumers an alternative channel for browsing and shopping and are unique in terms of the functions they can offer consumers and retailers (Wang et al, 2015), thus understanding the variables that influence the customer's experience is of significant value. In particular, high-street retailers offer an interesting area of study due to their continued adaption to new, digital, service delivery channels. As a result, two research objectives stem from our aim:

- 1) To develop an understanding of the potential variables that could influence the customer experience with high-street retail mobile applications.
- 2) To develop a conceptual Mobile Applications Customer Experience Model (MACE) providing an initial theoretical understanding of the customer experience with m-commerce mobile applications.

2. Theoretical Background

2.1 Customer Experience

Researchers previously highlighted service quality as a differentiator between a retailer's offerings of goods and services (Reinartz and Ulaga, 2008). The focus and importance attributed to service quality resulted in the development of SERVQUAL, a multi item scale that has been extensively used in order to assess service quality and its impact on consumer behaviour (Parasuraman et al, 1998). Subsequently, e-SERVQUAL was introduced as an online extension of the original scale in order to measure service quality in the online environment. However, more recently, researchers have suggested that service too has become increasingly standardised (Klaus, 2013), thus customers now require more than competent service, instead an effective customer experience that meets and exceeds expectations (Shobeiri et al, 2015).

The theoretical foundation of the customer experience is based on the concept that the customer experience is the combination of all cues and touch-points a customer has with an organisation, which in turn creates an overall experience (Homburg et al, 2015; Payne et al 2008). Meyer and Schwager (2007, p.18) define customer experience as, 'the internal and subjective response that customers have to any direct or indirect contact with a company'. However, more recently, Homburg et al (2015, p.8) follow on from Verhoef et al (2009) and suggest that 'the customer experience is the evolvment of a person's sensorial, affective, cognitive, relational and behavioural responses to a brand by living through a journey of touchpoints along pre-purchase, purchase and post-purchase and continually judging this journey against response thresholds of co-occurring experiences'. As a result, the customer experience can be seen as a holistic process and combination of cognitive, affective, social and physical components (Verhoef et al, 2009) leading to take away impressions.

A key distinction between the customer experience and service quality is the acknowledgement of customer emotions within the experience (Edvardsson, 2005; Schembri, 2006). The inclusion of customer emotions makes assessing the customer experience a complex area of study (Juttner et al, 2013). Customer emotions are often vividly recalled, yet difficult to describe, thus numerous researchers have applied psychology theories adopting the PAD model (Mehrabian and Russell, 1974), the

PANAS theory (Watson et al, 1988) as well as the differential emotion theory (Izard, 1977) to assist in understanding and an element of measuring the customer experience. Some research studies have focused on the measurement of the cognitive dimension of the customer experience (Lemke et al, 2010), however it is important that researchers include customer emotions as part of the measurement of the customer experience (Juttner et al, 2013).

Satisfaction, trust, re-visit intention, re-purchase intention and loyalty have all been outlined as outcomes of a positive customer experience (Shobeiri et al, 2015; Verhoef et al, 2009), thus it is not surprising that numerous retailers have a firm focus on delivering an exceptional customer experience (Homburg et al, 2015; Rose et al, 2012) regardless of the service delivery channel. The customer experience is often centred around the notion of 'value in use' where the customer jointly determines the value of the good or service offering (Gronroos, 2008). Thus, the experience the customer encounters is co-created through an alignment between the customer's goals and the retailer's offerings (Vargo and Lusch, 2008). The co-creation process limits the extent that a company can control the customer's experience as it can only support and facilitate customers' value creating process (Gronroos, 2008).

Regardless of the service delivery channel, i.e. in-store, online website or mobile application, customers always have an experience; this experience may be good, bad or indifferent and occurs whenever a customer buys a product or encounters service from a retailer (Berry et al, 2002). Focus on the online customer experience has emerged due to the transition from static websites to dynamic and interactive e-commerce sites (Klaus, 2013). Similarly, mobile applications provide a further dynamic channel to browse and purchase products, yet little is known on what influences the customers experience with such software. A number of variables are capable of influencing the cognitive and affective components of a customer's experience in the offline and online environment. In order to provide the study with further theoretical understanding, the following section will provide an overview on the variables highlighted as influencing the customer experience during use of online websites involving flow theory (Hoffman and Novak, 2009).

2.2 Variables influencing the experience

Numerous variables have been outlined as being capable of influencing the customer experience in the online web environment, namely, ease of use (navigational control), customisation/personalisation, convenience (usefulness), enjoyment, telepresence, time distortion and flow (Hoffman and Novak, 2009; Klaus, 2013; Rose et al, 2012; Martin et al, 2015; McLean and Wilson, 2016). A review of such variables may help us gain an understanding into the potential variables capable of influencing the customer experience with high-street retailers' m-commerce mobile applications.

Deriving from the technology acceptance model (Davis, 1989), Rose et al (2012) outline ease of use as an important variable capable of influencing customer emotions within the online retail environment. Ease of use refers to the ease in which a customer can learn to use a system and understand the basic functions, while avoiding error during their activity (Davis, 1989). In addition, based on existing theory on consumer purchase intention (Rose et al, 2012) research has highlighted customisation as a variable capable of influencing the customer experience. The increasing role of

technology in service delivery has seen an increase in the use of technology to provide customised services (Truel and Connelly, 2013). Customisation refers to the personalisation or individualising of services and content to a customer's own preferences and interests (Lee and Cranage, 2013), as well as a retailer's ability to personalise the delivery of the right content, to the right person at the right time (Tam and Ho, 2005). Thus, customisation can influence feelings of control and the ability to be an active part in creating the customer's unique experience (Cheng et al, 2010). Retailers' offering of a customised experience can aid in reducing a level of uncertainty that exists during Internet shopping (Magrath and McCormick, 2012). Therefore, offering customers the ability to filter content, favourite content and be provided content relevant to them, can result in positive customer emotions (Rose et al, 2012). However, research highlights that customisation is not as critical on the customer experience as ease of use within the online web environment (Martin et al, 2015). In spite of this, the distinctive nature of smartphone apps that allow customers to store data in a unique manner (Hsiao et al, 2016) and the ability of retailers to utilise such data for location awareness, context sensing and product personalisation (Alnawas and Aburub, 2016), may increase the importance of customisation as a variable capable of influencing the customer experience.

In line with the ability to use mobile apps to provide customers with a customised experience, previous research has highlighted that customers are able to access mobile applications anytime, anywhere (Shanker et al, 2016) leading to a convenient way to shop. Customers often use mobile applications 'on the go' (Wang et al, 2015), thus convenience, even within a hedonic context, may become an important variable within m-commerce in comparison to what research has shown within e-commerce (Rose et al, 2012). Further to this, Magrath and McCormick (2012) suggest that ease of use, customisation and convenience are all interlinked. Thus, we hypothesise that (H1) a relationship exists between the variables of ease of use, convenience and customisation to combine together as a higher order utilitarian factor.

Moreover, the level of enjoyment a customer experiences has been illustrated in later versions of technology acceptance theories (Venkatesh and Bala, 2008; Venkatesh et al, 2012) as well as being outlined as leading to satisfaction with the experience (Hsiao et al, 2016). Enjoyment is referred to as the activity of using a specific system that is enjoyable in its own right, aside from any performance consequences resulting from system use (Venkatesh, 2000). Mcgrath and McCormick (2012) suggest that ease of use, customisation and convenience may lead to high levels of enjoyment. Previous research within the online web environment highlight that those customers who do not experience enjoyment during their online shopping activity will seek to complete the activity at an alternative provider (Faiola et al, 2013; Lee et al, 2011). More recently, Hsiao et al (2016) suggest that customers will not be satisfied while using mobile applications without the hedonic element of enjoyment. Thus, during the online shopping encounter, previous research suggests that customers will not achieve the optimal experience should they not experience enjoyment in their activity (Hoffman and Novak, 2009). Therefore, we hypothesise (H2) that the utilitarian factors drive a customer's level of enjoyment during use of high-street retailers' mobile applications. Additionally, (H3) we hypothesise that the level of enjoyment a customer has during use of a high-street retailers' mobile application will influence a customer's level of satisfaction with the experience and a customer's emotions.

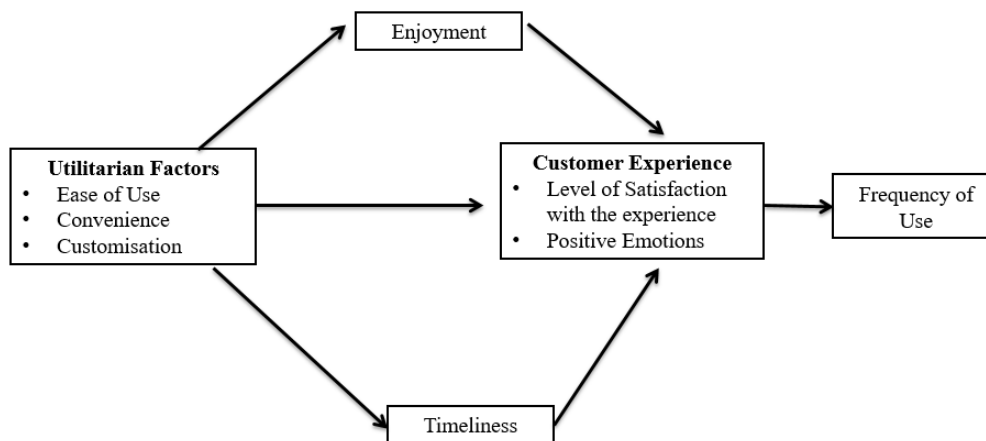
In line with research on enjoyment during online shopping, Novak et al (2000) introduced the concept of flow within the online environment in relation to the custo-

mer experience. The key premise of the concept of flow is based on a cognitive state where an individual is completely absorbed in an activity to the extent that they are fully immersed and engaged in the task while experiencing time distortion and a loss of self-consciousness (Csikszentmihalyi, 1997). Flow within the online environment has been defined as 'a cognitive state experienced during online navigation' (Novak et al, 2000, p.24). Therefore, flow can be considered as a motivational variable influencing the customer's experience (Hoffman and Novak, 2009). However, recent literature has revealed much debate around the concept of flow (Trevinal and Stenger, 2014; Mollen and Wilson, 2011) with regard to antecedents and consequences of flow. As well as enjoyment, telepresence and time distortion have been highlighted as both antecedents and consequences of flow (Hoffman and Novak, 2009).

Lee and Crange (2011) outline that telepresence is the feeling of being present within a virtual environment that is more dominant than the real life environment that the individual lives in. Hoffman and Novak (2009) outline that those individuals experiencing telepresence forget about their surroundings when searching online, thus while an individual's body may be in a physical environment, their mind is in a 'virtual space' in which the individual can find more real than the real life world. Thus, Faiola et al (2013) suggest that in turn consumers become completely immersed and engaged in the shopping activity they are completing and experience a distorted sense of time and positive emotions. Within this virtual environment, consumers lose the connection with real time, while it slowly fades away into the background of consciousness (Martin et al, 2015).

Similar to telepresence, time distortion is highlighted as a key part of flow (Hoffman and Novak, 2009). Time distortion, refers to the point in which consumers are so involved in the task that time elapses quickly without knowledge (Fan et al, 2013). Hoffman and Novak (2009) highlight that the time distortion experienced by consumers, where time passes un-consciously to the consumer, results in positive customer emotions and subsequently a positive customer experience.

Despite this, the usefulness of flow and the variables of time distortion and telepresence have been called into question (McLean and Wilson, 2016; Klaus, 2013). McLean and Wilson (2016) and Klaus (2013) outline that the customer experience is context specific. Thus, due to the nature of the smartphone device and the use of mobile apps often used 'on the go' in a utilitarian manner (Wang et al, 2015), consumers may in-fact be conscious of time spent on an activity and thus, the ability to complete shopping activities in a timely manner may lead to an effective customer experience within this context. Resource allocation theory (Kahneman, 1973; Zakay and Hornik 1991) highlights that individuals are occupied with the passage of time and often make time estimations during their activity. Therefore, while customers use apps on the go and often for convenience (Wang et al, 2015), the time spent using the app could be conscious to the individual. Therefore, in contrast to the traditional e-commerce environment (Rose et al, 2012) customers may be time conscious during use of m-commerce mobile applications. Therefore, we suggest that customers are conscious of time and thus hypothesise (H4) the utilitarian factor made up of ease of use, customisation and convenience will influence customers' perception of being able to complete tasks in a timely manner. Additionally, (H5) should customers be unable to complete tasks in a timely manner then they will have a negative customer experience with negative emotions. Figure 1.0 outlines our conceptual model.



3. Conclusion

3.1 Implications and future research

This conceptual study attempted to identify the variables capable of influencing the customer experience during use of m-commerce mobile applications. From a review of the literature we have developed five research hypothesis resulting in the development of a conceptual model. Over recent years' Mobile applications have emerged as a powerful and ubiquitous service delivery channel due to retailers' ability to offer services and products through such a channel. The rapid growth of consumers' adoption of such channels for shopping purposes highlights the importance of studying the area. Previous research has highlighted the difference between mobile applications and traditional e-commerce. Wang et al (2015) highlights that mobile applications are used 'on the go' and often in a goal directed context. Thus, the variables capable of influencing the customers experience during use of m-commerce mobile applications may differ from those in the traditional e-commerce environment. In particular, flow (telepresence/time distortion) has been outlined as a variable leading to the optimal customer experience within the e-commerce environment, however in contrast, due to the suggestions of m-commerce mobile applications being used in a goal directed context, and often on the move, consumers may be conscious of the time spent using the m-commerce application which ultimately has an effect on the customer's satisfaction with their experience. To date few studies have explored the customer experience with m-commerce mobile applications. Many studies have outlined the importance of exploring the customer experience within varying contexts. Due to high-street retailers continually adapting their retail strategy to include e-commerce and more recently m-commerce through mobile applications, it is important that we gain a theoretical understanding on the customer experience in differing contexts and channels. Specifically, this study establishes a conceptual model making the initial strides for future research to empirically test. During testing of the model, it would be advantageous to examine demographic variables such as age, gender and occupation. In addition, it would be useful to explore the role of screen size, an array of different smartphone screen sizes are available to consumers, identifying if the screen-size plays a moderating role between variables will continue to

enhance our understanding of the experience customers have with m-commerce mobile applications.

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THE EFFECTS OF VALUE CO-CREATION ON CONSUMER TRUST IN THE CONTEXT OF SERVICE FAILURES

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This study developed and empirically tested a model examining the effects of value co-creation on consumer trust after service failure. Specifically, it depicts the effects of low and high value co-creation on consumer trust in case of service provider's competence (Xie; Peng, 2009) or integrity (Laer; Ruyter, 2010) lacking. The experimental study we conducted, shows that after service failures, high level of co-creation enhances consumer trust when competence-based failure happens, whereas, in case of integrity-based failure high co-creation does not prevent from the depletion of trust. In contrast to previous contribution (Heidenreich et al., 2015), showing a negative correlation between high level of co-creation and customers' dissatisfaction after service failure, this study reveals that high level of co-creation affects positively trust when service failure depends on the lack of the service provider competence.

1. Introduction

Trust is the central tenet of relationship marketing in services (Schumann et al., 2010), since it is essential to build and keep effective long-term relationships between companies and consumers (Cho, 2006; Garbarino; Jhonson, 1999; Grégoire; Fisher, 2006; Sirdeshmukh; Singh; Sabol, 2002). Trust is one of the most effective methods of reducing uncertainty and the customers' sense of risk toward service before its consumption (Suh; Han, 2003). In addition, it has a significant and positive impact on the customers' commitment (Morgan; Hunt, 1994), as well as, on their loyalty toward the service provider (Garbarino; Johnson 1999; Sirdeshmukh et al., 2002). In such manner, trust is a powerful tool that has a positive effect on the consumers' repurchase intentions and on their engagement in word of mouth activities (Santos; Basso, 2012). Accordingly, the understanding of the trust formation process and of the factors influencing it, are a relevant topic for service companies.

Previous literature emphasized both the competence and the integrity of service providers as important drivers of trust formation (Sirdeshmukh et al., 2002; Schumann et al., 2010), as well as, the customers' ability to perceive them as a proxy of successful service encounters. Although companies adopt well-planned strategies to build and keep consumers trust, service failures are not rare events, as they are linked to the inherent variability and intangibility of service (Berry, 1995).

Such negative experiences follow from the mismatching between the service perfor-

mance and the customer's expectations (Hoffman; Bateson 1997); they may be related to company lack of competence (Xie; Peng, 2009) or to company lack of integrity (Laer; Ruyter, 2010) and may result in the consequent trust depletion or in the trust formation obstruction (Basso; Pizzutti, 2016). According to Wang and Huff, (2007), the lack of service provider's integrity is more closely associated with trust decreases than the lack of his capability. In addition to the negative influence on trust, service failures may trigger consumer negative emotions including feelings of unfairness and dissatisfaction (Bitner et al., 1990; Ro, 2015; Smith et al., 1999).

Recently, some authors (Heidenreich et al., 2015) investigated the consequences of service failures in relation to the engagement of customers in the service co-creation. Heidenreich et al. (2015), for example, explored the effects of failed co-creation (service failures) on consumers satisfaction. The authors stressed that when service meets the customer expectations, co-creation has a positive effect on satisfaction, but when service failures occurs, co-creation is negatively related to satisfaction.

Despite the intrinsic connection between service failures and service co-creation, current studies on service co-creation focus mainly on the effects of successful service delivery on satisfaction, trust, loyalty, etc. (Chan et al., 2010; Rajah et al., 2008; Randall et al., 2011).

Therefore, researches examining the effects of failed co-created services are limited and are strictly focused on customer satisfaction (Heidenreich et al., 2015). Accordingly, fundamental gaps remain in the understanding of the relationship between unsuccessfully service co-creation (e.g. service failure) and trust.

This study adds to this perspective by extending the current knowledge on the effects of the dark side of service co-creation to customer trust. Our research goals are two-fold. First, it aims to investigate the effect of failed co-created service on consumers trust, and second, it aims to empirically determine the differential effects of low and high levels of co-created services on customers trust in two specific cases: integrity and competence based violation.

The remainder of this article is structured as follow. First, we introduce our theoretical background and the research hypotheses. Second, we describe the research method we adopted. Third we present and discuss results, and finally, we provide implications for theory and practice and suggestions for future research.

2. Trust and service failures

Consumer trust is a multi-faceted construct that relates the expectations held by the consumer that the service provider is willingness to engage to deliver its promises (Sirdeshmukh et al., 2002). Trust plays an important role in keeping long-term and high-quality relationships between the parties, i. e., consumers and service providers (Crosby et al., 1990; Dagger et al., 2009; Grégoire; Fisher; 2006, 2008), as it enhances the consumers loyalty toward a service provider (Chai et al., 2015; Dewitt et al., 2008; Kharouf et al., 2014; La; Choi, 2012; Sirdeshmukh et al., 2002; Sun; Lin, 2010). Therefore, consumers who hold high levels of trust in a service provider are more likely to repurchase from it and are naturally interested in promoting positive WOM than consumers who hold low levels of trust.

The customers perceptions of the service provider's competence, benevolence and integrity are universally recognized as valid antecedents of trust: the more consumers perceive service providers as competent, benevolent and honest (e.g. integrity), the higher is their trust (Cho, 2006; Sirdeshmukh et al., 2002; Schuman et al., 2010). Such elements define the service provider's trustworthiness, that is the most important antecedent of trust formation (Cho, 2006; Colquitt et al., 2007; Kharouf et al., 2014; Mayer et al., 1995; Schumann et al., 2010; Sirdeshmukh et al., 2002).

Competence refers to the knowledge and the ability of the service provider (e.g. company or the employee) to apply such knowledge in practice in performing tasks, according to the expectation customers (Cho, 2006; Sirdeshmukh et al., 2002). Competence is thus perceived and assessed by customers during the service experience (service in action).

Benevolence concerns the service provider's motivation to take care customers. It roots on the service provider's good will intention, caring and altruism and is predictive of its interest for the needs of customers and of its engagement in promoting the other's best interests (Cho, 2006).

Integrity relates a very rational reason to trust someone (Colquitt et al., 2007), as it concerns both the principles and the moral values, as honesty, driving the company's actions (Mayer et al., 1995; Schumann et al., 2010). It emerges through the provision of reliable promises and through the sharing of reliable information. Such elements strongly affect the customers' perception of the provider fairness, honesty and sincerity (Colquitt et al., 2007; Mayer et al., 1995; Schumann et al., 2010), contributing to the building of integrity (Colquitt et al., 2007).

During the relationship between consumers and service providers, adverse events may violate consumers trust. According to Wang and Huff (2007, p. 1035), "a violation of trust occurs when the buyer perceives that the seller's failure violated a psychological contract between the seller and the buyer". Service failures are examples of events that may violate consumers' trust (Basso; Pizzutti, 2016; Wang; Huff, 2007).

Marketing literature has widely addressed the negative effect of service failures on trust. Bejou and Palmer (1998), for example, showed that after a service failure, customers may experience low levels of trust, especially when the service failure relates long-term relationship (e.g. one or two years). Wuen et al. (2004) and Sajtos, et al. (2010) investigated the effect of failure severity. They found a positive relation between the intensity of the failure and the loss of trust; indeed, more severe failures create greater damages on trust. In addition, Basso and Pizzutti (2016) empirically demonstrated that trust may decrease when consumer is exposed to a double deviation, that is, when the service failure is followed by unsuccessful service recovery. Rotte et al. (2006) revealed that, although customers with high levels of trust before a failure are more likely to forgive the company, the occurrence of the failure increases their uncertainty about the service provider reliability and destabilizes their trust.

After service failures, consumers show different levels of trust. It depends on the conditions under which the service was provided and specifically concerns the degree of engagement of customer in the co-creation of service. Accordingly, in the next section we present hypotheses regarding the effect of the level of co-creation on trust when services failures occur.

3. Value co-creation, service failures and trust

According to Vargo and Lusch (2004, 2008) service is the base of every exchange and customer is an active rather than passive recipient of service. This approach emphasises the relational and collaborative nature of the service exchange and of the value creation process (e.g. value co-creation) and identifies customers as dynamic resources that act both as resource integrators and value beneficiaries (Caridà et al., 2014). Value is co-created and emerges from the combined efforts of firms and customers, indeed it is fundamentally derived and determined in use through the integration and application of resources in a specific context (Vargo; Lusch 2008).

The active engagement of customer in the service provision process and in the realization of its benefit (co-creation of value) is a well-established topic (McColl-Kennedy et al., 2012; Prahalad; Ramaswamy, 2004; Vargo; Lusch, 2004, 2008). Consumer is always a co-creator of value (Vargo; Lusch, 2004) who contributes by integrating his/her creativity, ideas, expertise, and other resources (Caridà et al., 2015) to make jointly decisions during both the service design and the service delivery process (Chan et al., 2010); Dong, 2015).

Customers co-create value differently, indeed their involvement in the service provision process may occur at different levels, ranging from passive to a more active participation (McColl-Kennedy et al., 2012). The engagement of customers in co-creation activities can positively influence their assessment of value during the service experience. Indeed, such participation increases customers' satisfaction, as well as, their opportunity to benefit from high quality and more customized service (Chan et al., 2010). In addition, consumers who interact with the company can expect to receive hedonic, social and cognitive benefits, perceiving their experience in positive manner when their expectations are confirmed (Verleye, 2015).

However, even in services consumers are engaged in an active way, failures can occur. Recently, some authors have argued that the interaction between companies and consumers can result in value co-creation, when it generates benefits for consumers, but can also result in value co-destruction, when customers' expectations are not met (Echeverri; Skalen, 2011; Plé; Chumpitaz-Caceres, 2010). Heidenreich et al. (2015) demonstrated that co-creation can enhance customer satisfaction when the result of the service is positive, but can intensify dissatisfaction when a failure during the service provision occurs.

When service failure occurs, the level of co-creation may have different effects on trust. According to attribution theory (Folkes, 1984; Weiner, 2000), after negative events, such as service failures, consumers commonly make causal attributions, i. e., they wonder why such failure occurred. Previous research has shown that the level of co-creation has a positive influence on consumer internal causal attribution for the failure (Heidenreich et al., 2015). In other words, consumers are more likely to take the responsibility for the failure when they are highly involved in co-creation, in comparison to services they are little involved in co-creation (Heidenreich et al., 2015). This could make consumers feel they could have avoided the failure, and, then, make consumers do milder judgment about a failure. Therefore, it is expected that after service failures, consumers who have experienced a high level of co-creation during the service provision exhibit higher levels of trust. Thus we propose:

H1: After a service failure, consumer trust will be higher if the service was provided in a high level of co-creation than in a low level of co-creation.

However, based on cue diagnosticity (Skowronski; Carlston, 1987), the type of violation may provide cues for the individual to judge the company according to the characteristics of the violation: if the violation is referred to competence, the individual judgments will be made on the competence of the company, whereas if the breach is referred to integrity, individuals will judge the integrity of the company.

When consumers perceive service failures occur because providers do not have sufficient skills and knowledge (lack of competence) to provide successful service encounters, they may believe providers have low control over the causes of the failures and are not able to prevent them (Wang; Huff, 2007). In the other hand, when failures occur because providers actions are guided by principles that consumers do not accept (lack of integrity), they may believe providers have high control over the causes of the failures are able to prevent them (Wang; Huff, 2007).

In addition, as Plé and Chumpitaz-Caceres (2010) argued in their conceptual article, company may co-destroy value for consumers as result of the accidental or intentional misuse of consumers' resources. Although the authors did not make any proposition about in which of the two situations (accidental or intentional misuse of the resources) failure is more harmful, previous research show that when the failure could be avoided, or that it happens due to lack of integrity, trust is violated in a higher amplitude compared to situations where failure could not have been avoided or occurred due the inability of the company (Elangovan et al., 2007; Wang; Huff, 2007).

Although we expect that, in the context of service failure, co-creation has a positive effect on trust, this effect may occur only in the case of a failure due to lack of competence, which could not have been avoided by the company. On the other hand, if the failure is caused by lack of integrity and could have been avoided, we expect that trust will be greatly affected and will be similar to trust felt by a consumer who receives a service with low level of co-creation. Therefore we propose:

H2: In the high co-creation condition, trust is violated if the failure is integrity-based and not if the failure is competence-based.

4. Research methodology

This study adopts the experimental method to empirically validate H1 and H2. We performed a 2 (level of co-creation in service provision: high vs low) x 2 (service failure attribution: lack of competence vs lack of integrity) between-subjects experiment with random assignment.

187 participants, who were recruited via Mechanical Turk, have been involved in the study. Participants were 57.8% male, the average age was 34.27 years and they practice physical exercises 3.2 days a week.

4.1 Procedures

We adapted scenarios from Heidenreich et al. (2015) to define the level of co-creation manipulation. Accordingly, we manipulated the level of co-creation by varying the degree of effort, amount of information that the consumer should share with the company and the degree of customization on the scenario descriptions. Scenarios were based on a sports outfitter context and described a situation in which a consumer could customize sports shoes according to his/her needs, using new computer software with the help of an employee.

In the high co-creation condition, participants were asked to imagine that they should create a personal profile, providing several personal information, such as name, email, type of physical activity he/she would practice, and were able to choose the shoes characteristics, such as model, materials and colors.

In the low co-creation condition, participants were asked to imagine a situation that they should create a profile at the software, providing just little personal information, and were able to choose just the shoes model and color.

After reading the description of low or high co-creation, participants were randomly assigned to one of the failure conditions (competence or integrity). The failure was the same in both conditions, i.e., participants were asked to imagine that, after the established period their product was not yet available.

In the case of competence lacking, participants were informed that the reason of the failure related the employee's lack of skills and knowledge in using the software to manage their request, whereas in the case of integrity lacking, participants were informed that the failure related the decision of company to reduce service delivery costs (i.e. the company was not fair with the consumer as long as it decided to deliver the product a couple of days after the established period, in order to optimize its own results).

4.2 Measures

We measured the dependent variable, trust, using a four items adapted from Sirdeshmukh et al. (2002), measured in a seven-point bipolar scale (I felt this store is Very undependable/ Very dependable; Very incompetent/ Very competent; Very low integrity/ Very high integrity; Very unresponsive to customers/ Very responsive to customers. $\alpha=0.914$).

We checked the manipulations for the level of co-creation, the failure and the realism of scenarios. We used three items adapted from Heidenreich et al. (2015), measured in a seven-point scale for check manipulation for the level of co-creation. Similarly to the authors, we measured effort, information sharing and customization. For check the manipulation for the failure, we asked participants if they perceived the failure due the employee's lack of ability and knowledge about the software or due the store lack of integrity. Finally, participants perceived scenarios as highly realistic among the four different conditions (in a seven-point scale, means were all higher than five in all conditions).

Additionally, we controlled the effect of situation-related variables. We asked participants if they had already used a service similar to that described in the situation pre-

sented to them, if they were planning to buy a pair of sports shoes how many days per week they exercised. None of these variables have a significant control effect ($p > .10$).

5. Results

Manipulation check: In order to check the effectiveness of manipulation for the level of co-creation, we found that subjects exposed to high co-creation condition ($M = 5.56$) presents a higher perception of effort and engagement with the service than subjects exposed to low co-creation condition ($M = 4.09$; $F(1, 185) = 98.77$, $p < .001$).

The manipulation of type of service failure also was checked. Specifically, we found that subjects exposed to competence failure condition perceived that the failure was due the lack of ability and knowledge of the employee (95.6%), while subjects exposed to integrity failure condition perceive that the failure was due the principles and rules of the company (83%, $\chi^2(1) = 117.69$; $p < .001$).

Test of Hypotheses: We found a main effect of the level of co-creation on trust ($F(1, 183) = 5.640$, $p < .05$), showing that, following a service failure, trust was higher in high co-creation condition ($M = 3.66$) than in low co-creation condition ($M = 3.21$). This finding supports hypothesis H1. It is important to note that there is no significant main effect of the failure attribution on trust ($F(1, 183) = 1.416$, $p = 0.236$). However, we found a significant effect from interaction between the level of co-creation and the failure attribution on trust ($F(1, 183) = 4.891$, $p < .05$), as shown in Figure 1.

Specifically, in lack of competence condition, trust was higher in high co-creation ($M = 3.95$) than in the low co-creation ($M = 3.11$; $F(1, 88) = 14.697$, $p < .001$). However, in the case of lack of integrity condition, there is no significant difference between high ($M = 3.32$) and low co-creation ($M = 3.29$; $F(1, 95) = .011$, $p = .918$). This result provides support for H2 and shows that a high level of co-creation can mitigate the negative impact of a service failure on trust when the failure is attributed to the lack of competence, but cannot when the failure is attributed to the lack of integrity.

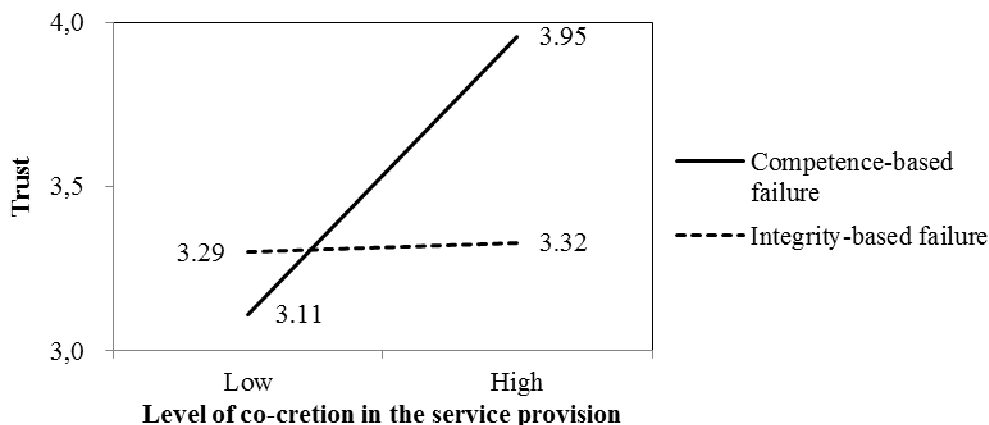


Figure 1. Interaction effect between the level of co-creation and the failure attribution on trust

6. Discussion and implications

The current research strives to contribute to theory and practice in many ways. First, it sheds light on a relevant and promising theme in service research, that is, the topic of trust from the perspective of customer co-creation in the context of service failure (Heidenreich et al., 2015; Ostrom et al., 2015). This study is the first to empirically compare the effects of low and high levels of co-created services on customer trust after service failure. We demonstrated that, in the context of service failure, co-creation has a main positive effect on trust. This result is consistent with previous research that has demonstrated a positive relationship between co-creation and trust in the context of no service failure (Rajah et al., 2008).

Second, contrary to previous contribution (Heidenreich et al., 2015) linking high level of co-creation to high level of dissatisfaction after a service failure, our study reveals that trust can be positively influenced by the level of co-creation when service failure occurs. In this vein, it is important to highlight the different antecedents and outcomes of satisfaction and trust. For example, consumers' expectations disconfirmation (Oliver, 1980) has been considered a relevant theoretical approach to explain variations in satisfaction. Therefore, in situations of service failure and high level of co-creation, consumers felt less satisfied than in situations of failure and low level of co-creation, because they feel a greater imbalance between their expectations and actual service performance (Heidenreich et al., 2015). Trust, in turn, is driven by positive beliefs held by consumers related to the service provider (Sirdeshmukh et al., 2002). Both satisfaction and trust are relevant constructs. However, trust plays a more crucial role in keeping long-term, high-quality relationships between consumers and companies than satisfaction (Garbarino; Johnson, 1999). Thus, companies focused in the construction of relationships with their customers may benefit from encouraging high level of co-creation, even if service failures occur.

Third this study underlines that in the context of service failures, a high level of co-creation helps maintain higher trust only in the case of competence-based failure, whereas, when an integrity-based failure happens, high co-creation does not prevent the company from trust reduction. Therefore, co-creation can mitigate the negative effects of a service failure on trust when the failure is attributed to the lack of competence, but not when it is attributed to the lack of integrity.

Finally, our research contributes to make managers aware of the effect of offering highly or low co-created services on trust and supports them during the service design process to better address co-creation level.

7. Limitations and Further research

The main limitation of this research relates the cross-sectional nature of the study, which prevents us from the opportunity to investigate the effect of co-creation on trust in service failures episodes over the time. Further researches should use different trust measures to identify the possible different effects on trust over time in failed co-created service situations.

In addition, they could explore the mechanisms that explain the positive effect of level of co-creation on trust in episodes of service failures. The mediating effect of causal locus attributions is a possibility.

Furthermore, some researches are dealing with the idea of service co-recovery (Dong et al., 2008; Roggeveen et al. , 2012), i.e., customer participation and involvement during the process of service recovery. Future research could investigate the effectiveness of service co-recovery to increase trust, according to the type of trust violation.

Finally, future research could examine the effect of service failures and value co-creation on other relevant variables, such as negative emotions, negative word-of-mouth and switching intentions.

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THE MEDIATED EFFECT OF PSYCHOLOGICAL OWNERSHIP ON LOYALTY IN ACCESS-BASED CONSUMPTION: THE CASE OF CARSHARING.

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Access-based consumption, denoting avoidance of ownership, but acquisition of temporary access, is gaining momentum. Based on this ownership-to-access shift, we hypothesize ownership not to be essential to develop possessive feelings by referring to the theory of psychological ownership. It defines the stage when an individual perceives an object as "his" and focuses on possessiveness, describing the extent to which an object is "mine." We empirically examined effects of psychological ownership in the context of carsharing.

1. Introduction

In the last two decades, access-based consumption has become an alternative to ownership, allowing temporary access to the usage of products without a transfer of ownership (e.g., Schäfers; Lawson; Kukar-Kinney, 2015). The most popular form of access-based consumption is carsharing (Bardhi; Eckhardt, 2012), attracting 4.94 million users globally (Frost; Sullivan, 2016). Carsharing customers buy a short-term access to shared cars and pay a transaction-based fee. They avoid ownership but make a profit of driving a car based on temporal access (Schäfers, 2013).

While the notion of access-based consumption is not new (e.g., carsharing dates back to the 1940s, see Shaheen; Cohen, 2007), it has recently gained popularity due to changes in consumer behavior (e.g., stronger price-consciousness) and technological innovations (e.g., mobile internet) (e.g., Belk; 2014; Lamberton; Rose, 2012). The sharing economy redefines the fulfillment of needs for access, while simultaneously moving away from static and dominant ownership structures (Botsman; Rogers, 2010). Consumers are interested in fewer belongings and enforced by the value created by experience rather than material possessions (Belk, 2014). For instance, Moeller and Wittkowski (2010), Wittkowski, Moeller, and Wirtz (2013), and Schäfers et al. (2015) examined benefits of access-based consumption in contrast to ownership based on perceived risks (e.g., responsibility for the maintenance of an owned car) which are avoided through access-based consumption. Schäfers et al. (2015) suggested that a more frequent usage of access-based consumption enforces owned vehicle reduction.

With regard to the tendency towards ownership reduction and conscious consumption, which come along with changes in consumer behavior, individuals express themselves not only through ownership (Belk, 1988) but also through access-based consumption (Belk, 2013, 2014). Creating a mirror image of the self, consumption

habits display who we are to ourselves and others (Belk, 1988). Consumers experience emotional and cognitive feelings toward objects leading into possessive feelings towards them. Such possessive feelings are psychological in nature (Asatryan; Oh, 2008). This psychological part of ownership defines a continuous relationship between the owner and the object referring to the theory of psychological ownership (Pierce; Kostova; Dirks, 2001, 2003). Psychological ownership describes the psychologically experienced link between the self and objects, expressed by calling objects as “mine” or “ours” (Pierce et al., 2001).

Nonetheless, concerning the concept of access-based consumption, ownership is no essential condition for the emergence of psychological ownership. One can have a feeling of ownership in the absence of legal ownership (Jussila; Tarkiainen; Sarstedt; Hair, 2015). Moreover, being owner of an object does not provide possessive feelings per se (Jussila et al., 2015). Bardhi and Eckhardt (2012) could not identify any sense of ownership within an interpretive qualitative study among carsharing users, as carsharing was found to have utilitarian and non-altruistic usage motives. However, Schäfers, Wittkowski, Benoit, and Ferraro (2016) provided empirical evidence for a contagious effect of misbehavior in access-based consumption. They found communal identification to be one factor enhancing responsibility and reducing misbehavior. As former research on psychological ownership provided evidence for psychological ownership in absence of ownership influencing the consumer’s behavior, emotions, and psychology (Asatryan; Oh, 2008), we assume consumers to have possessive feelings in access-based consumption. Concomitant with changing consumers’ tendencies to reduce ownership and to avoid risks of ownership via access-based consumption (Schäfers et al., 2015), we hypothesize that consumers express themselves not solely through ownership, but also through access-based consumption as it allows spending money for other purposes (Schäfers, 2013) and enables consumer to get in touch with objects and services they cannot afford or do not wish to purchase (Bardhi; Eckhardt, 2012).

Research on psychological ownership in consumer behavior is limited (Jussila et al., 2015). Furthermore, publications propose that effects of psychological ownership can be context specific (Garretson Folse; Moulard; Raggio, 2012). Following the recommendations of Asatryan and Oh (2008) as well as Jussila et al. (2015), we provide first empirical examinations on psychological ownership in the context of access-based consumption on the example of carsharing.

We expect consumers to build emotional and cognitive relationships to their temporarily accessed objects which result in a felt sense of ownership. “Getting familiar with an object” was examined to be causal for the emergence of psychological ownership in consumer behavior (Jussila et al., 2015). A recent study among 1,900 driving license holders shows that 26 percent do not want to use carsharing because they do not want to drive an unknown car (Berylls Strategy Advisors, 2014). Following the suggestion of Bardhi and Eckhardt (2012), we propose a causal relation between usage frequency, resulting familiarity, and a following perceived ownership of an object. Furthermore, psychological ownership can be caused by an exercised control over and the investment of the self into the object (Jussila et al., 2015). As access-based consumption does not exclude ownership (Schäfers et al., 2015), and has not yet been studied in a setting involving ownership (Jussila et al., 2015), we introduce a setting containing additional car ownership. We contrast the causal relationship among exercised control, investment of the self, and psychological ownership between carsharing users who additionally own a car and those who do not.

Although carsharing providers report increasing amounts of customers, registration to a provider does not automatically lead to frequent consumption. While fixed costs remain high, variable costs are low, resulting in a call for high utilization rates to be profitable (Brook, 2004). Loyalty represents a key element to improve transactions of existing customers (Helgesen, 2006). We assume psychological ownership to affect loyalty and examine the mediated effect of psychological ownership on loyalty in the context of access-based consumption by introducing satisfaction and trust as mediators. Psychological ownership was found to promote satisfaction (Weiss; Cropanzano, 1996). Trust is highly valued in access-based consumption (Bardhi; Eckhardt, 2012; Catulli, 2012). We assume satisfaction and trust to contribute to the relationship between psychological ownership and loyalty. As loyalty is associated with high repeat patronage (Javalgi; Moberg, 1997), it is expected to improve the consumers' future usage intensity.

Our paper is structured as follows: First, we introduce the theory of psychological ownership and develop a theoretical underpinning for its emergence in access-based consumption. Second, we present our analysis which contains ANOVA tests, mediation tests, and structural equation modeling with AMOS. Third, we provide results and discuss them, subsequently. Fourth, we elaborate on limitations and propose further investigations. Finally, we conclude our work.

1.1. The theory of psychological ownership

Calling something "mine" or "ours" is the key element of the self-concept (Belk, 1988). The self-concept describes the total of the individual's thoughts and feelings which he refers to himself as an object (Rosenberg, 1979). Consumer behavior is significantly promoted by the self-concept (Levy, 1959). By transferring one's self-concept on products and services, consumers create a mirror image of the self (Belk, 1988). They experience possessive feelings toward objects which are psychological in nature (Asatryan; Oh, 2008). This psychological part of ownership defines a continuous relationship referring to the theory of psychological ownership (Pierce et al., 2001, 2003). Pierce, Van Dyne, and Cummings (1992) defined psychological ownership as the stage when an individual perceives an object as "his." Possessive feelings can be developed towards all kinds of objects; they support identity-expression (Dittmar, 1992), and affect behavior (Isaac, 1933). Whereas self-concept describes the extent to which an object is "me", psychological ownership focuses on possessiveness (Pierce; Jussila, 2011), describing the degree to which an object is "mine" (Kamleitner; Feuchtl, 2015). Therefore, we assume psychological ownership to lead to comparable outcomes as ownership does.

Interestingly, Jussila et al. (2015) suggested that ownership is no necessary condition for the emergence of psychological ownership in consumer behavior. Being owner of an object does not provide possessive feelings per se (Vandewalle; Van Dyne; Kostova, 1995). As psychological ownership occurs independently of the ownership status, we expect psychological ownership to be relevant in access-based consumption, where the ownership of objects, which are shared among customers, remains with the service provider.

Psychological ownership was found to influence consumer's behavior, emotions, and psychology in a large variety of contexts (e.g., Pierce et al., 2003). It was predominantly examined in organizational behavior where it was found to have posi-

tive impacts on motivational, attitudinal, behavioral, and personal functional patterns based on employees' feelings of ownership toward their jobs and/ or company (Pierce; Jussila, 2011). Some of these findings were recently introduced to consumer behavior from organizational research (Jussila et al., 2015). For instance, Fuchs, Prandelli, and Schreier (2010) empirically examined the effects of psychological ownership in product co-creations where customers are empowered to decision-making processes for new product creations. Empowered customers showed stronger demand for the co-created products due to a development of psychological ownership towards these products. Asatryan and Oh (2008) contributed to the research on psychological ownership in consumer behavior by studying the degree to which customers perceived the restaurants they were visiting as "theirs." Peck and Shu (2009) provided evidence for an increased sense of ownership through a mere touch of objects. Psychological ownership was observed to build a wall against competitors, to enhance satisfaction, word-of-mouth communication, the intention to intensify the relationship with the object they perceived as "theirs", and willingness to pay more.

Despite the significant consequences of psychological ownership, its research in consumer behavior is limited (Jussila et al., 2015). Moreover, outcomes of psychological ownership are assumed to be context specific (e.g., Garretson Folsø et al., 2012). We suggest that the relevance of psychological ownership surpassed the importance of ownership in access-based consumption. Therefore, we contribute to the research of psychological ownership in services marketing in the context of access-based consumption.

1.2. Psychological ownership in access-based consumption

Psychological ownership in access-based consumption was examined within an interpretive qualitative study by Bardhi and Eckhardt (2012). It has not been empirically studied yet. As carsharing represents the most popular type of access-based consumption, and consumers do have a historically grown strong attachment to cars accompanied by a high degree of symbolism and consumer identity (Bardhi; Eckhardt, 2012), the paper is based on the context of carsharing to examine psychological ownership in access-based consumption empirically.

As Bardhi and Eckhardt (2012) did not identify a sense of ownership among carsharing customers, we generated a theoretical underpinning to the emergence of psychological ownership in the context of carsharing. Jussila et al. (2015) conceptualized the theory of psychological ownership for the research area of consumer behavior involving causes for its emergence. By doing so, they identified familiarity to the object and provider, exercised control over the object, and investment of the self into the object to cause psychological ownership in consumer behavior.

1.2.1 Familiarity via usage frequency

Bardhi and Eckhardt (2012) argued that customers did not perceive psychological ownership, because of the short time customers use carsharing. In fact, short-time usage represents a typical core characteristic of carsharing as the service is consumed consciously to achieve economic benefits. In accordance with Bardhi and Eckhardt (2012), we expect customers to consciously use carsharing for short-time

travels due to economic benefits. Nevertheless, carsharing customers face a long-term relationship with the provider as they become members of a community by registration. They enter into a formal relationship with the provider and, subsequently, are likely to use the service for an extended time period (Bolton; Lemon, 1999).

According to the theory of psychological ownership, consumers need to familiarize themselves with the object or service to perceive ownership (Jussila et al., 2015). However, as carsharing is only used for short trips, familiarization (e.g., understanding the peculiarities of the car) may be difficult, especially, if customers switch the cars they ride. Therefore, we expect familiarity to the service being causal for the emergence of psychological ownership in access-based consumption. The more frequent customers draw on this service, the more frequent they receive the opportunity to familiarize with the provider and the object, likewise. We assume usage frequency, referring to how often a service is used (Bolton; Lemon, 1999), to have a significant influence on the degree of psychological ownership.

H1: Consumers with a high usage frequency have significant stronger feelings of ownership than consumers with a low usage frequency.

1.2.2 Exercised control over the object and investment of the self

Bardhi and Eckhardt (2012) argued that carsharing customers did not perceive psychological ownership because ownership is valued higher than access. However, customers can also own an object, yet chose to use it in access-based services, too. For instance, one might own a smart, yet opted to use a shared smart, if it better suits his mobility needs. Because owned objects are judged more favorably compared to similar non-owned objects (Nuttin, 1987), we expect consumers to have stronger psychological ownership for the object they own compared to the similar object they additionally access in access-based consumption.

Moreover, in accordance with the theory of psychological ownership, consumers need to exercise control over an object to emphasize ownership towards it (Jussila et al., 2015). However, control is limited in access-based consumption as not all property rights are transferred (Moeller; Wittkowski, 2010).

Additionally, according to the theory of psychological ownership, the investment of the self improves feelings of ownership (Jussila et al., 2015). Car owners show high investments of the self (e.g., paying insurance) while consumers, who access cars in access-based consumption, do not have comparable investments of the self (e.g., they do not have to care about technique inspections). Consequently, we assume the following hypothesis:

H2: Consumers, who additionally own a similar object, perceive psychological ownership in access-based consumption less than consumers, who do not additionally own a similar object.

1.3. The mediated effect of psychological ownership on loyalty in access-based consumption

Loyalty, defined as a behavioral intention to continue the relationship between the customer and the service provider (Singh; Sirdeshmukh, 2000), is a key success factor for service providers (Javalgi; Moberg, 1997). Loyal customers pay more, repurchase products, engage in word-of-mouth communication, and give recommendations to others about the company's products and services (Ganesh; Arnold; Reynolds, 2000).

Asatryan and Oh (2008) provided evidence for the effect of psychological ownership on competitive resistance of customers of restaurants for which they feel a sense of ownership. In this context, competitive resistance is described as the tendency to ignore marketing efforts of competitors and instead favor the service provider with whom they identify (Asatryan; Oh, 2008). Customers with competitive resistance show a strong commitment to a target (Oliver, 1999). According to the theory of psychological ownership, a strong connection to a target (Furby, 1978) creates a preference for it. This competitive resistance is psychologically expressed by loyal behavior. Hence, we assume that psychological ownership positively affects loyalty. Moreover, we introduce satisfaction and trust as direct antecedents of loyalty to examine a mediated effect of psychological ownership on loyalty in access-based consumption. First, satisfaction and trust represent significant and constant antecedents of loyalty. Second, psychological ownership was found to enhance satisfaction (Weiss; Cropanzano, 1996). Third, trust plays a crucial role in access-based consumption (Bardhi; Eckhardt, 2012; Catulli, 2012). Consequently, we assume psychological ownership to promote the triangular relationship among satisfaction, trust, and loyalty.

1.3.1 The mediating role of satisfaction

Satisfaction directly affects behavioral intentions such as loyalty (Brady; Knight; Cronin; Hult; Keillor, 2005). Satisfaction is defined as a post-consumption evaluation of a service with given pre-consumption expectations which are either under- or over-fulfilled (Oliver, 1997). Prior research suggests a significant positive relationship between satisfaction and loyalty (Heskett; Jones; Loverman; Sasser; Schlesinger, 2008) referring to satisfaction as a key dominant factor influencing loyalty (Anderson; Formell, 1994). Therefore, we assume satisfaction to affect loyalty in access-based consumption significantly as well.

H3: Satisfaction positively influences loyalty in access-based consumption.

According to the theory of psychological ownership, feelings of ownership for a job were found to promote job satisfaction in the context of organizational behavior (Weiss; Cropanzano, 1996). Moreover, Beggan (1992) and Nuttin (1987) called for the examination of the relationship between psychological ownership and satisfaction in different research areas, for instance, in the context of consumer behavior (Jussila et al., 2015). Customer satisfaction has been described as an affective-cognitive outcome of consumption experiences (Liljander; Strandvik, 1997). As psychological ownership is underpinned by an affective-cognitive process (Pierce et al., 2001), satisfaction is expected to mediate the relationship between psychological ownership and loyalty in access-based consumption.

H4: Psychological ownership positively influences satisfaction in access-based consumption.

1.3.2 The effects of trust

Services marketing research suggests that consumer-provider relationships require trust because customers have to purchase a service before they experience it (Berry; Parasuraman, 1991).

In access-based consumption, trust is highly valued by customers (Catulli; Lindley; Reed; Green; Hyseni; Kiri, 2013). Bardhi and Eckhardt (2012) identified carsharing customers to be distrustful regarding cars to be not returned punctually. Catulli (2012) examined trust concerns to the service provider in regard to the car's hygiene and safety. In the context of electronic commerce, Kim, Ferrin, and Rao (2008) found familiarity representing an experienced-based antecedent of trust to have a significantly strong influence on customer trust. Familiarity refers to the degree to which a customer gained knowledge about the provider and understanding for the services and processes (Kim et al., 2008) (e.g., booking of carsharing cars via smartphones). Luhmann (2000) defined familiarity as a prerequisite of trust because customers will return to services being associated with positive experiences. Positive consumer judgments based on positive experiences cause trustworthiness (Kim et al., 2008).

According to the theory of psychological ownership, consumers need to familiarize with the object or provider to perceive feelings of ownership (Jussila et al., 2015). Hence, we assume psychological ownership to affect trust positively because psychological ownership requires a prior familiarization.

H5: Psychological ownership positively influences trust in access-based consumption.

Trust was found to be a key construct in regard to the development of a long-term customer-provider relationship (Morgan; Hunt, 1994). Following Morgan and Hunt (1994) and Singh and Sirdeshmukh (2000), we suggest trust as an antecedent of loyalty in access-based consumption.

H6: Trust positively influences loyalty in access-based consumption.

Singh and Sirdeshmukh (2000) proposed that consumer's evaluation of trust, which is formed before a transaction takes place, has a direct impact on post-consumption satisfaction. Catulli (2012) identified distrustful customers who reported concerns if the service will correspond to their expectations. Therefore, we assume trust to influence satisfaction directly in access-based consumption.

H7: Trust positively influences satisfaction in access-based consumption.

2. Analysis

2.1. Setting and data collection

This work is based on the context of carsharing to examine psychological ownership in access-based consumption empirically. We conducted an online survey among

carsharing users of 11 different carsharing providers in Germany. Participants were incentivized by the chance to win electronic devices and vouchers. Of 2,207 initial participants, we reduced the sample to 1,523 due to a detailed data adjustment. 70.2% were male participants and 34.8 years old on average ($SD=11.0$). 28.2% owned a car.

2.2. Measurement

To measure latent constructs given by our model, established scales were used on a five-point Likert-type scale (see Appendix). To assess the variable usage frequency participants were asked to categorize their usage behavior. In accordance with the management board of a carsharing organization, using carsharing not more than once a month was considered as a low usage frequency, whereas its use of at least two times a week was considered as a high usage frequency.

To test the mediating effects of satisfaction and trust, the established procedure of Baron and Kenny (1986) was applied. Three regression equations were conducted for each mediator. First, the regression of each mediator (satisfaction and trust) on the independent construct (psychological ownership) was conducted. Second, a regression of the dependent construct (loyalty) on the independent construct (psychological ownership) was provided, followed by, third, a regression of the dependent construct (loyalty) on both, the independent and the mediator for both mediations. For mediation to hold, the independent construct must affect the mediator in the first regression equation, the independent construct must influence the dependent construct in the second equation, and, the mediator must affect the dependent construct to the exclusion of the independent construct in the third regression equation (Baron; Kenny, 1986).

3. Results

3.1. Usage frequency

An ANOVA, comparing customers with high usage frequency and low usage frequency in terms of their perceived sense of ownership in access-based consumption, was conducted. Results showed a significant difference between both groups ($F=4.180$, $p=0.05$). Hypothesis 1 was confirmed. Customers with a high usage frequency ($M=2.72$, $SD=1.18$) differ significantly from customers with a low usage frequency ($M=2.54$, $SD=1.11$) regarding psychological ownership.

3.2. Car ownership

An ANOVA, comparing car-owning and non-car-owning carsharing users in terms of their perceived sense of ownership in access-based consumption, was conducted. Results showed no significant difference between both groups ($F=2.962$, $p=n.s.$). Hypothesis 2 was not confirmed. Car owners ($M=2.51$, $SD=1.13$) do not significantly differ from non-car owners ($M=2.62$, $SD=1.13$) in terms of psychological ownership.

3.3. The mediation effect of satisfaction

The mediation testing results supported our assumptions (see Table 1). The third regression equation showed that the effect of psychological ownership on loyalty is much less ($r=0.092$, $p<0.000$) compared to the second regression equation ($r=0.232$, $p<0.000$), concomitant with an improved R^2 in the third regression equation. Perfect mediation cannot be provided, because the beta value for psychological ownership remained significant (at $p<0.000$) in the third regression. Nevertheless, the beta value declined considerably, so that the mediation effect of satisfaction was confirmed.

Table 1: Results of regression equations testing mediation of satisfaction

<i>y</i>	Satisfaction	Loyalty	Loyalty
R^2	0.055	0.054	0.390
F	88.161***	86.418***	484.939***
Beta – psychological ownership	0.023***	0.232***	0.092***
Beta – satisfaction			<u>0.596***</u>

Note: *** $p<0.000$; Betas reported are standardized values

As expected, psychological ownership and satisfaction were correlated ($r= 0.023$; $p< 0.000$), causing multicollinearity due to correlated measurement error (Baron; Kenny, 1986). To overcome complications of measurement error, structural equation modeling was applied, providing robustness for testing interrelationships among constructs (Baron; Kenny, 1986). Results showed a good fit and the effect of psychological ownership on loyalty remained non-significant (see Table 2). The results supported a completely mediated effect of psychological ownership on loyalty via satisfaction.

Table 2: ML estimates for structural model parameters, satisfaction

Parameters	Standardized value	t-value
<i>Gamma</i>	0.259	8.538***
Psychological ownership → satisfaction		
<i>Beta</i>		
Satisfaction → loyalty	0.758	15.381***
Psychological ownership → loyalty	-0.009	-0.409 (<i>n.s.</i>)

Note: *** $p<0.000$, *n.s.*: not significant

Fit statistics: $\chi^2=123.259$, $df=24$, $\chi^2/df=5.136$, $RMSEA=0.052$, $SRMR=0.045$, $CFI=0.987$, $NNFI=0.981$

3.4. The mediation effect of trust

The mediation testing results supported our assumptions as well (see Table 3). The third regression equation showed that the effect of psychological ownership on loyalty is much less ($r=0.120$, $p<0.000$) compared to the second regression equation ($r=0.232$, $p<0.000$), concomitant with an improved R^2 in the third regression equation. Perfect mediation cannot be provided, because the beta value for psychological ownership remained significant (at $p<0.000$) in the third regression. Nevertheless, the beta value declined considerably, so that the mediation effect of trust was confirmed.

Table 3: Results of regression equations testing mediation of trust

<i>y</i>	Trust	Loyalty	Loyalty
R^2	0.039	0.054	0.363
F	61.370***	86.418***	433.885***
<i>Beta</i> – psychological ownership	0.197***	0.232***	0.120***
<i>Beta</i> - trust			0.568***

Note: *** $p<0.000$; Betas reported are standardized values

As expected, psychological ownership and trust were correlated ($r= 0.197$; $p< 0.000$), causing multicollinearity (Baron; Kenny, 1986). To overcome complications of measurement error, structural equation modeling was applied (Baron; Kenny, 1986). Results showed a good fit and the effect of psychological ownership on loyalty remained non-significant (see Table 4). The results supported a completely mediated effect of psychological ownership on loyalty via trust.

Table 4: ML estimates for structural model parameters, trust

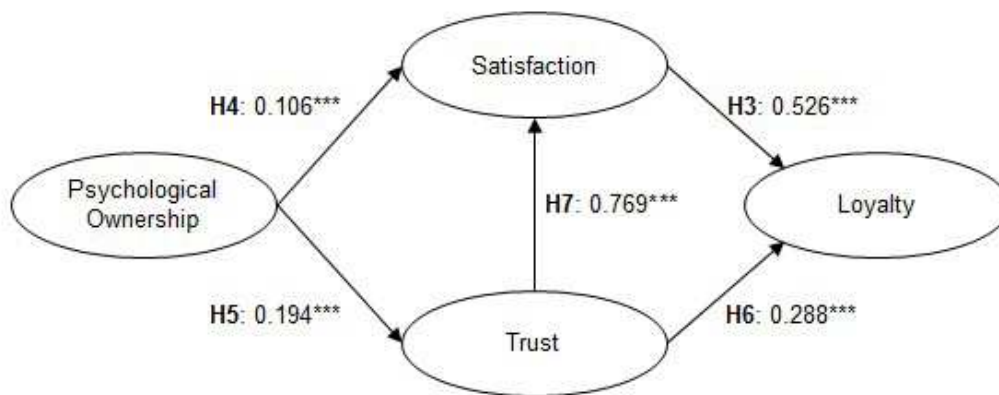
Parameters	Standardized value	t-value
<i>Gamma</i>	0.194	6.950***
Psychological ownership → trust		
<i>Beta</i>		
Trust → loyalty	0.694	16.017***
Psychological ownership → loyalty	0.048	2.210 (<i>n.s.</i>)

Note: *** $p<0.000$, *n.s.*: not significant

Fit statistics: $\chi^2=173.821$, $df=32$, $\chi^2/df=5.432$, $RMSEA=0.054$, $SRMR=0.041$, $CFI=0.986$, $NNFI=0.980$

3.5. Structural model

Exploratory and confirmatory factor analysis results showed an appropriate factor structure for the structural model. The measurement model implied high adequacy for the hypothesized model structure (see Appendix). The structural model estimation results showed a good model fit (see Fig. 1). The hypothesized structural model was confirmed. Satisfaction strongly influences loyalty in access-based consumption ($\beta=0.526$, $t=9.778$, $p<0.000$; H3). Psychological ownership positively affects satisfaction ($\gamma=0.106$, $t=4.682$, $p<0.000$; H4). Psychological ownership significantly affects trust ($\gamma=0.194$, $t=6.955$, $p<0.000$; H5). Trust also has a positive impact on loyalty ($\beta=0.288$, $t=6.325$, $p<0.000$; H6). Finally, trust strongly affects satisfaction ($\beta=0.769$, $t=25.635$, $p<0.000$; H7).



Fit statistics: $\chi^2 = 256.152$; $df = 60$; $\chi^2/df = 4.269$; RMSEA = .046; SRMR = .038; CFI = .984; NNFI = .980

Note: *** $p<0.000$; maximum likelihood estimation.

Fig. 1: Structural Model

4. Discussion

We provided evidence for the fact that psychological ownership is improved through a frequent usage of the service. Customers, who reported using carsharing at least two times a week, were confirmed to have significantly stronger feelings of ownership compared to customers, who used carsharing not more than once a month. By staying in line with Bardhi and Eckhardt (2012), who argued that carsharing customers are not able to emphasize feelings of ownership, because of the short time they use carsharing, our research result suggests taking the customers' long-term relationship with the provider into account. Due to a formal relationship (Bolton; Lemon, 1999), consumers are able to perceive psychological ownership because of their frequent usage of and a subsequent familiarization (Jussila et al., 2015) to the service.

Our assumption that carsharing users, who additionally own a car, have lower feelings of ownership in carsharing compared to carsharing users, who do not additionally own a car, was not confirmed. Exercised control and the investment of the self are considered to be causal for the emergence of psychological ownership (Jussila et al.,

2015). However, our research result suggests that exercised control, which is limited in access-based consumption, as no transfer of all property rights takes place,

(Moeller; Wittkowski, 2010), and lower investments of the self in access-based consumption, do not exclude the emergence of psychological ownership, neither for owners, nor for non-owners of similar objects. These results support the relevance and the potential for the emergence of feelings of ownership towards non-owned objects in access-based consumption.

Moreover, both, satisfaction and trust promote loyalty in access-based consumption. These results support theoretical conceptualizations referring to satisfaction and trust being key dominant factors of loyalty in services marketing (e.g., Anderson; Formell, 1994; Morgan; Hunt, 1994). Our work also promotes the meaningful relationship between trust and satisfaction, where consumer's evaluation of trust is directly related to post-consumption satisfaction (Singh; Sirdeshmukh, 2000). In the context of access-based consumption, trust strongly improves satisfaction. This result strongly supports the fact that trust is highly valued in access-based consumption (e.g., Bardhi; Eckhardt, 2012). Both, satisfaction and trust are significantly enhanced through psychological ownership. These results underpin the relevance and the influencing factor of psychological ownership.

We examined the relationship between psychological ownership and loyalty, which was mediated perfectly by satisfaction and trust. Although psychological ownership directly affects loyalty, the relationship between psychological ownership and loyalty was improved through the mediation of satisfaction and trust. These results underline the importance of taking stimuli into account while examining a relationship between two constructs (Baron; Kenny, 1986).

Finally, loyal customers are willing to increase their future usage intensity. A more intensive usage of the service promotes a higher usage frequency, which, in return, enhances psychological ownership.

5. Implications and Limitations

Overall, we contributed to the emerging research field of access-based consumption (e.g., Bardhi; Eckhardt 2012, Belk, 2013, 2014). Additionally, we contributed to the research on psychological ownership in marketing in the context of consumer behavior. By doing so, we followed suggestions provided by former publications (e.g., Asatryan; Oh 2008, Bardhi; Eckhardt 2012, Jussila et al., 2015). We were the first, who examined psychological ownership in a setting involving legal ownership in the context of marketing (Jussila et al., 2015). We provided evidence for its importance in access-based consumption, where no ownership is transferred.

Car owners, who additionally access cars in access-based consumption, do not differ significantly to non-car owners, who get in touch with cars by access rather than ownership. This result implies that on the one hand, marketers do not have to pay attention to the fact, whether their customers already own a similar object or not. On the other hand, consumers may have no feelings of ownership towards their owned objects. As Jussila et al. (2015) stated, ownership does not provide feelings of ownership per se. Furthermore, Karanika and Hogg (2013) argued that the longer consumer own an object, the less valuable it becomes to them. While participation in

carsharing is also motivated by the opportunity to switch cars in dependence of varying needs (e.g., booking a van for transportation, booking a small car for urban areas with limited parking space), consumers may experience feelings similar to the purchase of an own car every time they enter another car in carsharing. This exclusive opportunity, which comes along with a broad range of different models and brands, may support psychological ownership. As psychological ownership was confirmed to be improved by a high usage frequency, consumers may use access-based consumption more often, if the provider is able to cover more needs with a wide product range.

As our work focuses on carsharing, we suggest considering different contexts for investigations on psychological ownership (e.g., room rentals, fashion rentals). Moreover, we recommend examining the effects of psychological ownership in a peer-to-peer context, where customers rent objects among private entities (e.g., peer-to-peer carsharing). Furthermore, we suggest further investigations on psychological ownership towards owned objects. As consumers, who additionally own a car, are able to emphasize feelings of ownership towards objects used in access-based consumption like consumers, who do not additionally own a car, psychological ownership towards owned object may also vary in its intensity. Finally, as psychological ownership was found to be important in the context of access-based consumption, the motives for its emergence should be examined.

As customers of access-based consumption modes were found to be distrustful in terms of service reliability and integrity (Catulli, 2012), we provided evidence for psychological ownership significantly promoting trust. Moreover, we confirmed and extended existing research on the interactions among satisfaction, trust, and loyalty. Satisfaction and trust, representing key elements in access-based consumption (e.g., Catulli et al., 2013), were confirmed to perfectly mediate the relationship between psychological ownership and loyalty. As loyalty plays an essential role in services marketing (e.g., Javalgi; Moberg, 1997), we showed that psychological ownership significantly contributes to this issue.

6. Conclusion

Building on the work of Bardhi and Eckhardt (2012), we contributed to the research on psychological ownership in consumer behavior in the context of access-based consumption.

Our results underline the importance of psychological ownership in general, and for access-based consumption in particular. Overall, our investigations showed that psychological ownership leads to positive outcomes, which are comparable to positive outcomes of ownership. Purchasing an object is not necessary to experience feelings similar to ownership. Besides, companies offering access-based consumption modes may attract new target groups. For instance, consumers, who cannot afford to purchase a car, may experience car ownership through access. Finally, an intense usage of carsharing may increase future car investment decisions as customers perceive them as “theirs.”

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Appendix

Structural model: Items and reliability measures

	Cronbach's alpha	Construct reliability	Factor load- ings	Indicator reli- ability
Psychological own- ership	0.905	0.909		
x ₁ - When using a <provider>'s car, I feel like it is mine.			.778	.555
x ₂ - When driving, I feel a very high degree of personal owner- ship of the <provider>'s car.			.936	.758
x ₃ - When driving around with it, I feel like I own the <provid- er>'s car.			.910	.743
Trust	.897	.898		
x ₄ - <Provider> delivers what it promises.			.845	.617
x ₅ - <Provider>'s service claims are believable.			.860	.659
x ₆ - Over time, my experiences with <provider> have led me to expect it to keep its promises, no more and no less.			.830	.608
x ₇ - <Provider> has a name you can trust.			.782	.540
Satisfaction	.778	.777		
x ₈ - Very dissatisfied/ very satisfied			.767	.372
x ₉ - <Provider> falls short of expectations/ <provider> exceeds expectations			.717	.393
x ₁₀ - <Provider> is not very close to ideal provider/ <provider> is very close to ideal provider			.715	.370
Loyalty	.765	.830		
x ₁₁ - I would classify myself as a loyal customer of <provider>.			.462	.193
x ₁₂ - If asked, I would say positive things about <provider>.			.937	.730
x ₁₃ - I would recommend <provider> to a friend.			.907	.728

CFA model fit: $\chi^2=256.036$, $df=59$, $\chi^2/df=4.340$, RMSEA=.047, SRMR=.039, CFI=.984, NNFI=.979

THE MORE, THE MERRIER: CO-WORKING AS PRACTICAL EXPRESSION OF VALUE CO-CREATION IN SHARING ECONOMY

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The paper aims to facilitate the acquisition of a full awareness about the benefits of Co-Working, allowing the understanding of whether and how, in sharing economy context, it can be re-read in the light of the dynamics placed at the basis of Value Co-Creation. The paper, starting from a literature review on Value Co-Creation and Co-Working, follows a qualitative approach, by using, in particular, the case study methodology for a better understanding of the real impact produced by emergent cooperative logics on entrepreneurial and professional dynamics. In the light of what emerges from the interviews, Co-Working can be seen as practical expression of Value Co-Creation. In fact, in a holistic perspective, the analysis shows that, despite the high heterogeneity of the sample (due to the presence of people with different features, such as age, cultural background, socio-economic position, goals, etc.), the Co-Workers' vision about the opportunities of co-creating value is quite common and widely shared. The paper could be understood as a useful tool for both practitioners and scholars (researchers, students, etc.), aimed at helping to become aware about the opportunity of co-creating value in working context to efficacy and timely respond to changing market needs. The work presents a strong connotation of innovation as it finds the empirical evidence of a theoretical approach, known as Value Co-Creation, in a new but relevant phenomenon, called Co-Working.

Keywords: Co-Working, Sharing Economy, Value Co-Creation, Service-Dominant Logic

1. Introduction

The high environmental complexity pushes management theorists to focus their cognitive efforts on issues calling for the adoption of governance models oriented towards an increased interaction and collaboration among all actors involved in value creation processes. This scenario opens the door to a phenomenon playing a primary role in global economy, so-called Co-Working, whose importance arises from

its attitude to contribute significantly to the survival and subsequent development of each type of organization.

The term Co-Working has been used with increasing frequency over the last few years, especially in books describing business trends (Botsman and Rogers, 2011; Aguiar, M., & Gopinath, G., 2004; Thomas, D. S., 2015). It can be defined as a professional space in which it is possible to share knowledge and resources in order to co-create value for all involved actors. This logic answers to stimuli coming from major research areas, well established in the literature, based on a business management more oriented to resources and expertise sharing: several academics have highlighted that Co-Working phenomena can produce positive effects on the interpersonal relationships and work quality (Creamer, E. G. 2001).

However, despite its influence, Co-Working seems to be a theme not widely debated in the literature: this poor interest about the topic probably derives from the lack of a full understanding of the benefits springing from it. In this regard, therefore, the work, in an attempt to facilitate the acquisition of a full awareness about the benefits of Co-Working, aims to study whether and how, in sharing economy context, it can be re-read in the light of the dynamics placed at the basis of a wider phenomenon: Value Co-Creation.

The paper is structured in two sections: in a first phase, starting from an analysis of literature related to Value Co-Creation, it pays attention to the role played by users' participation in Co-Working spaces; in the second section, the work aims to provide an empirical evidence about advantages whose all actors involved in Co-Working practices can benefit.

2. Theoretical Background

2.1 Value co-creation

In a context of changes in competition and global trends, business management and strategies are observed nowadays as increasingly linked with service concepts and networks. Service logics (S-D logic and Service Science) promote the concept of value co-creation, intending the customer not more like a simple external factor of corporate and commercial interaction processes, but rather as a crucial actor in the organization and production processes, and thus able to actively contribute to achieving a sustainable competitive advantage. This vision, integrates the contributions of several parts (Woodruff, 1997; Grönross, 2000; Womack, Jones, 2007), allowing the sharing of insights, needs, resources, enhancing the relational approach (Gummesson, 1993; Prahalad, Ramanswamy, 2004) and the systems approach (Golinelli, 2005; Golinelli, 2008; Barile, 2008) for the supply chain as a whole.

From a systemic point of view (Systems Theories) the value of solutions is generated and received through interaction (Hakansson, Snehota, 1995). In this sense, the company's ability to interact with their target audience and gain benefits from the same customer emerges through continuous interactions (Barile et al 2013; Barile et al 2014). The inter-organizational relationships influence behavior, strategies decisively, policies, and governance of organizations and they are consciously aimed at a necessary mutual satisfaction between providers and users (Womack, Jones, 2007).

Value leads organizations try to set an operating philosophy oriented to the exploitation of all the contingents opportunities consistent with its own interests, its own value proposition, their cultural identity, towards an end definable "common" (Lusch, Vargo, O'Brien, 2007); so what in search of consensus, trust, legitimacy (at social level too), and the continues actions towards the development of inter-systemic relations increasingly characterize the entrepreneurial activity.

There are many considerations in literature concerning the "generation" of the value and it seems to be consisting with the new interpretative service perspective of inter-organizational relationships where the prefix "co-" qualifies the cooperation between actors and enhances the individual contributions. Over time, in literature, the term "value" has taken on different meanings (Brown 1984, Ravald, Grönroos 1996, Prahalad, Ramaswamy 2004, Sánchez-Fernández, Iñiesta-Bonillo 2007), changing depending on several factors, such as trends, people expectations, human needs, etc. In any case, until the end of the last century, value has always been perceived as something immaterial to provide to customers, seen as passive services and goods recipients. The value has been identified over the years in every element and resource involved in the production processes and measurable exchange. The value is inherent in innovation (innovation value, Mele, Polese, 2011), in the production process (process value), the product produced (market value), the service provided (service value), in the perceptions of customers (customer value). You get to talk even ROR - Return on Relationship (Gummesson, 1993) and marketing is immersed in the total management of the network of relationships (networks and total relationship marketing - Gummesson, 2008). There is a value proposed by companies (firm value), the value for third parties (stakeholder value), the value for investors (shareholder value), the value of a network (value network), a system (system value).

Regardless of the stage where you are in the generation process, you can have different meanings (Woodruff, 1997). Value is understood as a contribution to profit for the suppliers (economic value) or as something influencing the behavior of users (lifetime value), or as associated with the use and processing of a certain type of resources (resource value), related to its potential evolution (Vicari, 1991; Stampacchia, 2001), or function of the ability to manage new changing resources, such as knowledge (knowledge value, Rullani, 2004). According to Ramaswamy (2009), Löbler and Lusch (2014), value generated thanks all jointly and mutually provided resources corroborates the advantage of adopting cooperative behaviour. In this view, Value Co-Creation allows, on one hand, to exceed the typical distinction among suppliers and providers (Merz, Vargo 2009, Wieland 2015) and, on the other, to view cooperation as a source of advantage for both customers, which can custom their fruition experience (Tommasetti et al. 2014) and organizations, which can get benefits in terms of more revenues, higher profitability, new knowledge and strengthened customer loyalty (Barile, Polese 2010, Bettencourt et al. 2014). Today the value may even be seen as something collective, that is good for the community, which can be achieved through the sharing of many, if not all and in the interest of all (global value).

The value is therefore difficult to define and for this reason even more difficult to handle; there are numerous sizes and there are various processes of generation and several interpretative models; is something complex to be understood, is something personal and therefore must necessarily be organized and promoted as something extremely subjective. The value and its measure are still exclusive of the specific function "value system" that characterizes the subject (external or internal) from time

to time interested. The "value created" by an enterprise, in part is "spread" to the various stakeholders and is based mainly on the reports, some is "restrained" and refers to the ability of the company's management to renew and regenerate continuously the resources available, in order to maintain the "economic value" of a company (Stampacchia, 2005).

The survival of an organization is a function of its ability to create and promote value. Value creation qualifies as a yardstick by which each party interested in the fate and the results of measuring the relationship between activity obtained economic benefits and costs, with reference in particular to what was achieved by entities competitors (culture of value). Systems vision of the value co-creation process is facing both internally (through policies to improve the qualities of the products and processes), and externally (depending the relationship of cooperation with other companies and entities, to search structural and operational dimensions and technical heritage, cognitive and relational business). Value creation, therefore, it is made by consonance and competitiveness (Golinelli, 2010). With regard to the relationship between all of actors of the generation process, the creation and dissemination of the value appear as complementary moments of a single process. The value of a company, in fact, is likely to remain only potential and fail to be in practice if not reported clearly and convincingly to the market. To exist, the creation of value must be recognized, to be recognized (effective); it must be delivered and perceived (Golinelli, 2008). However, consumer's role has progressively begun to be considered fundamental in value creation process (Lusch et al. 2006, Vargo, Lusch 2008), especially thanks to the spread of an increasing awareness about the advantages coming from all stakeholders' participation in organizations activities. According to this perspective, based on a proactive customers' role, Prahalad and Ramaswamy (2000) pointed out that value creation is possible only thanks to a full consumers' involvement. This particular way of thinking has fostered the birth of a new approach, known as Value Co-Creation (Vargo, Lusch 2004) and based on the idea that no organization can generate value without their customers' involvement: the proposal made by companies generates value only after having been accepted by recipients (Frow, Payne 2011, Akaka et al. 2013).

This is ultimately a process of integration (of resources, expertise, information, interests) that consciously come to exist; the customer does not derive the value of the products directly from the purchase of them, but from their use; firms does not generate customer value on their own, but it can formulate their proposals of value that the customer has the option of accepting. The value, then, is not simply created in the simple production process and then be reflected in the market selling price (value in exchange), but it follows a co-generation process (Ballantyne, Varey, 2006) which provides two main components of the value, as realized in many distinct phases: the value is determined through a process of co-production, integrating the contributions of multiple parties (including consumers), sharing insights, needs, availability; the value is determined by the use the customer makes of the products they purchased (value in use) (Ballantyne, Varey, 2006), through a personal "consumption" process, (Grönross, 2008) feeding interaction between the parties in order to integrate and share resources and benefits.

The success of the ideas behind Value Co-Creation is also due to the spread of another wide phenomenon, named Service-Dominant Logic and considered as the result of the progressive accreditation of service as such (Tommasetti et al., 2015): over the years, the increasing attention on services continued to grow, until the ser-

vice logic has progressively exceeded the good one. Not by chance, S-DL includes Value Co-Creation as one of its main principles. In this regard, table 1 shows only S-DL premises related to the concept of value (from 6 to 11):

Table 1. Value Co-Creation as principle of S-D logic

N° Fundational premise	Original foundational premise	Modified foundational premise (2008)	Explanation 2004→2008	New founda- tional premise (2016)	Com- ment/explanation2008 →2016
6)	The customer is always a co-producer	The customer is always a <u>co-creator</u> of value	<u>Value creation</u> is <u>interactional</u>	<u>Value is co-created</u> by multiple actors, always including the beneficiary	<u>Value is typically created</u> (or anticipated) for multiple actors, including not only those involved in dyadic exchange, but
7)	The enterprise can only make <u>value</u> propositions	The enterprise cannot deliver value, but only offer <u>value</u> propositions	Enterprises can offer their applied resources for <u>value creation</u> and <u>collaboratively create value</u> following acceptance of <u>value</u> propositions, but they cannot create and/or deliver <u>value</u> independently	Actors cannot deliver <u>value</u> but can participate in the creation and offering of <u>value</u> propositions	The shift from the term "enterprise" to the more generic "actor" emphasizes the non-deliverable nature of value: the acceptance of <u>value</u> propositions implies a continuing role by the associated actors, whether afforded through resources provided directly (e.g., interpersonally) or impersonally (e.g.,
8)	A service-centered view is customer oriented and relational	A service-centered view is inherently customer oriented and relational	Service is inherently customer oriented and relational because it is defined in terms of customer-determined benefit and <u>co-created</u>	A service-centered view is inherently beneficiary oriented and relational	The term "customer" is replaced with the term "beneficiary" as the former implies something of a specific firm-centered orientation. Instead, the latter centers the discussion on the recipient of service and the referent of <u>Value Co-Creation</u>
9)	Organizations exist to integrate and transform micro-specialized competences into complex services that are demanded in the marketplace	All social and economic actors are resource integrators	The context of <u>value creation</u> is networks of networks (resource integrators)	All social and economic actors are resource integrators	NO CHANGE

10		<i>Value is always uniquely and phenomenologically determined by the beneficiary</i>	<i>Value is idiosyncratic, experiential and contextual</i>	<i>Value is always uniquely and phenomenologically determined by the beneficiary</i>	NO CHANGE
11				<i>Value Co-Creation is coordinated through actor-generated institutions and institutional ar-</i>	<i>Institutions play an essential role in co-creating value as they facilitate all actors' coordination in service ecosystems</i>

Source: Adapted from Vargo, Lusch 2008, 2016

The Value Proposition is a specific package of benefits and solutions that a service system intends to offer and provide to others. The division of labor is at the root of many value propositions; for the modern meaning of service it may be associated with a form of co-creation of value that involves all parts of an exchange. Looking at supplier / user relationship, often are the clients themselves to seek new modes of engagement (Mele, Polese, 2011); in related activities such as self-service, the desire to acquire the knowledge necessary for the performance of the job by itself, which will bring a direct benefit to the individual making the (in compliance with a protocol and a standard result that you can compare). In addition, the ubiquity of connectivity facilitates users to be well informed and reported in a global network, where there are the convergence of technologies and information sharing. It follows that (Polese, 2009; Polese, Monetta, 2006; Polese et al 2009a; Polese et al 2009b):

- 1) Customers are not isolated; the company-client relationship is two-sided; customers, the community of customers and businesses interact, always and everywhere; communities can be an integral part of the value creation process.
- 2) The result is a co-creation of value; what is created is an experience. The physical products and services can be artifice around which personalized experiences are co-created.
- 3) Always need new elements for the co-creation of value, such as two-way dialogue, access and transparency of information (to eliminate the asymmetry of information between the company and customer) and risk assessment (including consumers, their communities and businesses), the sharing of space, time and resources.

As a result, no single Actor alone can provide a complete co-creative experience. Often a network of actors must act together to provide a single experience of co-creation, where the spirit of collaboration, cooperation, sharing become key elements in this regard are becoming increasingly important concepts of co-design, co-

marketing, co-branding, co-production, co-innovation (Carrubbo, 2013). When we abandon centric product / service vision of value creation, which was for a long time the dominant logic in marketing and business strategy (Kotler, 1977; Porter, 1980), and we move toward a vision in which the experiential center is the co-creation we can open new and enlightening perspectives (Prahalad, Ramanswamy, 2000). The goal of value co-creation, in fact, must be either internal (through the services and the improvement of product quality strategies, the optimization of efficiency) and externally (in relation to collaborative relationships with other virtual actors, looking for a structural growth in terms of capacity, knowledge, technical opportunities and so on), of which for example the co-working is increasingly a significant real evidence.

2.2 Sharing Economy

Turbulence and complexity investing market dynamics are increasingly driving the actors involved in the processes generating value to use collaboration and interaction mechanisms, which foster phenomena able to acquire more and more importance in the context of managerial and business dynamics. An example is "sharing economy", understood as a phenomenon linkable to all those business models presupposing resources, skills, goods and services sharing among producers and customers (Hamari, J., Sjöklint, M., & Ukkonen, A., 2015).

In this regard, Rifkin (2014), define sharing economy as a complex logic involving a plurality of subjects not properly considerable as mere providers or users, but as actors able to actively participate in the whole production process (Botti et al.2015). This idea paves the way to the consideration according to which markets gradually open towards networks, property becomes less and less important than accessibility and self-interest is slowly overtaken by the search for collaborative interests. These pressures have partly been determined by the difficulties emerged with the financial and economic crisis of recent years, which has raised awareness about the importance of resorting to growth and development forms more consistent with the attempts aimed at ensuring a long-term sustainability.

Some studies (Botsman and Rogers, 2010; Heinrichs and Grunenberg 2013), consider the new cooperation forms (car sharing, bike sharing, boat sharing, file sharing, web sharing, etc.), inspired to a more collaborative style, able to create a break with traditional economic logic, improving social cohesion and rationalizing the available resources allocation. Therefore, sharing economy, according to these scholars, acts as "facilitator" of the concept of sustainability, in turn considerable in its triple environmental, social and economic dimension and able to emphasize the adoption of more sustainable consumption practices in a systemic perspective (Heinrichs, H., 2013).

In such a direction, sharing economy can be seen as a tool combining the results of those theoretical contributions attaching importance to actors' collaboration and resource sharing in several fields. One of these ones, of course, could be represented by work context, within which each person operates getting in touch with other people and with their cognitive, relational and economic resources. These features represent the foundations on which an emergent phenomenon is developing: Co-Working.

2.3 Co-working

The scholars interested in the themes related to working context have recently recognized the high importance of the interaction among the actors involved in the same value creation process. Some authors, in fact, have dedicated their studies to the deepening of the value created thanks to several actors' resources sharing in working phenomenon (Parrino, 2015).

This "new" trend [Spinuzzi, 2012], based on Value Co-Creation in working context (Co-Working), has been stimulated by new market needs, which have contributed to driving workers' intentions and efforts toward new cooperation mechanisms (Ross and Ressia, 2015). Co-Working, thus, is considerable as a response to the expectations arising from the changing conditions of socio-economic context: the Co-Working spaces are workplaces where professionals with different degrees of specialization and capabilities, exchange expertise, resources and services (desks, Wi-Fi connection, etc.).

According to the aforementioned considerations, it is possible to think about Co-Working as a (chrono) logical derivation of two other phenomena, Co-Production and Co-Creation, respect to which, however, it presents differentiation elements. In particular:

- Co-Production is definable as the customers' involvement process in producing (material) goods. In this regard, Firat and Venkatesh (1995) suggest that customers demand a role in production and that to satisfy them, marketers have to open up more and more of their processes and systems to consumers' active participation. Coherently, Ribeiro et al. (2012) point out the belief that, for a better and more complete social acceptance of a company production, it is necessary to adopt an holistic view by encouraging the recognition of the central role played by a particular figure, named prosumer (producer-consumer) and corresponding to the actor capable to manage the whole production cycle.
- Co-Creation, instead, is considerable as the process in which all actors participating to the value creation by means of goods or service provision are actively involved. With the theoretical passage from Co-Production to the concept of Co-Creation, a further step has been performed by replacing the term "prosumer" with "co-creator" (Xie, C., Bagozzi, R. P., & Troye, S. V., 2008). This choice is essentially due to the attempt to avoid using typical terms of Good-Dominant Logic (such as producer and consumer) and only use those ones characterizing Service-Dominant Logic (Cova et al. 2011).
- Co-Working can be finally qualified as the process in which the goods and/or service provision is realized thanks to the exercise of a working activity by all involved actors. Therefore, it presents elements in common with both Co-Production (in particular, customers' involvement for producing goods) and Co-Creation (specifically, value creation thanks to all users' active participation). However, it differs from them because it is a phenomenon typical of a work context (Moriset, B., 2013).

Several empirical evidences show that the activities performed in a Co-Working space can influence interpersonal relationships and work quality. In this regard, Creamer & Associates (2001) state that academics' real collaborative partnerships foster the birth and growth of significantly favourable relationships both inside and

outside of the workplace. The study specifically suggests that the spread of these relationships is encouraged by the sharing of common interests and purposes. Accordingly, Ferber e Loeb (1997), highlight a positive link between Co-Working and labour productivity: people participating in Co-Working activities can use space, computer equipment tangible and intangible resources, besides attending workshops, conferences and exhibitions.

Other studies (Uda, T., 2013, Gandini, A., 2015) show how users typically prefer working together in open and integrated Co-Working structures, being able to share their different but complementary skills, abilities and competences and obtaining mutual benefits. According to this statements, Co-Working spaces can be seen as stimulating factors of social learning capable of favouring the match among people with a common interest and/or goal. In this regard, Leforestier (2009) highlights a significant element of Co-Working: people's open-mindedness, which allow them to realize collaborative practices and foster the growth of stable social relationships.

3. Methodology and data description

The paper follows a qualitative approach, by using, in particular, the case study methodology for a better understanding of the real impact of emergent Co-Working logics on entrepreneurial and professional dynamics. The case study methodology is "a research strategy focused on the comprehension of the dynamics characteristic of a specific environment" (Eisenhardt 1989). Thus, this approach fosters the investigation of a phenomenon within a specific context, collecting data from several and sometimes-different sources, besides making possible to respond to specific research questions mainly by means qualitative methods and action researches.

The research has been realized by gathering information from several interviews to different actors involved in the Co-Working experience. In particular, the analysis has been conducted in a specific structure, "HubLaboraPics", in Salerno, a southern Italian city. The interviews, lasted about 30 minutes, have been tape recorded, verbatim transcribed, and analysed according to the specific research purposes, in order to cover each theme defined according to literature review results. The analysis has concerned 38 people:

- ✓ 2 structure managers: they have developed the idea of creating the Co-Working structure and currently assist both the financial advisor and software developer in providing services and users in using available spaces and resources;
- ✓ 1 financial advisor: he supports users in understanding economic and fiscal issues, besides assisting them for the start-up and development of new business ideas;
- ✓ 1 software developer: she provides her computer skills to users who need to be helped in using IT tools or improve their technological competences;
- ✓ 34 users: they develop their activity both using spaces and services made available within the structure and sharing their resources (competence, knowledges, opportunities, projects, values, etc.) with all the other actors involved in the Co-Working phenomenon.

4. Experiment And Results

The analysis has shown that, despite the high heterogeneity of the sample (due to the presence of people with different features, such as age, cultural background, socio-economic position, goals, etc.), the respondents' vision about the benefits, opportunities of co-creating value and limits of the Co-Working phenomenon is quite common and widely shared. Specifically, in fact:

- With regard to the benefits recognized to the adoption of Co-Working practices, all respondents have provided statements in line with the following interview excerpt:

"[...] beyond the economic advantages related to Co-Working activities, which have strong evidence, Co-Working phenomenon ensures a total and pervasive resources sharing, stimulating the emergence of new project initiatives".

Resources sharing enables people to achieve their objectives more effectively and quickly. The majority of respondents seems to agree with this statement, as indicated in the extract below: "Often, sharing a project represents its main strength: combining many people's ideas in order to develop any activity or aggregation event, guarantees a competitive advantage and lays the basis for success [...].

- As concerns the opportunities of co-creating value, with the exception of four people (who use Co-Working spaces benefiting of common services rather than sharing their own resources), all respondents have seemed agree with the following interview excerpt:

"Co-Working is not considerable or imaginable as a shared workplace, but as a space open to a heterogeneous audience, [...] where it is possible to confront each other, build relationships and collaborations that can also go beyond the boundaries of people's professional scope and share passions, values, habits, [...]".

- With reference to the limits of Co-Working, finally, the sample of respondents can be divided into two almost equidimensional sub-groups: on one hand, some respondents have expressly stated not to see any limit in the phenomenon, highlighting, therefore, their full and total satisfaction in co-creating value along with other actors; on the other, some interviewees, despite being satisfied, believe that Co-Working is susceptible of improvements. The idea of Co-Workers belonging to this sub-group can be deduced from the following interview extract:

"In order to enhance the positive impact of Co-Working on business and professional activities, Co-Working managers should dedicate more time to the planning of ad hoc communication strategies, customizing them according to customers' expectations and needs [...]. Therefore, it is necessary to promote the strengthening of partnerships and relational networks with all external actors (such as municipal and regional governments, universities, no-profit organizations, private companies, etc.), stimulating both the enrichment of Co-Working managers' vocational training and the accretion of efficiency of provided services and developed activities".

5. Conclusion and implications

The study highlights that considering Co-Working as a simple shared space aimed at promoting the costs reduction by splitting them among coworkers is rather simplistic and reductive: in addition to guaranteeing more savings, it also aims to encourage the profitable resources sharing among actors with purposes not necessarily coincident but always complementary or, at least, compatible. The Co-Working structures, in fact, can be understood as micro-systems of sharing economy within which multidisciplinary approaches spontaneously grow, encouraging learning and professional updating of all involved actors. Such an enrichment of knowledge and skills (ranging from graphics to information technology, from architecture to communication, etc.) is the basis of innovative processes, which, through discussion and informal comparison among coworkers, can start up and develop into a fruitful cooperative atmosphere (see Fig. 1).

This is the main reason for which Co-Working currently seems to represent one of the most valid solutions to the dangerous risk of a cognitive lock-in, typical of many urban areas, especially of the small ones. Many professionals, in fact, use to work in a sort of relational isolation, which inhibits their inspiration and creativity. Co-Working, instead, helps to stimulate an open-mindedness toward a lively interest in implementing innovative ideas capable of fostering collaboration among several actors. Therefore, also in the light of what has emerged from the interviews, Co-Working can be seen as practical expression of Value Co-Creation.

The work also tries to offer some insights for future researches on Co-Working, suggesting to investigate, on one hand, the factors unpredictably and rapidly affecting the emergence and development of new forms of employment and, on the other, users' role and their active involvement for an increasingly resources sharing. In this light, thus, the paper could be understood as a useful tool for both practitioners and scholars (researchers, students, etc.) aimed at helping to become aware about the opportunity of co-creating value in working context to efficacy and timely respond to changing market needs.

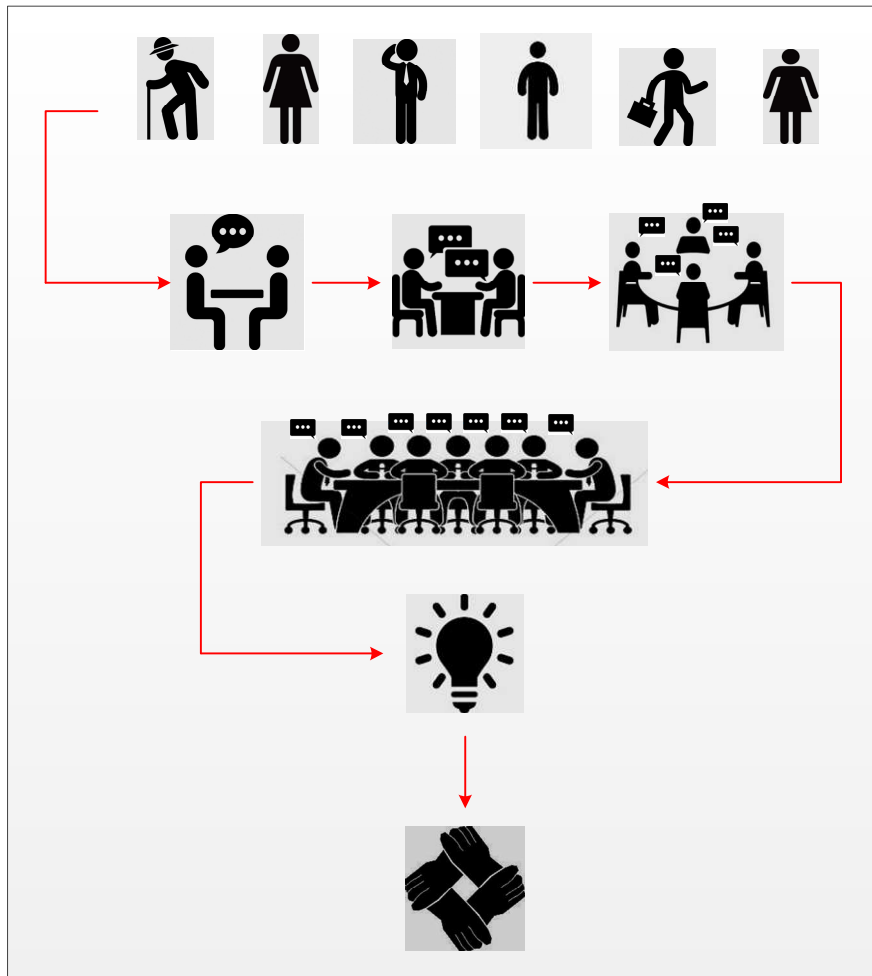


Figure 1: Co-Working process. Source: authors' elaboration

However, the research presents two main limits: first, it has been conducted in only one Co-Working structure; moreover, it has been realized in a limited time span (about four weeks). Therefore, it could be interesting to make a further analysis, both synchronic and diachronic, by means a data collection more extended in time and space.

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THE ORGANIZATION OF COMPANIES INVOLVED IN DRONE ACTIVITIES

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This paper presents a study on the business model of companies involved in the development of Small Unmanned Aircraft Systems, i.e. drones, and relevant services. The main companies involved and relevant activities are presented. The compliance with Open Service Innovation company model developed by Chesbrough is discussed. Moreover, the typical organization of Drone Service Providers is presented. Finally, the case of SenseFlyTM is discussed in order to show a practical application of the presented model.

1. Introduction

This paper aims at discussing the terms that influence the asset of companies that provide services related to the use of drones. Moreover, it exploits the similarity between companies involved in the development of drone services and the one described by the Open Service Innovation Model introduced by Chesbrough (Chesbrough, 2001 – Chesbrough, 2011).

Drones are flying platforms with both rotary-wing and fixed-wing configuration that are equipped with systems that supports manual or semi-autonomous remote control by operators (FAA, 2015). A whole set of new services could be provided thanks to the availability of these systems, such as traffic surveillance, monitoring of crops, packet delivery, law enforcement, fire monitoring, and support of digital communications (AUVSI, 2013). These application attracted important international high-tech companies, such as Google, Amazon, Facebook and Apple (NASA, 2015). Indeed, the technology of drones is well integrated with the Internet framework. Drones can provide services to Internet users while Internet can provide a communication support to drones (Gharibi; Boutaba; Waslander, 2016). They are also called Small Unmanned Aircraft Systems SUAS.

It is worth noting that the use of SUAS for civil applications causes also some important issues to be assessed. First of all, security issues shall be considered. Indeed, the drone operator shall ensure that the operation of drones is performed without adding risk to other civil applications (FAA, 2015). In particular, SUAS shall be realized so that the risk of collisions with other fixed or moving objects is reduced to the minimum. In addition, a safe flight termination shall be ensured for both nominal and emergency conditions. These are technical issues that need a specific technical knowledge to be assessed. A different type of problem is related to the protection of privacy (Glennon, 2015). Indeed, SUAS can record several forms of multimedia information from an elevated point of view. However, they have to respect privacy

regulation while performing observations in order to avoid performing illegal activities. This problem need to be treated by privacy legal specialists. Finally, the issue related to regulations must be assessed.

It is worth noting that the current SUAS market is at its earliest stage of development. Indeed, several regulatory issues shall be provided in order to assess a safe operative framework for these systems that will be effectively integrated with other human activities. Moreover, a dedicated traffic management system shall be developed in order to provide assistance for safe vehicle separation and routing, such as the one that is available for vehicular traffic and for manned aircraft (NASA, 2015).

As described in the previous paragraphs, the organization of a company that handles SUAS is a complex job. Several figures are needed, such as:

- 1) Specialists of SUAS platforms;
- 2) SUAS Remote Pilots;
- 3) Airspace specialists;
- 4) Legal experts that are capable to handle privacy issues;
- 5) Managers that are specialist of running companies that exploit advanced technologies.

This paper will describe the typical organization of a drone based company. First of all, SUAS market for civil use will be presented (AUVSI, 2013). Subsequently, drone issues will be discussed, i.e. technical matters, safety and regulatory questions, and privacy concerns. The framework of drone operation is compared to the Open Service Innovation model developed by Chesborough (Chesborough, 2011). The relevant peculiarities are discussed in details. A proper organization model will be developed for the most important applications presented. It will be derived by exploiting both existing experiences and regulatory guidelines. Finally, the case of SenseFly™ company is presented to report a distinctive experience in this field.

2. Literature Review

2.1. SUAS Providers and Services

First of all, the main categories of small drone shall be assessed in order to highlight the services that they can provide. Drones are a main source of service in the military field. In this case, they are classified in terms of their strategic performance. However, this paper is not focused on military use of drones. The focus is rather on civil applications of drones that are forms of activities that follows a fast developing process, in the last few years. A final statement on the definition of small drones has not been reached at international level. The general idea is that a drone can be classified as “small” if it provides limited damages to people and things in case it collapses on ground as a consequence of a failure. Some experts associate this condition to a limit in the maximum takeoff weight of the drone. However, the level of damage produced by a crash with ground depends on the total momentum of the drone, i.e. it depends on both its mass and its speed. Since the speed of most drones is very lim-

ited and the typical configuration of crashes is when drones reach the free-fall speed, i.e. a constant speed that depends on drone aerodynamic drag, the categorization in terms of weight is preferred. Small drones are considered the ones that have a maximum takeoff weight of less than 25 kg (FAA, 2015). The type of enterprises involved in SUAS applications include SUAS Providers and SUAS Service Providers. SUAS Providers are restricted to a few companies worldwide, mainly distributed in the US and in China, i.e. the countries with the most advanced SUAS deployment. More details about SUAS Providers will be presented in section 3. SUAS Service Providers are more largely diffused and the type of activity they carry out can be very variable. In the following lines, an overview of SUAS services is reported.

Several types of services have been considered for SUAS. Some of them are still at experimental level, some others are more mature depending on the level of risk they rise and, consequently, on the level of technology that must be adopted to let the drones fly safely.

A service that has been provided since several years by using SUAS is precision agriculture (Tokekar; Vander Hook; Mulla; Isler, 2016). These service has been developed in Japan where SUAS helicopters are used to estimate the harvesting stage of crops by visual inspection or by using other type of sensors. Moreover, SUAS are used to spray pesticides over crops. In the past, this function was performed by manned aircraft and it resulted in a dull activity, since it requested to fly up and down over fields in order to guarantee a proper irrigation. In addition, it was a dangerous job for pilots since the aircraft had to fly at low speed and low altitude.

A typical application for SUAS is law enforcement. Indeed, the availability of platform that helps to get an overview from above during a law enforcement activity is very helpful in order to help law enforcement operators to attain better situational awareness. For this reason, several local and national organization involved in law-enforcement activities are planning to use drone derived from military applications in order to perform patrolling and surveillance (AeronVironment, 2016).

Another task important for public activities is wildlife and wildfire surveillance. Drones are used to perform early detection of fires and to support fire extinguishment operations in order to reduce the risk of direct contact of human operators with fire (Merino; Ollero, 2010). Moreover, drones are used to detect illegal activities against wildlife so that people that perform this type of activities can be recognized and prosecuted (Gonzalez; Montes; Puig; Johnson; Mengersen; Gaston, 2016).

Aerial photography and, more in general, aerial remote sensing is a useful job that can be realized by exploiting SUAS. A huge list of end-user can be provided including mapping operators, realty agents, leisure employees, power-line and pipeline owners to monitor line interruptions and fluid leakage, and professional photographers (SenseFly, 2016).

The capability to attain elevated position at low cost makes SUAS suitable for performing as communication relay. They can be equipped with a proper transceiver or micro-cell payload in order to provide a radio link between two points that are out of line of sight connection. A similar application has been proposed by GoogleTM and FacebookTM in order to provide Internet connection for areas that have no line availability (Soundararajan; Agrawal, 2016) (Bonomi; Milito; Natarajan; Zhu, 2014).

Finally, SUAS are planned to be used by Internet shops for small packet delivery at local level. Indeed, some issues related to safety, autonomy, and allowed payload mass should be addressed but an experimental service has already been provided by AmazonTM (Pandit; Poojari, 2014).

2.2. Issues Related to the Use of SUAS

Several issues have been arisen in order to permit the use of SUAS in civil applications, such as:

- 1) Technical issues;
- 2) Regulatory issues;
- 3) Privacy issues;
- 4) Management issues.

First of all, technical issues, have been addressed. They can be summarized in the following list:

- 1) A Sense and Avoid strategy must be defined for each SUAS and for each application. Indeed, a non-negligible number of collisions is avoided each year thanks to the visual support of a human pilot. Regulatory agencies require that proper systems must be installed onboard SUAS to replace this function (Forlenza; Fasano; Accardo; Moccia, 2012);
- 2) A Flight Termination strategy must be defined for each SUAS, i.e. technical solution and a specific procedure must be defined so that the SUAS can perform safe landing in nominal and emergency conditions (Eaton; Chong; Maciejewski, 2016);
- 3) A Communication Data Link for Command and Control must be provided so that the remote pilot can perform a safe and efficient control of SUAS. This data link can be different from the one used to transmit and receive information related to mission payload. In general, a 2.4 GHz ISM digital data link is provided for Line-of-sight operations, i.e. the operations that take place when the remote pilot has direct visual contact with SUAS, while WiMAX and 4G LTE digital link are proposed for beyond line of sight operations, i.e. operations that take place when the remote pilot has no longer visual contact with SUAS (Rahman, 2014);
- 4) A proper traffic framework interface must be provided. Indeed, a SUAS traffic system must be built up in order to properly address the SUAS flight plan and to prevent the risk of unsafe separation or traffic congestion among SUAS and between SUAS and standard flying platforms that operate at low-altitude such as helicopters. A specific protocol over WiMAX framework has been proposed to exchange information between traffic framework interface and SUAS. Moreover, proper SUAS traffic monitoring stations will be deployed (Kopardekar, 2014).

Air traffic regulations must be updated in order to permit a regular operation of SUAS. SUAS will be allowed to fly in the segment of national airspace known as "G" airspace. Regulations to manage SUAS traffic have been issued only in the last few

years by regulatory agencies (Hoffmann; Prete, 2008). Some details still need to be better addressed, such as Sense and Avoid. This is a main issue that discourages potential SUAS service providers to start their business. For this reason, NASA has undertaken a specific study called NASA UAS Traffic Management UTM in order to fill the regulatory gaps (Kopardekar, 2014).

Privacy is an important term that must be accounted for by SUAS service providers. Indeed, like all instruments that collect multimedia information in public places SUAS must prove to respect people's privacy and must provide specific data processing guidelines in order to ensure that no misuse will be performed of data collected during SUAS missions. These guidelines must be related to data acquisition procedures, data storage procedures, data delivery to customers, and data cancellation from memories. Indeed, no service that could harm people's privacy can be legally authorized for SUAS operators and they cannot accept missions from customers that ask to perform a violation of someone's privacy. Recently, a major public discussion has been performed on US news providers in order to assess what type of SUAS operation could be authorized without risk of violation of someone's privacy. Indeed, some people consider that even law-enforcement operations should be forbidden if they determine the risk of people's privacy violation. In particular, a specific wave of opinion has been very critical, it is called Not-In-My-Backyard NIMB (Cavoukian, 2009).

Finally, management issues must be considered. Indeed, customers of drone providers do not request just the availability of the flying platform and the relevant remote pilot. They need that a specific service is offered, such as full support to one of the tasks reported in subsection 2.1. As a consequence, drone service managers must own a detailed knowledge about the requested application. Given the large variability of applications, drone service providers are usually specialized in one or few applications depending on the typical request of local customers (Rule, 2015). For instance, precision agriculture specialists are not usually requested to perform packet delivery services.

3. SUAS Market

As stated in section 2, the SUAS Platform Provider market is formed by a restricted number of companies worldwide, whereas the SUAS Service Providers Market is formed by a much larger number of enterprises that are specialized on customized services. As a consequence, while SUAS Platform Providers can be described in terms of involved companies and products, the SUAS Service Providers can be illustrated just in terms of market budget and worldwide distribution. It is worth noting that two types of drones are usually available from vendors:

- 1) Rotary wing drones, i.e. quadcopters or hexacopters, that are simpler to be handled but have endurance and maximum allowed payload weight limitations;
- 2) Fixed wing drones that have better performance in terms of endurance and maximum allowed payload weight, but they are much more complicated to be piloted since fixed wing planes need to have a minimum ground speed in order to

An overview of SUAS Platform Provider shows three main players and three interesting followers, such as (Drone Industry Insights, 2016):

- Chinese SUAS producer DJI™ is world largest drone producer. It sells about 50% of professional SUAS and covers about 70% of overall SUAS budget. This difference is determined by the fact that DJI™ leads the professional drone market with its model Phantom™, i.e. the market of drones that have a price higher than \$2000,00 (DJI, 2016);
- US producer 3D Robotics™ 3DR™ is second largest producer with a market share in the order of 10% both in terms of number of units and budget. It manufactures the drone named Solo™. Moreover, it develops an autopilot called Pixhawk™, i.e. the *de-facto* standard for self-developers of drones, since it is made with open source code based on a Linux™ operating system. It allows for advanced user to customize the operative functions of their drones (3D Robotics Inc., 2016);
- French producer Parrot™ sells a large number of drones, i.e. it has a share of about 20% in terms of unit sold, but it covers the low-cost segment and it results in less than 10% in terms of budget (Parrot SA, 2016);
- US producer AeroVironment™ that exploited its experience with military drones in order to produce a drone dedicated to law enforcement applications, i.e. the Qube™ model. It has a market share of less than 5% (AeroVironment Inc., 2016);
- Swiss producer SenseFly™ that is specialized in the development of professional systems with advanced capabilities. It manufactures the model Ebee™ that is the most important fixed wing system currently available. It is used for mapping applications as a low-cost replacement of manned aircraft. Sensefly™ has a limited share of market, i.e. less than 5%, but it is a leader among drone producers for professional surveying applications. Moreover, it has been acquired by Parrot™ in the year 2012. SenseFly is a sort of hybrid SUAS company, since it provides both platforms and services (SenseFly Ltd., 2016);
- Chinese producer Yuneec™ that produces a rotary wing drone named Typhoon™ that is a low-cost alternative to DJI™ Phantom™. It was funded recently, but it has already gained a share in the order of 5% of the overall SUAS market (Yuneec, 2016).

Regarding SUAS Service Providers, three main examples can be considered (Drone Industry Insights, 2016):

- US company MAVRX™ that provides services to support precision agriculture. It declared a total of \$11.9M funding in the year 2015 (Mavrx Inc., 2016);
- UK company Sky-Futures™ that provides oil and gas pipeline inspection services. In the past these services were developed using helicopters, but Sky-Futures™ was able to integrate the new technology into its core business. It declared a total of \$11.8M funding in the year 2015 (Sky-Futures, 2016);

- US company Cape Productions™ that provides video services to support movie producers and sport tv channels. It is the first company to receive a permission from FAA to fly its drones near the public. It declared a total of \$11.6M funding in the year 2015 (Cape Productions Inc., 2016).

Regarding the overall budget related to SUAS worldwide, it is estimated a value of \$8.2 billion by the year 2018 (ABI Research Inc., 2016). The study was carried out by integrating sale information by SUAS vendors and service providers, the number of flight licenses requested and SUAS customer surveys. The number is consistent with similar market research (AUVSI, 2016).

4. SUAS Services and Open Services Innovation

The scope of this section is to demonstrate that SUAS Service Companies are structured as Open Service Innovation Companies. While both type of companies, i.e. SUAS Platform Providers and SUAS Service Providers, can be classified in this form, the role of SUAS Service Provided has been highlighted in this paper, since the number of service providers tends to be much larger worldwide, while platform providers tend to be mainly focused on the companies reported in section 3. Consequently, a wider interest is reported on service providers rather than on platform providers.

4.1. Definition of Open Services Innovation

The definition of Open Service Innovation Companies is given by Henry Chesbrough (Chesbrough, 2011). Open Service Innovation Companies are described by Chesbrough as an evolution of traditional Product Based companies. The latter are the ones based on a standard product catalogue that fund their business on licensed and patented products developed by internal R&D employees. This is the standard model of companies since new fast digital communications have been available, such as Internet and last generation digital mobile communications. Conversely, Open Service Innovation Companies are distinguished by a structure that has a complex interface with external sources in order to provide satisfactory and up to date solutions to their customers. In particular, while the focus on traditional companies is related to the “product”, the focus of Open Service Innovation Companies is related to the “service”. For instance, a traditional company can be associated to a manufacturer of cars, while an Open Service Innovation Company is the one that provides advanced car rental services including all aspects that have interest for the customer, such as pick-up and return procedures, insurance, maintenance and repair.

The main differences between Product Based Companies and Open Service Innovation Companies are reported in table 1 (Chesbrough, 2011).

In the following section, the categories reported in Table I will be discussed considering the typical organization of SUAS Service Company in order to demonstrate the correctness of its classification as a Service-Based Company.

Table 1 – Comparison of Product-Based Company with Service-Based Company (Chesbrough, 2011)

	Product-Based Company	Service-Based Company
<i>Customer relationship</i>	Transactional	Relational
<i>Value</i>	From exchange	In use
<i>Customer</i>	Consumer	Co-creator
<i>Quality</i>	Zero defects	Customer satisfaction
<i>Core competences</i>	Built on assets	Built on processes

4.2. Organization of a SUAS Service Company

First of all, *customer relationship* is considered. It is worth noting that the typical customers of SUAS require a specific service to be provided rather than flying a particular SUAS model. Examples have been already discussed in previous section, such as harvesting monitoring, pipeline monitoring, surveying, and aerial remote sensing. The fact that this service can be provided by SUAS is a secondary detail that has minimal interest for customers. The UK company Sky-Futures is a classic example of such condition. In the past, the service of pipeline monitoring was realized by exploiting manned helicopters. SUAS are currently used in replacement of helicopters because they provide a significant cost reduction and they are more fitted to execute dull repetitive tasks. As a consequence, a transactional relationship with costumers is not feasible, since the typical costumer is not familiar with SUAS piloting and flight regulations. The most proper solution is a relational customer relationship that allows for selecting customized solutions to fulfill user requests by exploiting SUAS capabilities.

Regarding the *value*, SUAS service providers are usually paid in terms of flight hours. Consequently, the value is determined by SUAS use rather than in transactional form.

As reported in the first paragraph, a customized solution must be defined for each customer. Flight safety prescriptions and hardware can have significant change from application to application depending on the zone that must be overflown and by the requested flight plan. A constant integration between customer and company is mandatory to fulfill customer requirement. The effort required to customer makes it eligible as *co-creator* of SUAS service. Indeed, the service creation process must be regulated by a proper Non-Disclosure Agreement that defines the correct policy to reuse the developed solutions in future applications.

In the case of SUAS Service Providers, the quality assurance is determined not only by defining a proper Compliance Matrix to ensure fulfillment and traceability of requirements. Moreover, specific surveys are developed to assess the level of customer satisfaction by scoring SUAS Service Providers results. Most SUAS Service providers' websites have reserved sections where the costumer can fill the surveys. To this end, quality assurance includes customer satisfaction. For instance, a remote sensing service with zero defects can produce data that have poor significance for the user. The resulting perception of service quality by the costumer is poor, too.

Consequently, if a SUAS Service Provider plans to offer a useful service to its customers, quality must account for *customer satisfaction*.

Finally, core competences must be focused on processes rather than on assets. Indeed, the creation of a SUAS based service is a complex process that involves platform selection, flight plan determination, remote pilot selection, and request of authorization from flight safety agencies. The competences of company employees must be *built on process* in order to compel the above reported tasks. Figure 1 depicts a reference organization chart for a SUAS Service Provider.

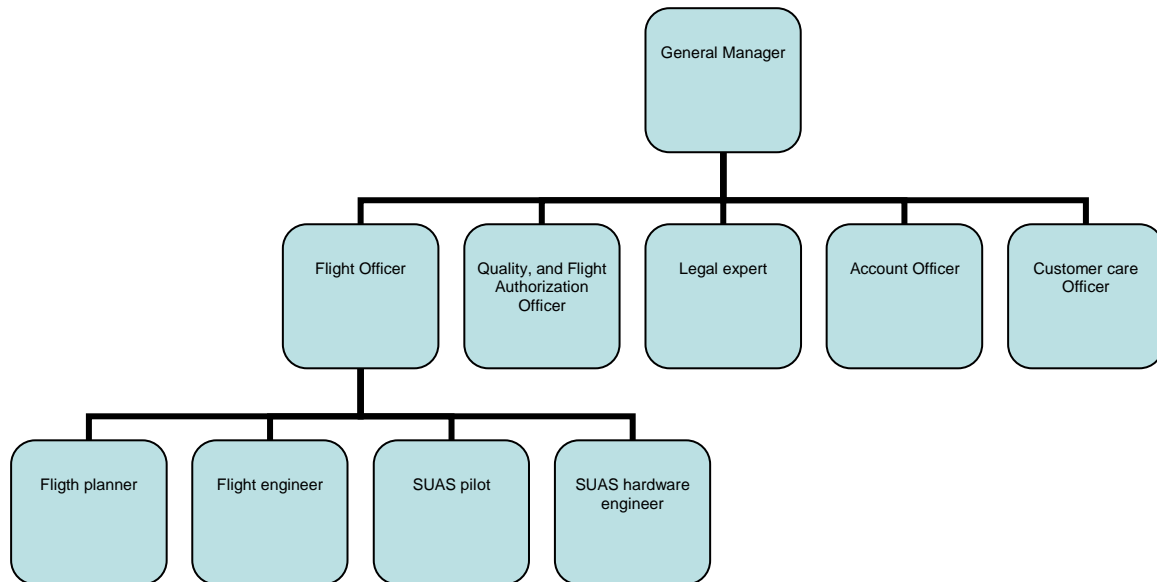


Figure 1 – Organization Chart of a SUAS service provider

The *General Manager* is the high-level responsible of company activities. This position is dedicated to a professional with an experience of several years in the business of aerial services. He coordinates all the company activities.

At second level six officers are needed, such as:

- 1) A *Flight Officer* who coordinates all flight activities. This figure needs knowledge in air traffic regulations, SUAS piloting, and SUAS platform handling. He is responsible of four people, such as:
 - a. A *Flight Planner* who is responsible of providing the flight plan of SUAS for each service requested by customers. He needs knowledge of air traffic regulations;
 - b. A *Flight Engineer* who develops all pre-flight and post-flight technical activities, such as installation of ground station and pre-flight tests;
 - c. A *SUAS Pilot* who performs piloting activities during flights. In case of use of several platforms, i.e. fixed wing and rotary wing, or performing long endurance flights, more than one pilot is needed;
 - d. A *SUAS Hardware Engineer* who performs platform procurement, maintenance, and configuration management;

- 2) A *Quality and Flight Authorization Officer* who monitors and handles quality assurance processes in the company. Moreover, he is responsible of interactions with flight safety authorities in order to attain the requested Certificate of Approval for each operative scenario needed to provide a service to a customer;
- 3) A *Legal Expert* who will be responsible of all legal aspects related to SUAS operation, such as accident management and privacy issue handling;
- 4) An *Account Officer* who performs all requested accounting and financial activities inside the company;
- 5) A *Customer Care Officer* who manages the interactions with customers.

The above reported organization chart can be used in a flexible form since some figures, such as Quality Officer and Legal Expert, can be covered by a single person if the size of the company is small. In case the company is large, some figures can be covered by multiple persons, such as pilots.

4.3. SenseFly™ case

Even if it is mainly a SUAS Platform Provider, Swiss company SenseFly™ case will be discussed in this subsection because it presents several distinctive issues related to Open Service Innovation. Moreover, SenseFly™ is a hybrid SUAS company since it provides several services to its customers, as reported in section 3. In fact, most distributors of SenseFly™ drones are SUAS Service Providers rather than SUAS Platform Vendors. This is due to the high technical added value of platforms developed by SenseFly™ and the relevant high level of cost, if compared with typical cost of SUAS platforms. These circumstances determined the need to provide a strong support to final customers in order to let them derive the maximum performance from the use of SUAS.

SenseFly™ was funded in the year 2009 by Prof. Jean-Cristophe Zufferey and Dr. Antonie Beyeler. They were experts in Robotics and Microengineering. Originally, it was a sort of spin-off from Swiss Federal Institute of Technology in Lausanne (EPFL). Since the start of the company, the team of researcher was integrated by Mrs Andrea Halter, i.e. a specialist in Geodesy, and Mr Cyril Halter, i.e. an expert of industrial qualification of laboratory prototypes with specific focus on aeronautics. This team developed an integrated platform including a lightweight fixed-wing drone with electric propulsion named Ebee™, a customized tool to perform drone remote control, and an advanced software, i.e. Emotion Flight Data Manager™, to realize post-processing mapping applications based on data.

The most important points related to Ebee™ development can be summarized in the following list:

- 1) The company has a strong background in terms of research on robotics and automation. In particular, Prof. Zufferey co-authored several research papers and books on topic related to bio-inspired systems (Zufferey; Floreano, 2006) (Beyeler; Zufferey; Floreano, 2009). Thanks to this research he was able to add advanced features to SenseFly™ systems, such as visual Sense and Avoid and advanced fail safe strategies. The results of Prof. Zufferey research

are available to the open audience in his publications. Currently, just one patent is recorded to SenseFly™ and it is related to a single drone and Prof. Zeuffrey is not in the list of inventors as reported in the patent database Google Patents;

- 2) The fixed wing configuration is a main advantage to overcome typical rotary wing limitations, such as reduced range and endurance performance and high sensitivity to wind;
- 3) Even if the fixed-wing configuration has several safety issues, i.e. a fixed-wing aircraft need to have a consistent speed to keep sustained while a rotary-wing aircraft can perform stationary hovering, they are mostly bypassed by SenseFly™ Ebee™ thanks to the following solutions:
 - a. Lightweight configuration, i.e. maximum takeoff weight in the order of 0.7 kg, that ensures low level of damage in case of collision;
 - b. Advanced Bio-Inspired Visual Sense and Avoid System installed onboard;
 - c. Advanced Fail-safe system that support the best control effort even in case of failure;
- 4) The system is easy to use. It can be launched by hand. It flies automatically over a path of waypoints that can be transmitted by means of a tablet. It performs safe belly landing;
- 5) Sense-fly performs end-to-end support from providing the SUAS platform to the software for advanced image processing. The customer is enabled to produce high accuracy 3D mapping by following a simple procedure from flight to the generation of output;
- 6) SenseFly™ makes an extensive use of web resources such as multimedia video and social networks. This approach helps to have a direct contact with costumers.

In the year 2012, SenseFly™ was acquired by large scale French SUAS manufacturer Parrot™. The acquisition determined no fusion between the two companies. Conversely, a synergic approach was followed, such as:

- Parrot™ acquired some advanced technological solutions to be implemented into its SUAS;
- SenseFly™ could exploit the large sales network and the assessed management capabilities of Parrot™.

The up to date price of Ebee™ is in the order of 20k€, i.e. about 10 times the average price of a SUAS. Indeed, it is an advanced platform developed for high level professional applications.

Currently, SenseFly™ has more than 100 employees and an annual revenue of about 6.3M€. Ebee™ has collected an overall of more than 50000 flight hours.

After joining Parrot, also a rotary wing drone has been developed named Albris™, i.e. an upgrade of previous model named Exom™. It exploits high level micro technology

developed for Ebee™ to be used for inspection purposes and mapping on small areas.

As a result, SenseFly™ can be undoubtedly classified as an Open Service Innovation Companies by considering the following issues:

- It promotes knowledge sharing with industrial partners, research centers, and customers;
- It has a relational relationship with customers by means of several multimedia documents available on the web and a constant attention to social networks;
- The results of R&D activities are usually made available to public by means of research publications;
- It has a main attention on customer satisfaction. For this reason, SenseFly™ has developed a network of more than 200 qualified point of sale worldwide in order to guarantee a constant and efficient support to its customers;
- Sense Fly™ core competences are built on processes. Indeed, they provide self-contained solutions to customers from SUAS platform to processing software, thus allowing for a complete end-to-end service support.

5. Conclusion

This paper presented a study on the companies involved in the development of Small Unmanned Aircraft Systems, i.e. drones, and relevant services. The main companies involved and relevant activities were presented. The compliance with Open Service Innovation company model developed by Chesbrough was discussed. The typical organization of Drone Service Providers was presented. Finally, the case of SenseFly™ was discussed in order to show a practical application of the presented model.

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THE ROLE OF LEADERSHIP AND EMPLOYEE WELL-BEING IN ORGANIZATIONAL DIGITALIZATION

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This paper proposes a new framework for exploring the role of leadership and employee well-being in organizational transformations towards digitalized operations and services. Applying positive organizational psychology, the framework aims to identify the factors that enable and support successful digital transformation and the alignment of both business objectives and employee perspectives. We propose that strategic-level leadership of digitalization along with servant leadership contribute to employee well-being in digital transformations, and together these aspects support digitalization. In addition to the generally used concept of technostress, we suggest that a special type of work engagement, called 'techno-work engagement', may also manifest itself.

1. Introduction

The development and implementation of information and communications technology (ICT) has had a major impact on business and working life as a whole. This paper presents a theoretical framework for understanding the role of leadership and employee technology-related well-being in the context of organizational digitalization.

Business scholars have argued that in the digital economy, there has been a paradigm shift in value creation towards the customer taking a more active and influential role in the process. For example, social media enables constant customer feedback in contrast to the traditional customer satisfaction surveys and focus groups (Westerman, Bonnet, & McAfee, 2014).

It seems evident that effective and value-creating digitalization requires not only new technologies and capabilities to utilize them, but also new kinds of management, leadership, organizational structures, service designs, and modified working processes. 'The giant leap' to digitalized business requires virtually all employees at all organizational levels to change their working practices and, therefore, to be engaged in planning, designing, and implementing changes.

However, less is known about this paradigm shift inside the company: how are employees' roles, tasks, and communication practices changing as a result of the increased digitalization of the organization's operations? What does this require from

leadership? How can organizations take care of employees' well-being and motivational factors when their work and its demands change rapidly? By proposing a new framework and some elaborated concepts, this paper aims to clarify the impact of leadership in digital business transformation.

We assume that the role of leadership should be considered in the digitalization process, as organizational digitalization represents a special type of organizational change. The effects of organizational change in general on employee well-being and its special leadership challenges have been researched intensively (e.g. Carter, Armenakis, Feild, & Mossholder, 2013; Kool & Dierendonck, 2012). However, digital business transformation as a special type of organizational change and a leadership challenge has not yet been explored extensively. The emerging concepts of 'digital leadership capabilities' and organizations' 'digital maturity' (Kane, Palmer, Phillips, Kiron, & Buckley, 2015; Kræmmergaard, El Sawy, Amsinck, & Anders, 2015; Westerman, Tannou, Bonnet, Ferraris, & McAfee, 2012; Westerman et al., 2014) have, however, been discussed in some papers, books, and reports, which we have utilized in the proposed framework.

We argue that in addition to the strategic leadership of digitalization, empowering and involving leadership (e.g. servant leadership) is needed to ensure that employees and their unique potential are considered and utilized in the process. Previous studies indicate that good and especially so-called servant leadership during organizational change is linked to more positive employee experiences (Hakanen, Harju, Seppälä, Laaksonen, & Pakkin, 2012). Servant leadership has been associated with experiences of work engagement, especially in uncertain circumstances (de Sousa & van Dierendonck, 2014).

Why do we think that employee well-being at work should be considered as an influential factor in organizational digitalization? First of all, the intensified use of digital technologies, especially ICT at work, may change the nature of the work as well as job demands and resources. Excessive job demands, when not accompanied with adequate job resources, have previously been shown to be associated with reduced energy among employees, which may eventually lead to burn-out (Job Demands Resources model, see Demerouti, Bakker, Nachreiner, & Schaufeli, 2001; Bakker & Demerouti, 2007). The concept of techno-stress has evolved to describe the stress caused by the use of information technology at work (e.g. Ragu-Nathan, Tarafdar, Ragu-Nathan, & Tu, 2008; Wang, Shu, & Tu, 2008; Salanova, Llorens, & Cifre, 2013). On the other hand, good job resources have been found to contribute to the emergence of a motivational state called work engagement, described in more detail later in this paper (Schaufeli & Bakker, 2010). Respectively, we assume that the use of technology may also act as job resource that supports employee well-being, and a new concept of 'techno-work engagement' could be developed to represent it.

The remainder of the paper is structured as follows: in Section 2, we present the theoretical background discussing the previous research on the key research concepts model and offer a proposal for the theoretical framework; in Section 3, we explain its formulation; and in Section 4, we outline its contribution to research and practice.

2. Theoretical background

2.1. Digitalization and digital maturity

The most visible layer of digitalization includes the increased use of information and communication technologies (ICTs) at work, the emergence of digital service provisions, and the use of digital marketing channels. However, some have claimed that the profoundness of the change caused by digitalization has not yet been realized in most companies and other organizations. Executive surveys (e.g. by Dorner & Edelman, 2015) reveal that at the same time as there is a great urgency among companies to become more digital, there is little consensus on what it really means.

The same applies to the current research on digitalization. The amount of various terms (e.g. e-commerce, ICT use, new media, technologization, new and emerging technologies, etc.) and approaches used makes it challenging to draw a bigger picture of the state of the art of digitalization research.

The term 'digitalization' is commonly used in Finland and the other Nordic countries, but it is not so common elsewhere. As proposed by Manuel Castells (2010), digitalization 'goes beyond the use of digital platforms and taking advantage of their specific affordances, but rather reflects the way that digital media and platforms influence the restructuring of the many diverse domains of economy, society and culture'. By using the term 'digitalization' – rather than, for example, ICT use – in this paper, we aim to highlight the profoundness of the change.

Defining and operationalizing the stage of the organizations' digital development proved to be a challenging task. Some of the articles we reviewed provided concepts and questionnaires for assessing digital readiness in specific areas of digitalization – for example, firms' self-service technology readiness (Ramaseshan & Kingshott, 2015) or the e-business readiness of the firm and the employees (Lai et al., 2013) – but these were considered too narrow for the designated purpose of reflecting organizational digitalization readiness as a whole.

The 2015 Digital Business Global Executive Study and Research (Kane et al., 2015) uses the concept of digital maturity to describe the digital readiness and capabilities of organizations. The study explored the visions of over 4,000 respondents. One of the main findings was that the firms with a clear and coherent digital strategy were digitally more mature than the others. A digitally mature organization was determined as 'an organisation where the digital has transformed processes, talent engagement and business models' – in other words, more mature digital businesses aimed at integrating digital technologies such as social media, mobile, analytic, and cloud services in their businesses. Conversely, less mature digital organizations basically tried to solve separate business problems with individual digital technologies. Moreover, strong leadership and a supporting organizational culture, accompanied with talent development throughout the organization and a willingness and capability to take risks, were found to be essential prerequisites for digital maturity.

Other researchers have also emphasized that digital maturity is more than just the pervasive use of new technologies. According to Kræmmergaard et al. (2015),

successful leadership and organizational change towards more digitalized operations require new models and modifications in the following areas: business strategy, business models, enterprise platform integration, people's mind-sets and skill sets, corporate IT function, and a new kind of humanized workplace.

In our framework, digital maturity is defined as an organization's capability to recognize and utilize the opportunities provided by the development of digital technology and the ability to carry out strategies to execute the vision. In the empirical study to follow this paper, digital maturity is measured as the employee's experience of the state of the organization.

2.2. The role of leadership in the digitalization process

2.2.1. The emerging concept of the strategic leadership of digitalization

To date, there are few studies on organizational digitalization as a broader leadership issue. As Kræmmergaard et al. (2015) argue, no common consensus or comprehensive articulation of the operational aspects of digital leadership exists either in theory or in practice. However, the theme has invited a growing yet inconsistent body of management guidebooks and executive surveys. For example, in *Leading Digital* (Westerman et al., 2014), digitally successful firms are called 'Digital Masters'. The authors claim that in order to become 'truly digital', both the digital capabilities to work differently and the leadership capabilities required to establish a vision and execute it are needed. The authors propose that digital leadership capabilities involve, for example, a transformative vision of the organization's digital future, the ability to involve every member of the organization in the digitalization and the discussion about it, and the development of the competencies needed in the digitalization process. Moreover, digital leadership requires the capabilities of the top management and the IT department in order to work collaboratively and to define tasks and responsibilities clearly enough in the digitalization projects.

In the theoretical framework drawn by this paper, we define the strategic leadership of the digitalization process as the leaders' ability to create a clear and meaningful vision for the digitalization process and the capability to execute strategies to actualize it. Moreover, it is assumed that digital leadership implies the ability to involve all members of the organization in the digitalization process, and to recognize and develop the skills and abilities needed to carry it out.

In the proposed framework, we regard strategic leadership as a prerequisite for successful digitalization, which is described as the aforementioned digital maturity. Moreover, we assume that strategic leadership of digitalization is associated with employee technology-related well-being. This assumption is based on the research findings suggesting that the clarity of the work role and work task – as well as consistency and predictability in leadership behaviour in general – are associated with employee well-being (e.g. Schaufeli & Bakker, 2010).

2.2.2. Servant leadership

Servant leadership has been described as a leadership style that enables the consideration and care of employees' well-being and encounters employees as individuals. The concept was first introduced by Greenleaf (1970), who claimed that servant leaders are those whose basic need is to serve others, allowing them to grow and develop. More recently, Dierendonck et al. (2011) argued that leaders who combine their motivation to lead with a need to serve others display servant leadership. Servant leadership is demonstrated by empowering and developing people – for example, by expressing humility, authenticity, interpersonal acceptance, and stewardship, and by providing direction to followers (Mittal & Dorfman, 2012).

In practice, a supervisor applying a servant leadership style supports the employees and enables their development and self-actualization. The servant leadership style has been found to contribute to followers' work engagement. The connection is mediated by organizational commitment and psychological empowerment (de Sousa & van Dierendonck, 2012). Moreover, servant leadership has been found to predict fewer burn-out symptoms and lower intentions to leave the organization. The relationship is mediated by experiences of fairness and involvement. (Hakanen & van Dierendonck, 2013)

However, it is not clear which elements of servant leadership produce both successful and sustainable changes in organizations. Servant leadership could benefit employees in potentially stressful situations, such as when organizations and the work done is changing rapidly and/or profoundly – which is often the case with digitalization. Hence, we assume that this leadership style, as it is tuned to take everyone's capabilities in the organization into best use, could be useful in digital transformation – for example, by increasing employee well-being and reducing stress.

We presume that when work conditions and demands are changing during the digitalization-related change, the employees' organizational commitment and ability to work independently when needed are especially beneficial. Servant leadership seems to support such behaviours and attitudes. Therefore, we assume that the organizations with higher levels of servant leadership behaviour have better prerequisites for digital maturity.

Servant leadership could be directly associated with the digitalization development; however, it is also possible that the association is mediated by the employees' level of technostress. This assumption is based on previous research findings suggesting that a lack of autonomy is related to experiences of higher technostress (Salanova et al., 2013). Servant leadership seems to enhance employees' autonomy, self-actualization, involvement, and empowerment. We presume that it promotes working conditions that reduce technostress. More precisely, we assume that employees who experience less technostress have the strength and the will to use new technology more efficiently. We also assume that servant leadership promotes employees' experiences of techno-work engagement.

In the proposed model, we use van Dierendonck and Nuijten's (2011) operationalization of servant leadership. In their work, eight aspects were discovered as the best indicators of servant leadership: empowerment, accountability, standing back, humility, authenticity, courage, interpersonal acceptance, and stewardship. In the empirical study to follow the framework formulation, a shortened eight-item version of the original 30-item scale was used for practical reasons.

2.3. The role of employee well-being

2.3.1. Technologizing work and well-being

In general, the use of technology at work and its implications for employee well-being have been researched quite actively and extensively. The acceleration of digitalization has led to a complex digital work environment in many organizations, which may be considered to be demanding by employees. Digitalization is making work more information-intensive: employees are required to process ever more information as the number of information and communication technologies increase. This can challenge employee well-being as the sheer amount of information and ICTs used at work may be difficult to manage. The constantly increasing use of ICTs and the amount of information processing needed affect, for instance, the pace of work by causing fragmentation, interruptions, information overload, and the constant need for multitasking. This can lead to a higher workload, stress, frustration, memory problems, lack of concentration, increased time pressure, and weakened control over one's work. (E.g. Mark, Gudith, & Klocke, 2008; Kouvonen, Toppinen-Tanner, Kivinen, Huuhtanen, & Kalimo, 2005; Klingberg, 2009; Kuikka, Akila, Pulliainen, & Salo, 2011)

While problems associated with ICT usability and malfunctions are often the first things that are brought up when discussing ICTs and well-being at work, they are not the only – nor probably even the biggest – factors. For example, the constant need and often exaggerated expectations to learn and master new, even very complicated technologies may increase workload and stress as well as hinder the employees' interest in ICTs in general. In addition, increased expectations of being available all of the time encourages excess overtime and blurs the lines between work and free time. This kind of overspill makes it harder to detach from work, and can cause stress and impede family life. Demands for constant availability and possible miscommunication while using computer-mediated communication channels may also make work-related communication stressful. (Day, Scott, & Kelloway, 2010) The factors discussed here are largely associated with technostress; the concept of technostress is presented in more detail in the next section.

In line with the Job Demands Resources (JD-R) model, we assume that the digitalization of work can be both a demand and a resource. Job resources assist in the completion of work and promote personal growth and development, whereas demands require extended effort and may have psychological costs (Schaufeli, Bakker, & Van Rhenen, 2009; cf. Day, Scott, & Kelloway, 2010). Job resources are associated with better employee well-being, whereas excessive job demands can reduce well-being at work. Digitalization can also function as a job resource and enhance employee well-being. It may enable greater flexibility in work scheduling and location, which can increase employees' control over the time and place of their work. If the constant availability of employees is not expected or demanded by the organization, digitalization can support work-life balance by providing employees with greater autonomy in when and where their work tasks are completed. It also makes it easier for employees in different locations to communicate and keep up to date on projects. ICTs offer new ways of sharing and collaboration, and can help group work by enabling asynchronous communication. Increased access to information may cause information overload, as mentioned above, but it can also make work more effective and smooth. Easier and quicker access, as well as new ways of analysing

information, can, for example, reduce employees' feelings of tension. (Day, Scott, & Kelloway, 2010)

Digitalization may also enhance working conditions. Digitalization may make work less physically or emotionally demanding by, for example, assisting in the completion of work or automating the repetitive, unmotivating, and/or physically challenging work processes. In addition, those workers who might feel bored at work (cf. job boredom) can find new inspiring variety, changes, and challenges due to digital transformation. Some employees may perceive using new technologies at work to be inspiring in itself, which might be associated with so-called techno-work engagement (described in more detail later). In the current study, we are especially interested in those work resources that support digitalization and well-being at work.

2.3.2. Technostress

Technostress is a form of work stress associated with the use of ICTs at work or the threat or fear of having to use them in the future. It is caused by the constant need to adapt to fast evolving technologies, and the physical, social, and cognitive demands that are directed at employees. Technostress is characterized by feelings of anxiety, fatigue, tension, inefficacy, and scepticism. Technostress can also manifest itself in the form of techno-addiction – the compulsive and excessive use of technologies. Technostress can reduce employees' job satisfaction and well-being at work significantly. (E.g. Ragu-Nathan et al., 2008; Wang et al., 2008; Salanova et al., 2013)

Previous studies indicate that the digitalization of work may increase the risk of technostress in many ways. As mentioned previously, multitasking and the demand for constant connectivity and availability may be negatively related to employee well-being. In addition, the continuous flow of information can be difficult to manage and cause information overload.

Technostress may also be caused by the constant need to learn and adapt to new technologies. The increased demand for extensive, up-to-date technology skills may also increase competition between employees and the fear of a weakened position in the labour market if these demands are not met. Continual changes in ICTs used at work and usability problems may also increase the risk of experiencing technostress. Furthermore, the lack of face-to-face interaction may be a source of stress, especially in fields that have traditionally relied heavily on interpersonal relationships. The need to communicate and collaborate with various individuals and groups using computer-mediated communication channels may also be challenging, especially since different groups may have different conventions and practices. (E.g. Ragu-Nathan et al., 2008; Wang et al., 2008; Salanova et al., 2013; Schellhammer, Haines, & Klein, 2012; Tarafdar, Pullins, & Ragu-Nathan 2014a; 2014b)

Studies have found that certain organizational mechanisms can reduce technostress. These include providing employees with comprehensive training in new technologies. The training should be more than just the distribution of technical instructions. Employees should be provided with a deeper understanding of how and why the technologies are used and what impact they will have on the employees' jobs. Employees should also be involved in the planning and implementation of new technologies, as this increases their sense of control over their work. Employees should be provided with continuous technical support as well as organizational and

managerial support. This can support the employees' sense of self-efficacy and stronger sense of control at work. (E.g. Ragu-Nathan et al., 2008; Tarafdar et al., 2014a; 2014b)

In the proposed framework, we include the concept of technostress by applying measures of techno-overload, techno-complexity, involvement facilitation, and literacy facilitation (Ragu-Nathan et al., 2008) as well as technology-enabled innovation and technology-enabled performance (Tarafdar et al., 2014a; 2014b).

2.3.3. Techno-work engagement as an emerging concept

Most of the previous studies measuring the association between technology and well-being at work have focused on technostress (e.g. Ragu-Nathan et al., 2008; Wang et al., 2008; Salanova et al., 2013; Schellhammer et al., 2012; Tarafdar et al., 2014a; 2014b.), which often associates closely with low employee well-being, especially since prolonged work stress may lead to even more serious consequences, such as burnout (e.g. Khamisa, Oldenburg, Peltzer, & Ilic, 2015).

There seems to be a shortage of studies focusing specifically on technology-related well-being at work. In line with the idea that technostress can be considered as a type of work stress and techno-addiction as a type of work addiction, we respectively suggest that there might appear to be a special type of work engagement, namely technology-related work engagement (henceforth referred to as 'techno-work engagement').

In positive organizational psychology, work engagement is a key concept used to describe subjective well-being in organizations (Bakker & Oerlemans, 2011). Work engagement refers to a motivational construct, defined as a 'positive, fulfilling, work-related state of mind that is characterized by vigour, dedication, and absorption' (Schaufeli, Salanova, González-Romá, & Bakker, 2002, p. 72). Vigour refers to high levels of energy and mental resilience when working, the willingness to put 'a little extra' to one's work, and persistence even when difficulties are encountered. Dedication refers to a sense of meaningfulness, enthusiasm, inspiration, pride, and challenge at work. Absorption means that one is fully concentrated, happy, and deeply engrossed when working: time 'flies' and it is difficult to detach oneself from work. (Salanova, Agut, & Peiró, 2005) In other words, work engagement is characterized by a high level of energy and strong identification with one's work (Bakker, Schaufeli, Leiter, & Taris, 2008).

High work engagement seems to have several positive outcomes, such as greater job satisfaction, lower absenteeism, lower turnover, and higher organizational commitment and performance (Salanova, Llorens, Cifre, Martinez, & Schaufeli, 2003; Schaufeli & Bakker, 2010; Schaufeli, Martinez, Pinto, Salanova, & Bakker, 2002; Schaufeli, Salanova, González-Romá, & Bakker, 2002). The best-known instrument to measure work engagement is the Utrecht Work Engagement Scale (UWES; Schaufeli, Bakker, & Salanova, 2006; Schaufeli, Salanova, González-Romá, & Bakker, 2002), which includes three subscales: vigour, dedication, and absorption. The UWES has been validated in several countries, including Finland (Hakanen, 2002).

We assume that using technology at work might also be perceived as inspiring, fulfilling, and encouraging of employee dedication, which was also found in a study covering flow experiences among ICT users (Rodriguez-Sánchez et al., 2008). While the concept of flow is well-suited to studying positive experiences and emotions while

working with individual applications, we saw the need to develop a measure that covers a more holistic experience of working in the digitalized (or digitalizing) work environment.

Therefore, we are currently developing a novel techno-work engagement scale that is based on the above-mentioned UWES (Schaufeli & Bakker, 2006). The concept of techno-work engagement covers the three key dimensions of work engagement, namely vigour, dedication, and absorption. When employees experience high techno-work engagement, they perceive the use of technology at work to be inspiring and they feel energetic, happy, and immersed when using technology. They might also be proud to use technology at work, and it might even be difficult to detach from the use of technology, since it is so inspiring. In addition, those who have high techno-work engagement might perceive the use of technology at work to be a pleasant new challenge that provides variety and opportunities to learn new things and support professional growth. Since techno-work engagement is a positive motivational state towards the use of technology at work, we suggest that employees who experience high techno-work engagement might be more open to new technologies and digitalization at work. Therefore, we assume that employees' techno-engagement contributes to organizational digitalization.

2.4. The emerging theoretical framework

Based on the previous empirical evidence, we formulated a proposition for a theoretical framework to explain the role of leadership and employee technology-related well-being in an organization's digitalization process (Figure 1).

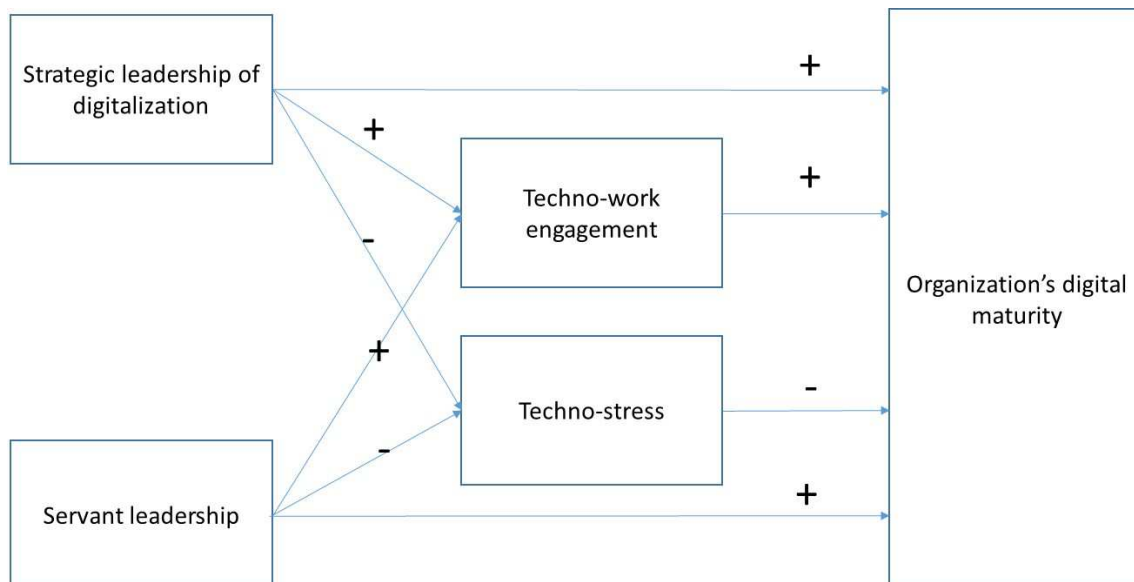


Fig. 1: The role of leadership and employee well-being in organizational digitalization – an emerging theoretical framework.

3. Methodology

This paper is part of a larger research project: USCO – Using digital co-creation for business development. The project is funded by Tekes – Finnish Funding Agency for Innovation, and co-funded by six participating companies and two public sector organizations. The participating employers have a total of approximately 30,000 employees. The three-year project focuses on the various aspects and practices of leading digital transformation in organizations and aims to support digital business/service development in Finnish working life. In addition to conducting multi-method research on the subject, the project tests and develops new tools and practices in order to support the utilization of digital technologies to increase customer value, productivity, and well-being at work. The main research partners are Laurea University of Applied Sciences – which focuses on co-creation and open innovation – and the University of Tampere, School of Management, which focuses on leadership and well-being at work in the digitalizing economy.

The main research data consists of a quantitative questionnaire of the employees of the participating organizations (N=5,000), which is conducted twice during the project, and qualitative interview data from around 50 management interviews.

The theoretical contribution of the whole study relates to linking three relevant approaches on digital transformation: leadership, employee well-being, and co-creational practices. However, in this paper our focus is narrowed down to the examination of the relationship between servant leadership, strategic leadership of digitalization, employee technology-related well-being, and successful organizational digitalization.

We created the theoretical framework for the subsequent quantitative study. The formulation of the framework has been guided by the literature review and the initial findings from the qualitative data collection. However, at the time of writing, we have not completed a thorough analysis of the interview data.

The first objective of the framework formulation was to identify relevant approaches and concepts in combining the present knowledge of digitalization-related leadership, employee well-being, and the state and progress of organizational digitalization. We initiated the process as a collaborative effort of the cross-scientific research group. Initial searches were conducted by using search terms such as ‘digitalization’, ‘digitalization AND leadership’, ‘digitalization AND well-being’, and ‘digitalization AND employee’. The search terms ‘digital’, ‘ICT’, and ‘technology’ were also used in addition to ‘digitalization’, as the latter term is not widely used. The findings were then discussed and evaluated.

As one purpose of the framework was to establish a foundation for the following quantitative data-collection and data-analysis, the search was then directed to usable, preferably empirically validated measurement instruments for the selected concepts. We utilized scientific databases such as EBSCO and Google Scholar during the process.

We chose the concepts of servant leadership (van Dierendonck & Nuijten, 2011) and technostress (Ragu-Nathan et al., 2008) as the cornerstones of the theoretical framework because they are strongly validated and tested in the previous research. However, following the principles of positive organizational psychology, which argues that well-being at work is more than just the absence of ill-being, a new concept of

technology-related engagement and a scale for its measurement were established, based on the well-established concept of work engagement (Schaufeli, Salanova, González-Romá, & Bakker, 2002).

During the literature review process, we found that both the state of organizational digitalization and digital leadership/leadership of the digital business change are emerging fields with few, if any, theory-based and/or empirically validated concepts or instruments for their measurement. However, instead of developing totally new scales for research purposes, we used items previously used in management literature (Westerman et al., 2012; 2014) and extensive management surveys (Kane et al., 2015) in the emerging concepts of the strategic leadership of digitalization (Westerman et al., 2012; 2014) and the digital maturity of the organization (Kane et al., 2015).

4. Discussion

The research-related contribution of this paper is in combining the previous research from at least two strong domains and in building a conceptual connection between them. The concepts of servant leadership (Van Dierendonck & Nuijten, 2011) and work engagement (Schaufeli, Salanova, González-Romá, & Bakker, 2002) have been created and empirically validated in the field of positive organizational psychology. Employee well-being in technologizing the work environment by applying the concept of technostress has been researched, especially in the field of Information Systems research (e.g. Ragu-Nathan et al., 2008). The role of leadership in organizational digitalization is an emerging research field in which the research concepts are not yet well-established. In the proposed framework, we utilize previous studies (Kane et al., 2015; Westerman et al., 2014) and will test them empirically in order to clarify the concept.

By introducing the emerging research concept of techno-work engagement (elaborated from the concept of work engagement; see Schaufeli, Salanova, González-Romá, & Bakker, 2002), we can clarify the less-explored positive associations of ICT use vs employee well-being. The introduction of techno-work engagement brings a new conceptualization under the research umbrella of positive organizational psychology. Thus, it enriches the examination of the grounds and the manifestations of employee well-being in new, digitalized work environments.

The framework is expected to have several managerial contributions. It aims to identify leadership qualities that signify the existence of technostress and technology-related work engagement among employees and relates them to the organization's digital maturity. Moreover, it specifies which leadership qualities are influential in digital business transformation. In doing so, it helps to set the guidelines for successful leadership and management practices when organizations carry out digital reforms and introduce new digital technologies.

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THE ROLE OF META-ORGANIZATION IN THE PRIVATE REAL ESTATE MANAGEMENT. INTER-ORGANIZATIONAL DYNAMICS IN THE HISTORIC CENTRE OF NAPLES.

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This study presents some preliminary insights of an ongoing research on smart communities with an emphasis on historic centers of cities. Our analysis is part of the Italian research project SNECS – “Social Networks delle Entità dei Centri Storici”. The main goal is to analyse models of meta-organization able to enhance and to manage the private real estate of the historic center of Naples (Campania Region, Italy), with a focus on the so-called “lower city”, which includes the Market Square area and the “Borgo Orefici” area.

1. Introduction, aim and scope

This study presents some preliminary insights of an ongoing research on smart communities with an emphasis on historic centers of cities. Our analysis is part of the Italian research project SNECS – “Social Networks delle Entità dei Centri Storici” (DATABENC PON 03PE_00163_1 CUPE68C14000050005).

The main objective of this work is to study the functions and organizational dynamics of actors who assume the role of meta-organizers, and as such operate in complex urban contexts, similar to the one under investigation, namely the historic center of Naples. We focus on projects directed at supporting and upgrading urban (towncentre) business improvement districts that use new and effective modes of governance of the private housing stock. In particular, it is useful to analyze the construction and management of relationships between the various actors (public and private property owners, potential investors, tenants, etc.). This will be done through the identification and analysis of national and international best practices, with the aim of identifying governance, organizational and financial sustainability characteristics that can be effectively replicated (with appropriate adaptations) in the geographical area under investigation.

In the light of the above research objectives, we study the current state of the issues involved. This allowed us to develop a classification scheme subdivided, for clarity, into three levels of analysis:

1. Meta-organizations;

2. Real estate management in the context of urban regeneration;
3. Economic restocking and "centri commerciali naturali".

This classification into the three levels corresponds to the intervention models that have allowed, in other contexts more or less similar to our research, the launch and consolidation of urban regeneration processes and the concomitant recovery of urban areas affected by decay and abandon (both economic and social). Furthermore, the levels also opens up a broader perspective to analyze the phenomena of transformation (in the negative sense) that have affected the area of Borgo Orefici, from the urban, social, demographic and economic perspectives.

Back in the days, the "lower city" of Naples used to be one of the most important economic districts of the city (textiles, wholesale and jewelry). Since the 1990s, it experienced a gradual leaving by the economic operators and progressive urban decay, due partially, but not only, to the new suburban settlement nodes: the CIS in Nola and Tari in Marcianise. The significant real estate assets dedicated to commercial and craft activities quickly got abandoned and for over 15 years has not found any effective purpose losing, in the process, much of its market value. These were our basic considerations, fundamentally viewed as part of a more general process of revival and renewal of the entire area of the historic center and tackled in close connection with the Borgo Orefici Consortium and the Consortium of Antique Textiles Shops ("Consorzio Antiche Botteghe Tessili"), two important engines of development in the area. In this light, we focused on the need to analyze these phenomena and direct them in an appropriate way, in order to launch new dynamics of development, organization and revitalization, starting from the private real estate and, in particular, from the multitude of entire vacant buildings in the area of our study. By establishing a new stable relationship between property owners and the a meta-organization actor, who in turn can develop and maintain relationships with entrepreneurs (existing and new ones) who intend to invest in the area, we believed that it would be possible to direct the establishment of businesses with appropriate shared goals - those of revitalizing the area and relaunching the value-creation process.

In light of these premises and of the main goal above mentioned, this article is organized as follows. We first explain the theoretical background we use, according to the three levels of analysis: the meta-organization in the literature; the real estate management in urban regeneration processes; the economic restocking and the natural business areas. Secondly, we present our early empirical analysis describing the methodology used and then describing and analysing the cases of best practices we chose on the basis of the main goal. In the last section some very preliminary considerations and the next steps of study are presented.

2. Theoretical Background

2.1. The meta-organization in the literature

The concept of meta-organization is typically studied by looking at the organizational level of analysis of the network. These actors play the role of the relational context catalyst by designing inter-organizational relationships, the rules and connecting languages between different nodes of a network. In the Italian and international organizational literature, a meta-organization is repeatedly likened to a broker, as their the main business consists of information passing and linking existing players (Antonelli, 2004). But unlike brokers, meta-organizations do not profit from the absence of links between the actors, but rather from the realization of the greatest number of possible relationships, with the goal of creating bridges between the different actors, so much so that they become described as "social brokers" (Antonelli, 2004; Coleman, 1988). In fact, a meta-organization aims at gaining the trust of the other players and to develop social capital (up to that moment, unused and unexplored), working to achieve common rather than individual goals.

Generally, meta-organizations are agencies created to attract investment in local areas, with the aim of urban regeneration and economic recovery and restocking (e.g. Starkey et al., 2000).

A meta-organization exists within the so-called hetero-regulated network, which is a type of network characterized by a relational environment in which the various actors "unconsciously" belong to the network, as they act without being aware of potential interactions and the activities to be undertaken at the strategic level to achieve a specific goal. A hetero-regulated network can still be missing one or several actors crucial to achieving its goal. Therefore, it is a collection of actors who physically exist in a network due to physical proximity, potential exchange and/or competitive interdependencies, offer similar and complementary services but do not have real relationships with each other. Burt (1992) defines the nodes of this network as structural holes, characterized by the lack of connection between the actors: the presence of a structural hole indicates that an actor who is on the other side of the hole accesses totally different information flows.

The lacks that characterize the relationship context are often related to:

- lack of actors capable of delivering some of those services needed to launch the process (for example: lack of financing or incubators) (lame relational contexts);
- lack of communication and connection between the different actors that stands in the way of a wide and integrated services (mute relational contexts);
- inability of the actors to launch promotion and development aimed at building a strong relationship with potential entrepreneurs (blind relational contexts).

From this point of view, one of the actors needs to take up the task of managing the network, to promote concrete establishment and growth of the network in full awareness. Through such awareness the said actor takes on the role and the functions of a meta-organizer. It designs the knowledge and content of the network, the form that it should take in order to be used by all the different actors-members of the network (Antonelli, 2004). His main functions can be summarized as follows:

1. to establishing the network by identifying different actors;
2. to assuming the role of a focal organization;
3. to defining the rules of communication between the actors of the network;
4. to enabling connections between the actors;
5. to defining strategies and actions for achieving specific goals;
6. to putting the network within the market, identifying the critical success factors and its competitive advantages.

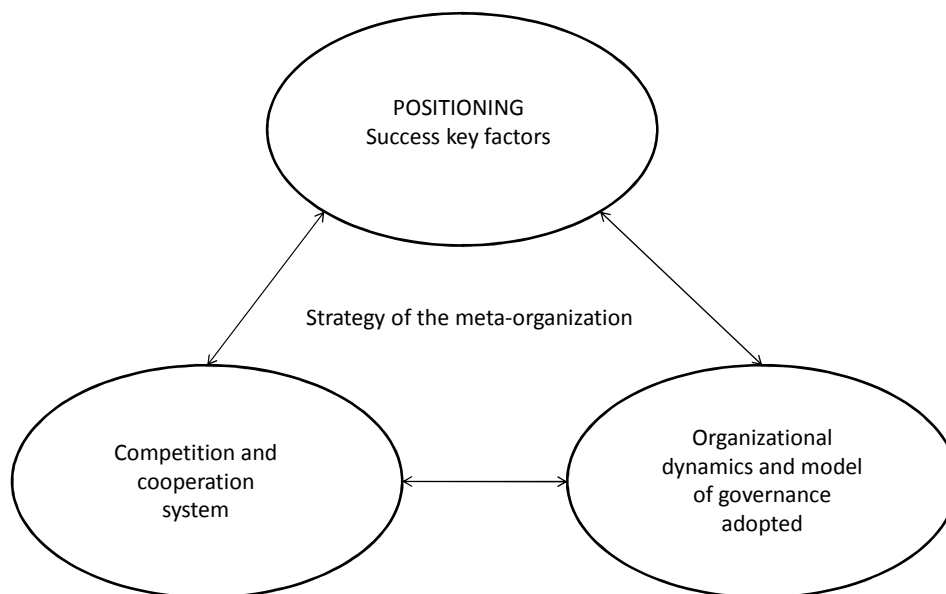


Figure 1. – The role of meta-organization

Source: Antonelli, 2004.

To define the mission and operating and coordination mechanisms to be used by the network actors, the meta-organization analyzes the critical success factors and defines the specific skills of each actor. As shown in Figure 1, meta-organization settles the strategy of the network as a whole.

The meta-organization and the organizations that will be part of the newly created network will assume the attitude that in the organizational literature is defined as strategic set (De Vita et al, 2007). A strategic set is formed by a set of actors who have relationships with the focal organization, which has a strong traction and a leading role, with physical proximity and perceptible influence. In addition, the focal organization/meta-organizer possesses the following characteristics: high degree of centrality, which means having a number of direct relationships with other actors, higher than the number of relationship the actors have with each other; a high index of interposition, which makes him a key intermediary in relations between the various actors (Lomi, 1991). The concept of mediation is closely related to that of network centrality

(Antonelli, 2004). Mediations are necessary to ensure that exchanges between the actors can take place.

These reflections can be applied within the urban regeneration processes aiming to give new life to abandoned areas, inside the historic centers of cities, which came about as a result of dislocations in the recent past yet which were previously characterized by a rich economic fabric. For example, by booming crafts and commercial identity. These are processes that are inserted within the phenomena of urban transformation, from the point of view of commercial revitalization, economic development, private and public real estate recovery and the urban maintenance in general. The meta-organization, in this sense, can be a development agency, a liaison office, a business district, a small business incubator. In fact, the meta-organization gives the network its relational capabilities, designs the knowledge base that will be used by the network actors and establishes sharing mechanisms. In addition, he acts as a regulator of the communication processes between the actors, as a moderator of interests and conflicts, with the responsibility of representing the network to the outside and guiding its overall strategic and organizational vision (Ricciardi and Izzo, 2006).

Closely related to the concept of meta-organization is the Anchor Development Organization model (ADO) (Puglisi and Di Raimondo, 2012; Feldman, 2003), which is a very useful organizational model for the integrated development of a territory and for its promotional and marketing policies, thanks to its core anchoring function which consists of the ability to (Dagnino et al, 2012; Puglisi and Di Raimondo, 2012):

1. to attracting new investments and new external enterprises to the reference area;
2. to playing a leading role in promoting value-creation policies, through new infrastructure, new businesses and new strategies aimed at developing a specific area;
3. to creating a network of internal and external relationships in the area (inter-company, inter-personal, intra- and inter-destination).

In this sense, the meta-organization, through the ADO, becomes a "local agglomerating force" (Feldman, 2003), a "strategic center firm" which, in partnership with other actors in the network, helps to create value, to organize resources, local capabilities and strategic development, as an "orchestrator of the network" (Lorenzoni and Baden Fuller, 1994; Puglisi and Di Raimondo, 2012).

2.2. The real estate management in urban regeneration processes

Within the ample level of analysis of the network, it is important to conduct a careful analysis of the link that can be established between the organizational models and the development of local areas, especially regarding the promotion and upgrading of regional identities.

The look of a city, and even more so of a historic center, is a part of the local cultural reality (understood in a broad sense) and involves a set of other immanent realities, such as the nature of the settlements and the types of uses, of appropriation of public spaces, events and projects that are the expression of new needs of the community (Bianchetti, 2008).

This binds to the political and institutional dimension and the choices made in terms of territorial identity redevelopment. In this context, urban policies during the last two decades have undergone a deep metamorphosis, moving towards an international context characterized by the prevalence of new urban marketing logic (Grandi, 2010). These concepts have as its primary objective the development of a wide-ranging area, which is not limited only to the physical environment, but involves economic, industrial, social, tourist and cultural planes, growing along the four main, intertwined strands:

1. to giving the urban areas its own identity (economic, social and cultural), recognizable and distinctive, generated as a response to increased competition between cities, both at a national and international level;
2. to placing policies to attract investment, create new tourism, trade, employment and promotion of a positive image of a city;
3. to focusing on the needs of citizens inhabiting the urban areas, as well as their respective productive activities, for an improved quality of life and increased sense of belonging to the territory;
4. to implementing urban regeneration policies where the economic goals are pursued along with the social and cultural ones, as opposed to exclusively or at the expense of the latter, as has been the case up to a decade ago (Grandi, 2010) .

In this sense, urban regeneration processes are typically characterized as processes in which it is possible to identify the four specific characteristics:

1. a general objective of recovering the degraded areas (not only in the suburbs) from different perspectives and not only from the commercial one;
2. a substantial top-down boost, i.e. from local public actors (although an increasing trend are participatory logics and bottom-up initiatives, based on a comparison of a large number of actors, both public and private, and ordinary citizens);
3. a consistent centrality of urban and architectural projects aimed at the recovery and reutilization of land and buildings;
4. a creation of regional development agencies based on operational autonomy.

The concept of *urban regeneration* was coined in the late 80s (Robert and Sykes, 2000) to define a style of very specific actions at brownfields or local areas, typical of integrated urban policies, endorsed by the European Union within the framework of regional policies "EU-15" in 1989. These policies based on the participation method and the integrated approach. That is not only physical rehabilitation of private and public buildings, but also of the public land, infrastructure, services and settlement of new business and commercial actors.

The *file rouge* of urban regeneration processes is certainly the introduction of policies that affect them in different forms, physical and urban regeneration, as well as economic and social rebirth of the areas affected by the intervention. This is complemented by the efforts to recovery the lost local identity, using innovative forms of local and public governance and efforts of private actors who, jointly, implement virtuous entrepreneurship projects (CRESME Research, 2012). In this sense, the approach is based on the method of active participation of the local inhabitants, inte-

grating the actions of physical and environmental transformation, economic and social development, culture, and promoting mutual synergies. An example of what is emerging is the urban regeneration process is the transformation of the city of Turin in the late 1990s and early 2000s.¹

Pilot urban projects are the first of innovation tools of urban regeneration policies that begin to emerge within the EU. Between 1990 and 1993 the Structural Funds have been used to fund the first phases of 33 urban pilot projects (the first were London and Marseille). These projects mainly concern specific urban problems such as degraded historical centers, former industrial sites, research and economic development of small and medium-sized enterprises. However, in terms of the integrated approach, only some of these truly face innovative strategies for local development through the creation of public and private investment opportunities (Lalli, 2014).

In this debate the roles of actors involved play a central role: public institutions, entrepreneurs, local stakeholders, citizens of the area. The diversity of their needs, knowledge, contribution, experience and subjectivity find their main expression in the network and in the need for a meta-organization. The network is designed as a flexible and dynamic structure to promote the integrated approach to urban policies and meta-organizer mitigates the physiologic limits of small businesses in independently managing large and complex relationships; It offers companies a space (and not only physical) to interact, meet, discuss, work together. In this context, for the governance of an area subject to "regeneration" the meta-organization:

- becomes a "*territorial organization*", an organization with deep roots in the territory which can be its active part;
- forms, organizes and manages a "*total actor network*"(creator of the network as a focal organization and the main engine);
- aims to be a "*true attraction-creator*" (attractor of funding, funds, new actors/entrepreneurs).

An important part of urban regeneration processes is represented by the public and private real estate assets, divested and existing in the areas of regeneration. Their correct and fruitful management involves understanding the operational models that over time have become established for the exploitation of the same. In the first instance, it is useful to distinguish between public and private housing stock. With the former, the issue of exploitation of public property requires local governments to give a deep and proper consideration to the idea of the city and the territory that they intend to implement within the urban redevelopment processes. These should lead to articulated real estate-specific actions, strongly connected to a deep change of the Italian society linked to the creation of metropolitan cities, enforced by Law No. 56 of April 7th 2014 "Disposizioni sulle città metropolitane, sulle Province, sulle unioni e fusioni di Comuni".

Whereas, in the case of the private real estate, the significant changes that have affected the real estate market since the late 80s onwards have influenced the dynam-

¹ See: Dansero E., Dematteis G. (2012), La dimensione internazionale della geografia torinese, in Accornero C., Marucco D. (eds.), Torino città internazionale: storia di una vocazione europea, Donzelli, Rome, pp.129-130.

ics of the sector development, especially as regards the city center areas. In particular, in the last two decades it has gone from a "quantitative phase", where real estate demand exceeded the supply, to a "qualitative phase", characterized by offer exceeding the demand (Tortora, 2012). This phase has led to a demographic depopulation process of specific areas that, in many cases, has inevitably brought about also economic depopulation (e.g. urban voids, leaving of properties used for commercial activities following the migration to other areas).

Especially in this case it is important to understand the value-creation process that can be performed by the different actors within the real estate market to solve the following problems:

1. geographical location of redevelopment and enhancement investments;
2. allocation of resources among different types of real estate;
3. identification of the most suitable uses and functions;
4. choice of partners and the level of collaboration;
5. definition of the level of concentration, diversification.

In the 90s, the private property sector, and especially the increasing integration of local property systems within the new networks of global capitalism, have become a key driver of urban regeneration agenda. Regeneration pushed by the "real estate leverage" and major projects have not, in fact, contributed to the housing market of the city and especially to creating more efficient and supportive historic centers, in terms of habitability and a shopping/business usability.

However, in recent years many urban regeneration interventions mainly focus on the *real estate*. In fact, there are series of large-scale attempts aimed at creating new strategic locations to house urban amenities (facilities for culture, commerce and entertainment). Consider the most famous examples of major projects that have led to a radical transformation of significant parts of the urban fabric of Barcelona, London, Lisbon, Berlin and Bilbao. These were followed by Milan, whose inclusion in the global networks of real capitalism has set in motion a huge investment of tangible and intangible resources, which have spilled over the entire city in support of impressive regeneration works.

In the last decade, the urban areas abandoned of these cities and subject to depopulation and unused, are at the center of large transformative interventions promoted and managed by a new generation of *city builders* (Memo 2007). These property-level transformation processes have given rise to new skills and new organizational models (Haila 1997; Fainstein 2001). Naturally, construction of new buildings is an important phase; but the relationship between the capital and the construction industry is now largely shifting in favor of new skills and the ability to absorb incomes that come from the services sector. In particular, there is a new actor on the rise: NOTIA (Nuove Organizzazioni del Terziario Immobiliare Avanzato - New Organizations of Advanced Tertiary Sector) that integrate highly skilled functions and services. Compared with the traditional players, these are larger companies operating in several national and urban contexts. These organizations are composed of individuals of different types that are interested in investing in real estate regeneration process, *private newcomers*: financial and insurance companies; banking institutions and foundations; mega-developer and experts in the design and management branch, urban

planning and engineering; management companies of goods and public functions emerged from privatization processes; large commercial distribution operators; virtuous entrepreneurs, cultural and tour operators, citizens, who through the acquisition of buildings or entire areas support the restoration, recovery and renovation of properties of third parties, or in other cases directly affect the real estate portfolio (Rigon et al., 2010).

The economic revival of cities and the need for extensive re-use of empty urban spaces requires a close consideration of urban regeneration processes of this type, focusing on urban and real estate market. The wave of large projects has strong impacts and generates economic transformations and socio-political development which must be taken into account (Fainstein, 2001; Savitch and Kantor, 2002; Moulaert et al, 2003; Memo, 2007). Real estate management interventions are conceived an opportunity to build or return new identity to the cities and neighborhoods subject to regenerating, giving rise to a new urban experience with an increasing focus on aesthetic function (Memo, 2007). In this framework, the role of publicly funded resources, and especially of private enterprises and productive activities become a priority. In addition, as noted by Le Galès (2006), the loss of the protection role played by national states towards local companies exposes the European urban systems to a context in which the mobility of capital and productive agents has increased significantly, causing new forms of territorial competition.

Nevertheless, it is worth to mention critical aspects, risks and costs that the real estate-based regeneration can trigger, especially for the most disadvantaged citizens, narrowing the conditions of access to real estate and, more generally, to the neighborhood opportunities, resulting in non equally-based distribution of costs and benefits among the local population. In fact, as claimed by Memo (2007), urban regeneration and real estate move in a field where there are strong interests, resulting from redefinition, on the one hand, of property values and, on the other hand, of the intangible resources of the area that acquires a certain value for the life of its inhabitants. That fact is even more compelling when applied to significant asset, in terms of their quantity and value, whose refunctionalization can greatly affect the dynamics of a territory and values of real estate, residential and non-residential, with resulting price fluctuations depending on the choices of the intended use.

As for the private real estate (belonging to natural or legal persons), especially non-residential, one must begin with a clear consideration of the development processes that affect the territorial areas with the presence of real estate whose owners become an active part or even, in some cases, play the role of promoters of regeneration processes. This is also because the interventions in the area, as it is in the case of public entities, affect the future dynamics of development and the market values.

The expressed considerations have even greater significance if we refer to areas subject to phenomena of urban, economic and social degradation. This is true for many small businesses and workshops (especially those situated in the historic centers) who are at risk of not being able to remain on the market, due to the growth of urban incomes and real estate finance speculation, being expelled to peripheral or marginal areas that do not necessarily suit their activities, despite the fact that their offer of goods, services and labor might actually be a driver for the competitiveness of the area (Gaeta 2006).

To conclude this section, we would like to highlight one aspect that emerges with a fair degree of clear: analyzing the phenomena of urban regeneration inevitably means focusing one's attention on real estate (re)generation processes. This bond can be created by highlighting the potential of area's development and the concrete possibility of creating synergies between public and private actors for the commercial revitalization, recovery and private building management, for the purposes of new settlements and for urban maintenance in general.

2.3. Economic restocking and the natural business districts model

The third level of analysis we propose refers to a model of economic restocking that is one of the natural business district that is an initiative take up in several developed countries around the world. In the Italian language is Centro Commerciale Naturale (CCN) and it is an institution aimed at the revitalization of urban centers. CCNs² assign the management to private-nature subjects, such as consortia of companies, recognizing the effectiveness of bottom-up organization.

CCNs are naturally profits-driven, but they also fully enter into the sphere of social and cultural activities of the city. The primary objective of the collaboration between a public body (local authority), traders, small businesses, artisans and citizens is to not disperse social value and recover the systemic value of the city center, with the aim of restoring identity and experience.

The organizational and management literature, in this context, emphasizes the importance of a strategic and operational planning that will transform city centers into "containers" of distribution, entertainment, shopping, crafts and culture, and new sociality (Sansone, 2007). The associational and cooperative impetus has already had its strong momentum in Europe with the organizational model of *Town Centre Management* (cases arose in the late 80s) that showed remarkable results in major cities in England, France and Germany. It is a set of activities carried out to provide a control function in favor of the companies that are located within an urban area. In this sense, the experiences of CCNs in Campania, Piemonte, Lombardy, Emilia Romagna and Trentino Alto Adige also demonstrate some traits of such successful arrangements in terms of organization and management.

CCNs have the quality to overcome the occasional associations, ensuring a development that has its bases on specific collaborative and employment policies, by adopting techniques close to those used by large distribution centers and shopping malls with the clear objectives of growth and profit, while at the same time taking measures to fulfill the objective of greater social recovery and enhancement of a city. In fact, CCNs adopt a mode of organization which has as its objectives the recovery of an area from the economic and demographic point of view; enhancement of the

² The Campania Region established the institution of "Centri Commerciale Naturale" (Business Improvement Districts) with the article no. 3 of the Regional Law 1/2009.

area of interest to residents, commercial players and tourists who visit the area; encouraging collaboration and communication between the interested traders and entrepreneurs and between them and the public authorities; and focusing on organizational design perspective of collective wellbeing (Sansone, 2007).

Unlike the integrated shopping malls, the CCNs focus attention on visibility, promotional and public communication policies based on an operational program of actions which defines the role of each of the operators involved, creating a dedicated legal body which coordinates all the activities involved.

Therefore, the CCN could become the focal actor in the network to provide the crucial but missing services or to strengthen the activities that are already carried out but disconnected from the strategic point of view. These services may include, for example: training and assistance programs aimed at illustrating the aims, lines of action and instruments that are part of the program designed for new players who intend to settle in an area, an agency between supply and demand of properties, selection of suitable properties for business activities, establishment of laboratories, secretarial, legal and accounting services, training, assistance to the team-building, help with business plans for start-ups, support for access to funds from different sources, provision of network contracts, etc.. In this sense, CCN in a specific area may assume the role of meta-organization for the coordinated management of city center and represent an important tool of value creation and economic recovery, as well as urban and real estate regeneration.

From the organizational point of view we would like to highlight two aspects. The first refers to the delegation process that characterizes the relationship between different actors involved in the restocking initiative, which is the dependency relationship established within the decision-making process of a CCN and other actors. The second aspect refers to the existing level of coordination in the relationship between the subject nominated to be a CCN and local actors and organizations, that can be connected to the type of bonds that regulate this relationship. Based on these two elements, the literature identifies three distinct organizational models (Zanderighi, 2008).

1. centered model: characterized by the presence of a dominating player among organizations operating in the area. This role can result, first of all, from the existence of a concentration in real estate property that is used to define the composition of the portfolio of businesses and to manage, on a contractual basis, the overall articulation of the services offered by the companies, negotiating with other stakeholders the provision of collective support services. Secondly, the position of dominance in the relationship may arise from a concentration of activities, for example, commercial, with the presence of large points of sale.

2. associative network model: characterized by cooperation and collaboration that distinguishes the relationship between a CCN and individuals operating in the area. The relationship between the organizations is created on a voluntary basis and is based on a logic of associative interdependencies aiming at developing common activities, the use of common resources and the union of efforts. The definition of the activities that are subject to coordinated management and its cost coverage are linked to an ongoing negotiation process that defines the boundaries of the model and the ability of individual firms to build consensus, in terms of a collective benefit that can be achieved through *group-oriented* behavior.

3. contractual network model: characterized by companies that are mutually bound through the creation of a management company, whose members are shareholders and whose goals are mutually defined in a formal contract. The adhesion of organizations to such model can be on a voluntary basis for sharing of collective purpose of the initiative or, where legally permitted, on the basis of a territorial restriction tied to doing business and/or land ownership.

To conclude this brief proposal of restocking model, we would like to summarize two reflections. The first is that this model is based on social and economic cohesion, integration of public and private resources, participation, creation of business networks and territorial development. It is evident how difficult it is to combine all these statements. Thus, it is crucial to study the most appropriate ways of managing and monitoring the results of the model. The second one is linked to the need to study and to outline the implementation of the initiative process, phases, costs and to define the degree of participation of all public and private stakeholders, identifying the role, goals, weight and contribution of each.

3. The empirical analysis

3.1. Methodology

In this first phase of the research, our empirical approach follows a qualitative methodology and consists of the analysis of best practices. In particular, we will investigate case studies of national and international experiences of urban regeneration and real estate management in geographically delimited local areas. According to this approach we will identify those governance, organizational and financial sustainability characteristics such that can be effectively replicated and employed in the network of our area of investigation.

We collected main cases, that according to the model of meta-organization have managed, not only regeneration and economic restocking processes, but have implemented innovative managing methods of the real estate of specific and delimited areas. The main goal in this preliminary phase of the study is to identify those best practices that in force of similarity and characteristics of the geographic area covered by redevelopment, of variables and operating methods, the organizational structure and the governance model adopted, respond to the integrated development strategies that may be implemented in the historic centre of Naples, and specifically in the area of Borgo Orefici.

Moreover, we selected those best practices along the intertwined three levels of analysis that inform our article. In particular, we briefly present the following cases:

1. Barcelona (Spain);
2. Newcastle-Gateshead (UK);
3. Turin (Italy);
4. REIT model – KIMKO New York (USA);
5. Manchester (UK);

6. Salzburg (Austria);
7. Cesena (Italy)

3.2. Best practices

Redesigning a territory and its functions: Barcelona

Barcelona is one of the best known examples of urban regeneration on a large scale. It is a larger intervention which began in the early 80s, based on a strong and shared program, through a participatory planning model that was very innovative for its time. The project first addressed the most deprived areas and focused its action on the historic center, with an extensive plan of projects entrusted to a public company (Promoció Ciutat Vella) who took on the task of leading the program, constraining the operation, facilitating investment and attracting capital. The project redesigned the functional structure of the city and radically altered the functions of entire neighborhoods, also and above all thanks to the investments for the 1992 Olympics, which, in addition to the redevelopment of areas in a state of degradation (such as the mountain of Montjuic), saw the affirmation of innovative urban equalization models, such as the construction of the Olympic Village (Boigas et al., 1991). The latter, thanks to a public change of the area's use functions, was carried out with the funds of private individuals who remained property owners and got the opportunity to sell these property rights on the market, then as actually next happened.

Culture-led regeneration: Newcastle-Gateshead

At the end of 90s, in the Newcastle-Gateshead area, a wider urban regeneration process started (Miles, 2005), based on new functions for cultural purposes. The project saw interventions for the recovery of existing buildings, the construction of new buildings, and strengthening of the link between the two cities: both of functional (with the construction of a movable bridge) and socio-economic (with the development of an area brand and the support to new creative and tourism businesses) point of view. In support of the process of recovery and revival of the cultural offer and tourist area, at the end of 1999, a public-private agency was born, the "Newcastle upon Tyne - Gateshead Initiative", with the aim of positioning and promoting it as a European tourism destination through cultural programming and the offer of high-profile events. The measures implemented and the establishment of an entity responsible for the development and promotion have changed the urban image (Miles and Paddison, 2007) and gave a new impetus to the local economy, the social life of the area and local identities, profoundly changing the relationships between cultural life, urban area and the local community, encouraging the growth of a new awareness of its potential (Marino, 2010).

Mending the area: Turin

In the mid-90s, the need to create new and profitable uses for a number of areas no longer occupied by large industrial settlements, as well as questions about the identity of the city itself, together with the investments planned for the 2006 Winter Olympics, have given rise to an urban renewal program constructed from initiatives to "mend the social fabric" and to activate a new approach model for a combination of urban and social planning (Colantonio and Dixon, 2011). The basic idea that inspired the project was that you can not provide solutions to complex problems such as the

redevelopment of a portion of a city, and therefore it is not enough to design and implement construction-urban planning actions without placing them in an intervention strategy aimed at mitigating the forms of economic and social hardship lived in that territory (Guercio et al., 2004). The Turin projects and architectures did not radically alter the territory; instead, the city saw redevelopment processes that increased the quality and the livability of the area, the services offered and gave new impetus, including economic, to significant portions of the territory. Among these, one of the most interesting involved the process of economic recovery and revitalization of the commercial and craftsmanship system of the Porta Palazzo neighborhood with the construction of two initiatives - one of a predominantly public character and the other one mixed. The first was directed to the recovery of a part of the building of the former arsenal that previously used to divide the neighborhood in two parts. The building was transformed from a "barrier" into a "passage" and a place of aggregation for a number of craft and commercial activities dispersed within the neighborhood. This initiative required public intervention: for its social value, for the need to reduce the prices compared to the high cost of recovery, and, finally, to create urban supporting works. The second initiative, more related to the revitalization of trade, was the 2008 creation of a consortium (with private and public partners) Borgo Dora Balon (a CCN) whose aims were to promote and foster common policies of local marketing to improve the quality of the village; to promote the economic development of commercial, craft and business activities; to promote and coordinate the environmental rehabilitation of public spaces; to manage and coordinate territorial activities, tourism and culture.

Managing and enhancing the real estate with REIT - Real Estate Investment Trust

REIT (Real Estate Investment Trust model) is an increasingly diffused practice to the management of private real estate (even though methods and regulations differ from each country), through listed companies that own and manage interest-bearing commercial real estate. REITs offer investors a potential for earnings and capital appreciation equivalent to that generated from investing directly in real estate. Since REITs are companies listed on the Stock Exchange and the minimum financial commitment may even be a few Euros, these are a very attractive form of investment accessible to a wide audience of investors whose advantages also reside in the possible diversification across a number of properties, fields, and geographical areas, the constant monitoring of performance and the generally adopted corporate governance models (Block 2012). In most cases, REITs were born as a real estate spin-offs made by persons (individuals and/or legal entities) with substantial real estate assets, sometimes in collaboration with each other. Their significant economic dimension and the possibility of raking up capital on the market allows them to pursue an ongoing action of real estate development, to manage it and maintain it properly and, where there is a significant concentration in specific geographical areas, to promote and support the regeneration processes aimed at the development and enhancement of an area, resulting, in general, in a further growth of the managed assets' value. Among the many existing REITs, we can take an example of KIMCO, based in New York. It's the biggest manager of commercial areas in the United States, with more than 550 shopping centers (for 8 million square meters) from the US to Puerto Rico. Quoted in 1991 at the New York Stock Exchange (NYSE) and included in the S & P 500, the company has more than 50 years of experience in the acquisition, development and management of commercial areas (Abatecola 2007).

Developing the attractiveness of the urban center: Manchester

The project was part of a vast and complex intervention of urban regeneration that has affected the whole of Great Manchester area. In 2000, from the aggregation of existing partnerships, was created Manchester City Centre Management Company Ltd. It was a public-private non-profit organization created by the City of Manchester and major trade groups, together with a broad partnership (big chain stores, retailers, existing urban shopping centers, tourist operators, the Police, Universities, etc.) with the aim of supporting the trading system of the entire city, suffering from the pressure from strong suburban shopping centers (Rinaldi 2008). The initiative had the objective of maintaining and developing the attractiveness of the city center for all users, ensuring prosperity, vitality and development of the city center and providing security, accessibility and urban quality. The MCCMC operated with a budget where only 12% comes from the public sector; more than 50% comes from revenues generated through advertising activities and services. Objectives and operational activities were defined in detail with a four-year strategic plan (Williams 2003). In the short period 2004-2007, the trade turnover has increased by about 300 million pounds per year, with a significant increase of the number of outlets intended for trade and economic activities in general.

"A new music in the center": Salzburg

The beauty and the fame of Salzburg and its Festival allowed a prosperous tourism and therefore retail trade. Nevertheless, Salzburg also suffered from the changes in the commercial distribution models and therefore fierce competition from suburban shopping centers. In 2003, after a series of previous attempts to revitalize the city center, at the urging of the private operators, was created Tourismusverband Salzburger Altstadt (Salzburg City Centre Tourism Association, "TSA"). TSA is currently run by the Altstadt Salzburg Marketing GmbH, a limited liability company whose 49% stake is held by TSA, while the majority is represented by the private sector. This CCN, which sees the eager participation of almost all city center operators, requires all economic sectors to pay compulsory dues by all the interested and involved actors, and an additional tax levy which is collected by the City and transferred to the management company, which operates in a regime of strong transparency and pays particular attention to monitoring the results.

Relaunching the core of the city: Cesena

In 2003, the "CesenaInCentro" project was born on the initiative of private operators. The purpose is to face the progressive leaving of the town center shops by customers in favor of suburban commercial facilities. The initiative is part of a broader project involving the collaboration of the cultural offer, entertainment and tourism systems, with the objective of revitalizing the city center as a whole - particularly the almost completely pedestrian area known as "intra moenia" - bringing it back to its original social and economic fulcrum. So far, the initiatives have concerned the system of mobility (with benefits to BID customers), cultural and artistic events, revitalization initiatives (e.g. evening and/or Sunday openings, music, children's entertainment, etc.), customer service (e.g. baby parking and delivery of purchases). The success was largely due to the valid system of exclusively private relations already existing between the stakeholders. However, reduced financial participation of individual operators (only 25% of the total) represented a substantial limit to the growth and maintenance of the project.

4. Some preliminary considerations and next steps

In this article we proposed some very preliminary reflections on the issues of urban regeneration and, in particular, to real estate regeneration process which have been on the rise in the recent years. In particular, we reasoned on the rising Italian institution of CCN as an economic restocking organizational model.

Each level of analysis informed and laid the foundation for the next. Retracing the themes analyzed from a theoretical point of view and the cases examined, we arrive at a series of reflections that are set out below and represent food for thought for the next steps of our study.

The analyzed urban regeneration projects did not have a one-way public foundation but instead arose and developed through complex interactions between the territory and private stakeholders, demonstrating the validity and long-term effectiveness of participatory and bottom-up planning. In this sense, the consolidated vision of a national or regional development agency, as conceived and disseminated in the 90s, could be revisited today from the perspective of an actor-facilitator (the meta-organization) who lays the foundations for the creation of a network in which private and public actors, and private citizens can share objectives and ways of development.

The close link between urban regeneration process and new real estate systems management features highlights the great importance of careful planning processes oriented to the medium to long term. In fact, this brings about the need for a careful assessment of the effects of the location in the city, in terms of services and attractors and in relation to any outstanding issues, such as economic, social and environmental externalities that flow from it and that large real estate development project inevitably tend to increase. Moreover, we can not overlook the fact of frequent "inflated" real estate development, caused by the real estate finance speculation and supported more by the availability of credit to the actors involved than by the actual demand from potential and actual users. The assessment should consider not only the impact that changes have on the lives of inhabitants of a given area, but also on wider outcomes for the city. The immediate effect of improving the characteristics and livability of the areas is the growth in value of existing private property assets, which, however, in some cases can lead to gentrification effects, which should be adequately mitigated.

At the end of this study we wish to outline a trial meta-organization model with the explanation of variables and implementation of operational procedures, integration of initiatives and activities to be undertaken. The model will be transferred to the pilot area Borgo Orefici and used as an operational tool for implementation. It will take the form of a proposal for development of a model for the management of real estate and rents to attract the owners, allowing the meta-organization to have space for the launch and development of the process, as well as providing sufficient scope for entrepreneurs wishing to invest in this area in order to address the establishment of consistent activity in an appropriate way. With this in mind, the creation of a network contract, which can involve both the process promoters and property owners, is essential for the definition of a shared model of intervention that shall act as a facilitator of a process of urban development. Therefore, the role of the network will be to put in place a series of analyses and preparatory support for business start-up (audit and

evaluation of existing assets, definition of economic parameters for rent amounts, defining standards for the redevelopment of the properties themselves and relative quantification of the costs, identification and acquisition of financial resources to support the process). Its further role will be to enable real support services, such as training, coaching and tutoring for potential new settlers, support to access adequate financial resources to start new business ventures, activation of common services or entering into agreements for access to certain types of services at cheaper rates, and so forth.

The meta-organization will contribute to the consolidation of urban regeneration processes and the renewal of an urban space affected by degradation and desertion, both from the economic and social point of view.

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THE SERVICE EXPERIENCE MODELLING METHOD: AN INNOVATIVE THREE-LEVEL APPROACH FOR EFFECTIVE SERVICE MODELLING

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The artefact of this research paper is stated by the service experience modelling method developed on a constructed mixed methodology. It represents an innovative three-level approach for effective service modelling. The first level service classification provides an overview over the services of the provider. The second level service conception aids to model situational service scripts of different service domains. The third level service process modelling is based on service blueprinting to model the highest information degree. For modelling practice the service experience modelling method application is validating its service modelling effectiveness.

1. Research Background and Objectives

For service modelling many directions are possible and the problem is how to model services effective. To demonstrate or in some cases to reduce the complexity of services various types of service modelling techniques can be applied. These are covered by service classifications, service conceptions, and service process modelling.

In the service science literature there are numerous different types of service classifications developed with highly diverse dimensions, scopes, and representations. The service technology use, service encounter, and service time consumption are important scopes of service classifications. The modelling of the service technology use during the service production process at the service encounter must cover the service time consumption (Kolek et al., 2015). To give some examples, an established service classification is described by active and passive roles for customers (Mersha, 1990). The digitalization of services is categorized into four groups: differentiation services, service modularization, add-on-e-services, and core e-service customization (Meier; Piller, 2001). Service systems are classified by a range of customer contacts required during the service production process: the pure services, mixed services, and quasi-manufacturing (Chase, 2010). Another service classification is developed to grasp the service customization degree (Salegna; Fazel, 2013). The dimensions of service classifications are deepened in section 2.3 as a first dimension of the Service Process Modelling (SPM) Element Framework constructed.

Service conceptions can be represented by service business models or service scripts (Schank; Abelson, 1977; Gibbs; Tenney, 1980). Service scripts can be treated as stories of services (Gibbs; Tenney, 1980). These service stories are told with the aid of added or deleted script implication changes (1) and script variable changes (2). The customer sat down (1) at the table (2). He paid the bill (1) and gave a tip (2). Schank and Abelson (1977) introduced a service script explained with a restaurant script for the application example of a coffee shop. The service script elements for modelling the restaurant service effective are track (e.g. coffee shop), roles (e.g. customer), props (e.g. tables), entry conditions (e.g. hungry), and results (e.g. no longer hungry). They also differentiated the restaurant service into different service scenes: entering, ordering, eating, and exiting. This scenes or episodes are described based on the service production process of the restaurant. For the application of service scripts it is important to define service events for a better understanding of the service business model – like in the restaurant when the customer has to pay the bill. Also interferences and distractions can occur during the service script application meaning missing fits with the planned or implemented service script. For instance, the customer leaves before he has paid. Such not-expected actions of roles – like customers or employees – are beyond of the service script. For being successful it is important to try to fulfil or to return to the service script. Different service scripts can interact with each other meaning that the start and ending of service scripts can be linked together. There are also different types of service scripts, which are involved in section 2.3 as a second dimension of the Service Process Modelling (SPM) Element Framework created.

For enterprise modelling there are several modelling techniques developed for modelling business processes or business cooperation, which can be also used for effective service process modelling, like the Unified Modelling Language (UML), Business Model and Notation 2.0 (BPMN) (OMG. 2016), extended Event-driven Process Chain (eEPC) (Nüttgens; Rump, 2002), flow diagram, SCOR-Model, FlexNet Architect (Becker et al., 2011), Knowledge Modelling and Description Language (KMDL) (Gronau; Fröming, 2006), Mind Mapping, e³-value, service blueprinting (Fließ; Kleinaltenkamp, 2000), and other modelling techniques. These selected modelling techniques for effective service process modelling are presented in section 2.3 as a third dimension of the Service Process Modelling (SPM) Element Framework built.

This research background leads to the objective to develop an innovative approach important for effective service modelling. This approach stands for a well-grounded mixed method on a methodological foundation e.g. for modelling immaterial service but also service-product-bundles (Kolek et al., 2015). To answer the question how to model services effective several objectives must be achieved. Therefore, the three main objectives of this research paper are stated as:

(1) *The construction of a mixed methodology for the development of service modelling methods.* This mixed methodology combines the concept of the innovative cooperation experience modelling method to model cooperation on three different levels with a raising degree of information, results of a literature review as a selected research method for clarifying service classification concepts (Kolek et al., 2015), and a morphological box called the Service Process Modelling (SPM) Element Framework as a basic for a specific decision for each level of the service modelling method to be developed.

(2) *The development of a method for effective service modelling.* Based on the Service Process Modelling (SPM) Element Framework an innovative three-level approach for effective service modelling is developed. The development starts with the first level. Here, a service classification is selected or developed on a conceptual basis as a kind of regulatory framework. Then a type of a service script modelling technique is ordered through the second level to allow the modelling of different service scenes. Then a service process modelling technique is chosen to define the third level because of its lines for the detailed documentation of service production processes.

(3) *The application of the developed service modelling method.* The selected application examples are different services like health services, education services, food services, construction services, and others. These different services types are modelled to demonstrate and to evaluate the developed service experience modelling method. The raising degree of information should simplify its practical application.

For the achievement of these main objectives this research paper is structured as follows. First, the mixed methodology is constructed (section 2). Then the service experience modelling method is developed (section 3) and applied (section 4). In a last step, the research results are discussed (section 5).

2. Mixed Methodology Construction

2.1. The Cooperation Experience Modelling Method

The cooperation experience modeling method was developed to plan and to document the operation of cooperation. The cooperation experience modelling method consists of three levels. The three-levels are linked by the degree of information on each level, which is increasing from the first to the third level (Strotmeier et al., 2015). The cooperation experience modelling method is transferred to the service experience modelling method developed in section 3, because of its innovative three-level approach which is beneficial to apply and retain. Therefore, this innovative three-level approach must be described first.

To support the cooperation experience modelling method with its characteristics perfectly, also a specially developed software tool has been developed – the cooperation manager³. It represents a software prototype for effective cooperation modelling.

The first level of the cooperation experience modelling method is so called the regulatory framework (see figure 1). It provides an overview about the processes of the cooperation and it is integrated within the cooperation manager also on the first level. With the cooperation manager three different process types can be created, processed and deleted: management, core and support processes. The first level of the cooperation manager includes the regulatory framework with its management,

³ The cooperation manager can be downloaded on the project website: <http://www.cooperation-experience.de/content/prototypen> [Accessed on 28.06.2016]

core and support processes that is similar to the structure of a house. The management processes are forming the roof (e.g. controlling, strategic planning, and value and culture planning). The core processes are displayed as pillars (e.g. completely renovation). The support processes are building the foundation wall (e.g. legal management, human resource management). Within each core process the process step information like involved roles are modelled e.g. tiles company, houseowner, kitchen & co., sanitary-technic company, and electro company.

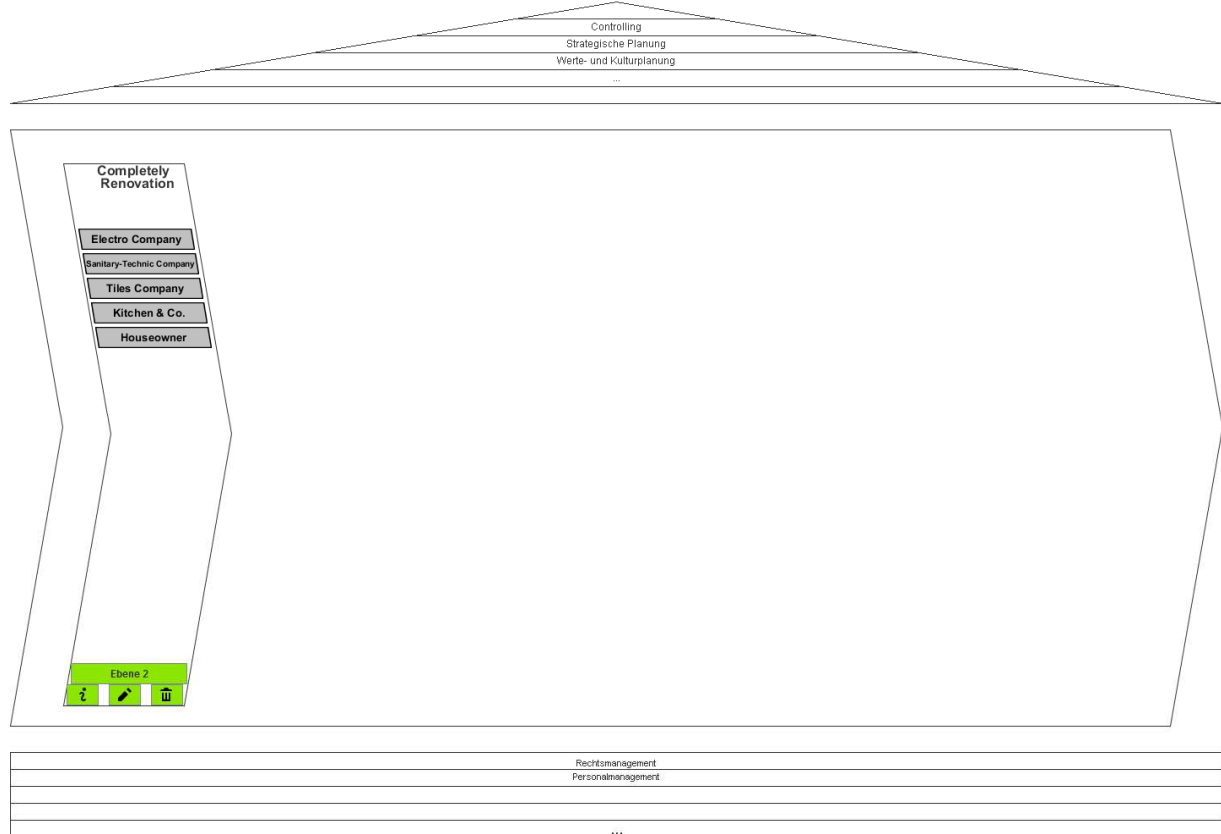


Figure 1. Level 1 – Regulatory Framework.

The second level of the cooperation experience modelling method is termed cooperation scenarios (see figure 2). It describes the activities between the cooperation partners defined as involved roles (e.g. tiles company, houseowner, kitchen & co., sanitary-technic company, and electro company). The second level is used to display cooperation scenarios of core processes. In the foreground of this level the information flow between actors (roles) are especially focused and it is shown, who in what order must whom send an information object. At the beginning this level is only with the roles, which are standing in the rectangles around the cooperation activities, filled, because they are taken from the first level (regulatory framework). In the example, the tiles company, the houseowner, the sanitary-technic company, the electro company and kitchen & co. New cooperation activities can be created, which are then arranged among themselves – for example *result: electronic*. In the next step, the roles have to be linked to the cooperation activities. This is made possible by the symbols on each role.

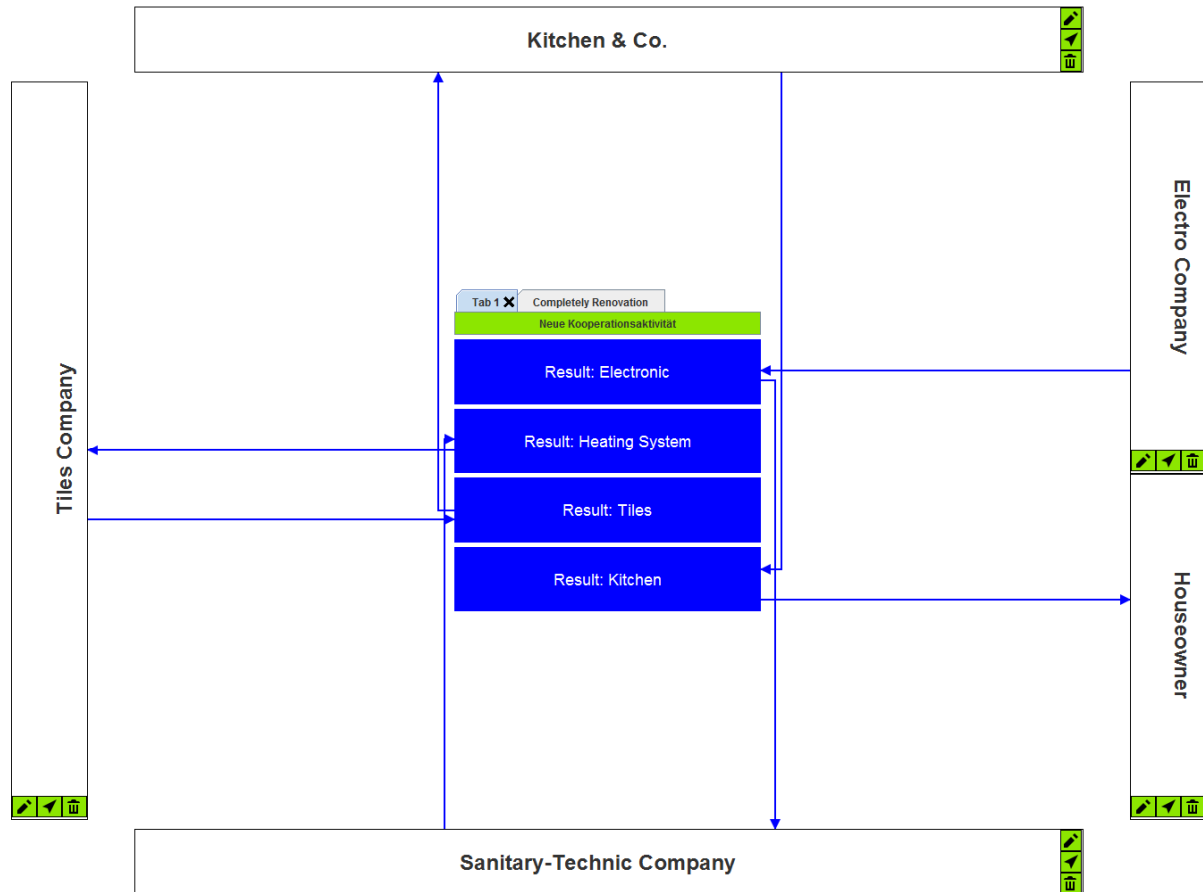


Figure 2. Level 2 – Cooperation scenarios.

The third level process detail modelling (automatic generated) (see figure 3) exists of BPMN (Business Process Model and Notation) choreography-diagrams (OMG, 2016), which are automatically generated based on the information of the second level cooperation scenarios. The BPMN choreography-diagrams detail the description of the activities between the cooperation partners. The third level is designed to include sequences, loops and branches in the models and to prepare those models for a simulation.

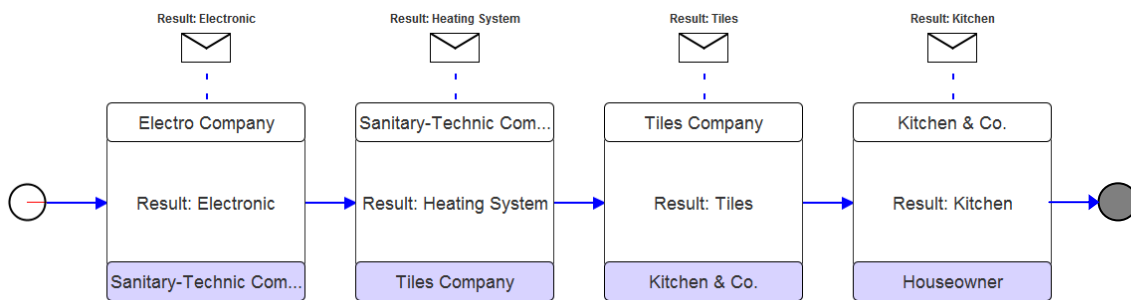


Figure 3. Level 3 – Process detail modelling (automatic generated).

2.2. Clarifying Service Classification Concepts

Different research methods can be applied as a construction foundation of the mixed methodology for the development of innovative methods for effective service modelling. The research method variety of information systems research covers formal/conceptual and argumentative-deductive analysis, simulation, reference modelling, action research, prototyping, ethnography, case study, grounded theory, qualitative/

quantitative cross analysis, and labor/ field experiments (Wilde; Hess, 2007). In this research paper, the argumentative-deductive analysis is applied by focusing on the research results of an in-depth literature review clarifying service classification concepts (Wilde; Hess 2007; Kolek et al., 2015). This research method is selected because it is a main goal of this research paper to link existing modelling techniques on different dimensions or levels rather than to develop new modelling techniques.

The in-depth literature review evaluates the time-based development of service classifications. The analysis of the concept matrix based on a conceptual foundation visualizes the required further research as a meaningful service classification research agenda (Kolek et al., 2015). This research paper closes some current research gaps.

Service classifications must cover the scopes service technology use, service encounter, and service time consumption. They should be also able to represent service-product-bundles. For clarifying services three- or better multi-dimensional representations are recommended to structure a service classification. They are developed first on a conceptual level and second on an empirical level (Kolek et al., 2015).

Innovative service business models or service scripts (Schank; Abelson, 1977) can be modelled with the aid of the literature conceptualization framework (see figure 4). Strengths, weaknesses, opportunities, and threats are obvious, if the service classification scopes are transferred into the service script. For example, a restaurant script can involve the scopes service individualisation (e.g. offering exclusive food), service technology use (e.g. using tablet computers), service immateriality (e.g. an installed open kitchen), service interaction (e.g. conversations with other guests over the tablet computer), customer integration (e.g. customers are ordering and paying with the tablet computer), and service complexity (e.g. food recommendations are displayed on the tablet computer) (Kolek et al., 2015).

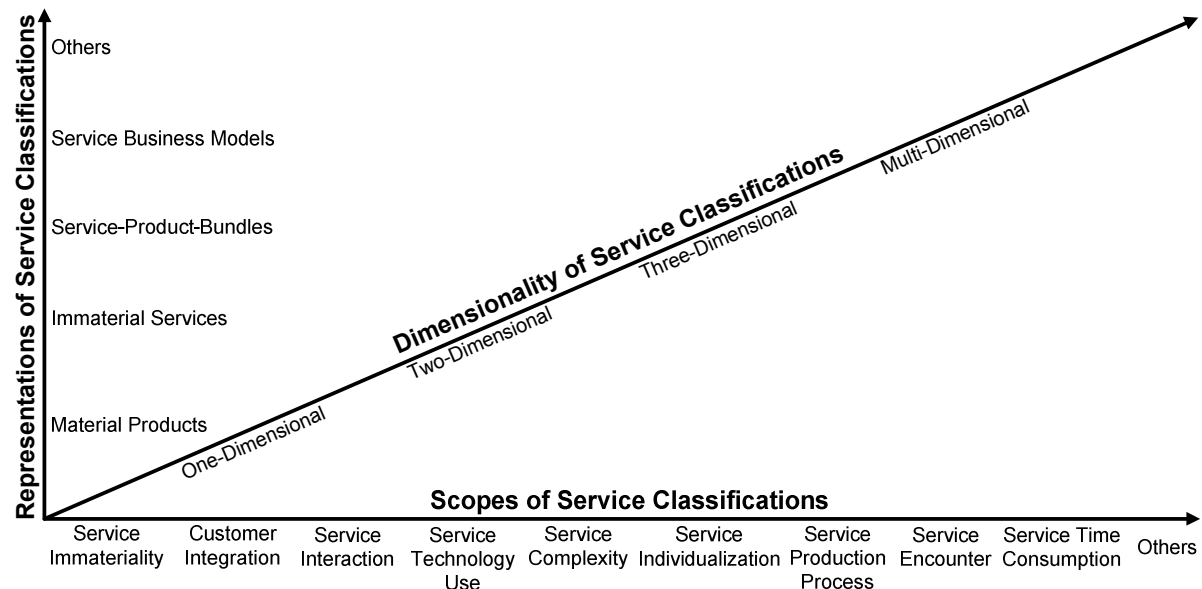


Figure 4. Literature Conceptualization Framework (based on Kolek et al., 2015).

2.3. The Service Process Modelling Element Framework

The Service Process Modelling (SPM) Element Framework (see figure 4) developed based on the Business Process Management (BPM) Context Framework of vom Brocke et al. (2015) represents a special type of a morphological box. This morphological box is constructed to combine existing service modelling techniques on different dimensions. It stands for a methodological basis to decide for characteristics on each dimension. It contains the four dimensions service modelling goals, service classification, service conception, and service process modelling.

Its first dimension is a goal dimension for service modelling: Service (process) development or service (process) optimization. Depending from the modelling focus of the development of the service modelling method it can be applied for service (process) development or service (process) optimization. The second dimension of service classification is based on existing literature review results of Kolek et al. (2015). Therefore, representations, dimensions, scopes, and development are integrated into the SPM Element Framework for the selection or construction of a service classification. The third dimension of service conception covers the service scripts types of different service domains. The fourth dimension of service process modelling involves the different modelling objects, which allows selecting an effective modelling technique also usable for effective service process modelling.

Element factors		Example characteristics				
Dimension of Service Modelling Goals						
Modelling Focus	Service (Process) Development			Service (Process) Optimization		
Dimension of Service Classification						
Representations	Products	Services	Service-Product-Bundles	Service Business Models	Others	
Dimensions	One dimension	Two dimensions	Three dimensions	Multi dimensions		
Scopes	Service Technology Use	Service Encounter	Service Time Consumption		Others	
Development	Conceptual Level			Empirical Level		
Dimension of Service Conception						
Service Scripts	Situational Service Script			Personal Service Script	Others	
Service Domains	Health Services	Education Services	Food Services	Construction Services	Others	
Dimension of Service Process Modelling						
Modelling Objects	Information	Systems	Knowledge	Processes	Organisations	
	Data	Functions	Resources	Activities	Cooperation	
	Levels	Time	Roles	Actors	Others	
Modelling Techniques	Unified Modelling Language		FlexNet Architect	Service Blueprinting		
	Business Process Model and Notation 2.0			e ³ -value	Petri-Nets	
	Knowledge Modelling and Description Language			Entity-Relationship-Model		
	extended Event-driven Process Chain			Flow diagram	Others	

Figure 4. The SPM Element Framework: A Morphological Box to Define the Elements of Service Modelling Methods (based on vom Brocke et al., 2015).

The service experience modelling method focuses on the goal to enable the service (process) development. A service classification is integrated as a special type of regulatory framework for services and service-product-bundles. This service classification should represent immaterial services but if possible also service-product-bundles on three dimensions with the aid of the scopes service time consumption, service technology use, and service encounter. The service classification is developed on a conceptual level. For service conception a situational service script of the health service domain is described. Situational service scripts are describing the actions of the employees and customers. Personal scripts are not selected because of their high variety caused by the highly different beliefs of customers towards services. For service process modelling it is decided to model processes, activities, and times on different levels. Instead of Business Process Model and Notation 2.0 (BPMN) choreography diagrams (OMG, 2016) like in the cooperation experience modelling method the service blueprinting (Fließ; Kleinaltenkamp, 2000) is included into the service experience modelling method.

3. Service Experience Modelling Method Development

3.1. Overview of the developed Innovative Three-Level Approach

The artefact of this research paper is stated by a developed innovative three-level approach – so called service experience modelling method – valuable for effective service modelling. These three levels are built upon and detail information for service planning, coordination, and controlling. As a mixed approach this developed modelling method exists of the three levels: service classification, service conception, and service process modelling. The level 1 service classification has the goal to provide an overview over the services classified. Therefore, the developed service classification assists to clarify planned or existing services. The level 2 service conception follows the goal to describe situational service scripts. Therefore, the planned or existing situational service scripts are described and linked over the different scenes also adding important roles, props, entry conditions, and results. The level 3 service process modelling delivers a detailed description of the activities of the customer and service provider. Therefore, service blueprinting is applied to detail information about the service production process. The goal between the level 2 and 3 refers to forwarded information objects to enable service blueprinting. The service experience modelling method is developed to improve the planning, coordinating, controlling of services, service business models and service production processes. It is practical for representing immaterial services and service-product-bundles. An overview of the innovative three-level approach for effective service modelling is provided in figure 5. Each level will be detailed in the next sections.

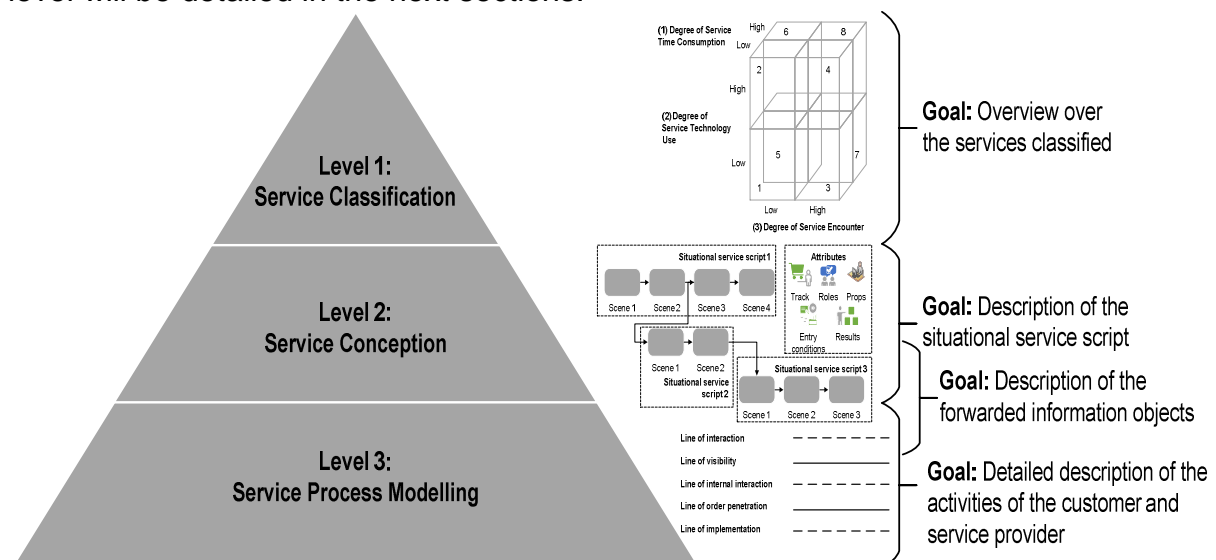


Figure 5. Three-Level-Approach of the Service Experience Modelling Method for the Documentation of Services, Scripts and Processes (Illustration based on Strotmeier et al., 2015).

3.2. The First Level: Service Classification

The first level service classification based on the SPM Element Framework (see figure 4) focuses on the dimension of service classification with its element factors representations, dimensions, scopes, and development. Regarding the literature review results from Kolek et al. (2015) no service classification fits into these scopes directly. Therefore, a new service classification is constructed based on the three scopes ser-

vice time consumption, service technology use, and service encounter (see figure 6). These scopes are integrated as three dimensions of the service classification developed on a conceptual level. The service classification constructed aided to clarify different services and services bundled with products into two main groups of services: time-saving services and time-consuming services. This time-based service groups are differentiated as follows:

1. Time-saving services with less technology use and few encounters
2. Time-saving services with much technology use and few encounters
3. Time-saving services with less technology use and many encounters
4. Time-saving services with much technology use and many encounters
5. Time-consuming services with less technology use and few encounters
6. Time-consuming services with much technology use and few encounters
7. Time-consuming services with less technology use and many encounters
8. Time-consuming services with much technology use and many encounters

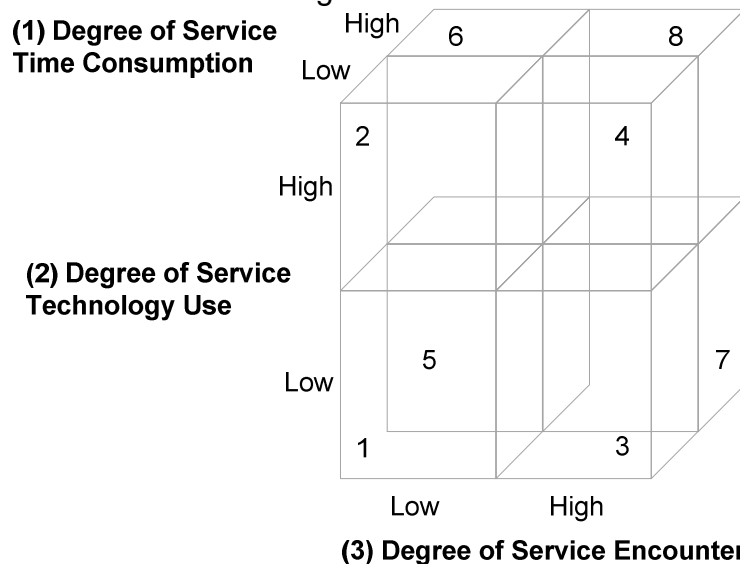


Figure 6. Time-based Service Classification (Development based on Haywood-Farmer, 1988; Kolek et al., 2015).

3.3. The Second Level: Service Conception

The second level service conception is based on situational service scripts. In situational service scripts different scenes are described – like in a movie script – the roles or actors (like employees and customers) are involved into the service and fulfilling tasks or activities. These service scenes are based on different service settings enriched with different characters, facilities and objects. For the application case of modelling situational service scenes modelling techniques are often not visual enough, because they are developed for other purposes like process or cooperation modelling. Therefore, a storyboard for modelling situational service scripts represents the modelling technique of choice (see figure 7). Storyboards are often containing comic with characters or photos with person. All of these storyboards are combining

headings, pictures, and describing texts. The schematic diagram below demonstrates the idea of modelling situational service scripts as a storyboard. This is useful for modelling service scenes of different service domains like the health service domain.

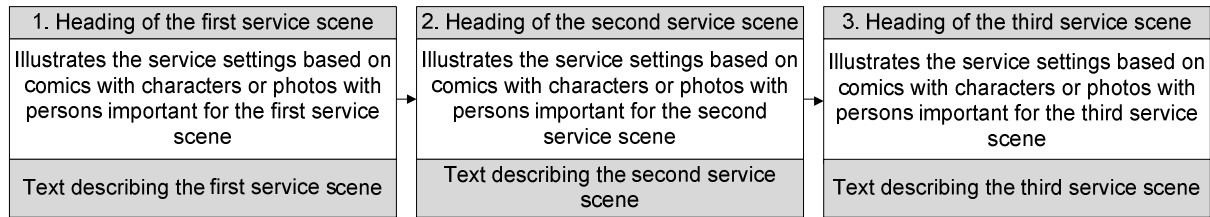


Figure 7. A Situational Service Script Modelled as a Storyboard.

3.4. The Third Level: Service Process Modelling

On the third level service process modelling service blueprinting is chosen based on the SPM Element Framework (see figure 4). Service blueprinting with its different development stages (e.g. Shostack, 1984; Shostack, 1987; Kingman-Brundage, 1989; Fließ; Kleinaltenkamp, 2000) characterizes an explicit developed approach for modelling service production processes effective. Service blueprinting can be combined with time management aspects. For example, by using the net plan technique for modelling the needed times of process steps and their start and end time points (Fließ et al., 2004).

Service blueprinting is constructed based on five lines for modelling service production processes effective. It is first established by Shostack (1984, 1987) using the line of visibility to separate for customers visible from invisible service production processes. Kingman-Brundage (1989) added the line of interaction, line of internal interaction, and line of implementation to service blueprinting. The line of interaction separates the tasks or activities of customers and service providers. The line of internal interaction located below the line of visibility separates the support functions from the backstage activities of the service provider nonvisible for customers. The line of implementation differentiates the management functions from the support functions. Activities of the customers are placed above and all other activities of the service provider are located below the line of interaction. Fließ and Kleinaltenkamp (2000) introduced the line of order penetration located between the line of internal interaction and line of implementation. The line of order penetration splits the customer-dependent from the customer-independent support activities. The support functions are linked with the service potential in the production-theoretic view based on external production factors from the customers (customer-dependent) and internal production factors from the service provider (customer-independent).

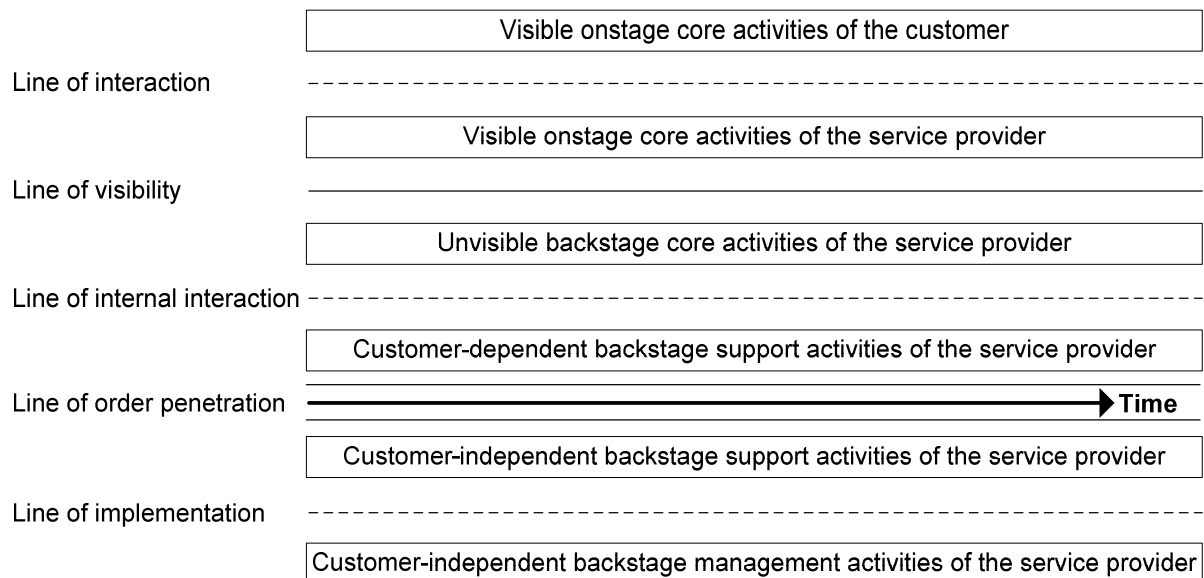


Figure 8. The Lines of Service Blueprinting (based on Shostack, 1984, 1987; Kingman-Brundage, 1989; Fließ; Kleinaltenkamp, 2000).

4. Service Experience Modelling Method Application

4.1. Overview of the applied Innovative Three-Level Approach

The application of the service experience modelling method is based on the applied innovative three-level approach. For this reason, the application goals are described to provide an overview. First, an overview over the service domains placed into the time-based service classification is presented. Second, a situational service script of a selected service domain is modelled. Third, for modelling the service productions processes of the selected service domain the needed information objects are described. Finally, a detailed description of the core, support, and management activities is modelled effective with service blueprinting. Further evaluation of the service experience modelling method is needed for testing the understandability and other criteria of the services and services bundled with products modelled. A selected evaluation framework or existing modelling framework of Gemino and Wand (2004) or Schalles (2011, 2013) can build the methodical foundation for evaluating the effectiveness and efficiency of the service experience modelling method.

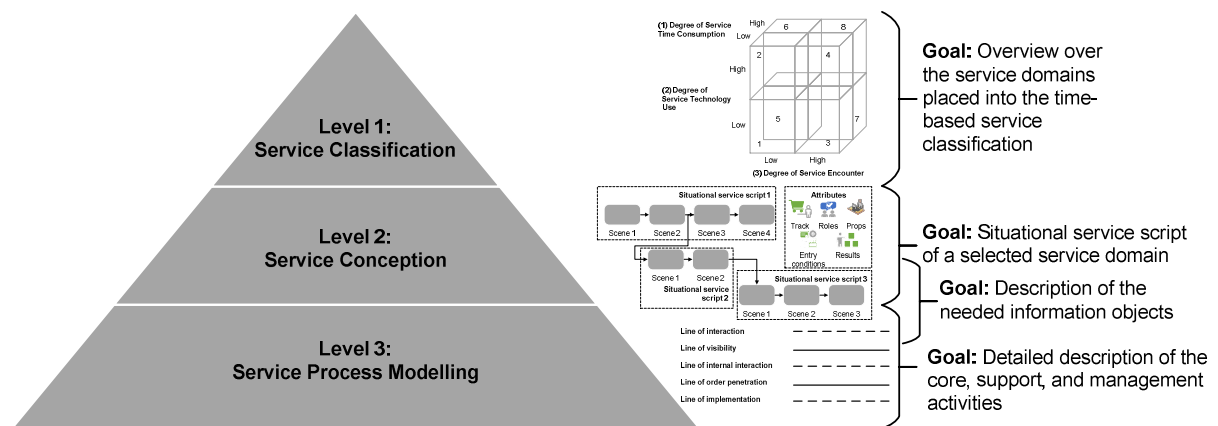


Figure 9. Application of the Service Experience Modelling Method: An Innovative Three-Level-Approach (Illustration based on Strotmeier et al., 2015).

4.2. Application of the First Level: Service Classification

To illustrate the application of the first level service classification selected application examples are different services of the health, education, food, construction, and other service domains. These different types of services are classified conceptual with the aid of the service classification developed. This service positioning is reasoned based on the two time-based service groups with four possible characteristics per service group:

1. *Food services.* Time-saving services like fast food restaurants are often using less technology (e.g. an information system for order acceptance) and have few encounters (e.g. personal at the cash desk when paying the bill).
2. *Transport services.* Time-saving services like provided public transport services are mostly linked with a lot of technology use (e.g. trains, rails, information systems) but have only few encounters (e.g. online at the booking system or at the pay machine to get the ticket).
3. *Online services.* Time-saving services like online auction houses are commonly using less technology (e.g. a website installed on a server) and often have many encounters (e.g. logins or questions of the users).
4. *Smart services.* Time-saving services like production process information services are frequently using much technology (e.g. data repositories, network technologies, information systems) and are specified by many encounters (e.g. contacts over online platforms with developers, operators, and users).
5. *Repair services.* Time-consuming services like automobile repair services are commonly using less technology (e.g. tools, software) and have few encounters (e.g. providing the automobiles/ objects as external production factors for repair).
6. *Construction services.* Time-consuming services like a construction planning service of an architect are using much technology (e.g. building information modelling) and characterized by few encounters (e.g. planning discussions with the customer at the beginning and reporting of planning documents).

7. *Education services.* Time-consuming services like higher education services of a university are using less technology (e.g. a campus management system) and are typically characterized by many encounters (e.g. personal, telephone, and online contacts from start to finish of the education service).
8. *Health services.* Time-consuming services like hospital services are generally linked with a high degree of technology use (e.g. hospital information systems, electronic patient records, medical equipment) and are combined with various encounters (e.g. personal, telephone, and online contact several times as long as the health service takes).
- 9.

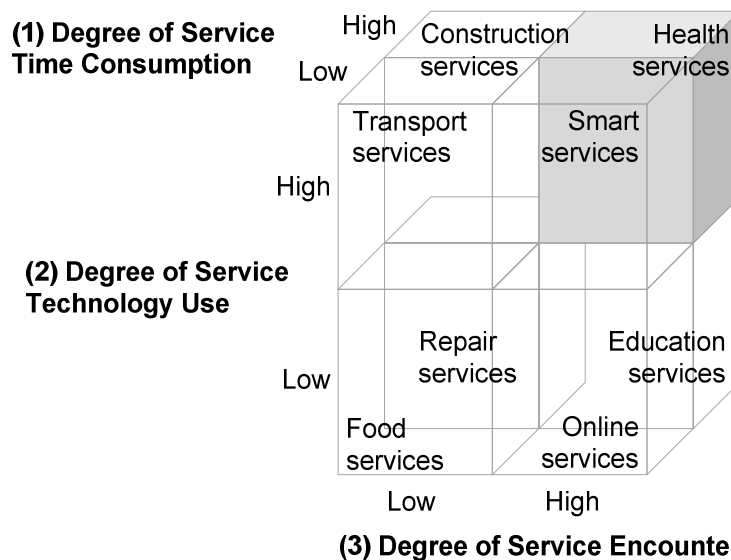


Figure 10. Service Domains placed into the Time-based Service Classification (Development based on Haywood-Farmer, 1988; Kolek et al., 2015).

4.3. Application of the Second Level: Service Conception

A situational service script of the selected service domain health services is modelled. Therefore, a service conception is conducted. The service production process of an ambulatory treatment is very similar in many hospitals and it is used as a suitable application example. The scenes of the health service being modelled consist of the six service scenes: Patient fills in a form, patient registration, patient waiting room, medical treatment, medical data input, and medical consultation. About the service script within the hospital more detail information are visible directly because of the used headings, comics or pictures, and text descriptions for each of the situational service scenes. For developing situational service scripts effective, it is useful to include elements of a modelling technique like the Business Process Management and Notation (BPMN) choreography diagram (OMG, 2016) to illustrate the planned or existing service production process.

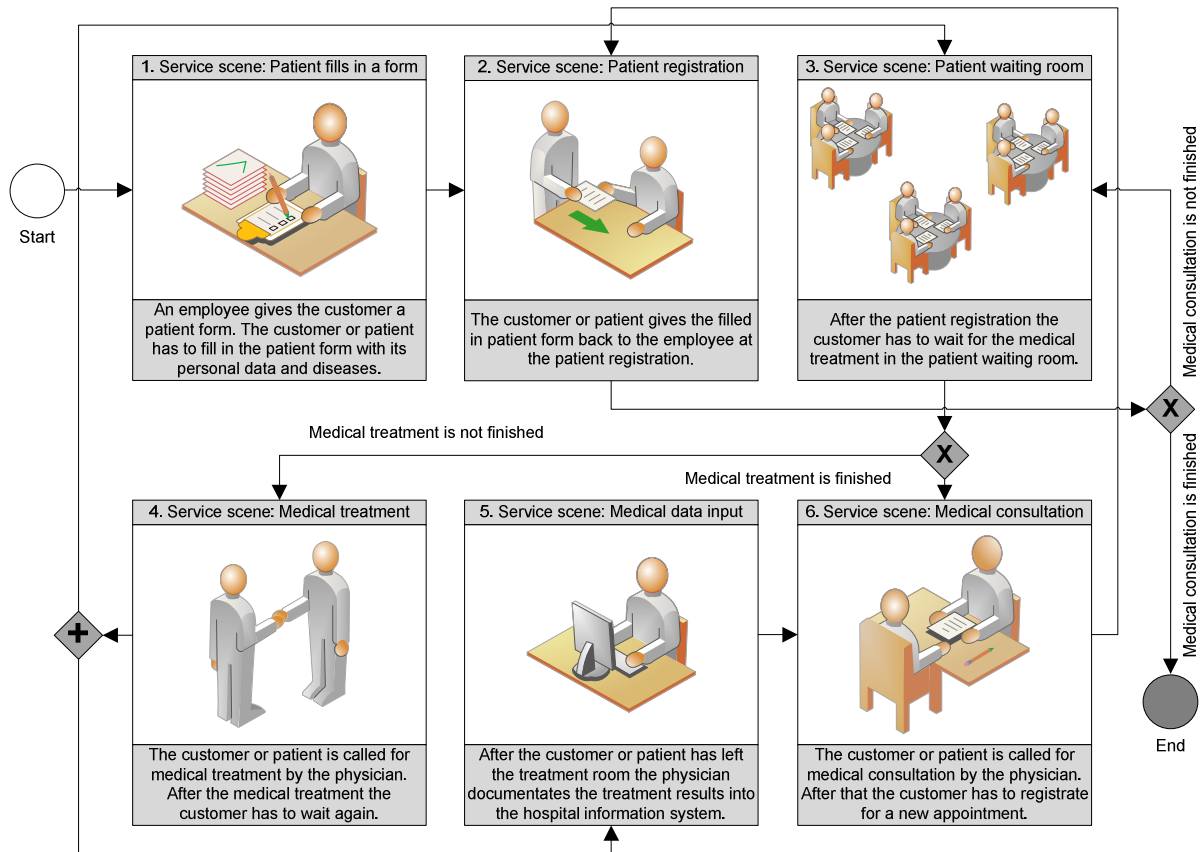


Figure 11. Situational Service Script of a Health Service Modelled as a Storyboard.

4.4. Application of the Third Level: Service Process Modelling

The third level service process modelling details the second level service conception. Therefore, the modelled situational service script is the basis for service blueprinting. Above the line of interaction the health service activities of the customer are located (e.g. patient fills in a form). The activities of the service provider are placed below the line of interaction (e.g. medical treatment). Additional to the service scenes of the health service within a hospital other invisible service scenes are also modelled (e.g. health insurance calculation, invoice for the health insurance of the patient). About the service production process of the ambulatory treatment or hospital service more detail information are visible. Below the line of implementation the human resource management is placed. On this basis the customer-independent activities can be supported (e.g. usage of a hospital information system, technical equipment, and data base of diagnosis codes and prices). These three activities under the line of order penetration support the customer-dependent activities like transcriptions, electronic patient records, and customer management. For example, the transcription activity within the hospital simplifies the medical data input. The electronic patient records are supporting the preparation of the patient forms, medical treatment, medical data input, and medical consultation. Customer management is possible due to the electronic patient records and important for the health insurance calculation and writing an invoice for the health insurance of the patient.

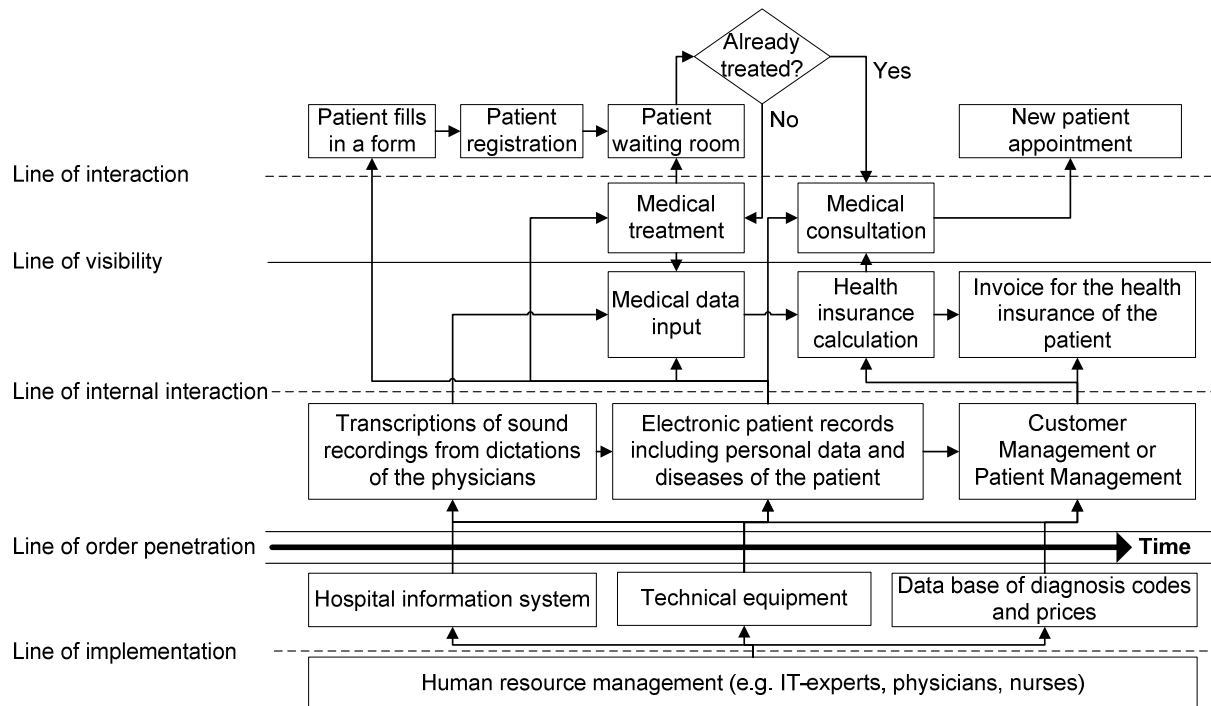


Figure 12. Blueprinting of a Health Service (Technique based on Shostack, 1984, 1987; Kingman -Brundage, 1989; Fließ; Kleinaltenkamp, 2000).

5. Discussion of the Research Results

5.1. The Constructed Mixed Methodology

Modelling technique. Other modelling techniques can be transferred as a basis for a mixed methodology to develop innovative service modelling methods. For example, another level-based or view-based modelling technique can be selected to transfer the concept of this modelling technique to the mixed methodology. These techniques are also usable to handle or in some cases to reduce the complexity of the enterprise reality or objects being modelled like a business cooperation or business process. Another suitable modelling technique is represented by the Unified Modelling Language (UML) (OMG, 2016) with its different views on users, structures, behaviours, implementations, and settings.

Research method. Other research methods and results can be used for combination within the mixed methodology for service modelling method development. For instance, a literature review can be combined with grounded theory procedures for deeper theoretical and practical insights for the development of service modelling methods. Suitable research methods can be selected on the foundation of the method spectrum of information systems research (Wilde; Hess, 2007) like expert interviews, a delphi study, or quantitative study. The results of these research methods must be applied for constructing a morphological box fitting as a methodical basis for the effective development of innovative service modelling methods.

Morphological box. As indicated, other morphological boxes can be constructed as a part of the mixed methodology to design innovative service modelling methods on a well-grounded foundation. The constructed morphological box – so called the SPM

Element Framework – can contain other and/or further dimensions but also other and/or further attributes describing the included dimensions. It can be decided for another framework instead of the BPM context framework (vom Brocke, 2015) as an additional orientation during the morphological box construction.

5.2. The Developed Service Experience Modelling Method

The first level: service classification. The time-based service classification based on the three dimension service time consumption, service technology use, and service encounter is also developed on a conceptual level and not on an empirical level – but most service classifications are developed on a conceptual level first and afterwards optimized on an empirical level (Kolek et al., 2015). It is valuable to classify services rather than to classify service-product-bundles. Services can be differentiated into two time-based service groups: Time-saving services and time-consuming services. Its three dimensions aid to design new services and to position existing services.

The second level: service conception. In the service science literature there is no technique developed and available to model situational service scenes directly. Service scripts within the literature remembered on described process workflows but without modelling elements for designing situational service scenes like symbols. To handle or in some cases to reduce the service complexity described as service abstraction the modelling of situational service scenes as a storyboard – filled with involved roles or actors, objects, facilities, and so on – should be more understandable than as a process workflow diagram without any illustrations only based on text and flows of processes and information. Therefore, storyboard modelling seems to be the best fitting method at this state of the art.

The third level: service process modelling. In this research paper the SPM Element Framework is constructed as a decision basis for selecting a suitable modelling technique for effective service modelling. The most of the modelling techniques like BPMN 2.0 (OMG, 2016) illustrated in the SPM Element Framework are established to model business processes. For the special case of modelling service processes service blueprinting appeared as one of the most fitting techniques. Some of the reasons are stated by its development for service process modelling, the structured modelling of service processes with the aid of the five lines for example to separate the activities of the customers and employees of service providers, and times that can be planned, coordinated, and controlled.

5.3. The Applied Service Experience Modelling Method

The first level: service classification. The time-based service classification enables not only the service management (Corsten, 2001) to clarify planned or existing services for service quality (Parasuraman et al., 1985) enhancement. It is also possible to position other services as the application examples indicate if they are fitting with the three dimensions service time consumption, service technology use, and service encounter. The goal of service positioning is to get a regulatory overview. The assignment of services is due to argumentation why they fit into the three dimensions. In service practice, the most services will fit into the dimensions stated as time-based service groups directly but some could represent special application cases. Clarified immaterial services can be also linked with material products to locate service-

product-bundles within the time-based service classification e.g. selling products like medical home equipment together with time-consuming health services. This demonstrates the flexibility of service and service-product-bundle clarification.

The second level: service conception. The modelling of situational service scripts with storyboards appears to be clearly understandable and practical for service conception. Headings and description texts are easy to define. Comic elements are difficult to select and to interpret e.g. the patient waiting room could be understood as a meeting room for model interpreters. In real-life service practice pictures of the service settings should be used for a deeper understanding of the situational service scenes and overall service potential. It is assumed, that especially the modelling not only of service scenes with storyboards makes fun. This hypothesis is linked with the *hedonic motivation* (Venkatesh et al., 2012) of model developers. *Hedonic motivation* can be considered as an essential reason for using modelling results like a service scene storyboard (Venkatesh et al., 2012). Another reason for using modelling results can be shaped by *habits* (Venkatesh et al., 2012) of customers and employees of service providers if they are modelled within the situational service scripts. If the modelling makes fun and well-known behaviors are recognized the generated *price value* (Venkatesh et al., 2012) is expected to be high. This should also have a positive impact on the use of effective modelled service business models. Hence, modelling conventions or modelling rules – not only for modelling situational service scripts – must be further developed.

The third level: service process modelling. The application of service blueprinting indicates that improvements of this modelling technique are required. Hence, a suggestion for re-designing service blueprinting is provided. The suggestion is based on the questions how to model service technology use effectively and for that application purpose which lines should be adapted. Adapted and new introduced lines are suggested to reflect a differentiated view of technology use during the service production process. The adapted and new introduced lines of service blueprinting are marked as bold (see figure 13). A new *line of technology use* is implemented within service blueprinting. It separates therefore the (external) technology use of customers. Above this line customer activities excluding technology use and below this line customer activities including technology use are modelled. Under the *line of technology use* the line of interaction is kept but moved to the second position, because on this position it is useful to separate the activities of customers from those of the employees to differentiate the technology use of customers and service providers. The line of internal interaction is transferred into the adapted and new introduced *line of internal technology use*. It separates the (internal) technology use of service providers. Above this line service provider activities excluding technology use and below this line service provider activities including technology use are shown. The production-theoretic view is retained regarding the line of order penetration and it is still on its position (Fließ; Kleinaltenkamp, 2000). It differentiates now between customer-dependent and customer-independent technology use activities of the service provider. Above the line the customer-dependent technology use activities and below the customer-independent technology use activities are placed. The line of implementation still separates the customer-independent support activities from the customer-independent management activities of the service provider. Management activities like human resource management are today in the most cases linked with internal technology use. Therefore, the line of implementation is also unchanged on its position (Kingman-Brundage, 1989). The horizontal line of visibility is adapted and new introduced as a vertical line. It splits based on the process modellers decision

visible onstage activities from invisible backstage activities of both the customers and employees of the service provider. This leads to the advantage while service process modelling that not only service provider activities can be invisible modelled. Now customer activities can be invisible (e.g. patient fills in a form) or visible (e.g. patient registration) for service providers. Here, the service provider activities can be invisible (e.g. health insurance calculation) or visible (e.g. medical consultation) for customers, too. For the differentiation of process types an annotation is connected with each activity. Process model developers can decide between (C) core activities, (S) support activities, and (M) management activities. This process type annotation improves the concept of the line of internal technology use because customers can perform core activities and now also support activities.

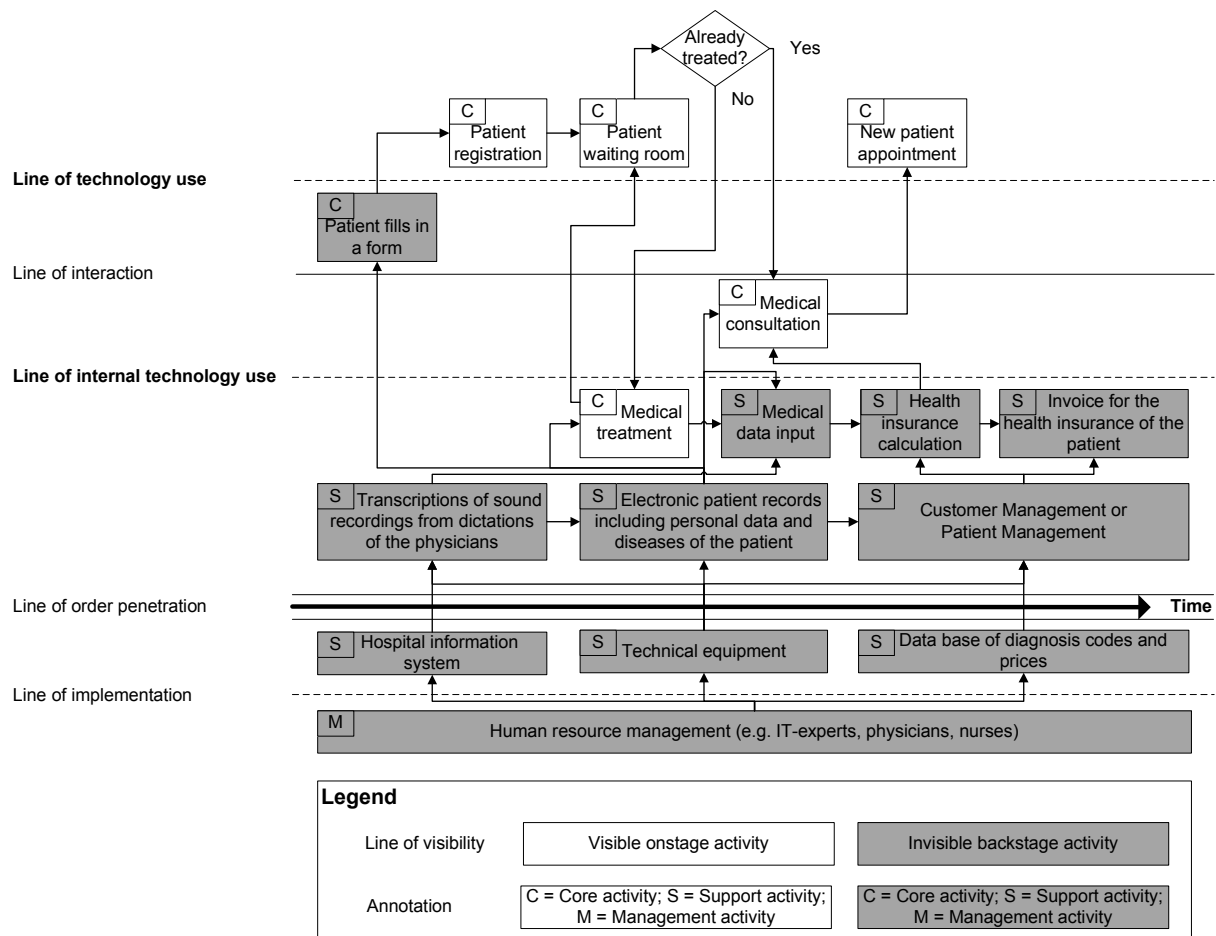


Figure 13. Service Technology Use Blueprinting of a Health Service (Technique further Developed based on Shostack, 1984, 1987; Kingman-Brundage, 1989; Fließ; Kleinaltenkamp, 2000; Kolek et al., 2015).

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THE SHARING ECONOMY: WHAT MAKES IT ATTRACTIVE FOR CONSUMERS? A PRELIMINARY STUDY IN THE CONTEXT OF HOSPITALITY SERVICES IN FRANCE

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Nowadays more and more services are provided by individuals to others through electronic trading platforms. Numerous service fields are concerned: transportation, equipment/good rental, hospitality, education ... Consumers seem enthusiastic with this new form of consumption. Our aim is to better understand what is at stake with this "collaborative" consumption. Research questions are focused here on the consumer behavior in the field of hospitality services in France. Qualitative approaches are used. After mapping collaborative platforms operating in the field, few typical suppliers are selected and a "netnographic" approach is conducted: suppliers' websites and dedicated blogs and forums where consumers share and discuss their experiences are compared using content analyses.

1. Introduction

Partout dans le monde, une vague de nouvelles entreprises vient secouer et remettre en question les formes établies de commerces et de services. Ni services aux consommateurs, ni services aux entreprises, ce sont des services offerts par des consommateurs à d'autres consommateurs grâce à des plateformes électroniques d'échange. Que ce soit pour emprunter des biens ou des équipements, louer des appartements ou des maisons ou bien offrir des compétences en échange de contreparties équivalentes ou d'argent, les consommateurs montrent un engouement certain pour cette nouvelle forme de consommation qualifiée de collaborative. Les entreprises qui gèrent ces plateformes bénéficient d'un bouche à oreille gratuit, connaissent une croissance forte de leur chiffre d'affaires ainsi que de leur valorisation capitalistique. Elles se développent très rapidement à l'international alors que de tels résultats ne sont atteints qu'au terme de décennies d'efforts par des entreprises traditionnelles.

Le concept de consommation collaborative est déjà ancien puisqu'il apparaît aux Etats-Unis avec Felson et Spaeth (1978, 614) qui la définissent comme "*des événements pendant lesquels une ou plusieurs personnes consomment des biens ou services dans le but de partager une activité avec d'autres*". Cette conception semble

très, voire trop, large, car elle ne prend en compte que la simple intention de partager une consommation avec d'autres. Ce qui a profondément changé depuis tient au développement sans précédent d'Internet et à l'apparition du *Web 2.0* qui ont considérablement facilité les échanges de pair à pair. Botsman et Rogers (2010) définissent la consommation collaborative comme un "*modèle économique basé sur l'échange, le partage, la location de biens et services, privilégiant l'usage sur la propriété*". Partant de là, ils identifient trois domaines impactés : les styles de vie (comme avec le *coworking*, *CouchSurfing* ou *Pretersonjardin*), les marchés de l'occasion (comme *leboncoin*, *eBay* ou *Etsy*) et les systèmes produit-service. Ces derniers sont orientés vers un usage partagé d'un bien ou d'un service sans transfert de droit de propriété : il s'agit principalement des locations entre particuliers. Cette catégorie de consommation collaborative touche des secteurs multiples et très diversifiés allant de la voiture au logement, en passant par l'outillage, les vêtements et les accessoires de mode ou de luxe. Seraient par exemple classés dans cette catégorie les plateformes telles que, *airbnb* ou *SacsDeLuxe* par exemple.

D'autres auteurs adoptent des points de vue plus restrictifs. Ainsi, Bardhi et Eckhart (2012) proposent de privilégier la préférence pour l'usage au détriment de la possession : "*au lieu d'acheter et de posséder des biens, les consommateurs préfèrent payer pour accéder temporairement à ces biens et services et profiter de l'expérience qu'ils procurent*". L'accès à la consommation aurait ainsi tendance à se substituer à l'accès à la propriété. Cette définition demeure insatisfaisante car elle s'applique tout aussi bien à l'ensemble du marché traditionnel de la location et aux services en général. Enfin, pour Belk (2014), il s'agit d'une "*coordination entre individus pour l'acquisition et la distribution d'une ressource, en échange d'un paiement ou d'une autre compensation*". L'existence d'une compensation serait, dans cette perspective, un critère important pour délimiter les frontières de la consommation collaborative. Le troc et l'échange feraient donc partie de la consommation collaborative car la compensation mise en œuvre n'est pas forcément monétaire ; en revanche, la gratuité, le bénévolat et le don en seraient exclus.

Un grand nombre de définitions variées coexistent donc et tous les auteurs ne s'entendent pas sur les frontières de ce que l'on doit appeler consommation collaborative. Néanmoins, trois caractéristiques majeures se dégagent de ces définitions :

- L'usage se trouverait favorisé plutôt que la propriété.
- La relation directe, de pair à pair, prendrait le pas sur l'intermédiation entre producteurs et consommateurs.
- Les interconnexions permises par les outils d'Internet et du *Web* en constitueraient le support principal, mais pas exclusif.

Dans cette perspective, on peut interpréter l'économie collaborative comme le développement ultime de l'économie des services, rendu possible par les technologies de l'information et de la communication. L'économie des services est, en effet centrée sur la valeur d'usage plutôt que sur la valeur d'échange qui était au cœur de l'économie industrielle. Les consommateurs des services collaboratifs mettent aussi souvent en avant la qualité des échanges, la convivialité des prestations, dimensions qu'auraient perdues les services marchands en dépit de la généralisation des programmes de qualité. Notre intérêt pour l'économie collaborative rejoint ainsi celui plus ancien de l'interaction et l'échange entre consommateurs et prestataires.

Nous proposons dans cette communication de rappeler en premier lieu, quelques fondements théoriques qui nous semblent essentiels pour comprendre la consumma-

tion collaborative, puis nous indiquerons en second lieu les questions de recherche qui guident notre analyse. Nous terminerons en présentant les méthodes d'investigation utilisées et les résultats de cette recherche exploratoire sur les services collaboratifs.

2. Fondements théoriques

Quelques idées fondamentales ont marqué les analyses du développement post-industriel des économies occidentales. Elles nous paraissent très utiles pour comprendre les développements contemporains de l'économie collaborative. Deux courants de recherches fondateurs de l'économie des services apportent, en effet, un éclairage intéressant sur la question : d'une part, les analyses de la tertiarisation de l'économie et du comportement du consommateur, ainsi que, d'autre part, celles portant sur l'innovation dans les services.

2.1. Tertiarisation de l'économie et comportement du consommateur

Le développement des services dans les années 1970 a donné lieu à plusieurs débats et il nous semble judicieux en premier lieu de rappeler les idées de Gershuny (1978) sur deux points : l'analyse de la consommation et le comportement du consommateur.

Gershuny a développé l'approche de Lancaster (1971) selon laquelle les choix du consommateur ne portent pas tant sur les produits en tant que tels, que sur leurs qualités ou leurs caractéristiques. Pour analyser la structure de la consommation finale, Gershuny part des grandes catégories traditionnelles de besoins des ménages car différentes modalités techniques permettent de les satisfaire : un même besoin, (comme le lavage de linge par exemple) peut être satisfait par l'achat d'un bien d'équipement (machine à laver) ou par le recours à un service (blanchisserie). Il n'est pas sans intérêt d'observer que cette structuration de la consommation en termes de fonctions de consommation est reprise par la plupart des études sur l'économie collaborative. Ainsi, l'étude réalisée par *Nomadeis* et *TNS-Sofres* (2015) propose de subdiviser l'économie collaborative en fonction des besoins de consommation satisfaits : se déplacer ; transporter ou stocker des objets ; se loger ou se divertir ; se nourrir ; s'équiper ; s'habiller ; se faire aider ; se financer. *PricewaterhouseCoopers* (2015) utilise une nomenclature plus ramassée mais qui suit la même logique : hospitalité et restauration ; mobilité et transport ; commerce et biens des consommateurs ; média et divertissement.

D'autres études reprennent des nomenclatures très proches qui, toutes, mettent en avant les besoins des consommateurs. Pour les entreprises, il ne s'agit plus d'offrir des biens ou des services pour satisfaire ces besoins, mais plutôt de proposer une solution globale et efficace au moindre coût.

Le second apport de Gershuny qu'il nous paraît pertinent de rappeler concerne le comportement des consommateurs. Il s'inspire là de l'analyse microéconomique des comportements humains de Gary Becker dans laquelle il introduit le travail domestique. Cette variable (la contrainte domestique) interviendrait de façon déterminante

dans les choix de consommation finale : certes, la nature et le prix des biens offerts sur le marché jouent, mais aussi le temps de travail domestique nécessaire à l'usage des biens achetés. Des services domestiques sont ainsi autoproduits en associant des biens acquis et du travail domestique. Or, à la différence du temps du personnel d'une entreprise de services, ce temps de travail domestique n'est pas monétisé : les services autoproduits présenteraient donc un avantage coût évident par rapport aux services marchands pour la plupart des consommateurs. Cela devient cependant de moins en moins vrai, si l'on considère des consommateurs dont les revenus du travail sont de plus en plus élevés.

Toutes les études réalisées sur la consommation collaborative montrent que la première motivation des consommateurs de ces nouveaux services est le prix, ou plutôt l'économie qu'ils réalisent par rapport au même service offert par une entreprise traditionnelle. Le consommateur rationnel de l'économie collaborative bénéficie non seulement de la sous-estimation du coût du travail du prestataire, mais aussi de la sous-estimation du coût capitalistique des biens d'équipement mis à sa disposition (automobile, biens ménagers, outils) par ses pairs. En effet, les modes de vie actuels conduisent souvent à posséder plusieurs automobiles, des équipements et des résidences multiples. Ces équipements sont sous-utilisés de manière chronique, un phénomène accentué par la baisse tendancielle de la taille des ménages. Suréquipés, les ménages sous-évaluent systématiquement le coût d'usage et d'amortissement de leurs équipements. Les plateformes d'échange permettent une valorisation ponctuelle et facile de ces capacités inutilisées car elles mettent en relation les offreurs avec des consommateurs qui en ont le besoin.

L'économie collaborative apporte un éclairage nouveau à des questions au de l'analyse économique depuis Adam Smith. La tertiarisation de l'économie a eu pour conséquence de développer la valeur d'usage, qui fut délaissée pendant la période de croissance des Trente Glorieuses, marquées par la croissance extensive de la consommation des biens industriels. Par nature, les services produisent de la valeur d'usage et apportent un complément à la valeur d'échange des biens. Les analyses d'Orio Giarini (1987) ont mis en évidence que le coût total de la consommation des biens excédait largement leur seule valeur d'échange : formation, maintenance, destruction et récupération sont aussi nécessaires et constituent autant de coûts cachés, mal perçus par les consommateurs. Les études sur le développement de la consommation collaborative révèlent le souci de durabilité qui anime certains consommateurs, mais aussi la généralisation de nouveaux comportements. L'enquête de l'Observatoire Société et Consommation (*Obsoco*, 2012) montrait déjà que pour 83 % des français il était plus important de pouvoir utiliser un bien que de le posséder. D'autres enquêtes d'opinion, comme celle réalisée par *PricewaterhouseCoopers* (2015) révèlent aussi que les consommateurs de l'économie collaborative ne seraient pas hostiles à devenir plus tard eux-mêmes fournisseurs de services, en mettant à disposition d'autres personnes des biens qu'ils auraient acquis. Le simple fait d'envisager de partager ou de louer un équipement renforce incontestablement le désir de le posséder et pousse même à acheter plus (Robert *et al.*, 2014), plus grand ou de meilleure qualité, grâce à la perspective de récupérer une partie de la valeur du bien en le fournissant temporairement à d'autres.

L'économie collaborative apparaît ainsi comme le dernier développement de la tertiarisation de l'économie, gommant en grande partie les différences entre biens et services, entre valeur d'échange et valeur d'usage, pour incarner dans la valeur pour le consommateur ce que Vargo et Lusch (2004) présentent comme la logique domi-

nante de service « *SDL* » (*Service Dominant Logic*). D'un point de vue plus sociétal, l'économie collaborative peut également être interprétée comme une extension du repli du modèle salarial et hiérarchique, déjà perceptible dans le développement des services marchands aux entreprises et qui concernerait désormais l'ensemble de la sphère de la consommation.

2.2. Nature des services, innovation et relation marketing

La question de la définition de la nature des services, a toujours été essentielle pour les chercheurs en raison des implications statistiques pour les économistes ou managériales pour les gestionnaires. A côté des définitions cherchant à caractériser l'essence du service comme "*un acte, une exécution, une performance*" (Rathmell, 1966), d'autres (comme Hill, 1999 ou Gadrey, 2000) proposent un contenu plus précis en combinant l'activité, son résultat et les rapports de propriété mis en jeu. Des définitions plus larges ont aussi été avancées qui englobent toutes les activités proposées pour répondre à un besoin identifié : Grönroos (2008) met ainsi l'accent sur l'interaction entre le consommateur et le système mis en place par un fournisseur de service et conçu comme solution à un certain nombre de problèmes pouvant être rencontrés par les clients potentiels. De même, pour caractériser l'innovation dans les services, Gallouj (2002) définit le service comme un ensemble de vecteurs caractérisant les compétences de la firme (compétences du prestataire, caractéristiques tangibles ou immatérielles de la prestation), celles du client (compétences et caractéristiques techniques du client) et enfin les caractéristiques du service en lui-même. Deux approches ont été proposées pour décrire de façon plus poussée le système assurant les prestations, celle de la Servuction (Eiglier, 2004) et celle du "*Service delivery system*" (Lovelock, 2000). Toutes deux distinguent la partie du système qui est visible par le consommateur et celle qui ne l'est pas.

Ces définitions synthétiques et générales permettent de bien identifier chaque service, mais elles restent focalisées sur un seul service et un seul prestataire alors même que les formes complexes associant plusieurs prestataires se multiplient. L'économie collaborative repose sur ce qui est appelé plateforme pour caractériser des produits, services, entreprises ou institutions qui assurent un rôle d'intermédiaire entre deux ou plusieurs groupes d'agents (Rochet; Tirole, 2003). L'émergence des plateformes est un phénomène qui impacte aujourd'hui la plupart des activités, des produits aux services. Annabelle Gawer (2009) les décrit comme un bloc fondateur à partir duquel une multitude de firmes peuvent développer des produits complémentaires, des technologies et des services. Ces entreprises dans la périphérie du centre fondateur constituent l'écosystème de la plateforme. L'architecture des plateformes et ses conséquences modifient notre vision de l'innovation dans le commerce et les services. Le modèle de référence de Faïz Gallouj (2002) pose que l'innovation dans les services concerne un des vecteurs caractérisant les compétences du prestataire, des clients ou le service lui-même. Ce modèle général n'est pas vraiment remis en cause, mais son contexte change. Dans les plateformes, l'innovation se déroule au centre, mais surtout dans les entreprises complémentaires de la périphérie qui répondent directement aux besoins des consommateurs. Plus il y a d'innovations dans la périphérie, plus la plateforme et ses utilisateurs bénéficieront d'un effet de réseau créatif de valeur (Gawer, 2009). La notion de plateforme collaborative peut être introduite dans le sens où ce sont les utilisateurs qui créent de la valeur en échangeant entre eux. La proposition de bien ou de service est faite par un utilisateur, la transaction est finalisée et évaluée entre les utilisateurs. La plateforme n'offre que des ser-

vices supports : affichage des offres et des demandes, service de communication par messagerie, sécurisation des paiements, qui, s'ils sont plus élaborés, peuvent faire l'objet d'une tarification supplémentaire : assurance, options de mises en visibilité (Terrasse, 2016).

C'est à ce stade que le management de l'écosystème par la plateforme prend toute son importance pour définir quelles activités peuvent être introduites dans l'écosystème : qu'est-ce qui relève de la propriété intellectuelle de chacun des membres, quelles fonctionnalités doivent être introduites dans la plateforme et, enfin, comment se réalise le partage des bénéfices. Les chercheurs ont porté une attention particulière au rôle des services dans les plateformes d'activités, soit qu'ils accroissent la valeur de plateformes existantes, soit qu'ils interviennent comme facteurs d'attraction et de garantie pour les consommateurs de produits nouveaux, comme les *smartphones*, dont le marché est encore en cours de création.

Le contexte des plateformes à réseau de marché dual a fait l'objet de développements spécifiques (Eisenmann *et al.*, 2006) qui intéressent au plus haut point l'économie collaborative : chaque côté du réseau représente un type d'utilisateur différent comme les chauffeurs et les consommateurs dans les plateformes de transport, les logeurs et les résidents dans les plateformes d'hébergement, les vendeurs et enchérisseurs dans les plateformes d'échange. La plateforme supporte des coûts pour servir chacun des groupes d'utilisateurs, mais elle peut aussi potentiellement tirer un revenu des deux groupes. Eisenmann *et al.* ont bien analysé la nécessité de créer rapidement un effet de réseau pour toutes les plateformes : celles qui servent un marché dual sont très souvent conduites à subventionner les utilisateurs au détriment des fournisseurs pour impulser une adoption rapide. Le positionnement sur un marché dual rapproche ces plateformes de la position des franchiseurs traditionnels, mais leur degré d'engagement et d'implication reste très en retrait.

La relation d'une plateforme avec les consommateurs peut se trouver perturbée par de nombreux éléments indépendants du prix de ses services. Même quand les aspects opérationnels sont gérés de façon satisfaisante, les promesses, les attentes et l'expérience de service vécue peuvent différer d'un fournisseur à un autre car les services délivrés par les plateformes ne sont pas formatés comme peuvent l'être ceux d'une firme intégrée ou de franchisés appliquant une politique de réseau. Ces questions peuvent revêtir une importance cruciale car, pour les services comme pour l'échange de biens, l'évaluation après l'expérience vécue a été identifiée comme étant le principal déterminant des achats futurs. Les plateformes reposent sur les évaluations post expérience spontanées ou sollicitées, mais la question se pose (et est souvent posée) de la véracité de ces témoignages et de l'identité de leurs auteurs.

Comme l'a indiqué Gummesson (2002), les implications marketing de la relation client pour les réseaux de services de masse, comme le sont ceux fournis par les plateformes, restent peu étudiées, notamment en ce qui concerne les programmes de fidélité. Une plateforme est probablement considérée par les consommateurs comme le principal organisateur de la délivrance des services qu'il achète, mais cette quasi-marque ne met en œuvre qu'une relation minimaliste avec ses usagers et dégage sa responsabilité de tout problème survenant entre offreur et acquéreur.

3. Questions de recherche et hypothèses

Lorsque l'on confronte les fondements théoriques de l'économie collaborative avec l'observation du fonctionnement concret des services proposés sur le mode collaboratif, on en vient rapidement à se poser un certain nombre de questions autour desquelles notre recherche s'est organisée. Etant au début de cette recherche, ces questions demeurent au stade exploratoire. La première question qui se pose est de nature préliminaire : quelle est l'étendue du phénomène ? Combien de plateformes collaboratives opèrent en France, dans un domaine particulier ? Sont-elles en concurrence frontale avec les prestataires traditionnels de ce marché ?

Nous avons choisi le secteur de l'hébergement temporaire en France car il comporte des offres classiques d'hôtels et chaînes hôtelières qui font face à l'émergence de plateformes collaboratives. Ce secteur apparaît donc *a priori* est directement confronté à cette nouvelle concurrence provenant de services rendus entre pairs *via* des plateformes spécialisées accessibles en ligne. L'impact effectif de cette offre collaborative est difficile à estimer. Les évaluations varient de un à quarante ou cinquante, selon les études (0,15 % du chiffre d'affaires des principales entreprises concurrentes du secteur selon une étude de l'ADEME de 2015 ; 7 % de l'offre d'hébergement au niveau mondial selon l'institut Xerfi en 2015). Il faut, en outre, bien considérer qu'une part non négligeable de ce nouveau marché ne se serait pas concrétisée en tant que demande auprès des prestataires traditionnels. La totalité de l'expansion de la consommation collaborative ne se fait donc pas au détriment des hôteliers professionnels.

Deux questions de recherche ont retenu notre attention : En quoi les services collaboratifs sont-ils différents des services traditionnels qu'ils concurrencent ? Quelles sont les forces et les faiblesses de ces deux modes de services, du point de vue du consommateur ?

3.1 Services collaboratifs - Services traditionnels : quelles différenciations ?

Si l'on met de côté l'hypothèse d'une concurrence absolument frontale entre les deux modes de prestation, on est conduit à s'interroger sur ce qui différencie les deux types d'offre : sur quoi porte la concurrence et quelles compétences distinctives sont mises en avant par les organisations collaboratives et les services offerts de manière traditionnelle.

Les services proposés ne sont pas nouveaux : logement, transport, location, restauration, finance. La nouveauté réside dans la mise en réseau des individus sur une grande échelle grâce aux plateformes virtuelles qui combinent données, moteurs de recherche et connectivité. Ainsi que le souligne Frédéric Mazella (2015), fondateur de la plateforme *BlaBlaCar* : "Les plateformes libèrent les échanges entre particuliers des obstacles transactionnels historiques (information imparfaite, coûts, distance géographique, etc.)". Le modèle économique des plateformes est complètement différent du modèle des prestataires traditionnels. Sur quels points particuliers y a-t-il affrontement direct, et quelles sont les stratégies d'évitement adoptées par les plateformes ? Comment justifient-elles leur différenciation pour satisfaire les besoins des consommateurs par rapport aux réponses classiques offertes par les professionnels ?

3.2 Forces et faiblesses des deux modes pour le consommateur ?

Certains travaux soulignent l'avantage prix dont bénéficieraient les offres collaboratives. En effet, les surcapacités d'équipement des particuliers permettent aux utilisateurs de bénéficier de ces équipements pour un prix plus bas ou un meilleur rapport qualité-prix que ceux offerts par les services traditionnels. Cependant, on peut aussi faire l'hypothèse que le choix des consommateurs s'explique par des prestations plus personnalisées, adaptées et efficaces que les services traditionnels. Outre leur prix d'accès plus bas, cette facilité d'usage pourrait donc expliquer une partie de leur succès (Novel, 2013).

D'autres travaux (Daudey; Hoibian, 2014 ; Robert *et al.*, 2014) ont mis l'accent sur le rôle de la recherche du lien social dans le succès de la consommation collaborative. La consommation collaborative établit par définition des relations entre pairs, mais ces relations ne prennent pas la même forme ni la même ampleur selon le bien ou le service concerné et le type de transaction. Tout un continuum existe : à côté des activités de ventes de biens qui n'entraînent que des liens ponctuels et faibles, on rencontre des activités qui permettent la création de liens plus étroits, voire les nécessitent (partage de locaux, de repas, *couch-surfing*, ...). Ainsi, comme le soulignent Robert *et al.* (2014), une valeur de lien (Godbout; Caillé, 1992) peut venir s'ajouter à la valeur d'usage d'un bien ou d'un service puisque certaines pratiques permettent la création ou le renforcement de liens sociaux. Certaines pratiques de la consommation collaborative peuvent ainsi répondre, mieux que les réseaux traditionnels, aux besoins des consommateurs, en matière de rencontres de nouvelles personnes, de nouvelles relations, de partage d'expériences : *« L'influence du Web 2.0 et des réseaux sociaux contribue à l'émergence d'une « culture du nous » qui ne réinvente pas seulement ce que l'on consomme mais la manière dont on consomme »* (Novel; Riot, 2012).

Ces atouts potentiels de l'offre collaborative ne peuvent cependant se concrétiser qu'à partir du moment où une relation de confiance est nouée entre les pairs. La confiance est un concept central de l'analyse de la vie sociale et économique : *« un monde sans confiance est un monde inhumain : un monde du chaos... Elle est un principe d'ordre, elle lève, dissipe, suspend l'incertitude »* (Karpik, 2007). La confiance dans les prestataires et dans la qualité des prestations est un déterminant de la satisfaction des clients des services et commerces traditionnels (Sirieix; Dubois, 1999). Dans la consommation collaborative, le consommateur traite avec une plateforme qui se contente souvent de le mettre en relation avec le prestataire. Les plateformes collaboratives tentent de pallier leur manque d'engagement avec des outils tels que les profils, les évaluations des prestataires voire même des usagers pour rassurer les deux types d'intervenants. Les évaluations ainsi communiquées publiquement demeurent cependant sujettes à caution et remplacent mal une garantie de bonne fin pour créer la confiance indispensable à certaines transactions. La fragilité de la relation de confiance entre consommateur et prestataire peut nuire au développement des prestations collaboratives si l'exactitude du bouche à oreille n'est pas attestée. *« Sans cette confiance, c'est le système entier qui peut s'enrayer »* selon Novel (2013). Si cette hypothèse est corroborée, l'économie traditionnelle du commerce et des services peut trouver là des vecteurs de résistance à l'économie collaborative. Offrir des garanties de qualité nourrit la confiance du consommateur, tout en mettant en lumière les risques que prennent les particuliers en confiant leurs actifs à d'autres personnes ou en utilisant les biens mis à disposition par d'autres particuliers.

4. Méthodologie et résultats

Pour apporter quelques éléments de réponse à ces questions, nous avons mené une première étude qualitative organisée en trois étapes. La première consiste à recenser les plateformes collaboratives d'hébergement temporaire implantées en France tout en observant quels modalités de compensation sont mises en œuvre. Cette cartographie doit permettre de bien cibler les deux étapes suivantes. La seconde étape a pour but de comparer, à partir d'analyses de contenu, l'offre collaborative d'hébergement et les offres d'entreprises hôtelières implantées en France à partir des messages portés par des sites Internet d'enseignes d'hôtellerie et d'une plateforme collaborative de référence. Enfin, la dernière étape vise à recueillir des points de vue de consommateurs à travers l'évaluation de leur expérience telle qu'ils en rendent compte dans les forums et les blogs dédiés ; une netnographie (Kozinets, 1997, 2002 ; Bernard, 2004) sera mise en œuvre dans ce but. Il s'agit d'une méthode qualitative récente non intrusive permettant d'exploiter, sous forme d'analyse de contenu, les informations rendues publiques sur Internet par les consommateurs lorsqu'ils décrivent et évaluent leurs expériences.

4.1. Cartographie préliminaire

L'économie collaborative étant en évolution rapide, il convenait de commencer par baliser le champ couvert afin de repérer les plateformes pertinentes pour l'objet de la recherche. Dans ce but, a été établie une cartographie sommaire, mais à jour, des offreurs et du marché de la consommation collaborative en matière d'hospitalité en France.

	Sans contrepartie	Contrepartie réelle	Contrepartie financière
	Prêt	Echange	Location
Temporaire (vacances)			

Tableau 1: répartition des plateformes collaborative en fonction du type de contrepartie

Une analyse documentaire a servi de point de départ principalement appuyée par une recherche systématique sur Internet. Toutes les plateformes collaboratives proposant des hébergements de courte durée en France ont pu ainsi être recensées au printemps 2016. Ce type d'hébergement s'adresse principalement aux personnes désirant se loger pendant leurs vacances ou leurs déplacements professionnels. Ces plateformes ont ensuite été classées en trois groupes sur la base du type de contrepartie exigée lors de la transaction.

Il convient en effet de distinguer trois modes opératoires. Certaines plateformes collaboratives, telles que *CouchSurfing*, *Welcome.be*, *Global Freeloaders*, ou *Warm Showers* regroupent des offres dans lesquelles les transactions s'effectuent sans aucune contrepartie : les hôtes proposent un hébergement gratuit pour quelques nuits. Un second groupe de plateformes (*echangersamaison.com*, *Trampolinn*, *Stay 4 Free*, *GuestToGuest*) rassemble des offres dans lesquelles les transactions s'effectuent avec une contrepartie non financière, sous forme d'échange de logement, simultané ou décalé dans le temps. Enfin, un troisième type de plateformes, les plus nombreuses, regroupent les transactions dans laquelle une contrepartie financière est exigée. Ces offres concernent la location de chambres chez l'habitant, d'appartements ou de maisons pour les vacances ou les déplacements professionnels.

Les deux premières formules n'ont qu'un impact limité pour les professionnels de l'hôtellerie et n'ont pas été prises en compte pour la suite de la recherche. En revanche, les offres du dernier groupe se rapprochent beaucoup de l'offre traditionnelle d'hébergement proposée par l'hôtellerie et sont souvent perçues comme une concurrence frontale par les professionnels. Dans ce dernier groupe, la plateforme collaborative la plus connue est certainement *airbnb* qui propose à fois de l'hébergement chez l'habitant en sa présence (comme *BedyCasa*) ainsi que de l'hébergement chez l'habitant en son absence (comme par exemple *abritel*, *Wimbu*, *Homelidays*). Cette plateforme collaborative de location et de réservation de logement entre particuliers a été créée en 2008 à San Francisco par Brian Chesky et Joe Gebbia. Elle s'est rapidement développée, tant aux Etats-Unis que dans le reste du monde, d'abord (2011) sur le marché européen, avant de se tourner vers les marchés australien et asiatique (2012), puis cubain (2015). Elle propose aujourd'hui plus de 2 millions de logements dans 34000 villes et 191 pays (site *airbnb*).

De son côté, le parc hôtelier français est composé d'hôtels indépendants et de chaînes hôtelières intégrées. Selon une étude réalisée par *CoachOmnium* (2016), l'hôtellerie indépendante représente en France environ 83 % des entreprises, mais elle est composée en majorité de petits établissements plutôt familiaux et ne compte que pour 61 % des chambres et 53 % du chiffre d'affaires. Les 68 enseignes de chaînes hôtelières recensées en France nous intéressent plus particulièrement ici car elles proposent une offre par nature plus standardisée et homogène d'un établissement à l'autre, qu'il s'agisse d'hôtels possédés en propre par la chaîne ou de franchises. La concentration y est assez élevée puisque les deux premiers groupes rassemblent les trois quarts des hôtels intégrés en chaînes : le groupe *Accor* (près de 1500 hôtels en France) contrôle à lui seul 47 % des hôtels affiliés à des chaînes hôtelières intégrées, tandis que 28 % sont contrôlés par le groupe *Louvre Hôtels* (827 établissements). Les 25 % restants ressortent de groupes nettement moins importants (par exemple *B&B* ou *Choice*, avec respectivement 232 et 130 hôtels en France).

4.2. Une offre collaborative nettement décalée

Notre étude porte sur un échantillon de convenance composé de la plateforme collaborative d'hébergement *airbnb*, la plus connue et la mieux implantée en France, et de 6 enseignes franchisées : 4 contrôlées par le groupe *AccorHotels* (*Novotel*, *Ibis*, *Ibis Styles* et *Ibis Budget*), le groupe *B&B Hôtels* et une des enseignes du groupe *Choice*, (*Comfort*).

Enseigne	Logo		Catégorie	groupe
Ibis		Site général		AccorHotels
Ibis		Site spécifique de l'enseigne	Economique	AccorHotels
Ibis Styles		Site spécifique de l'enseigne	Economique	AccorHotels
Ibis Budget		Site spécifique de l'enseigne	(très) Economique	AccorHotels
Novotel		Site spécifique de l'enseigne	3 étoiles milieu gamme de	AccorHotels
B&B Hôtels		Site spécifique de l'enseigne	Economique	B&B Hôtels
Comfort		Site spécifique de l'enseigne	2/3 étoiles	Choice
Choice		Site général		Choice
airbnb		Site spécifique de l'enseigne		

Tableau 2: Les sites Internet étudiés

L'objectif de cette analyse est de voir en quoi l'offre d'une plateforme collaborative (*airbnb*) se différencie des offres hôtelières plus traditionnelles. Pour observer ces offres, nous avons étudié le site web de chaque entreprise car il "*reflète parfaitement la stratégie de communication de l'annonceur grâce aux éléments de contenu qui composent le message*" (Robert et al., 2014). Le contenu de l'ensemble des énoncés présents sur les sites et destinés aux clients a donc été analysé et comparé aux énoncés destinés aux voyageurs sur la plateforme d'*airbnb*. Pour chacun, nous avons décomposé l'offre de service, extrait l'argumentaire marketing utilisé de ma-

nière à mettre en évidence points forts, particularités et compétences distinctives mises en avant par chacune des entreprises concernées. Nous avons rapporté les *verbatim* les plus caractéristiques en conservant leur orthographe d'origine.

Le site d'*airbnb* s'adresse à la fois aux (futurs) hôtes et aux voyageurs. Les informations destinées aux voyageurs comportent des énoncés relatifs aux concepts, au fonctionnement de la plateforme, des informations destinées aux hôtes et des offres d'hébergement spécifiques. Chaque offre est présentée selon une matrice-type qui comporte une présentation de l'hôte, une présentation du logement et des commentaires de voyageurs ayant séjourné dans ce logement.

Concernant la partie logement, la matrice comporte une présentation succincte rédigée librement par le propriétaire ainsi que 7 autres rubriques principales : le logement, les équipements, les tarifs, le règlement intérieur, les dispositifs de sécurité, la disponibilité et les photographies. À l'exception de la description du logement, les informations contenues dans ces rubriques sont fournies sous la forme d'une liste d'items qui sont complétés par l'hôte (capacité d'accueil, nombre de salles de bain, *etc.*) qui apparaissent à l'écran s'ils sont présents (les équipements de sécurité, par exemple) ou qui sont toujours mentionnés et mis en gras lorsqu'ils sont présents ou barrés lorsqu'ils sont absents (exemple pour les équipements). Seule la rubrique description libre permet à l'hôte de décrire son offre d'hébergement comme il le souhaite.

La suite de notre propos décline les caractéristiques des différentes offres exprimées sur les sites en fonction du domaine sur lequel elles portent : le cœur de métier (l'hébergement), les services périphériques, les tarifs puis les éléments de fiabilité.

4.2.1. Le cœur de métier

Les informations recueillies sur les sites Internet hôteliers concernent essentiellement le cœur de l'offre à savoir : la chambre et ses équipements, l'accueil et le petit déjeuner.

- *Bien dormir : la chambre.*

Sur les sites de tous les hôtels étudiés, la majorité des informations fournies sont liées à la chambre et à ses équipements. Systématiquement, ce thème est abordé de deux manières, d'un point de vue factuel voire même technique et d'un point de vue plus subjectif, plus expérientiel.

Pour les chambres, c'est le côté spacieux, fonctionnel, modulable, mais également, le design qui est mis en avant. Il y est également fait référence comme étant un véritable espace à vivre, un lieu de vie et de complicité, à l'atmosphère apaisante, feutrée. Si quelques énoncés ont trait à l'insonorisation, à l'occultation, à l'équipement (téléviseur, *wifi*, ...), la majorité d'entre eux concernent la literie. En effet, un grand nombre, voire des pages entières, lui sont consacrés avec force détails techniques. Il y est question de manière détaillée du sommier, du matelas et de son sur-matelas, des couettes et de leur housse, des oreillers. À côté des informations techniques (ex : "*Un matelas double technologie : un matelas à mémoire de formes grâce à des ressorts ensachés*"), on y retrouve également un langage plus sensuel comme par exemple pour les couettes ("*moelleuse, sensations enveloppantes, douillette, onctueuse, matière douce, accueillante, sensation soyeuse, douceur inédite*") ou le sur-matelas ("*épais et addictif*") mais également une approche plus marketing :

“... votre sommeil heureux est notre priorité” (Ibis)

“Le sommeil heureux, pour la famille Ibis, c’est plus qu’un engagement, c’est une expertise” (Ibis)

Sur le site d'*airbnb*, les informations concernant la chambre ou le logement sont très succinctes puisqu’elles se résument à un simple inventaire de ce qui est présent ou absent et de quelques nombres (nombre de chambres, nombre de couchages, ...).

- L’accueil

Par définition, l’accueil fait partie intégrante des métiers d’hôtellerie. Pourtant peu d’énoncés factuels sont consacrés à l’accueil proprement dit. Il y est question des heures d’accueil, de la présence de bornes d’assistance, du système de *check-in* et *check-out* mis en place. En revanche, l’accent est fortement mis sur l’écoute et la disponibilité des équipes, jusqu’à prendre une forte orientation marketing :

“Chez Novotel, tout est pensé pour répondre aux besoins de chacun, partout et à toute heure.” (Novotel)

“Notre satisfaction ... votre sourire et votre prochaine venue » (Comfort)”

“Vous accueillir en personne et dans la bonne humeur, c’est un point d’honneur, chez B&B Hôtels” (B&B)

“Jour et nuit, nos équipes sont à votre écoute. On s’occupe de tout. On s’occupe de vous 24h/24.” (Ibis)

Cette large place accordée aux énoncés marketing concernant l’accueil rejoint la volonté des hôteliers de réduire le plus possible le temps consacré aux formalités administratives et à l’enregistrement, afin de laisser plus de place au contact avec le client (Christine Pouletty, directrice parcours client chez Accor).

Chez *airbnb*, peu d’informations relatives à l’accueil sont mentionnées dans la matrice de l’offre à l’exception des horaires d’entrée et de sortie des lieux. Par contre, sur la plateforme de nombreux arguments marketing y font référence.

“Découvrez l’accueil chaleureux que les hôtes airbnb vous réservent à travers le monde.” (airbnb)

- Bien commencer la journée : le petit déjeuner

Nombreux sont aussi les énoncés consacrés au petit-déjeuner. Il y est question de *“buffet varié”*, *“petit déjeuner à volonté”*, de la liste des produits proposés. Ces énoncés sont principalement sur le registre factuel seuls quelques-uns sont plus subjectifs (buffet équilibré, buffet gourmand, ..).

“Jeûner ou petit-déjeuner ? Un dilemme que vous n’aurez pas chez B&B Hôtels : difficile de résister à l’appel des sirènes... du buffet en libre-service et à volonté, qui s’en prend sans scrupules à vos cinq sens” (B&B)

“Vous démarrez la journée du bon pied, à votre rythme : buffet varié, petit-déjeuner rapide ou service en chambre” (Ibis)

Chez *airbnb*, le service du petit déjeuner est simplement mentionné sous la forme oui/non dans le formulaire de présentation du logement.

4.2.2. Les services périphériques

Les services périphériques proposés dépendent de la gamme d’hôtel. Les hôtels très économiques proposent peu de services périphériques alors qu’ils sont nombreux

dans les hôtels étoilés. Ainsi, *Novotel* par exemple, consacre de nombreuses pages de son site aux services périphériques tels que le bar, le restaurant, les équipements sportifs, la piscine *etc.* Certaines enseignes ont développé une offre réservée aux professionnels en déplacement (espaces de travail, salles de réunions, ou même une équipe dédiée à l'organisation des réunions ou conférence).

Chez *airbnb*, peu d'informations concernent les éventuels services périphériques associés aux offres d'hébergement, à l'exception de la piscine, du jacuzzi, de la salle de sport, sous la forme présent ou absent. Pour les professionnels, *airbnb* propose des logements sélectionnés ("*business travel ready*") avec des services et des équipements adaptés ainsi qu'un système de facturation adapté.

4.2.3. Les tarifs

Tous les sites d'hôtel analysés comportent des énoncés relatifs aux prix et un programme de fidélité. Les énoncés parlent du rapport qualité/prix (*Comfort*) ou simplement du prix ("*des prix d'ami*" chez *B&B Hôtels*, "*Vous ne trouverez jamais moins cher ailleurs*" chez *Novotel*). *Choice* de son côté propose la garantie du meilleur prix Internet, tout comme *Ibis* qui garantit le meilleur prix.

"Choice Hotels garantit pour la totalité de ses établissements que les meilleurs tarifs sont sur les sites Internet de Choice. Réservez votre chambre sur ChoiceHotels.fr et si vous trouvez un meilleur tarif public pour le même hôtel, le même type de chambre et aux mêmes dates sur un autre site internet éligible, nous nous engageons à vous offrir la première nuit et à aligner le prix du reste du séjour sur le tarif le plus bas. C'est la garantie que nous vous offrons !" (*Choice*)

"Si vous trouvez moins cher ailleurs, nous vous offrons ce tarif moins 10 %" (*Ibis*)

Rien de semblable chez *airbnb*, aucun énoncé ne parle du prix. Par contre, chaque offre d'hébergement est systématiquement proposée sous la forme d'une photo du logement, de la photo et du prénom de l'hôte et du prix à la nuitée mentionnés en grand. Le prix doit être perçu comme étant attractif de fait sans avoir recours à une argumentation particulière.

4.2.4. La fiabilité

La fiabilité est souvent définie comme la capacité à réaliser le service promis en toute confiance et de manière précise. Elle est argumentée de façon très différente par les professionnels de l'hôtellerie et par la plateforme collaborative. Les premiers mettent en avant leur réseau et la standardisation qui y est mise en place, comme un premier élément d'assurance qualité. Le site collaboratif mise sur une charte de bon comportement et surtout sur les système de notation ex-post qui est censé, à la fois, modérer les tentations d'abus des deux parties et donner des informations rassurantes pour les futurs accords entre pairs. Les deux modèles déclarent aussi mettre en œuvre un service client dédié à la résolution des problèmes éventuels.

- *La standardisation, Le réseau :*

Les sites hôteliers mettent clairement en avant leur réseau d'hôtels en mentionnant systématiquement la taille de leur réseau et son implantation mondiale (*Novotel* : "*avec plus de 400 hôtels & resorts dans 61 pays*", *Ibis* : "*3 marques et 1 800 hôtels dans le monde*", *B&B* : "*245 en France, 23 en Italie, 358 en Europe*") et proposant des hébergements dans plusieurs établissements. Il en est de même pour *airbnb* qui

propose sur sa page d'accueil des liens vers des hébergements dans plusieurs villes et pays, mais bien sûr il n'y a aucune standardisation, c'est même le contraire qui serait recherché.

- Les garanties

airbnb a mis en place une Charte d'hébergement dans laquelle sont mentionnées les règles à respecter par l'hôte au sujet de la mise à jour de l'offre et du calendrier des disponibilités, le temps et le taux de réponse aux demandes d'information et de réservation des voyageurs, l'engagement vis-à-vis de la réservation, conformité entre l'offre et la réalité, la propreté. En cas d'évaluations négatives, *airbnb* se réserve le droit d'appliquer des pénalités financières, voire de retirer l'offre de leur site.

Enfin, les commentaires sont un moyen pour les voyageurs de partager leur expérience par rapport à leur séjour dans l'hébergement. Peu utilisé sur les sites hôteliers, à l'exception de *B&B Hôtels*, ils sont très systématiques et très utilisés sur le site d'*airbnb*.

- Le service client

Par ailleurs, sur les sites hôteliers, des informations sont systématiquement présentes sur le service client, via une fiche de contact, une adresse mail ou un numéro de téléphone. Par ailleurs, l'accent est généralement mis dans les sites Internet sur l'écoute, la disponibilité du personnel à répondre aux besoins. *B&B* propose même un dédommagement en cas d'incident non réglé.

"Si un incident survient et que nous ne pouvons pas le régler sur place et tout de suite, nous vous remboursons immédiatement et nous vous offrons une invitation pour votre prochain séjour." (B&B)

Chez *airbnb*, l'accent est également mis sur la disponibilité de leur équipe pour répondre aux problèmes des voyageurs. Pas de numéro de téléphone, mais bien une fiche de contact à compléter.

"Nous sommes là pour vous aider 24h/24, Que vous soyez voyageur ou hôte, communiquez avec notre équipe internationale de l'assistance utilisateurs. Ce sont de véritables interlocuteurs en chair et en os, et ils sont disponibles 24h/24, partout dans le monde."

4.3. Les commentaires des utilisateurs

La dernière partie de notre recherche vise à mettre en lumière les faiblesses et les lacunes de l'offre collaborative mais également ses points forts, tels qu'ils sont perçus par le consommateur. Dans ce but, nous avons réalisé une netnographie (Kozinets, 1997 ; Bernard, 2004). Cette méthode d'enquête qualitative considère Internet comme une source de données aisément mobilisables. Il s'agit de relever les messages postés sur des forums, des blogs *etc.* portant sur l'aspect de la consommation qui est concerné, de façon à en exprimer le sens.

Ont ainsi été relevés les contenus des commentaires, informations, conversations laissés sur le net, entre le 1^{er} mai et le 21 juillet 2016, par des voyageurs après avoir loué un hébergement *via* la plateforme *airbnb* ainsi que ceux des voyageurs ayant fréquenté les hôtels franchisés. Plus d'une centaine de commentaires ont ainsi été rassemblés, notamment à partir des blogs "*Nowmadz*" (34), "*Trust pilot*" ou "*Voyage forum*", ou encore des forums dédiés "*Igral*" pour *Ibis-budget* (48) et pour *Novotel* (31). Ils ont fait l'objet d'une analyse de contenu selon une perspective inductive de

manière à faire émerger des catégories d'analyse (Spiggle, 1994). Ces catégories recouvrent assez précisément celles déjà mises en évidence lors de l'étude de l'offre, auxquelles vient s'ajouter une évaluation globale de l'hébergement. Les *verbatim* les plus caractéristiques sont repris en conservant leur orthographe d'origine.

4.3.1. L'évaluation globale

Les internautes sont nombreux à donner une évaluation générale de l'hôtel et à commenter sa localisation.

"l'Hôtel est très bien », "une valeur sûr sur metz.... Jamais déçu"

"hôtel qui est par ailleurs très bien situé dans Madrid, a proximité des transports en commun et du centre ville"

"Hôtel située près des accès rapide, dans une zone très tranquille, de nombreux restaurant de proximité déplacement à pied"

4.3.2. Le cœur de l'offre

- *Bien dormir : la chambre.*

Près des deux tiers des commentaires des internautes ayant séjourné à l'hôtel ont trait à la chambre qu'ils s'agissent de sa taille, de sa décoration, sa luminosité ou de son équipement.

"Chambre simple mais propre et confortable. " ; "Chambre suffisamment grande pour accueillir un lit parapluie"

La literie occupe une place prépondérante dans ces commentaires

"literie très convenable" ; "La literie est tres bonne, on y dort bien"

Toutefois, les commentaires ne sont pas toujours positifs surtout dans les hôtels économiques dans lesquels la localisation des sanitaires, leur taille sont souvent source de mécontentement.

"Coin wc séparé très apprécié"

"Seule la cabine de douche qui donne directement dans la chambre est un peu étrange"

"Seul bémol la salle de d'eau trop petite impossible de se tourner devant le miroir si la porte était fermé"

Sur le site d'*Airbnb*, deux types de commentaires coexistent concernant le logement. Côté positif, ils mettent en avant son côté pratique (possibilité de faire ses repas, de se reposer pendant que les enfants font la sieste, d'avoir plus qu'une simple chambre), son emplacement et son équipement.

"De toute façon perso en voyage ou en week-end j'apprécie avoir la possibilité de préparer mes repas dans le logement ou dans un self catering car je n'ai pas forcément envie d'aller au resto quotidiennement" (Nowmadz – Nath – 19 Mai 2015)

"... on adhère bien au principe. Une chambre chez l'habitant, ça veut dire plus de place que si on louait une chambre d'hôtel, on peut accéder au salon, à la cuisine, se faire ça popotte, etc." (Nowmadz – Sego – 19 Mai 2015)

"On a choisit Alrbnb ces fois là pour pouvoir manger en automonie et surtout pour le rapport localité/Prix. Pour être au coeur des quartiers qui nous intéressaient" (Nowmadz – Pauline M – 18 Mai 2015)

Côté négatif, il est très souvent question d'absence de propreté voire d'insalubrité,

“ l'appartement est vraiment crade. Il y a des taches sur le lit, les taies d'oreiller puent, les serviettes de bain sont tachées et il y a des taches ou de la poussière en grande quantité un peu partout” (Frenchwithbenefit)

- *L'accueil et le personnel.*

Le personnel et l'accueil sont des sujets récurrents dans les commentaires des internautes ayant séjournés à l'hôtel. En effet, 28 % des commentaires font référence au personnel et 19 % à l'accueil, et ils sont presque toujours positifs. Le personnel y est notamment décrit comme professionnel, serviable, agréable, attentionné, poli, courtois, aimable, réactif.

“J'ai apprécié le professionnalisme du personnel d'accueil” ; “L'hôtesse d'accueil est toujours très polie est très gentille” ; “Personnel très sympathique et très attentionné”

L'accueil est notamment décrit comme sympathique, professionnel, impeccable, agréable. Le voyageur apprécie particulièrement de pouvoir être informé sur l'hôtel, les environs, les bonnes adresses,

“L'accueil est parfait, la personne nous a bien informé de l'organisation de l'hôtel ainsi que des choses à voir aux environs.”

Du côté d'*airbnb*, l'hôte est très fréquemment au cœur des commentaires. Même si la majorité des voyageurs louent un logement dans lequel le propriétaire n'est pas présent au moment de leur séjour, l'accueil, le partage d'expérience est pourtant fortement apprécié, comme en témoignent de nombreux commentaires.

“participer à la vie chez les gens : en nous invitant à déguster des plats pakistais à Dubaï, ou des plats portugais à Copenhague, en jouant aux mots croisés en Australie ; les propriétaires qui partent en week end et nous laissent leur appart ; les propriétaires qui nous prêtent un masque et tuba pour aller observer les poissons en snorkelling” (Nowmadz – Segó – 19 Mai 2015)

Si le voyageur loge chez l'habitant et *a fortiori* partage le logement avec l'hôte, c'est justement pour échanger, partager, rencontrer l'autre et parfois être guidé. Malheureusement, les nombreux commentaires négatifs montrent que ce partage d'expérience promis n'est pas suffisant, voire même absent.

“chambre bien grande toilette salle de bains privative, mais les propriétaires! Le compagnon passe à côté de nous (50cm) ne nous regarde même pas va au réfrigérateur puis seulement après serre la main ... Le départ le matin? Personne, ou plutôt si, ils s'était préparé du café, l'on pris dans leur chambre et ne sont jamais redescendu pour nous dire au revoir.” (Trust Pilot – Joly – 1 juin 2016)

“J'ai fait 15 jours en Irlande, la qualité des séjours variant du tout au tout. Certains vont être au petit soin, en mode chambre d'hôte : guides & cartes dispos sur le lit en arrivant, conseils avisés de l'hôte, petit déjeuner en commun avec la famille (parfois pas prévu mais gratos); et d'autres à l'arrache complet, en mode rien à foutre : personne à l'heure d'arrivée, fantômes (hôtes présents mais aucun échange), chambre, vaisselle et pièces communes dégueulasses...” (Jeux Vidéo – Fuser – 15 février 2016)

De plus, certains regrettent une dérive par rapport à l'esprit initial du collaboratif qui reposait sur de l'hébergement de particulier à particulier. Si c'est encore le cas pour de nombreuses offres, certains internautes constatent que les logements proposés

ne sont plus ceux des hôtes, mais bien des logements destinés uniquement à la location et qu'une même personne en propose parfois plusieurs, ce qui modifie tout un aspect de l'offre. Cette dérive peut aboutir à ce que seul le côté financier prime pour l'offreur et que le consommateur en prenne clairement conscience. Ce qui paraît légitime chez un professionnel peut alors être vécu comme un abus.

“Maintenant ce sont souvent des agences qui louent en passant par Airbnb. C'est une usine”. (Jeux vidéo – Mononucleoze – 15 février 2016)

“... Finalement l'esprit initial de Airbnb n'est plus là. La raison qui mettait en relation des personnes disposants d'espaces pour dormir dans la convivialité cédé la place au business à tout crin... Finalement c'est sans doute mieux à l'hôtel” (Nowmadz – Perdaems le 13 avril 2016)

“... pensant avoir à faire à des particulier, il y a aussi pas mal de pros que s'en servent comme outils de promo”

“Nous avons réservé le 28 mars 2016 un logement pour 2 nuits à Édimbourg en Ecosse, séjour que nous avons payé intégralement 95£ la nuit. Nous avons reçu une confirmation de réservation. La semaine dernière, soit 3 semaines avant le départ, la propriétaire nous contacte nous disant que, comme Août était la période des festivals dans cette ville, le prix de la nuitée passait à 170£ !!!” (Nowmadz – Just – 4 juillet 2016)

- *Bien commencer la journée : le petit déjeuner*

Le petit déjeuner est abordé dans 24 % des commentaires laissés par les voyageurs ayant séjournés à l'hôtel. Ils apprécient qu'il soit complet, varié, copieux, bon, suffisant, de qualité.

“nous avons prit le petit déjeuner sur place et le prix est correct car très copieux et bon”

“un très bon déjeuner avec beaucoup de choix”

Aucun commentaire sur ce point n'a été relevé chez les internautes ayant fréquenté un hébergement *via airbnb*.

4.3.3. Les services périphériques

Les services périphériques font également l'objet de commentaires chez les internautes ayant fréquenté l'hôtel. Ainsi, le parking est abordé dans 22 % des commentaires. Il semble que la présence d'un grand parking gratuit, fermé, sécurisé soit un véritable atout pour un hôtel et qu'à défaut, une solution proposée par l'établissement sous la forme d'un parking payant, mais peu onéreux, soit vraiment appréciée.

“l'hotel est doté d'un garage très pratique, le tarif du garage s'élève à 5 euros par nuit le prix est en dessous des prix affichés dans d'autres hôtels pour un garage”

“tous les parking publics sont payants. En réponse, l'hôtel propose des places à la journée dans un parking couvert pour seulement 7€ par jour”

Enfin, l'accès au *wifi* est particulièrement apprécié et les commentaires positifs soulignent sa gratuité et la qualité de la connexion. D'autres services liés à l'infrastructure sont abordés de manière plus épisodique comme la restauration, le bar, la présence d'une salle de sport, de jeux, ...

airbnb ne proposant pas systématiquement de services périphériques, aucun commentaire n'a été relevé sur ce point.

4.3.4. Les aspects financiers

Le prix est également un thème majeur puisque 35 % des commentaires des voyageurs ayant séjourné à l'hôtel y font référence, en particulier dans le cas d'un hôtel économique. On y parle surtout du rapport qualité-prix.

Du côté des voyageurs d'*airbnb*, le prix est certainement le point positif le plus important. Les expériences des internautes rapportent qu'il s'agit d'une solution économique de logement car il est possible de louer un logement entier pour le prix d'une chambre d'hôtel.

“Ca nous est revenu bien moins cher qu'une petite chambre d'hôtel et cela nous a également évité de trop avoir à dépenser en restaurants, laverie, etc.”

“Mais surtout, le prix est presque divisé par deux”

S'ils regrettent parfois que le prélèvement se fasse immédiatement au moment de la réservation, ils apprécient que le versement à l'hôte ne soit fait par la plateforme que 24h après l'arrivée dans le logement.

“Le règlement se fait par carte bancaire ou par Paypal. Airbnb conserve l'argent et ne le verse que 24h après l'arrivée effective dans les lieux. Cela permet, en théorie de régler ou d'éviter les litiges” (Nowmadz – Lydia – Mai 2015)

Néanmoins, plusieurs commentaires trouvent excessifs les frais de service prélevés par *airbnb* et le coût parfois élevé des frais de ménage.

“Vous trouverez les mêmes locations, mais en moins cher, sur Abritel, Homelidays ou Vacancesespagne.fr, car sur ces sites, il n'a pas de frais de service. Parfois ces frais de service s'élèvent à 100€, voire plus, tout dépend du montant global de la location (pourcentage). Je viens d'en faire l'expérience, hier. Je viens de réserver un petit appartement pour 800 € la semaine (Mijas, en juillet), sur Abritel. Le même logement, avec le même propriétaire, aux mêmes dates, était à 920 € sur AirBnB (800 € + 120 € de frais de service)” (Voyage Forum – Genal – 15 juin 2016)

4.3.5. La fiabilité

- La standardisation

La standardisation des prestations hôtelières inhérentes aux chaînes hôtelières est attendue par le client et le rassure : les prestations seront de même niveau dans tous les hôtels, il sait à quoi s'attendre.

“La prestation est conforme au standing des hôtels accors” ; “Une chaîne d'hôtel où on n'a jamais de mauvaise surprise.”; “Novotel est sans surprise” ; “Cet hôtel est toujours identique donc rien à dire” ; “C'est standard sur tous les Novotel en Europe” ; “Les hôtels IBIS se ressemblent tous donc aucune déception à avoir quand on les choisit”; “Après, Ibis Budget c'est sans surprise, ils sont tous pareils à peu de chose près”

A l'opposé, chez *airbnb*, le côté hétérogène des offres est mis en avant et est, sans doute, recherché par les voyageurs. Cependant, malgré cette offre très diverse, le voyageur attend que la réalité de la prestation soit conforme à ce qui en est montré sur le site et les commentaires relevés montrent que ce n'est pas toujours le cas.

“quel plaisir de dénicher par photos allechantes l'appartement avec terrasse qui permettra de passer 10 jours de vacances à Tel Aviv du 05 au 15 Juin

2016. Seulement à l'arrivée dans l'appartement qui s'avère n'être qu'un studio, il a fallu déchanter. La chambre n'était qu'un lit bloqué entre le mur et une cloison: la seule façon de se coucher aurait été de monter par le pied du lit, car pas même 1 cm de chaque côté. Aucun rangement prévu pour les vêtements, donc le propriétaire avait mis une "armoire" en tissus dans le salon (pas sur la photo de l'annonce). Concernant le coin cuisine, dans le salon, on apercevait la plaque de cuisson juchée sur le haut de l'élément suspendu (pas d'échelle ou d'escabeau en vue pour y accéder). Dans l'entrée du studio, un très gros trou dans le coffrage des tuyaux laissait presager un passage pour les nuisibles. Le sol du studio était très sale" (Trust Pilot – Alain Hubel – 8 juillet 2016)

- Les garanties :

Chez les utilisateurs d'airbnb, de nombreux commentaires signalent la possibilité pour les hôtes d'annuler la location, même au dernier moment, laissant ainsi les voyageurs dans le plus grand désarroi.

"j'ai réservé l'été dernier pour un voyage de 15 jours à Los Angeles. L'hôte a annulé à 2h du matin heure française alors que nous décollions à 7h vers LA. Nous avons réussi à trouver un autre logement mais beaucoup moins bien et plus cher. Nous avons décidé de retenter l'expérience cette année pour Miami beauc. Même scénario, annulation par l'hôte pour aucune raison valable" (Trust pilot – Katou - samedi 23 avril 2016)

Ce point n'est pas apparu dans les commentaires des voyageurs utilisant l'hôtel.

- Le Service client

En cas de problème, le client veut pouvoir bénéficier d'un service clientèle afin de trouver une solution à son problème ou obtenir réparation du préjudice subi. Chez airbnb, les commentaires négatifs les plus nombreux ont trait au service client. Si certains internautes vantent la réactivité du service, nombreux sont ceux qui mettent en cause sa compétence et qui soulignent la difficulté à entrer en contact avec lui. Ce service client n'est joignable que par mail et une fois obtenu un numéro de téléphone, le temps d'attente est ensuite très long (plus d'une demi-heure) avant d'obtenir un correspondant. Cela relève d'un grave dysfonctionnement car la qualité du service client fait partie des promesses mises en avant par la plateforme

De nombreux commentaires signalent également des difficultés de remboursement rencontrées en cas de problème (annulation, logement insalubre, ...) : soit le remboursement est long et nécessite plusieurs appels et courriels, soit il est très partiel voire refusé. D'autres se plaignent de l'absence d'aide en cas de problème sur place.

"Aucun numéro de téléphone sur le site, contact uniquement par mail. Et en plus ils vous répondent en anglais! (pas gênant pour moi mais j'imagine à ceux qui ne parlent pas anglais!" (Trust Pilot – Gilles Mooknice – 5 juillet 2016)

"Non remboursement alors que l'Hôte à annulé la réservation juste après que ma réservation ait été acceptée. Je me suis fait planter et j'ai payé pour un logement que je n'ai jamais vu ! Impossible de joindre Airbnb qui ne répond pas à ma demande. Il n'y a aucun suivi de la part de cet organisme qui se contente de prendre sa commission. C'est du vol !" (Nowmads – Vincent – 23 novembre 2015)

4.3.6. Synthèse des comparaisons

Cette première analyse permet d'établir un certain nombre de constats rassemblés dans le tableau 3.

Tableau 3 : Synthèse des comparaisons

	Modèle plateforme collabora- tive (<i>Airbnb</i>)	Modèle classique des services (<i>Accor/ Choice/B&B</i>)
Sujet	Vous	Nous
Contexte	Le monde	Le réseau
Promesse marketing	Vivre, rencontrer, aimer, découvrir	Bien dormir, bien manger, ressentir du bien-être, "on s'occupe de tout"
Arguments marketing	Les hôtes, les expériences vécues, les lieux.	La fleur de service
Les sujets communs mais traités différemment : Prix Echec prestation de service	Prix présenté, critère de choix. Action déterminée et difficile des clients pour obtenir une compensation.	Prix argumenté. Politique de réparation
Slogan type	Réservez des logements auprès d'hôtes locaux dans plus de 191 pays et vivez là-bas, comme chez vous.	Jour et nuit, nos équipes sont à votre écoute. On s'occupe de tout. On s'occupe de vous 24h/24. Votre sommeil est notre priorité. Votre chambre et votre lit sont d'un confort absolu (Ibis)
Représentation graphique	Film de rencontres et moments partagés. Les hôtes et les voyageurs	Des photos des lieux, descriptif technique (lit), actions promotionnelles, mise en scène professionnelle des lieux et offres de service

Les hôtels proposent une offre complète associant le cœur de l'offre (l'hébergement et l'accueil) avec des services périphériques plus ou moins étendus (petit déjeuner, location de voiture, etc.). Cette offre complète constitue une vraie fleur de services, comme l'a définie Lovelock (2000) qui couvre au mieux les besoins principaux et secondaires des clients.

airbnb, de son côté propose un nombre d'hébergements nettement plus important que l'offre hôtelière. Cette offre est très diverse, voire hétérogène, mais cela permet de répondre aux souhaits, besoins, désirs de chacun. Cependant, contrairement aux hôtels, *airbnb* ne maîtrise ni le cœur de l'offre ni les services périphériques. En effet, ce sont les hôtes et eux seuls qui gèrent leur logement (l'équipement, l'organisation, la propreté, la localisation), les réservations, l'accueil, les services annexes (petit déjeuner, draps et serviettes, *wifi* etc.). *airbnb* ne peut donc pas communiquer sur le contenu de l'offre. Il communique donc plutôt sur l'esprit, la sécurité des transactions, son service client qui devient un élément essentiel de sa crédibilité.

La dichotomie organisationnelle de l'offre collaborative impacte la qualité de service car elle introduit des éléments de déresponsabilisation des offreurs (annulation surprise des réservations par les hôtes, difficultés pour obtenir le remboursement, propreté critiquable, non-conformité du logement par rapport à l'annonce). Au-delà des problèmes de qualité de la prestation de service, c'est également la fiabilité du service client qui est clairement mise en cause (délai, réponse dans la langue de l'utilisateur, absence de ligne téléphonique dédiée, absence d'aide sur place). La confiance établie entre pairs trouve là une limite, alors que l'offre intégrée des hôtels permet la mise en place d'une politique de réparation en cas d'échec de la prestation de service.

5. Conclusion

Cette recherche apporte quelques éléments permettant une meilleure compréhension de ce nouveau phénomène qu'est la consommation collaborative d'un point de vue marketing : la description, l'analyse des offres et de leur perception par les utilisateurs. Ce travail souligne les différences des propositions commerciales et marketing faites aux utilisateurs en fonction de leurs modèles économiques.

La cartographie a permis d'établir un premier état des lieux de cette nouvelle forme de consommation en soulignant l'existence de trois modes opératoires : sans contrepartie, avec contrepartie réelle, et avec contrepartie financière. Ce dernier concentre notre intérêt car il vient directement concurrencer les modèles conventionnels du secteur. L'analyse approfondie des arguments marketing de plusieurs sites de chaînes hôtelières a permis de souligner que les offres proposées présentent peu de points communs avec le principal site collaboratif. Tous, cependant, prévoient une réassurance afin d'établir la confiance nécessaire à toute transaction. D'un côté, une offre de service détaillée basée sur une véritable fleur de service, de l'autre une promesse d'expériences sans limites géographiques. Enfin, la netnographie permet de révéler comment les consommateurs perçoivent les offres et les promesses qu'elles contiennent. Les commentaires étudiés sont rarement neutres : soit positifs, soit négatifs. Les sujets abordés sont rarement les mêmes, à l'exception des cas de défaillance du service et de considérations sur les prix, sujet abordé dans 35 % des commentaires étudiés. D'un côté, la perception de l'offre de services est déclinée par les commentaires portant sur le modèle conventionnel (localisation, chambre, accueil, personnel en contact et petit-déjeuner), tandis que de l'autre côté, pour le modèle collaboratif les remarques concernent plutôt les hôtes et les expériences vécues.

Ce travail présente bien sûr des limites, notamment du fait que le modèle collaboratif évolue vite et le modèle conventionnel également. Soulignons par exemple l'acquisition récente par le groupe *Accor* de la société *Fastbooking* en avril 2015, acteur spécialisé dans la création de sites web, afin d'accélérer la digitalisation de l'entreprise dans le cadre de son plan *Leading Digital Hospitality* (*Xerfi*, 2015). L'étude sur une période plus longue peut révéler de nouveaux éléments. Le choix de certaines enseignes peut également constituer une limite, l'analyse qualitative exploratoire n'a cependant pas pour but d'être représentative mais de couvrir un large éventail de situations pour identifier les concepts pertinents. Malgré tout, ce premier travail ouvre des perspectives de recherche futures, notamment pour approfondir le point de vue des consommateurs vis-à-vis de chacun des modèles : quels critères de préférence et selon quelle hiérarchie pour chaque modèle ? Quels éléments contextuels viennent changer la donne ? Des profils particuliers de consommateurs peuvent-ils être identifiés ? On peut également s'interroger sur l'impact pour le consommateur des deux styles de communication si différenciés selon le modèle : celle-ci peut jouer comme un frein ou une motivation et en fonction de quels déterminants (âge, style de vie...). Enfin le sujet de la confiance mérite à l'évidence d'être approfondi, les utilisateurs déçus par une plateforme collaborative sont-ils définitivement perdus pour celles-ci ? Quels éléments de garantie le modèle conventionnel peut-il mettre en avant pour séduire cette cible ?

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THE STUDY ON NATIONALITY STRUCTURE OF SERVICES IMPORTS IN CHINA:BASED ON THE VALUE-ADDED TRADE ESTIMATION

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This paper uses the world input-output table (WIOD) based on value-added trade estimates the overall service industry and different intensive type of services import country (region) structure of China, and compared with the traditional total value accounting methods. Meanwhile, the paper also discusses the effect of the GDP, services imports and goods imports on services imports. The results are following. (1) The imports market of China's services value-added are mainly from the developed countries, and the developing countries is accounting for relatively small. (2) Chinese Knowledge and technology-intensive services imports from developed countries are a higher proportion, but there still exist differences of the import country (region) structure for different element intensity services in the two calculation method. (3) Indirect services value-added imports caused by goods imports are slightly larger than direct services value-added imports through services imports. So, China must play the spillover effects of services imports, improve the services imports quality and expand services imports appropriately, and add supporting intensity of the advanced technology-intensive manufacturing and encourage imports service elements.

Key Words: value-added trade, services import, country or region structure

1. Introduction

Under the impact of "On the balance of trade" of mercantilism and "infant industry protection theory" of Liszt, the scholars and practitioners from domestic and foreign almost all advocate their own interests to expand exports. Based on these, our government has been implementing "Reward export and import restrictions" trade policy, and the trade surplus is considered as an important indicator of economic development and growth. However, the frequent trade friction induced by huge trade surpluses and enormous pressure of RMB appreciation brought by huge foreign exchange reserves have led us to re-examine our trade policy, while China has become the world's largest exporter. At the same time, although the "Made in China" label has been all over the world, China's manufacturing exports mainly dependent on cheap labor and capital investment are still in the low end of the global value chain, and have been a series of more serious questions caused by the spread of the financial crisis, such as a small part of the large foreign-funded enterprises

dominate China's export trade (Manova & Zhang, 2009), "inhibition effect" resulting in a business increase value ratio (Zhang Jie, 2013), and developed "capture" (Niu Weiping, 2012) by the developed countries and many more. However, faced with the third industrial revolution, more and more countries had invested productive services to manufacturing which is the middle - investment industry with knowledge-intensive, technology-intensive. Professional services provided the manufacturing industry with transportation and warehousing, finance and insurance, for R & D, computer software, telecommunications and other communication services, whose role is recognized around the world. Keller (2002) had pointed out that OECD had achieved the increasing of domestic technology by increasing producer services imports, the importation trade of production service has a positive role in promoting the development of the manufacturing sector of the importing country (Hoekman, 2006), not only to enhance our manufacturing industry efficiency (Mongolian Anglo and Yin Xiangshuo, 2010), and also to promote a long-term manufacturing endogenous growth stabilizing (Yeling Li and Zhao Linhai, 2008), it is a leading force in the industrial structure adjustment and up the value chain target (Liu Zhibiao, 2014). In other words, the productive service importing trade, as an important part of trade in services, become more and more important of import as an increasingly highlighted (Yang Ling, 2014). In fact, the developed countries in the new international division of labor almost all are of the top global or regional service center now, they firmly occupied the top of global Global Value Chain and create most of new wealth through the provision of high-quality production services or services for consumption to other countries. In this regard, the State Council file about "a number of opinions support the steady growth of foreign trade" (Guo Ban Fa [2014] No. 19) made it clear to gradually expand the service imports, and about "Opinions on Strengthening imports" (SCS No. [2014] 49) further pointed out that we should vigorously develop trade in services imports, actively expand domestic knowledge needed advice, research design service, energy saving, environmental services, technology-intensive production and imports of services and tourism imports. Under the impetus of this series of policy, China's imports of services have made great progress. In the period of "the Twelfth Five-Year Plan", China's services import and export rising global rankings. According to WTO statistics, China's total trade in services in 2015 ranked second in the world, China's service imports grew 18.6%, the proportion of services imports in the total imports (of goods and services and imports) was 20.2%, the gap of service importation between China and the United States ranked first in the world narrowed sharply to \$ 32 billion, and services trade deficit narrowed to \$ 136.62 billion.

However, research on imported services are mainly concentrated in two areas, one is the research on services imports promoting manufacturing efficiency and the relationship between services imports and economic growth, the main opinions are that services importation can promote manufacturing technical progress and efficiency raising of a country by a series of effects and means, such as the accumulation of physical capital, human capital, institutional changes, and so on (Mary Amity & Shang-Jin Wei, 2005. Francois & Woerz, 2007. Alan Macpherson, 2008. Fan Xiufeng, Han Yafeng, 2012. Wang Chao Yi, 2013. Moshua, Zhou Xiaoming, 2015. and etc.). The other one is on the status of services importation, such as total trade, industrial structure and industry structure and complexity degree of the services imports (Li & Murtaza, 2007. Marvasi, 2010. Yang Ling, 2014. and etc.). However, the existing studies have paid little attention to structural problems of importing country, and a large number of existing research results are based on

estimated gross calculation method .However, the division of labor in the global value chain model, the traditional gross calculation method can not avoid facing repeated calculation problem , in some ways it is difficult to reveal the true status of a country's industries (including services) , whereby the scientific of conclusions based on this calculation metod may also be questioned.Moreover, The Development of " trade value-added " concept and a series of related empirical research had provided another idea (Koopman, Wang and Wei 2014, Timmer et al 2014), and together with the database development of the World Input-Output Database (WIOD) and the Trade in value added (TIVA) , so these new ways of thinking about trade and the new data make economists better describe the true origin of added value of country and industrial imports (Richard Baldwin, Rikard Forslid and Tadashi Ito , 2015) .Based on this, this paper will use the input-output table (WIOD) data and trading framework based on the added value to estimates services imports structure at the angle of the overall service industry and different elements intensive types of the country (region) from 1995 to 2011, and comparing with the traditional gross calculation method,to clear the "macro" features of China`s service imports as well as " substructure " Evolution under a category services, and to study the factors influencing China`s service imports At last,this paper try to provide scientific basis for enhancing China the international competitiveness of services and policy formulation of opening up service industries.

2. The research methods and data sources

2.1 Research Methods

Reference the method of Johnson and Noguera (2012) to measure a country's industrial value-added export levels , thus indirectly measure a country's industrial value-added import level. According to the definition of Johnson and Noguera (2012) , the value-added export is the value-added of production in a country and end-use in another country. Moreover , a country's industrial added value imports include not only imports value achievement from the industry's directly imports, but also indirectly achieved by other industry imports. Based on the formula (1) to measure the value of a country's exports :

$$VT = \begin{bmatrix} VT_{11} & VT_{12} & \dots & VT_{1G} \\ VT_{21} & VT_{22} & \dots & VT_{2G} \\ \vdots & \vdots & \ddots & \vdots \\ VT_{G1} & VT_{G2} & \dots & VT_{GG} \end{bmatrix} = VBY$$

$$= \begin{bmatrix} V_1 & 0 & \dots & 0 \\ 0 & V_2 & \dots & 0 \\ \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & \dots & V_G \end{bmatrix} \begin{bmatrix} B_{11} & B_{12} & \dots & B_{1G} \\ B_{21} & B_{22} & \dots & B_{2G} \\ \vdots & \vdots & \ddots & \vdots \\ B_{G1} & B_{G2} & \dots & B_{GG} \end{bmatrix} \begin{bmatrix} Y_{11} & Y_{12} & \dots & Y_{1G} \\ Y_{21} & Y_{22} & \dots & Y_{2G} \\ \vdots & \vdots & \ddots & \vdots \\ Y_{G1} & Y_{G2} & \dots & Y_{GG} \end{bmatrix} \quad (1)$$

Formula (1), assuming that there are G countries in worldwide , N sectors , and V is the GN row and GN column , which is direct domestic value added coefficient

matrix of the world's countries, V_s is the diagonal matrix with N rows and N columns whose element in the diagonal line is various sectors of direct value added coefficient of the country s ; B is the global Leontief inverse matrix row with GN row and GN column. Bsr is N rows and N columns which represents the total production demand from the country s when the national r increase additional unit of final demand. Y is GN row and G column, which is the final product used matrix around the world, Ysr is N rows and 1 column, which represents the final production demand vector of state r from the countries S .

Formula (1) described the value-added export distribution between countries in each country (industry). VT is the global value-added production and export matrix with GN row and GN column. $VTsr$ is N rows and N columns matrix which represents the value of national S production but end-use of the National r . VT_{ss} elements in the matrix VT diagonal indicates value-added which is produced by country s and used in domestic, such as the VT_{11} represents value-added of both production and end-use in the country 1. and the elements in the non-diagonal of the matrix VT constitute a matrix of bilateral value-added trade between the countries, such as the VT_{12} showing the added value of production in Country 1 and end-use in Country 2, namely the value-added export from country 1 to country 2 is the import of country 2 from country 1. the first row the off-diagonal elements of matrix VT is obtained by adding the sum of the rest of the world countries value-added exports. The meanings of matrix VT other lines are similar to the first row, the diagonal elements VT_{22} in the second row represents the added-value of production in country 2 and end-use in country 2 own, while other elements like VT_{2i} ($i \neq 2$) represents the value-added of production in country 2 but end-use in Country i , that means that the added value export of country 2 to country 1 is the imports of countries i from country 2. And so on. Therefore, using the formula (1) can measure a country's (industrial) value-added exports, thereby indirectly measure a country's (industrial) added value of imports.

2.2 Data

According to the above method, the calculation of a country's industrial imports of value-added need the world input-output matrix data. At present, more authoritative and popular used international input-output table has four data, such as the international input-output table developed by OECD and the World Trade Organization, and GTAP database, Asian international input-output table, WIOD data. Among them, the first three database contains only a few years the world input-output tables, and discontinuous in time. However, The WIOD database developed by EU can provide the world input-output tables from 1995 to 2011, covering 17 years time series data of 35 industries in 41 countries. among these, and from the 18th to 35th categories is about services and a total of 18 services sector (see Table 1), which can provide detailed data for this paper estimating China and the world's major economies and their industry's value-added import and export. So, Taking into account the continuity and integrity of the data, we use the latest release of the world's EU WIOD input-output tables. At last, this paper, according to the above-mentioned measurement methods, estimates China's service industry bilateral value-added imports from 1995 to 2011, and study country or regional structure of China's services value-added imports.

Table 1 the code and name of service sector in the world the input-output table

Code	Name	Code	Name
c18	Construction	c27	Post and Telecommunications
c19	Sale, Maintenance and Repair of Motor Vehicles and Motorcycles; Retail Sale of Fuel	c28	Financial Intermediation
c20	Wholesale Trade and Commission Trade, Except of Motor Vehicles and Motorcycles	c29	Real Estate Activities
c21	Retail Trade, Except of Motor Vehicles and Motorcycles; Repair of Household Goods	c30	Renting of M&Eq and Other Business Activities
c22	Hotels and Restaurants	c31	Public Admin and Defence; Compulsory Social Security
c23	Inland Transport	c32	Education
c24	Water Transport	c33	Health and Social Work
c25	Air Transport	c34	Other Community, Social and Personal Services
c26	Other Supporting and Auxiliary Transport Activities; Activities of Travel Agencies	c35	Private Households with Employed Persons

Data: World Input-Output Database, www.wiod.org.

3. Calculation results and analysis

3.1 Services overall estimation

According to estimation results in Table 2 ,we can get some information. (1) Approximately two-thirds of China`s services imports are from developed countries,and Japan and the United States share the majority and were more than 10%.But Japan's share showed a downward trend. Japan's held largest share before 2005 and the United States surpassed Japan after 2005.followed by Germany , the share of imports is at 5.8% between ~ 10.2. other European countries , such as Australia , France, Britain and other times , is substantially less than 5 % . (2) the proportion of services imports from emerging industrial economies like Korea and Taiwan is declined largely and between 8.7% ~ 15.4 . (3) the share of service imports from BRICS is small but steady increase between 2.3% ~ 7.8 ,and Russia's share is relatively larger than Brazil and India . (4) the share from other developing countries is little and holds volatility in between 12 to 20%. In short , the value-added imports of China's services is mainly from developed countries led by the US and Japan and Germany , followed by the newly industrialized economies of Korea , Taiwan and other BRIC countries.

Table 2 the country (region) structural of services import of China based on value-added in trade calculation unit ,%

	1995	1997	1999	2001	2003	2005	2007	2009	2011
Developed countries	69.20	69.05	68.10	65.18	67.63	65.11	68.89	67.55	66.08
United States	15.44	17.04	15.84	16.37	14.29	14.37	15.83	16.57	17.13
Japan	19.94	19.12	17.90	15.94	16.19	14.83	13.33	12.92	10.27
Australia	3.22	3.89	2.96	2.33	2.46	3.10	3.50	4.43	5.46
Canada	2.40	2.20	1.66	1.90	1.65	1.78	2.16	1.92	2.08
Germany	6.67	5.86	6.66	7.11	9.07	8.47	9.01	10.13	8.81
France	4.19	3.80	3.51	3.64	3.44	3.51	3.28	4.31	4.35
United Kingdom	4.37	4.95	6.16	3.99	3.60	3.56	5.67	3.14	3.43
Italy	4.08	3.77	3.16	3.05	2.93	2.82	2.76	2.96	3.27
Netherlands	2.30	2.04	2.16	3.03	4.54	3.45	2.94	3.20	3.14
Spain	1.40	1.32	2.00	2.69	3.35	3.00	3.51	0.86	0.85
Belgium	1.75	1.67	1.66	1.13	1.21	1.14	1.44	1.37	1.63
NIEs	12.77	15.38	13.92	12.40	12.59	11.98	10.41	9.36	8.70
Korea	6.25	7.07	6.09	5.30	6.21	6.19	5.68	4.91	4.71
Taiwan, China	6.52	8.31	7.83	7.10	6.39	5.79	4.73	4.45	3.99
BRICS	2.34	3.42	2.82	3.72	4.18	5.46	5.92	6.01	7.71
Brazil	0.61	0.81	0.54	0.63	0.81	1.12	1.37	1.92	2.08
India	0.44	0.92	0.94	1.35	1.27	1.48	1.55	1.10	1.45
Russia	1.29	1.69	1.34	1.74	2.09	2.86	3.00	2.99	4.18
Other developing countries	15.69	12.16	15.16	18.71	15.59	17.45	14.78	17.08	17.52

Then, we added a further comparison of estimation results of China's Services imports Country or Region structure between value-added in trade calculation methods and the traditional trade estimates methods. Table 3 is the China's services import country (region) structure based on the traditional trade calculation method from 1995 to 2011. however , compared with the calculation results in Table 1 ,there are similarities between the two. (1) Either calculation method , the developed countries occupy a major share and developing countries accounted for a relatively small in China's services imports.(2) the estimation results of two kinds of calculation methods also show that the proportion of services imports from emerging industrial economies of Korea and Taiwan are in decline , while the proportion from the BRIC countries has risen steadily.

But more importantly, there is a significant difference between the two measurement results . compareing the results of Tables 2 and 3 ,we can found differences in the following aspects. (1) Based on value-added in trade estimating, the share of developed countries is relatively stable and were between 64.6% ~ 69.2% .while the results of calculations based on traditional trade calculation method, the share of developed countries fluctuated between 50.8% ~ 74.9 . (2) based on the results of the traditional calculation calculation , the share of China's services imports from the United States is largest and rising fast from the lowest with less than 8% to the highest with 26.05%in 2010. while based on the results of the value-added in trade calculation, the share of services imports from the United States is relatively stable between 13.4% ~ 17.2% . (3) Based on estimated results of traditional trade calculation method, the proportion of Japan is low and much lower than the results based on value-added trade calculation method.German is relatively similar situation, but the differences between the two calculation methods is not so big in Japan. while the Netherlands and Australia are on the contrary , the share

based on traditional trade calculation method is higher than based on the value-added in trade calculation method. Based on the traditional trade calculation method, Taiwan, one of the emerging economies, holds extremely small proportion and even zero in recent years. But based on the value-added in trade calculation method, its proportion are not small and fluctuating between 3.9% ~ 8.4%. (5) the share from other developing countries based on the traditional calculation method is higher than based on the value-added in trade calculation method before 2009, but it is on the contrary after 2009.

Table 3 the country (region) structural of services import of China based on traditional trade calculation method unit %

	1995	1997	1999	2001	2003	2005	2007	2009	2011
Developed countries	61.44	69.40	65.38	53.50	68.08	56.73	71.98	71.98	72.82
United States	10.03	12.21	7.99	9.38	10.43	11.31	15.87	21.69	25.51
Japan	7.93	12.09	6.74	3.01	4.03	4.25	4.68	4.83	1.73
Australia	5.64	6.07	3.21	2.34	2.99	3.44	4.15	6.19	6.55
Canada	4.67	4.81	1.71	1.37	1.41	1.43	2.26	1.88	1.63
Germany	3.12	2.45	2.91	2.96	7.02	5.25	6.55	7.83	6.73
France	1.80	1.34	1.07	1.41	1.62	1.83	1.23	5.10	4.77
United Kingdom	7.16	8.61	13.98	2.35	2.17	1.98	9.43	3.15	3.34
Italy	4.77	4.84	2.35	2.10	1.79	1.94	1.69	2.65	3.76
Netherlands	4.39	3.56	4.60	9.53	14.54	8.06	6.15	7.48	6.62
Spain	3.05	3.71	7.75	11.47	12.15	8.77	9.48	0.20	0.12
Belgium	3.67	4.59	5.25	1.63	1.39	1.13	2.21	2.11	3.06
NIEs	9.24	9.23	8.10	7.40	8.77	7.44	5.75	3.62	4.87
Korea	9.15	9.13	8.01	7.32	8.73	7.43	5.75	3.62	4.87
Taiwan, China	0.09	0.10	0.09	0.08	0.04	0.01	0.00	0.00	0.00
BRICS	0.73	2.63	1.75	4.43	3.77	6.32	5.77	3.37	6.59
Brazil	0.03	0.03	0.01	0.01	0.03	0.15	0.08	0.10	0.13
India	0.21	0.24	0.47	2.47	0.93	0.82	0.67	0.29	0.29
Russia	0.49	2.36	1.28	1.95	2.81	5.35	5.01	2.98	6.17
Other developing countries	28.60	18.74	24.77	34.67	19.38	29.51	16.50	21.04	15.72

3.2 Services classification level estimation based on factor intensity

To further analyze the Country structure and trends of services import, this paper took the classified investigation the above-mentioned 18 service sectors in accordance with factor intensity characteristics. In this paper, 18 service sectors were divided into three categories reference WIOD data build instructions and Stehrer's Industrial Division for WIOD (2012). In Table 1, c18, c19, c20, c21, c22, c26 and c35 of 18 services sectors are classified as labor-intensive services, the c23, c24, c25, c27 and c29 classified as capital-intensive services, the c28, c30, c31, c32, c33 and c34 classified as knowledge and technology-intensive services. Then, based on the value-added in trade calculation method, the paper measures the country structure of China's three categories of services import from 1995 to 2011. And, to knowing the Country structure and trends of services import, this paper reported the results of the above two methods together.

Table 4 the country (region) structural of different elements intensive services import of China based on value-added in trade calculation unit ,%

		1995	1997	1999	2001	2003	2005	2007	2009	2011
Developed countries	the labor-intensive services	66.74	68.08	65.30	63.01	62.70	61.39	62.21	61.11	57.95
	the capital-intensive services	66.44	64.03	64.23	60.49	61.47	59.63	61.15	60.03	56.90
	the knowledge and technology intensive services	73.10	72.46	71.95	68.90	73.78	70.22	76.87	75.15	75.51
NIEs	the labor-intensive services	11.08	14.01	14.33	13.42	14.06	14.07	12.24	11.80	10.62
	the capital-intensive services	15.14	17.50	16.43	14.72	14.92	13.20	12.06	10.60	10.16
	the knowledge and technology intensive services	13.29	15.62	12.52	10.58	10.55	9.95	8.43	7.17	6.77
BRICS	the labor-intensive services	3.00	4.32	4.10	4.91	5.60	6.86	7.64	7.88	10.33
	the capital-intensive services	2.91	4.69	3.21	3.94	4.86	7.74	8.22	8.40	10.80
	the knowledge and technology intensive services	1.38	1.93	1.65	2.71	2.88	3.43	3.73	3.72	4.61
Other developing countries	the labor-intensive services	19.19	13.60	16.26	18.66	17.64	17.68	17.91	19.21	21.10
	the capital-intensive services	15.51	13.79	16.13	20.85	18.74	19.43	18.58	20.97	22.14
	the knowledge and technology intensive services	12.24	9.99	13.88	17.80	12.79	16.41	10.97	13.96	13.11

Table 4 shows the country (region) structure of the different elements intensive services import in China based on value-added in trade calculation method. According to the results shown in Table 4 , we can find the following feature. (1) no matter what type of services, China`s services are mainly imported from developed countries . the import share of knowledge and technology-intensive services especially is from the developed countries and more than 70%, and the import share of the labor-intensive services from developed countries is slightly more than capital-intensive services. (2) For all types of services , the share of imports from the newly industrialized economies of Korea and Taiwan shows a downward trend. the import share of knowledge and technology intensive services holds the largest decline and down about 7% and followed by capital-intensive services, but the labor-intensive services are relatively stable .(3) no matter what type of services , the import share from the BRIC countries showed a significant upward trend.the capital-intensive services showed the largest increase with 8%,and labor-intensive services also increased very significantly with 7%, and the knowledge and technology intensive services is relatively small rise with 3%. (4) For services imports from other developing countries, only the import share of capital intensive services increased significantly, and most of the year accounted for more than the labor-intensive services .

Table 5 the country (region) structural of different elements intensive services import of China based on traditional trade calculation method unit ,%

		1995	1997	1999	2001	2003	2005	2007	2009	2011
Developed countries	the labor-intensive services	59.85	75.31	74.91	66.70	59.97	49.83	54.14	60.08	56.59
	the capital-intensive services	71.32	72.84	76.39	59.66	57.41	55.37	57.39	61.49	56.03
	the knowledge and technology intensive services	59.24	57.41	59.31	47.73	74.00	59.27	86.45	81.58	88.10
NIEs	the labor-intensive services	2.81	3.73	0.18	0.07	0.05	0.01	0.63	0.33	0.66
	the capital-intensive services	7.48	6.40	9.46	10.76	16.18	11.84	12.53	10.28	13.40
	the knowledge and technology intensive services	21.55	20.14	10.05	8.25	8.10	7.47	4.44	1.68	2.31
BRICS	the labor-intensive services	0.73	2.39	3.72	6.01	7.19	13.80	10.87	5.78	12.39
	the capital-intensive services	1.19	5.92	3.41	4.65	6.13	12.86	11.35	7.58	12.51
	the knowledge and technology intensive services	0.49	0.68	0.68	3.91	2.07	1.23	0.93	0.42	1.17
Other developing countries	the labor-intensive services	36.61	18.56	21.20	27.21	32.79	36.36	34.36	33.81	30.37
	the capital-intensive services	20.02	14.84	10.74	24.93	20.29	19.93	18.73	20.64	18.06
	the knowledge and technology intensive services	18.73	21.78	29.96	40.11	15.83	32.03	8.18	16.32	8.43

Table 5 shows the country (region) structure of the different elements intensive services import in China based on traditional total value trade estimates of the of law, comparing with the results shown in Table 4, we can find the following feature. (1) Two Calculation Results have shown that different types of services imports in China are mainly from developed countries, and the calculation results based on the value-added in trade calculation method is relatively stable, while the results based on the traditional trade calculation method is greater volatility. (2) For the import share of labor-intensive services and knowledge-intensive services import from NIEs, the results based on the value-added in trade calculation method is much larger than based on the traditional calculation method. For capital intensive services import from NIEs, the results based on the value-added in trade calculation method is larger than based on the traditional calculation method before 2003 but is not very different after 2003. (3) Two Calculation results have also shown that the import share of various types of services of China from BRIC countries is uptrend, and the labor-intensive services and capital-intensive services rising large with more than 10%, but the knowledge and technology-intensive services rose less. (4) Based on the results of the calculation value of trade law, the import share of capital-intensive of China from other developing countries showed a clear upward trend based on value-added in trade calculation method, while holds a little change based on the traditional calculation method.

4. Model and analysis

4.1 Model

According to the previous analysis and related theoretical research, Models can be constructed as follows.

$$\log MSA_{it} = \alpha_0 + \alpha_1 \log MS_{it} + \alpha_2 \log MM_{it} + \alpha_3 \log GDP_{it} + \varepsilon_{it} \quad (2)$$

The subscript i indicates the country or region, the subscript t represents the year, $\alpha_0 - \alpha_4$ is the regression coefficient, ε_{it} is for the random disturbance.

MSA_{it} represents the services value-added imports of China from the country or region i , and MS_{it} and MM_{it} represent imports amount of goods and services of China from the country or region i based on the traditional calculation method, and data is from the European Union WIOD database. GDP is Per capita of each country or region which is from UNCTAD database.

4.2 Results analysis

The regression results in Table 6 is divided into four, including (1), (2), (3) and (4) which are the explained variable of regression analysis, respectively based on the overall services value-added import, labor-intensive services value-added import, capital intensive services value-added import, and knowledge and technology-intensive services value-added imports. From the panel data regression results in Table 6 shows the following results. (1) Overall, services import, goods import and per capita GDP have a significant positive effect on services value-added import of China, and the effect of goods import is slightly larger than the services imports from 1995 to 2011, indicating that the indirect services value-added imports in China caused by goods imports are slightly larger than the directly services value-added imports brought by services import. For the labor-intensive and capital-intensive services value-added import, the indirect services value-added imports in China caused by goods imports are significantly greater than the directly services value-added imports brought by services import, particularly evident in labor-intensive services. (3) For the knowledge and technology-intensive services, the directly services value-added imports brought by services import are significantly greater than the indirect services value-added imports in China caused by goods imports.

Table 6 Regression Results

Explanatory variables	Overall imports of services (1)	the labor-intensive services (2)	the capital-intensive services (3)	the knowledge and technology intensive services(4)
logMS	0.3216***	0.1870***	0.2894***	0.3855***
logMM	0.3220***	0.3892***	0.3257***	0.2976***
logGDP	0.6679***	0.7937***	0.7846***	0.6188***
C	-3.7321***	-5.8052***	-6.2441***	-4.4141***
R2	0.8429	0.7703	0.7403	0.8791
N	663	663	663	663
Prob>F	0.0000	0.0000	0.0000	0.0000
Hausman test	Fixed effects	Fixed effects	Fixed effects	Fixed effects

Note: " ***", " ** " and " * " represent respectively significance level of 1%, 5 % and 10%.

5. Conclusion and Policy

As the deepening of services participated in the global value chain division, the real dependence of China in the global value chain and trade with other countries is also of great significance. In view of this, this paper uses the world input-output table (WIOD) based on value-added trade estimates the overall service industry and different intensive type of services import country (region) structure of China, and compared with the traditional total value accounting methods. Meanwhile, the paper

also discusses the effect of the GDP, services imports and goods imports on services imports. The results are following.

One, the imports market of China's services value-added are mainly from the developed countries, and the developing countries is accounting for relatively small. And the share of services imports from NIEs such as Korea and Taiwan is in decline, while the share has risen steadily from the BRIC countries. For the developing countries, based on traditional accounting methods the share from other developing countries is higher than based on value-added in trade accounting methods before 2009, but is on the contrary after 2009. In short, these results indicate that China is high upstream dependence on the developed countries, China must increase their degree of investment services to reduce the adverse effects of fluctuations of the developed countries to the China.

Two, Chinese Knowledge and technology-intensive services imports from developed countries are a higher proportion, but there still exist differences of the import country (region) structure for different element intensity services in the two calculation methods. First of all, no matter what type of services and what kind of accounting method, developed countries are China's main source of services import, just the results based on the value-added in trade accounting relatively stable while based on the traditional trade accounting are volatility larger. And the proportion of services imports from NIEs such as Korea and Taiwan showed a downward trend, but the BRIC countries showed a significant increase. Secondly, for NIEs, the proportion of labor-intensive services and knowledge-intensive service import based on value-added in trade accounting is much larger than based on the traditional trade Accounting, capital intensive services holds the same trend before 2003 while are very different with steady trend after 2003. Third, the Chinese, the proportion of Chinese capital-intensive imports from other developing countries showed a clear upward trend.

Third, indirect services value-added imports caused by goods imports are slightly larger than direct services value-added imports through services imports. Chinese labor-intensive and capital-intensive services showed a significantly larger, especially the labour intensive services. However, the directly services value-added import brought by knowledge and technology-intensive services are greater than the indirect services value-added imports caused by goods import.

The profound understanding of the status of China's services import can bring about an important revelation to achieve the goal of "the rise in the amount of quality and quantity" of China's trade in services. First, we must play the spillover effects of services imports. China can make use of a golden opportunity of developing FTA "along the way" to increase R&D, integrated technology services, financial services and other high-ORDERER production services imports, and better meet the demand of the efficiency of productive service to enhance advanced manufacturing technology. The second is to improve the services imports quality and expand services imports appropriately. The productive service trade import complexity has a significant positive impact on the international competitiveness of manufacturing industries as a whole and technology-intensive manufacturing industries. and shows a greater role in promoting the international competitiveness of some technology-intensive manufacturing. Therefore, China should develop the services quality by services import and its knowledge spillover effects under open conditions. Third, China should add supporting intensity of the advanced technology-intensive

manufacturing and encourage imports service elements . Studies have shown that the indirect services value-added imports caused by goods imports are larger than the direct services import value-added through services imports. so,China should gradually liberalized restrictions on services imports, and encourage actively the advanced manufacturing to get more foreign productive service products . Otherwise,China should increase direct knowledge and technology -intensive services import because the directly services value-added imports brought by it are significantly greater than the indirec services value added caused by goods import.

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THE VALUE (CO)CREATION AS PEAK OF SOCIAL PYRAMID

Polese Francesco, Caputo Francesco, Carrubbo Luca, and Sarno Debora

The challenging issue of value (co)creation has attracted a great number of researchers and decision makers to debates on ways to improve the capacity and will of actors to collaborate to produce better solutions and results. Some researchers have analysed value (co)creation as the result of the individual and collective will to collaborate. Referring to these reflections, this paper proposes to investigate the topic of value (co)creation from a different point of view. It highlights not only how the opportunities for value (co)creation are related to the individual and collective will, but that they are influenced by deep individual and collective psychological and sociological status. Hence, value (co)creation is proposed as the peak of the social pyramid, the last step of a staircase, each level of which represents a specific actor's need. Therefore, the principal goal is to demonstrate that a win-win logic in the value (co)creation perspective is possible only if all the involved actors are in a condition of well-being.

keywords: value (co)creation, social and psychological needs, structural equation modelling, European companies

1. Introduction

In the last few years, an increasing numbers of researchers and practitioners have focused their attention on the topic of value (co)creation (Prahalad & Ramaswamy, 2004; Payne et al., 2008; Spohrer & Maglio, 2008; Vargo et al., 2008; Grönroos, 2011; Pels et al., 2012) and on the opportunities related to the development of win-win strategies based on the satisfaction of all the involved actors (Ballantyne & Varey, 2006; Grönroos, 2008; Maglio et al., 2009; Barile & Polese, 2010; Di Nauta et al., 2015).

This increasing attention can be explained as a consequence of the more evident reduction in use of old models, instruments and approaches in supporting decision makers in facing the emerging social and economic challenges (Barile & Saviano, 2010; Golinelli et al., 2012; Wieland et al., 2012).

In such a vein, both researchers and practitioners have started to investigate possible different pathways to achieve organizational aims, superseding the traditional

transactional approaches (Pels et al., 2000; Barrett, 2002; Barile et al., 2015; Evangelista et al., 2016). In this direction, they have focused their attention on ways to improve opportunities for collaboration among different actors (Lusch et al., 2007; Reay et al., 2009); on the possible advantages related to the building of value (co)creation processes (Prahalad & Ramaswamy, 2004; Möller et al., 2008); and on the instruments useful to monitor the results of collaborative processes (Prahalad & Ramaswamy, 2013).

Despite this, all these contributions appear to focus attention only on the 'tangible evidences' related to value (co)creation processes and little attention is paid to the dimensions that influence the emergence of a value (co)creation approach (Edvardsson et al., 2011). Managerial and organizational literature offer very few contributions on the analysis of the variables that push actors towards a possible collaboration (Barile & Saviano, 2013).

Some advancements in knowledge on this topic are offered by sociological and psychological studies that try to explain the willingness to cooperate as a consequence of individual well-being (Kramer et al., 1996; Chen, 1998; Carrubbo et al., 2012). According to Moorman and Blakely (1995), the will to develop or to build a relationship based on collaboration and on value (co)creation can emerge only if the basic needs of an actor (individual or social group) are satisfied. In the same direction, Fehr et al. (2002) show how willingness to cooperate is relevant only in cases in which involved actors have no other priority needs, such as economic stability, social recognition and health status, to solve.

Building on these contributions, the paper proposes an empirical study of a sample of 2,938 European firms involved in a cluster. Using secondary data provided by the European Union Open Data Portal survey of 2006, a structural equation model (SEM) is developed to investigate the relationships between some variables considered representative of the well-being of companies—such as the number of employees, turnover of employees, investment in innovation, financial and normative conditions, and perceived level of competitiveness—and companies' attention to and investment in collaboration and value (co)creation.

The rest of paper is structured as follows. In section 2, the analysis of the theoretical and conceptual framework on which the research is based is proposed and the hypotheses are formulated. In section 3, the methodology is presented and discussed. In section 4, the findings are presented; in section 5, they are discussed both from a theoretical and from a practical point of view. Finally, in section 6, some final remarks are traced and possible future lines of research are proposed.

2. Theoretical and conceptual framework

2.1 Internal conditions for companies' well-being

According to different managerial and marketing studies, companies' competitiveness can be explained in terms of their capability to combine in better ways their available knowledge, resources and competences to satisfy the needs of the market (Krugman, 1996; Holsapple and Joshi, 2001; Saviano & Caputo, 2013). This capability is related to the adopted organizational models (Nadler et al., 1992), to planning information flows (Carneiro, 2000) and to human resources motivation and belonging (Daley, 2006).

Focusing the attention on this latter element, it is possible to note how different contributions are offered by managerial literature about the ways in which it is possible to motivate human resources (Nohria et al., 2008) and to improve the feeling of belonging in companies' strategies and plans (Bartlett & Ghoshal, 2002). The attention to these topics is explained by the established link that exists between the well-being of human resources and their productivity (Bakker & Demerouti, 2008) and, consequently, the impact on a companies' performances (Becker & Gerhart, 1996).

Despite this, most of the contributions offered by literature exclusively focus their attention on the actions that companies can perform to improve internal conditions for competitiveness (Chen & Watanabe, 2007). Only a few contributions consider the impact that the plans and behaviours of companies not directly linked to human resources can have on their well-being and, consequently, on the opportunities for companies to develop efficiency, effectiveness and suitable pathways based on collaboration and value (co)creation.

In such a vein, according to Frey and Stutzer (2010), it is possible to underline that the conditions of well-being of human resources are influenced by the general balance of the companies in which they act. More specifically, Henriques and Sadowsky (1999) underline that the productivity of human resources is influenced by the perceived stability and safety of their relationships with companies. On the same lines, Narver and Slater (1990) show that human resources with a positive outlook on the future of their company are more productive and are available to do more to achieve the company's aims. Therefore, the paper states that:

H₁: There is a positive relationship between the number of a company's employees and the company's attention to and investment in collaboration and value (co)creation.

H₂: There is a positive relationship between the turnover of employees and the company's attention to and investment in collaboration and value (co)creation.

From a different point of view, another dimension considered relevant by managerial and organizational studies with reference to companies' competitiveness is the atten-

tion to and investment in innovation (Tsai, 2001). This dimension has attracted the interest of different researchers because it represents a possible way to evaluate the capabilities of companies and to align them with the evolving context and, in some cases, influence it (Tushman, 1997). However, companies' attention to and investment in innovation also has a wider meaning when considered with reference to the internal conditions for companies' well-being (Santolaria et al., 2011). According to Jimenez-Jimenez and Sanz-Valle (2005), working in an innovative company offers human resources greater stimulus which positively impacts their performance. On the same lines, Beugelsdijk (2008) shows that human resources involved in highly innovative companies are more oriented towards interacting with others and collaborating with external organizations to achieve the company's aims. Therefore, the paper states that:

H₃: There is a positive relationship between the investment in innovation and the company's attention to and investment in collaboration and value (co)creation.

According to the managerial and organizational literature, internal conditions affect the conditions of stability, productivity and belonging of human resources, and consequently, they impact on the opportunities for companies to pay attention to the processes of collaboration and value (co)creation (Jaakkola & Hakanen, 2013). In such a vein, it is possible to highlight that companies able to create conditions of internal stability and well-being should have more opportunities to build value (co)creation pathways (Holbeche, 2005). Despite this, internal conditions are not enough to assure companies of opportunities to build value (co)creation and collaborative processes (Akaka et al., 2012). In fact, according to Barile et al. (2013), companies cannot be considered autonomous entities because they are part of a context and they are influenced by its dynamics and dimensions. Therefore, in investigating how well-being can be considered a precondition for value (co)creation processes, it is appropriate also to focus attention on the external conditions for companies' well-being.

2.2 External conditions for companies' well-being

In the last twenty years, the social and economic dynamics in which companies are involved have acquired increasing relevance (Holling, 2001; Castells, 2011). Events such as globalization, diffusion of information and communication technologies (ICTs) and changes in user lifestyles are profoundly influencing the ways in which companies plan and implement their behaviours and actions (Dicken, 2007). As a consequence of the increasing relevance of social and economic dynamics, the power of companies to influence market dynamics is progressively decreasing (Rezabakhsh et al., 2006).

To face this emerging change, researchers and practitioners have tried to identify possible ways to improve the capability of companies to understand and manage market dynamics (Helfat et al., 2009). More contributions have focused their attention on possible instruments able to support companies (Ghodeswar & Vaidyanathan,

2008), on the role of knowledge management in managing emerging dynamics (Lawson & Samson, 2001) and on the opportunities offered by stronger interaction with users to better catch the emerging market opportunities (Cooper & Inoue, 1996; Golinelli et al., 2010).

Despite this, all these contributions principally focus on the possible actions that companies can develop to manage external dynamics: few contributions make reference to the impact that companies' perception of external conditions has on their performance and plans.

In such a vein, an interesting advancement in knowledge is offered by Banerjee (2001) highlighting the influence that companies' perception of external dynamics has on their strategies. Building on this contribution, it is possible to underline that the ways in which companies perceive the influence of the external context influences their willingness to develop possible pathways for collaboration and value (co)creation (Berthon et al., 2001). More specifically, it is possible to state that if companies perceive positive external financial and normative conditions, they are more oriented to develop possible new pathways with different actors. Therefore, the paper states that:

H₄: There is a positive relationship between the companies' perception of external financial and normative conditions and the company's attention to and investment in collaboration and value (co)creation.

In the same vein, companies' perception of the level of competitiveness can also influence their strategies and behaviours. In fact, as shown by Brown et al. (1998), if companies perceive a high level of competitiveness, they are oriented only to build and develop pathways considered safe with known actors; consequently, they are less oriented towards developing new opportunities for collaboration. Similarly, Kramer (2011) shows that collaboration among different companies is more common in a market in which there is a low level of competitiveness and in which companies are sure of their position and market share. Therefore, the paper states that:

H₅: There is a positive relationship between the level of competitiveness perceived by a company and its attention to and investment in collaboration and value (co)creation.

3. Methodology

3.1 Data, variables and conceptual model

The research is based on secondary data provided by the European Union Open Data Portal from a 2006 survey based on a sample of 2,938 European firms involved in a cluster. The survey is based on 25 multiple choice questions aiming to acquire

general information on the companies involved in the sample and on their perception of the external dynamics and the advantages offered by collaborations with other companies or organizations. From the data provided by the European Union Open Data Portal, the results related to the number of companies' employees, turnover of employees, investment in innovation, perception of financial and normative conditions, and level of competitiveness perceived by the company have been extracted and considered as independent variables.

In the same vein, from the data offered by the European Union Open Data Portal, the results related to the companies' attention to and investment in collaboration and value (co)creation have been extracted and considered as a dependent variable.

Accordingly, the proposed structural model (see Figure 1) consists of five independent variables and one dependent variable.

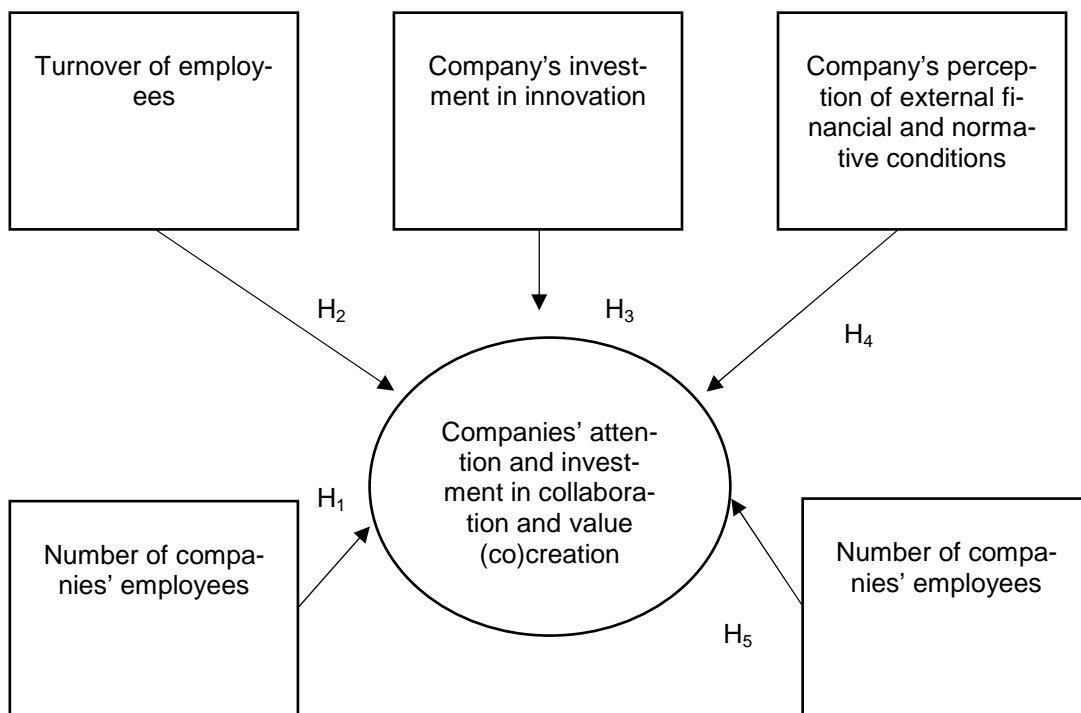


Figure 1. The Conceptual Model

3.2 Sample

The sample was composed of 2,938 European firms involved in a cluster and operating in different sectors such as services (26.7%), construction (8.7%), food (6.1%), ICT and communication (4.5%), metal manufacturing (3.8%), textiles/leather (3.8%), automotive (2.9%), production equipment (2.8%), pharmaceuticals and medical devices (2.1%), chemical products (1.7%), energy (1.4%), entertainment (1.2%), plastics (0.8%) and aeronautics and space (0.7%).

Our choice to focus the attention on European firms involved in a cluster was motivated by the increasing attention that the topic of collaboration and value (co)creation is acquiring in Europe (McKinsey, 2012), and by the consideration that companies involved in a cluster have had previous experience of collaboration and value (co)creation and so are better able to evaluate its advantages and disadvantages (Pitelis, 2012).

3.3 Data analysis

The reliability of the model was measured using Cronbach's alpha (α); the convergent validity of the model was verified by measuring the composite reliability (CR) and the average variance extracted (AVE); and the fit of the model was verified by measuring some fitness indexes such as the comparative fit index (CFI), the normed fit index (NFI), and the goodness of fit index (GFI).

After this, the hypotheses were verified via SEM (Bowen & Guo, 2011).

4. Findings

The following Table 1 reports the Cronbach's alpha (α), composite reliability (CR), and average variance extracted (AVE) coefficients for all the investigated variables.

Table 1. Relationships among Study Constructs

Construct	α	CR	AVE
The number of companies' employees	0.71	0.81	0.57
The turnover of employees	0.76	0.79	0.83
Company's investment in innovation	0.92	0.83	0.51
Company's perception of external financial and normative conditions	0.83	0.71	0.79
Transparency of companies' communication	0.75	0.73	0.67
Level of competitiveness perceived by company	0.74	0.79	0.56
Companies' attention and investment in collaboration and value (co)creation	0.71	0.77	0.52

According to Nunnally (1978), reliability can be considered achieved with an α value of 0.70 or greater.

According to Hair et al. (2010), the convergence of the model is verified if the CR is more than 0.7 and the AVE is more than 0.5.

As shown in Table 1, the coefficients exceed the identified cut-off values.

Following verification of the reliability and convergence of the data, the hypotheses were tested using SEM, shown in Table 2.

Table 2. Hypothesis Testing Results

Hypothesis	Standardized regression coefficient	P-value
H ₁ (+): The number of companies' employees → Companies' attention and investment in collaboration and value (co)creation	0.683	0.09
H ₂ (+): The turnover of employees → Companies' attention and investment in collaboration and value (co)creation	0.721	0.11
H ₃ (+): Company's investment in innovation → Companies' attention and investment in collaboration and value (co)creation	0.807	0.09
H ₄ (+): Company's perception of external financial and normative conditions → Companies' attention and investment in collaboration and value (co)creation	0.647	***
H ₅ (+): Level of competitiveness perceived by company → Companies' attention and investment in collaboration and value (co)creation	0.893	0.12

Notes: ***: Standardized regression coefficient is significant at the 0.001 level (two-tailed).

All the hypothesis with a perceptual value (P-value) lower than 0.5 are considered confirmed.

The fit of the model is verified by investigating some fitness indexes (Table 3).

Table 3. Fitness index

Index	Value	Cut-off value
comparative fit index (CFI)	1.03	>0.90 (Hoe, 2008)
including normed fit index (NFI)	1.36	>0.90 (Hu and Bentler, 1999)
and the goodness of fit index (GFI)	0.94	>0.90 (Jöreskog and Sörbom, 1996)

Considering the results reported in Tables 2 and 3, the fit of the conceptual model can be considered verified and all the hypotheses are confirmed.

5. Discussion

The topic of collaboration and value (co)creation poses many different challenges for both researchers and practitioners (Prahalad & Ramaswamy, 2002). Among the different conceptual domains in which contributions and advancements in knowledge are required, the paper focused attention on the conditions required to improve value (co)creation processes.

In order to verify possible elements able to influence the opportunities for companies to develop a value (co)creation process, some hypotheses have been formulated, building on the contribution offered by both managerial and organizational literature as well as from psychological and sociological studies.

As show by the results of the SEM, the research underlines that there is a positive relationship between the number of companies' employees and companies' attention to and investment in collaboration and value (co)creation (H_1). This evidence is aligned with previous organizational and psychological studies (Kang et al., 2007). It highlights how human resources involved in companies with a high number of employees are more oriented towards collaborating and (co)creating value with external organizations in order to achieve the company's aims. According to Kitchen and Daly (2002), this evidence can be explained in terms of human resources' perceptions of companies' internal dynamics. More specifically, human resources involved in companies with a high number of employees are oriented towards being more collaborative as a consequence of the vibrant dynamics that they perceive inside the company (Schuler & Jackson, 1987). In such a vein, according to Sun et al. (2007), the need to interact with more actors inside the companies to perform a task pushes human resources to be more available too in terms of collaboration with external organizations and companies.

In the same vein, the research shows that there is a positive and significant relationship between turnover of employees and companies' attention to and investment in collaboration and value (co)creation (H₂). This evidence, too, is aligned with previous studies on human resources psychology (Huselid, 1995). According to Jackofsky (1984), human resources involved in companies with a low turnover of employees are surer of their work stability and, for this reason, are more oriented towards collaboration and are proactive in terms of new plans and programmes. Similarly, they are also more oriented towards participating in pathways based on collaboration with external actors if they are typically characterized by a higher level of risk.

From the research it also emerges that there is a positive and significant relationship between companies' investment in innovation and companies' attention to and investment in collaboration and value (co)creation (H₃). As underlined by Nambisan and Baron (2009), this correlation is the consequence of human resources' perception of companies' strategies and pathways. Being involved in a more innovative company offers human resources the opportunity to be more oriented to face the challenges imposed by collaborating and interacting with other actors. On the same lines, De Brentani (1991) shows that the correlation between companies' orientation towards innovation and their attention to collaboration and value (co)creation can be considered two dimensions of the same pathway and sometimes it is not possible to have one without the other.

The research also underlines that there is a positive relationship between companies' perception of external financial and normative conditions and companies' attention to and investment in collaboration and value (co)creation (H₄). This evidence can be considered to be aligned with previous managerial studies (Huse, 2007). More specifically, according to Polese et al. (2011), the dynamics of the context in which companies act represent a relevant variable in influencing companies' strategies and plans, not only in a direct way by creating opportunities and risks, but also from an indirect viewpoint, because they influence the vision and the mission of companies and, consequently, their aims.

Finally, the research shows that there is a positive and significant relationship between the level of competitiveness perceived by companies and companies' attention to and investment in collaboration and value (co)creation (H₅). This evidence underlines the strong influence that individual perception can have on improved decisions and plans. As underlined by Wayne Pace and Stephan (1996), the perception of competitiveness is a consequence of companies' perception of their position in the market and, in this sense, it influences the pursued aims. In other words, companies that perceive a high level of competitiveness are more oriented towards defending their position from possible competitors' attacks and are less oriented towards paying attention to the opportunities offered by collaboration and value (co)creation with other actors.

6. Final remarks and future lines of research

The topic of value (co)creation represents one of the most interesting challenges imposed by the recent evolution of managerial and marketing studies. It has attracted more researchers and practitioners to identify best practices and the correct pathways to support collaboration among different actors in the achievement of shared aims (Mele & Polese, 2011). Despite this, most of the attention paid to this topic is focused on ways to build pathways for value (co)creation and very little attention is paid to investigating what are the conditions required to facilitate companies' investment in these pathways.

To bridge this gap, this paper proposes to investigate the conditions that influence companies' and human resources' decisions and behaviours about value (co)creation. In this vein, it states that value (co)creation can only be considered a possible aim if all other essential needs are being satisfied. More specifically, it proposes considering value (co)creation as a higher level of a hypothetical social pyramid that can be reached only after the other levels have been achieved (See Figure 2).

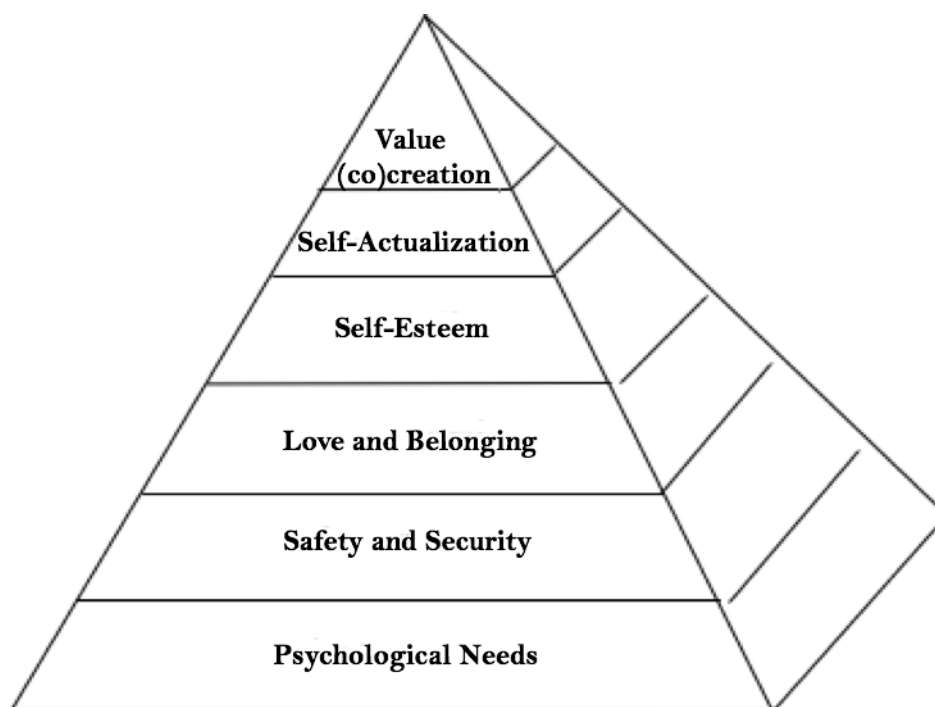


Figure 2. The value (co)creation as peak of social pyramid

(Source: Authors' elaboration from Maslow, 1943: 384)

To support the empirical reflections herein, this paper proposes a study on the relationships between some dimensions considered representative of the well-being of companies and companies' attention to and investment in collaboration and value (co)creation. The evidences show that there is a clear influence of the identified dimensions on the willingness and proactivity of companies in the value (co)creation domain.

These evidences open up an interesting possible pathway of research to investigate more thoroughly what kinds of pre-condition are required for companies that aim to develop a value (co)creation process. In such a vein, from the reflections and empirical evidences herein, some implications can be derived both from a theoretical and from a practical point of view.

More specifically, from a theoretical viewpoint, the need arises to:

- Better investigate companies' conditions of well-being in order to identify possible pathways to improve opportunities for value (co)creation approaches.
- Define a wider definition of value (co)creation able to include variables and dynamics not directly related to companies but able to indirectly influence the success of value (co)creation strategies.
- Improve multi- and trans-disciplinary frameworks able to include contributions and perspectives from different research streams interested in the topics of relationships, interactions and value (co)creation.

At same time, from a practical point of view, there is a need to:

- Develop instruments, models and approaches able to include a wider perspective on the relevant dimensions for value (co)creation processes.
- Investigate in depth companies' perceptions and perspectives in order to define the economic guidelines able to support the emergence of value (co)creation-based organizations.
- Build strong multi- and trans-disciplinary collaborations among practitioners specializing in different domains in order to support companies in developing a wider perspective of the dimensions involved in the value (co)creation process.

Accordingly, with all the implications highlighted, it is possible to affirm that this paper represents only a first step on a longer research pathway. As such, it does not aim to offer a solution to the study of value (co)creation, but aims to propose a new management challenge that requires the embracing of a relevant multi- and trans-disciplinary effort.

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TOWARDS METHOD FRAGMENTS FOR SERVICE ENGINEERING

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To overcome the challenges resulting from the proliferation of service engineering methods, we present a method engineering approach for service development and provision. Based on method fragments, i.e. coherent pieces of a method, a method can be assembled according to characteristics of a service project. Using a design science approach, we develop a metamodel for service engineering method fragments with the focus on service customisation. In addition, a service customisation information system is conceptualised.

1. Introduction

Today's service industry faces two distinct challenges. On the one hand, companies need to provide services as efficient as possible. On the other hand, the diversity of customer requirements increases and companies need to continuously improve their services (Heiskala, et al., 2005). Service engineering tries to tackle this dichotomy by providing approaches for a systematic service development. In doing so, process models, methods, and tools are developed (Fährnich & Opitz, 2006). Although these approaches for systematic service development and provision exist, still some 40 percentages of service projects fail (Leimeister, 2012, p. 94). This is caused by the fact that companies are both not aware of service engineering approaches and are not able to use provided methods and tools in their specific service project (Fährnich & Meiren, 2007; Zhou & Tan, 2008).

The existing challenges can be ascribed to the fact that companies observe a need for action concerning the configuration of service engineering approaches (Uhrmann-Nowak, 2010). Due to the large heterogeneity of the service domain (Münkhoff, 2013), it is not feasible to use a one-size-fits-all approach for service development and provision. Instead, the used methods and tools need to be chosen and adapted to specific service project characteristics.

To address the mentioned challenges, we present a method engineering approach for service engineering. Method engineering originates from information systems development and aims at designing, constructing, and adapting development methods, techniques, and tools (Brinkkemper, 1996, p. 276). It is based on so-called method fragments that are combined according to the individual characteristics of a development project.

The research process of this paper follows a design science approach according to Pfeffers, et al. (2007) and is depicted in Fig. 1 (the current state of the research is marked with an asterisk). The design science research lifecycle starts with identifying and motivating a problem. The motivation for the research at hand was derived from previous research projects and from indications for research gaps in academic literature. As a second step, the objectives for a solution need to be defined. We follow the design science guidelines established by Hevner, et al. (2004), i.e. artefacts need to be produced, and the research must have practical relevance and provide new contributions for solving the problem. In addition, the research must follow a rigor and iterative process with continuous improvement of intermediate results. Finally, results of the research must be communicated.

After this preparatory work, artefacts as the central element of design science research projects are defined. According to the design science guidelines, artefacts are produced iteratively which is reflected by the cycle between *Method Fragment Development* and *Evaluation*. During construction of research results, intermediate results are evaluated by demonstrating their usability and by pointing out the way that produced artefacts contribute to the problem. A common approach for demonstrating the usability of theoretically designed artefacts is to develop a real world application using these artefacts. In addition, evaluation can be conducted in the form of expert panels or by assessing productivity gains. Each method fragment that was positively evaluated is formalised and, thus, can be used as part of a service engineering support system.

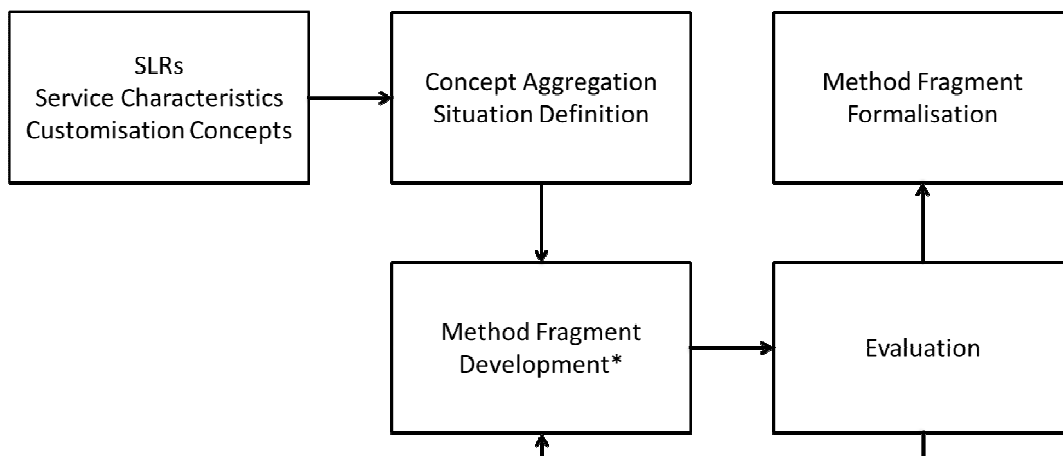


Fig. 1: Research process

For presenting our findings, the paper is structured as follows. In the next section we introduce the theoretical backgrounds concerning method engineering. As preparatory work, structured literature reviews (SLRs) for identifying service characteristics and service customisation concepts were conducted and are presented in section **Errore. L'origine riferimento non è stata trovata.** For developing coherent method fragments, section **Errore. L'origine riferimento non è stata trovata.** presents a metamodel for service engineering method fragments. Based on this metamodel, we present the usage of method fragments in section **Errore. L'origine riferimento non è stata trovata.** Finally, section **Errore. L'origine riferimento non è stata trovata.** concludes the paper with an outlook on future research and provides insights about applying service engineering method fragments.

2. Method Engineering

The development of method engineering approaches was triggered by the increased complexity of software engineering projects and the insight that there is no single suitable engineering method for conducting heterogeneous projects (Brooks, 1987). According to Tolvanen (1998), three approaches for selecting an engineering method exist. First, using the textbook approach, a single method is used and performed as described. Second, using a contingency based approach, suitable parts of various methods are combined. However, the methods do not provide techniques to assemble a holistic process. Contrary, the method engineering approach allows for individual configuration of a method according to project characteristics. For doing so, the characteristics of a project are described in terms of a so-called *situation* and method fragments appropriate for this situation are selected and combined (Tolvanen, 1998).

According to Brinkkemper (1996), method fragments are defined as “coherent pieces of [...] development methods”. To define method fragments, a two-step approach is used: The first step is to identify suitable method fragments. For doing so, existing methodologies can be decomposed into independent parts. In addition, companies might use best practices as a starting point for defining method fragments. The following key questions can be used as a guideline to identify suitable method fragments (Deneckere, et al., 2008):

- *What is the result when using a method fragment?* This answers the question about the contribution of a method fragment to the overall project. It is used to define the fragment's goal.
- *What are the preconditions to use a method fragment?* Often, it is necessary to conduct preliminary work to execute a part of a method. In these cases, it might be necessary to establish organisational or technical preconditions.
- *In which specific contexts can the method fragment be used?* A very important aspect of method engineering is to describe the situation, in which a method fragment is applicable. In doing so, it is possible to identify relevant fragments. An existing method might be tailored for a specific use case and is, thus, only applicable for a particular project type.
- *What are the constituent parts of the method fragment (activities, models, artefacts etc.)?* To achieve the goal associated with the method fragment, it is necessary to perform several activities, e.g. gather customer requirements. In addition, a method can provide specific modelling notations to represent the results, e.g. the requirements might be represented in terms of use cases.
- *How is the application of the method fragment supported?* Besides describing necessary activities, a method might also provide or reference software tools that support executing the activities. In addition, existing documentation (e.g. standards) can be used.
- *What relations and dependencies with other method fragments exist?* Besides preconditions to perform a method fragment, other dependencies might also exist as well. For example, an existing method might contain decisions that lead to mutually exclusive activities. While identifying method fragments, it is

necessary to keep track of these dependencies for establishing a consistent method repository.

As a second step, the method fragments need to be specified according to a coherent predefined structure. On the one hand, a unified, formally defined structure allows for efficient method fragment search. On the other hand, the structure is necessary to assemble method fragments into a holistic method by using established interface descriptions. To facilitate search and simplify usage, Karlsson & Wistrand (2006) differentiate between an internal and an external view on method fragments. The external view contains a descriptor for identifying the method fragment and the interface description to specify the suitable situation and goals. In terms of the internal view, the content of the method fragment is described in terms of a so-called guideline and a product aspect. The guideline describes the activities that are necessary to perform a method fragment and, thus, to achieve a specific goal. In addition, the product aspect describes used tools and formalisations.

The general method engineering process is depicted in Fig. 2. The *method base* contains the set of predefined *method fragments* (MF1, MF2, and MF3). Each method fragment is suitable for a specific situation, denoted by service characteristics. In the example, the two binary characteristics *C1* and *C2* exist. The method base serves as a repository for method fragments: method fragments can be added, updated, and removed. For the provision of a service project, it is necessary to define the characteristics of the service project. Therefore, the same characteristics *C1* and *C2* are used. In *Project A*, both characteristics are defined, for *Project B* the value of *C1* is unclear. This might be due to the fact that the project is very innovative and, thus, vague.

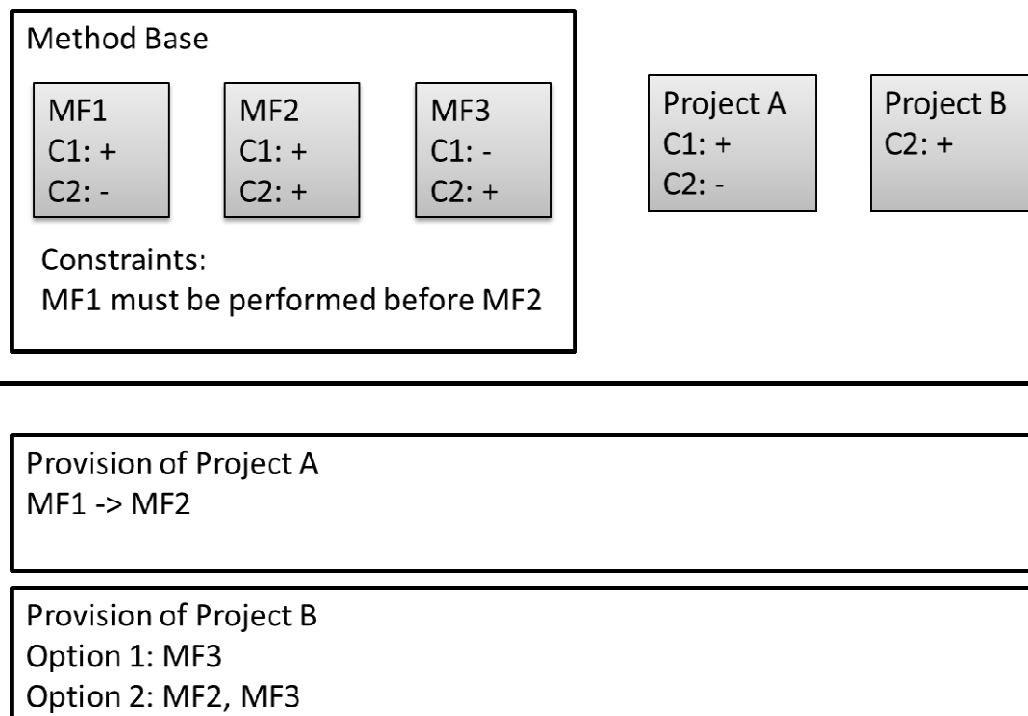


Fig. 2: Method engineering process

A project is matched with suitable method fragments according to its characteristics. Thus, relevant method fragments for *Project A* are *MF1* and *MF2*. To assemble these

method fragments into a method, dependencies need to be considered. In the example, a dependency *MF1 must be performed before MF2* exists, resulting in the sequential order of both fragments. In case of *Project B*, two relevant sets of method fragments exist due to the fact that the value of characteristic *C1* is not known. Relevant sets can either contain only method fragment *MF3* or both method fragments *MF2* and *MF3*. Selecting appropriate method fragments is the task of the project manager. Likewise to *Project A*, relevant fragments for *Project B* are assembled. Since no temporal dependencies between method fragments *MF2* and *MF3* are defined, both fragments can be performed in arbitrary order.

3. Service characteristics and customisation approaches

For answering the above presented questions and to establish a sound metamodel deduced from the current state of the art concerning service customisation, two systematic literature reviews were conducted. First, service characteristics were identified. Based on these characteristics, it is possible to answer questions about the context in which a customisation method fragment can be applied. With the second literature review, approaches for customising services were identified. Based on these approaches, an aggregated overview about customisation concepts was established.

3.1. Service characteristics for describing the situation

For valid application of method fragments, it is necessary to specify suitable situations. Therefore, a structured literature review was conducted and the results were presented in Becker, et al. (2011). Table 1 presents an extract of the most relevant identified service characteristics.

The characteristics were divided into three classes: *customer interface*, *service process*, and *service outcome*. Characteristics of the customer interface class describe the interaction between service providers and customers. With the help of these characteristics, it is possible to describe the impacts of customer decisions on service provision. Process characteristics are mostly relevant for service providers and influence temporal and local service factors. The characteristics of the service outcome allow for describing services from a customer's point of view.

Table 1: Relevant service characteristics, source: (Becker, et al., 2011)

Characteristics of the customer interface	
Customer contact	Indicates the customer involvement in service provision. It can be distinguished between active contact (customers are directly involved in service provision) and passive contact (customers only need to be on-site).
Relation between customer and provider	The relation can be formally established (e.g. Service Level Agreements) or based on informal agreements (e.g. honorary offices). It can be distinguished between continuous service provision and singular provision.
Customer interaction	Customers and providers can interact via a human or a machine interface. Additionally, service provision can either be bound to a specific location (e.g. ATMs) or can be location-independent (e.g. Online Banking).
Characteristics of the service process	
Flexibility	A service process might either be rigid (e.g. due to legal restrictions) or flexible. Flexibility can either be achieved by predefined service variation points or by ad-hoc customisation of employees.
Technology usage and degree of routine work	Several service process steps can be supported or even fully provided by IT. In addition, the complexity of used technologies is relevant. The degree of routine work is closely connected with technology usage, since routinized work can be supported by IT systems more easily.
Decoupling	Decoupling of the service provision impacts the locations where a service can be provided. For example, services requiring heavy machinery are bound to a specific location.
Characteristics of the service outcome	
Materiality	Services with a material result (e.g. ordering customised jewellery) can be distinguished from services with immaterial results (e.g. education). On the one hand, materiality has great impact on the way customers can evaluate the service. On the other hand, different competencies are necessary for providing services with material outcome compared to providing services with immaterial outcome.
Service recipient	Services might either address people (e.g. education changing a person's mental state, person transport changing a person's location), things (e.g. transporting goods changing the location of things), or information (e.g. Big-Data-Services processing data). In addition, services can address time aspects (e.g. maintenance reducing wear and tear) or location aspects (e.g. providing food during a long flight with specific location-based constraints).

3.2. Customisation approaches for describing method fragments

For specifying method fragments, it is first of all necessary to identify methods and parts of methods that can be decomposed into fragments. For identifying relevant

methods, a structured literature review about service customisation was conducted (Becker & Klingner, 2016).

Due to the heterogeneity of the service domain, no unified terminology for describing customisation approaches exists. Thus, the following classification is used to build a hierarchic structure for the different customisation approaches:

- *Concept instances* are the specific terms that are used in academic literature to describe a customisation approach. For example, the concept instances *building blocks*, *modules*, and *service configuration items* were identified.
- Concept instances with identical semantics were aggregated into *concepts*. For example, the above mentioned instances are assigned to the concept *components*.
- For additional aggregation of concepts, *generalised concepts* were established. They contain adjacent concepts, e.g. the concepts *portfolio*, *components*, *interfaces*, and *variants* are assigned to the generalised concept *modularisation elements*.
- *Classes* are used to define different views on the service development and provision process. For example, the generalised concepts *modularisation elements*, *characteristics*, and *dependencies* are assigned to the class *representation*.

In addition to the classification, each concept has a specific type constraining the transition from concepts to method fragments. The possible types are listed in Table 2.

Table 2: Concept types

Concept type	Description and Examples
Service modelling and description	<p>Concepts of this type are necessary for describing the variability of customisable services. The spectrum comprises simple textual descriptions as well as formal specification of variation points.</p> <p>Concepts like <i>components</i>, <i>interfaces</i>, and <i>dependencies</i> are examples of modelling and description concepts. They are used to model the internal view of a service.</p>
Customisation process	<p>Concepts of this type describe specific activities for customising services. In general, these concepts can be used for defining the guideline of a method fragment.</p> <p>Concepts like <i>additive customisation</i>, <i>product bundling</i>, and <i>alternative-based customisation</i> are examples for customisation process concepts. They are used as guidelines for employees during service provision</p>
Influence factors	<p>Concepts of this type represent decisions during service customisation as well as external influence factors. They are used to further specify the situation in which a method fragment can be applied.</p> <p>Concepts like <i>context</i>, <i>time pressure</i>, and <i>target audience</i> are examples for</p>

influence factors.

4. Metamodel for Service Engineering Method Fragments

Based on the general method fragment structure presented in the previous section, a metamodel for defining service engineering method fragments was developed. The constituent parts of the metamodel can be seen in Fig. 3. Every method fragment consists of a descriptor, an interface, the guideline, and a product aspect. In the following sections, the development of the metamodel is presented. First, section **Errore. L'origine riferimento non è stata trovata.** outlines the external view by specifying the structure of a method fragment with respect of specific requirements of the service engineering domain. The internal view of method fragments is presented in section **Errore. L'origine riferimento non è stata trovata.**. A formal definition of the internal views allows for a unified representation of method fragments and, thus, enables simple combination of fragments.

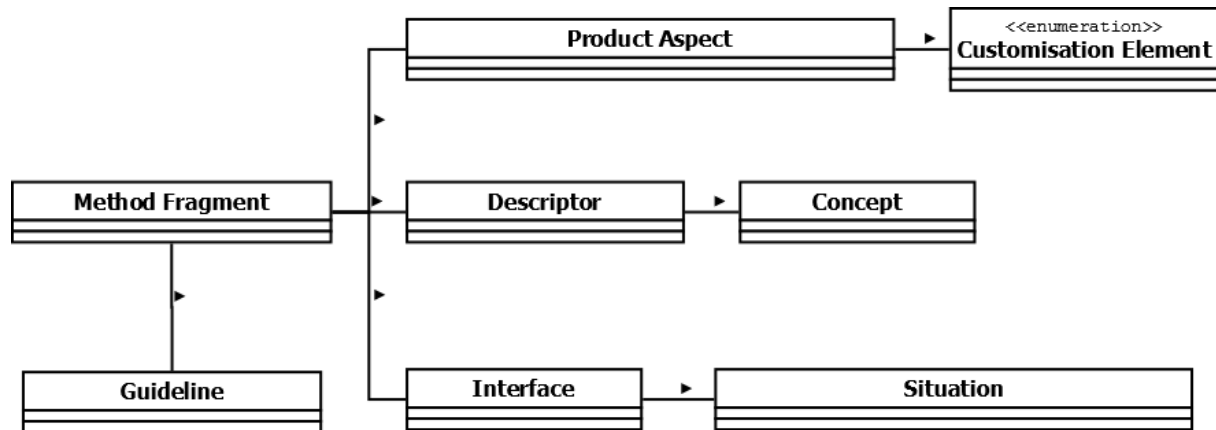


Fig. 3: Metamodel for Service Engineering Method Fragments

4.1. Metamodel of the external view

The external view of a method fragment as shown in Fig. 4 consists of the descriptor and the product aspect. In addition, the interface is used to describe the situation where a method fragment can be applied. For being able to define a method base as a collection of method fragments, dependencies can be specified, too.

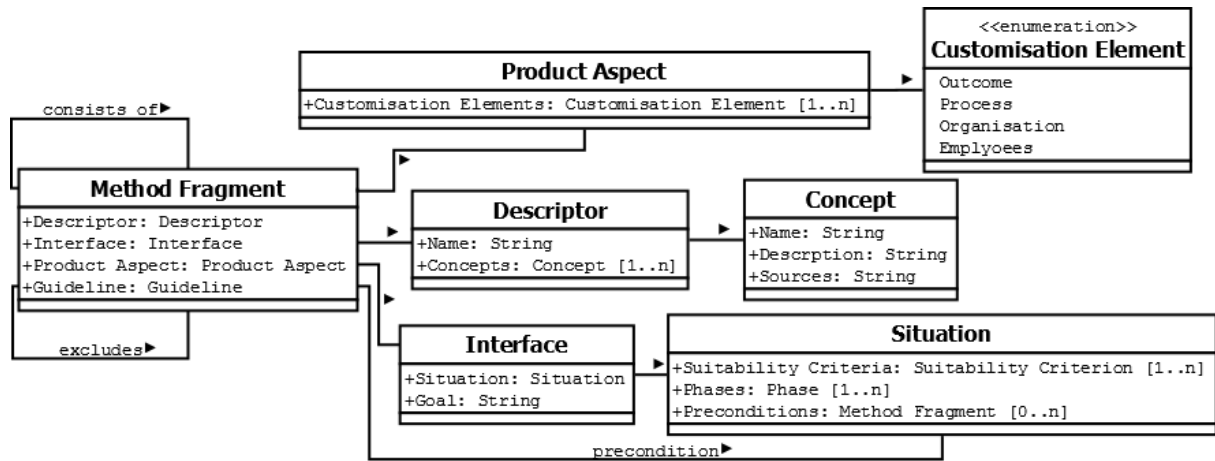


Fig. 4: Metamodel of the external view

4.1.1. Descriptor

Based on the descriptor, a method fragment is uniquely identified as part of a method base. For doing so, every method fragment has a unique name. Besides identification, method fragments are linked with the fundamental concepts from the structured literature review. **Errore. L'origine riferimento non è stata trovata.** Based on this reference, further information can be obtained, e.g. use cases and evaluations.

As can be seen in Fig. 4, a method fragment can be derived from more than one concept from literature. This is due to the fact that there might exist several ways to achieve the goal of a method fragment. For example, the method fragment *module based customisation* has two variants, *additive customisation* and *subtractive customisation*.

4.1.2. Interface

The interface of a method fragment is used both for describing the specific situation this fragment can be applied as well as describing the goal of the method fragment. For describing the situation the service characteristics presented in section **Errore. L'origine riferimento non è stata trovata.** are used. Thus, the situation describes applicability based on the customer interface, the service process, and the service outcome.

Besides suitable service characteristics, the application of a method fragment is further bound to a specific service lifecycle phase. Using the metamodel, the service lifecycle is specified according to DIN (1998) by the six phases *idea generation and assessment*, *requirements analysis*, *design*, *implementation*, *provision*, and *termination*. The relevant phase of a method fragment is considered for assembling an individual method based on sequential combination of selected method fragments. However, it is necessary to note, that there might also exist fragments that are relevant in different phases and, thus, can be applied at different points of the service lifecycle.

To further specify suitable situations for applying a method fragment, it is necessary to describe preconditions that need to be satisfied. A precondition might be either technical or substantial. Using technical preconditions, it is possible to describe preparatory work that is necessary to apply a method fragment. For example, the

method fragment *module based customisation* requires applying the method fragment *portfolio modularisation*. Without having defined modules, it is not possible to combine modules. Substantial preconditions are used to link two or more method fragments with each other that aim at a similar goal. For example, the method fragment *interpersonal customisation* has the precondition *customer model development* which simplifies applying the fragment by defining relevant tools and models.

The goal of a method fragment is described using textual form. Due to heterogeneity of possible goals, a reasonable formalisation is not possible. However, the description of goals should adhere to a consistent structure, e.g. by describing preconditions. For example, the goal of the method fragment *interpersonal customisation* is *employees adapt their appearance and behaviour to customer requirements*.

4.1.3. Product aspect

The product aspect is defined by the service customisation elements addressed by a method fragment. As stated in section **Errore. L'origine riferimento non è stata trovata.**, the service outcome, service process, company, and employees are possible elements. By using the product aspect, method fragments can be categorised. For example, companies seeking to modify their organisational structure for customisation can select the appropriate method fragments.

4.1.4. Dependencies

Besides the above described preconditions for applying a method fragment, additional dependencies between method fragments might exist. Using these dependencies it is possible to define compound method fragments. In addition, method fragments can be marked as mutually exclusive. Compound method fragments allow for defining approved combinations. For example, the method fragment *interpersonal customisation* suggests the method fragment *customer model development*. To improve convenience of the method base, it is possible to aggregate both method fragments into a new fragment, *model based interpersonal customisation*. Interaction effects that occur due to aggregation can be described in terms of a new interface and guideline of the aggregated method fragment.

Contrary to compound methods, mutual exclusiveness of method fragments defines two or more method fragments that must not be used together. Usually, this is based on incompatible foundational concepts of the fragments. For example, the method fragments *module based customisation* and *option based customisation* are mutually exclusive. While the former is based on customer-individual combination of modules, the latter is based on providing several service variants that a customer can select.

4.2. Metamodel of the internal view

The main part of the internal view is characterised by the guideline. Using the guideline, the application of the method fragment is described in detail. In the following, an extensible metamodel of the internal view is developed. Using the metamodel, different types of guidelines can be used. Further, the metamodel unifies the terminology used in the method base. As can be seen in Fig. 5, a guideline consists of two main elements. While *roles* are responsible for developing and providing services, *artefacts* are necessary tools for applying method fragments.

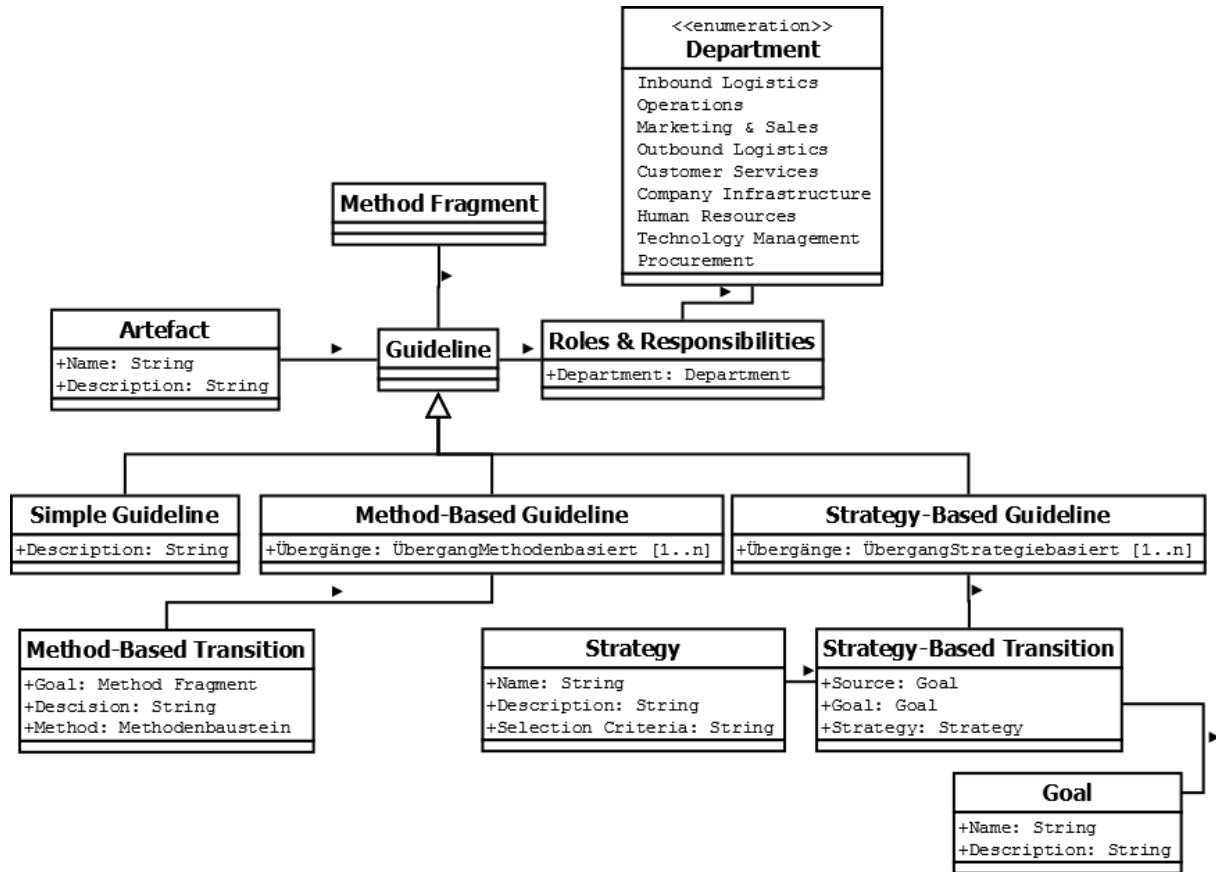


Fig. 5: Metamodel of the internal view

4.2.1. Roles and responsibilities

Using roles and responsibilities, it is possible to describe persons, IT systems, or machines that are responsible for providing several activities of a method fragment. Due to the abstraction level of method fragments and heterogeneity of the service sector, it is not feasible to unify role names for all companies. Instead, a generic role concept is used based on the value chain defined by Porter (2010, p. 64). According to this value chain, companies perform primary and secondary activities. Primary activities are directly connected to producing goods and providing services. They comprise *inbound logistics*, *operations*, *marketing & sales*, *outbound logistics*, and *customer service* (Porter, 2010, p. 66). Secondary activities are of supportive nature and comprise *company infrastructure*, *human resources*, *technology management*, and *procurement* (Porter, 2010, p. 66). Due to the importance of the external factor for services (Meyer, et al., 2000) customers are integrated into the role concept, too.

For assigning segments of the value chain to method fragments, the so-called RACI matrix is used. For every method fragment, it is stated who is responsible for providing activities (*Responsible*) and who approves activities (*Accountable*). In addition, it is stated who has additional information for completing activities (*Consulted*) and who needs to be notified when a method fragment is applied (*Informed*) (Jacka & Keller, 2012, p. 258).

An example for assigning responsibilities using the RACI matrix is given in Table 3. As can be seen, the customer service and operations are responsible for providing the method fragment interpersonal customisation. Both of these divisions have direct

customer contact and are responsible for providing services. Thus, employees with these roles need to be able to perform the customisation. In case of enquiries, marketing and human resources are consulted. On the one hand, marketing provides customer databases containing information about demands and peculiarities of regular customers. On the other hand, the human resources department is responsible for training and education of employees concerning interpersonal customisation. In addition, marketing is informed about applying customisation activities for keeping track and archiving these activities in customer databases. Finally, marketing is also accountable, i.e. the department approves and defines valid customisation activities.

Department/Responsibility	Responsible	Accountable	Consulted	Informed
Inbound logistics				
Operations	X			
Marketing & Sales		X	X	X
Outbound logistics				
Customer service	X			
Company infrastructure				
Human resources			X	
Technology management				
Procurement				

Fig. 6: RACI matrix for method fragment interpersonal customisation

Attention should be paid to the fact that the RACI approach cannot always be used in its entire form in every company and for every service. For example, especially small companies do not separate responsibility in different departments. In this case, different responsibilities coincide and might become superfluous. In addition, the RACI matrix differs between different types of services based on the specific characteristics. For example, the service *withdraw money* can be provided either by an ATM or by a human employee. If the service is provided by an ATM, the operations department is no longer responsible for interpersonal customisation because the user interface is fixed. As a possible solution, a method fragment might have different RACI matrices based on the respective service characteristics.

4.2.2. Artefacts

Artefacts are all kinds of elements that are used to perform customisation during service development and provision. Examples for artefacts are customer data that are used to make decisions or employee handbooks containing detailed information about service provision. The artefacts are usually inferred from the product aspect, e.g. method fragments with the product aspect *organisation* require the artefact *organigram*.

4.2.3. Guideline

To describe how to perform a method fragment, the guideline references roles, responsibilities, and artefacts. The guideline can be defined in several ways, which is reflected as subclasses in Fig. 5. The *simple guideline* is the most basic version and describes the content of a method fragment purely textual without formal referencing other method fragments. Contrary, *method-based* and *strategy-based guidelines* use so-called *transitions* for defining how to achieve specific goals and to allow for a more formal definition of the method fragment application.

Using the method-based guideline, a superior goal that should be achieved by performing a specific method fragment is defined. Usually, various approaches for achieving a goal exist. Every approach is more or less suitable based on different influence factors. To enable selection of a suitable method fragment, the decision criteria are defined. The transition of a method-based guideline is, thus, defined as a triple (*goal, decision, method*).

An example for a method-based guideline is depicted in Fig. 6. It shows the method fragment *module-based customisation* with the alternatives *additive customisation* and *subtractive customisation*. The customer state is used as the decision criterion: for regular customers, the method fragment *subtractive customisation* is used; customisation for new customers is performed using the method fragment *additive customisation*.

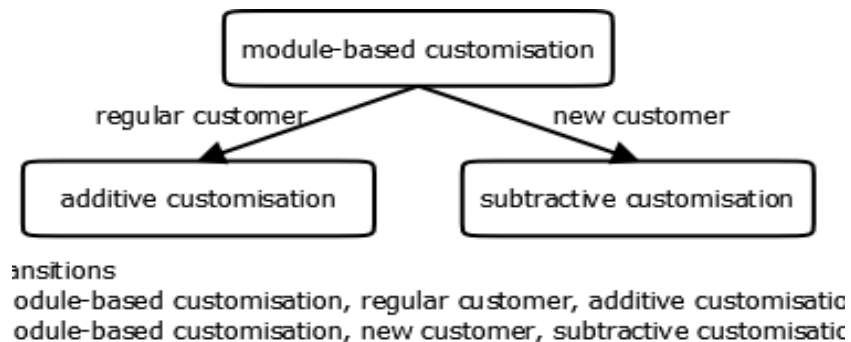


Fig. 7: Method-based guideline for module-based customisation

Based on this definition, Fig. 7 shows the representation of this guideline conforming to the metamodel.

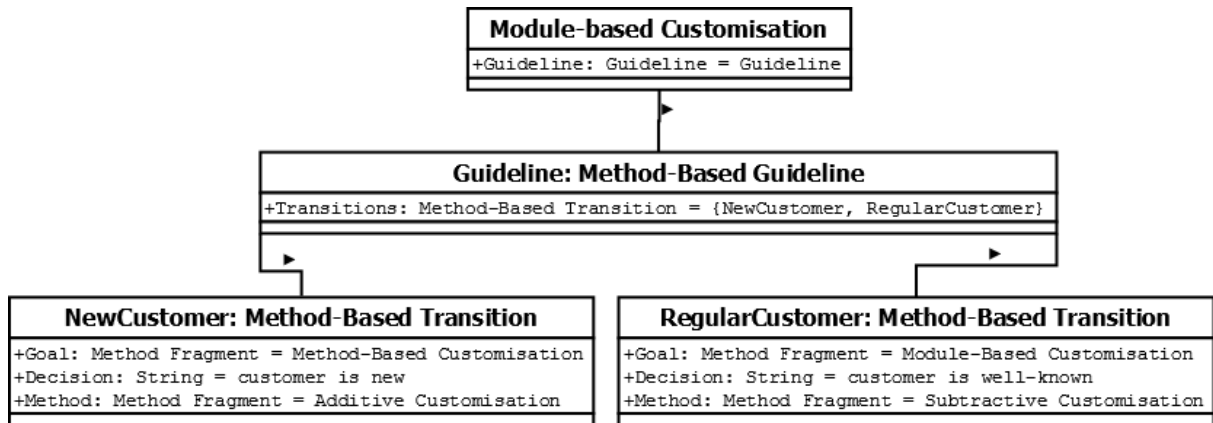


Fig. 8: Representation of the method-based guideline conforming to the metamodel

Contrary to transitions for method-based guidelines, transitions for strategy-based guidelines are defined as a triple (*source, goal, strategy*). As presented in Fig. 8, the strategy-based guideline of the method fragment *module-based customisation* begins at the source *Start*. The goal *customise customer interaction* can be achieved using two different strategies. First, the *new customer strategy* used subtractive customisation. Second, the *regular customer strategy* uses additive customisation.

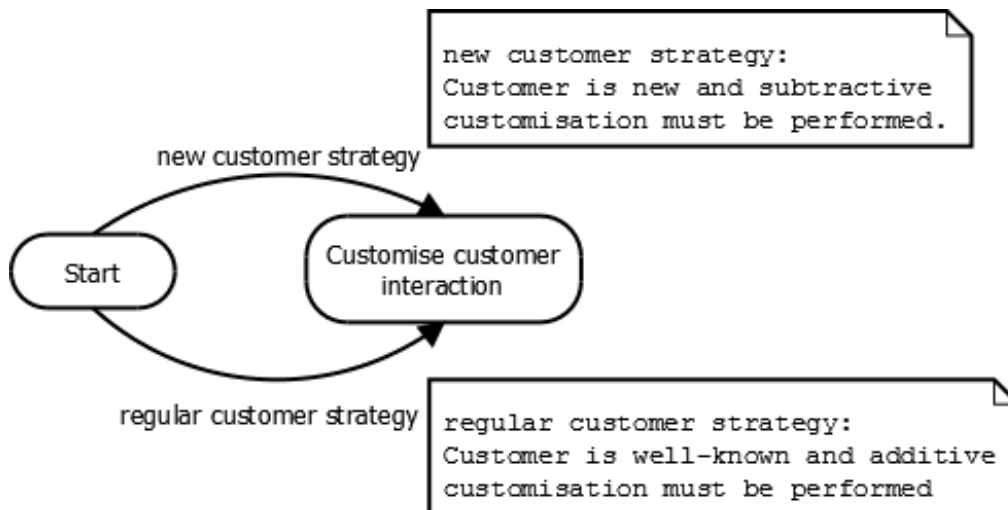


Fig. 9: Strategy-based guideline for module-based customisation

From the metamodel-conform representation of the strategy-based guideline (see Fig. 9), it can be seen that each of the depicted strategies is linked to a specific method fragment. The two strategies *new customer strategy* and *regular customer strategy* are defined as *T1* and *T2* respectively.

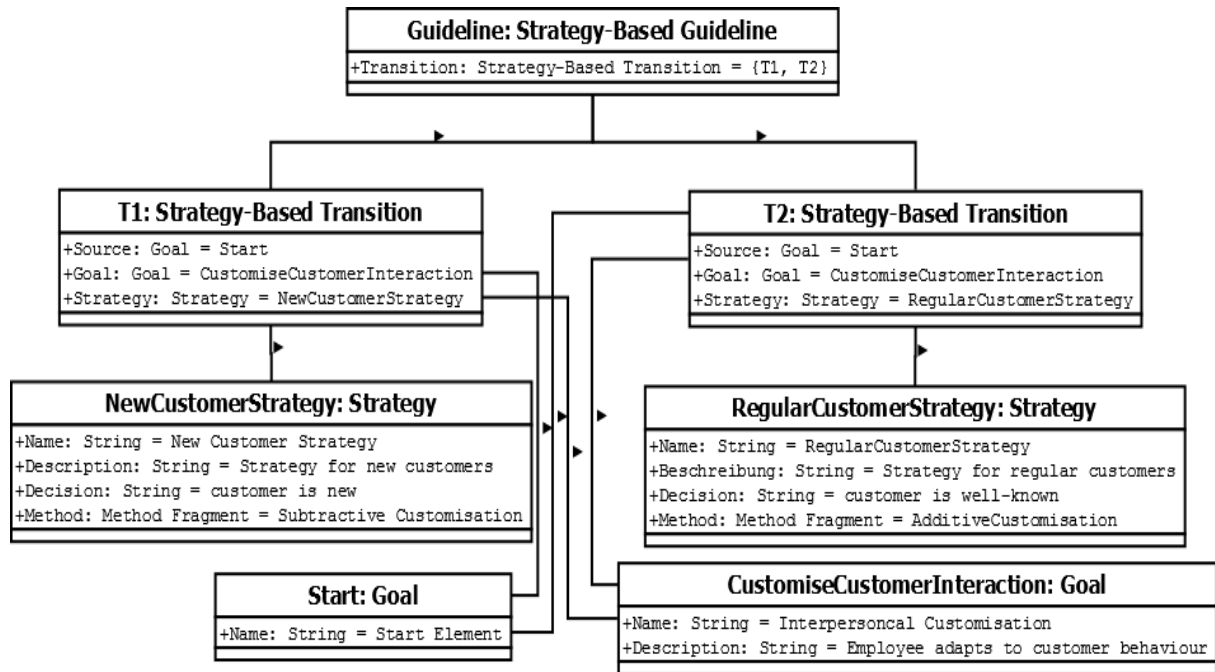


Fig. 10: Representation of the strategy-based guideline conforming to the metamodel

5. Usage of Service Engineering Method Fragments

Based on the metamodel presented in the previous section, it is possible to specify method fragments. These method fragments are stored in a method base acting as a central repository. To assemble a method using existing fragments, the following approach can be used (Harmsen, 1997):

- *Defining the situation:* As a first step, it is necessary to define the situation, i.e. the specific characteristics of a planned service project. In doing so, only method fragments relevant for the respective situation are presented. The more characterisation factors are used, the more specific the situation can be described. However, it is also possible to describe an incomplete situation to support searching for method fragments in early service lifecycle stages.
- *Selecting method fragments:* Based on the description of the situation, appropriate method fragments are selected. Since it is not always possible to describe a situation in detail, alternative fragments might be found. Kornysheva (2007) argues that users should be supported in selecting suitable alternatives. In addition to explicitly selected method fragments, logical dependencies must be considered, e.g. method fragments requiring other fragments.
- *Integrating method fragments:* Using the selected method fragments, a holistic method is established covering the whole service lifecycle. For doing so, it is necessary to assemble the fragments into a meaningful order. Therefore, rules (e.g. preconditions) can be used.
- *Performing the service project.* The method consisting of selected method fragments is used for monitoring the process. However, dynamic changes must be considered, e.g. changes in the service characteristics resulting in a

need for different method fragments. Therefore, it is necessary to select alternative method fragments during project performance.

In the following, a concept for a service customisation information system is presented (see Fig. 10). It consists of a *method base component* containing the predefined method fragments. The *service project characterisation component* is used for defining a specific service project and selecting appropriate method fragments. Based on the selected method fragments, a holistic method is assembled and transferred into a *workflow management component*. Using this component, a service project can be conducted.

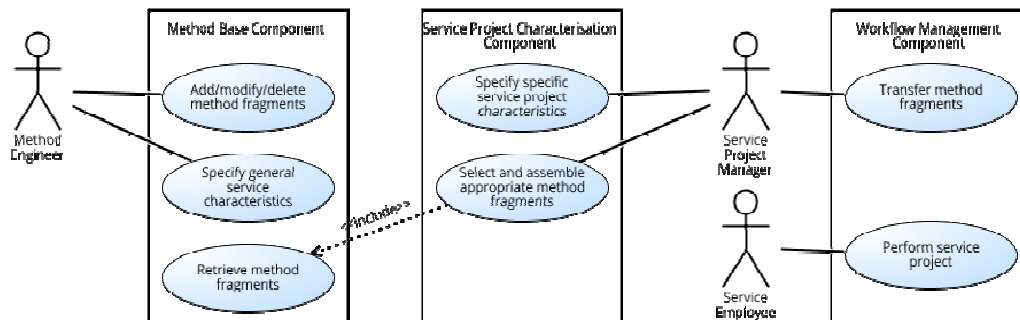


Fig. 11: Service customisation information system architecture

In general, three distinct roles using the service customisation information system can be identified. The *method engineer* is responsible for maintaining the method base. She has to add, modify, and delete method fragments and specify the general service characteristics that are used to define a situation. The method engineer must ensure consistency of the method base. This is of special importance when new method fragments are added. Ideally, the method base component supports the method engineer by pointing out possible inconsistencies, e.g. contradictory method fragments.

The *service project manager* is responsible for characterising a specific service project. Thus, he selects the values of matching service characteristics. Based on the definition of a service project, appropriate method fragments are presented. The task of the service project manager is to choose between alternative method fragments and to assemble the fragments into a holistic method. Assembling fragments is supported by the system based on definition of dependencies between method fragments, e.g. mutually exclusiveness or requirements. The assembled method is transferred into the workflow management component. Finally, the service project is performed by the *service employee*. The workflow management component presents the method fragment as tasks that must be executed. In addition, the service employee is responsible for giving feedback about changed service characteristics. Based on this feedback, the assembled method is modified: inappropriate method fragments are removed and replaced by appropriate method fragments.

6. Conclusion and Future Research

Development and provision of customer-individual services is an ever-increasing challenge for companies, since it is positioned in the dichotomy between the need for efficiency and adapting services to customer requirements. The objective of our research has been the development of strategies for increasing the effectivity and efficiency of service customisation. Therefore, we specified a unified framework consisting of a semi-formally defined method fragment metamodel. In addition, examples for service engineering method fragments were presented. The existing fragments can be used to assemble process models for a service project with specific characteristics. The underlying metamodel allows for specifying new method fragments that adhere to the given structure.

The presented results can be used both in science and in industry. In particular, the metamodel should be part of future discussions about relevant service customisation elements. By using a metamodel-based approach, it is possible to reuse the metamodel and add missing elements or adapt existing elements. In addition, this should foster a general discussion about unifying or standardising service customisation approaches. As was revealed by the literature reviews, the service customisation domain is still very heterogeneous and is in need for a harmonisation of its terminology. Using the results in industry allows for establishing a method base including approved best practices.

Building on the results presented in this paper, our next steps are to continuously extend the method base by specifying new method fragments based on literature⁴. Additionally, existing method fragments are formalised according to the metamodel and transferred into a service customisation information system as defined in section **Errore. L'origine riferimento non è stata trovata.** Based on this information system, service projects can be set up by defining their service characteristics. Based on these characteristics, relevant method fragments are selected and can be assembled into a holistic process model. In addition, the information system integrates software tools supporting method fragment application, e.g. software for additive service configuration.

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⁴ A thorough overview about method fragments is presented under <http://serviceconfiguration.org>

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USER AS A NEW COMPONENT OF PRODUCTION: TYPOLOGY OF SERVICES FROM THE PERSPECTIVE OF THE LABOUR PROCESS.

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Nowadays there is an increasing involvement of the user (consumer/client) in production and innovation processes. This phenomenon is changing the way we look at innovation. Therefore, two changes are at play: on the one hand, the joining of goods and services innovations in a common framework, and on the other, linking them with consumer participation. These approaches allow us to derive a service-goods-user typology according to the different kinds of production. So, another element must be added to the historical production organizations: artisanal, manufacturing, industrial, informatics, scientific and customization. These organizations are based on tools, machinery, energy, information and science, and customer participation, respectively. In this context, there are different kinds of services and goods correlated with each organizational production stage.

Key words: *Service innovation, Customization, Customer-driven manufacturing, User involvement, Service Typology.*

1. Introduction

The objective of this paper is to propose a typology of services including client participation in the production and innovation of goods and services based upon the organizational labour production development.

The approach involves adding a customer/client participation as part of the labour process in different kind of organizations - artisanal, manufacturing, industrial, informatics, and scientific.

From this point of view, including those typologies cited in the literature on service innovation, the aim is to characterize the relationships between users (customer/client) within production, looking mainly at the economic dynamics of diminishing costs and transaction costs.

2. Literature Review

Early research on technology was based on evolutionary theory linked to product development focussing on the manufacturing sector (Schumpeter, 1942). Until that stage, "the study of technical change in the service sector was largely neglected as

services were viewed as low technology users” (Cainelli, et al., 2004). Services have some of the following general characteristics (Djellal & Gallouj, 2013):

Intangibility as “it does not have a ‘tangible’ form that can be accumulated and circulate economically independent of its support”;

Interactivity by means of customer participation in the production of the service, as they specifically co-produce the service⁵;

Time factor, such as the need to distinguish the output, that is, the short-term service from its medium- and long-term effects that is to say, the outcome.

More recent studies show that innovations require increasingly sectorial interrelationships between goods and services (Omachonu, 2010) and are presenting convergence tendencies of technologies and knowledge (Table 1):

Table 1: Convergence of technology and knowledge in services

	Technology	Service knowledge
Goods	1. Technological Convergence, and Fusion	2. PSS, Product Service System (Baines, et al., October 1, 2007), (Omachonu, 2010)
Services	3. Technology Enabled Services (TES)	4. Service Convergences

Source: Author’s adaptation from (Chang, et al., 2014)

1. The technological convergence is focused on manufacturing, reaching a certain level of "fusion" as is the case of mechatronics and optoelectronics (1975-1990) (Kodama, 1986). Modularization is facilitated by the introduction of ICT within the framework of achieving the integrity of the product.
2. Product Service System, PSS, deal with dynamic interdependencies of products and services in production (Meier, 2010), which are defined as a marketable set of products and services that are capable of jointly fulfilling customers' needs” (Omachonu, 2010). The term “service” has evolved to include many of today’s offerings that are characterized by bundled solutions consisting of products and services (Nam & Lee, 2010).
3. Services enabled by technologies, TES, which are provided by “business services company that uses proprietary technology to deliver something that is better, faster, and cheaper than if you do it yourself or hire a traditional firm.” (Hurst, et al., 2014).
4. The convergence of services involves removing boundaries between multiple services to offer a total solution through collaboration, coordination, constella-

⁵ Consumers of IT and network services sometimes provide their own labor, their own technologies (computers, Internet), and eventually a certain amount of capital to co-produce the service (Djellal & Gallouj, 2013)p285.

tion value in a single place of purchase and integration of services. This involves creating networks of customers, partners and employees to co-create and facilitate interaction with the client producer.

The customer-driven services and manufacturing is marked by an increase in variety in order to tailor the product or services to the customer's needs. These trends are resulting in manufacturing "in small batches, while at the same time showing steadily decreasing product life-cycles driven by customer orders" (Wortmann, 1997). In services there is a wider variety ranging from how the service is designed and developed to how it is delivered and managed (Miles, 2005). The innovation strategies are changing from "innovating *for* customers" to "innovating *with* customers" and involving those customers in a process of "knowledge co-creation" (Desouza Kevin C., 2008). Services increase their heterogeneity depending on the extent of customer interaction (Randhawa & Scerri, 2014).

Another approach involves considering which factor is undergoing most change: physical (goods), information, Knowledge-based or people, or stressing intra-services differences in terms of the patterns of technologies used, relevant market characteristics and the technical skills required (Miles, 2008).

3. Methodology

The point of departure is to make a synthesis of the different kind of typologies already developed for service innovation and for user participation in innovation.

User participation is increasing due to economic tendencies such as:

- 1) Competing costs, quality and positioning in globalization and value chains;
- 2) Mass customization tendencies (Da Silveira , et al., 2001);
- 3) Artisanal manufacturing, "offering broader access to a level of quality that can't be achieved by traditional mass-scale businesses" (Upbin , Dec 11, 2013);
- 4) Open innovation as a means of reducing costs and grasping opportunities (Mina , et al., 2014); it is much less a dichotomy (open versus closed) than a continuum with varying degrees of openness (Huizing, 2011), with a large scope of ways and instruments.
- 5) Collaboration for innovation, which is more frequent in the services, firms (Chesborough, 2011b).

In order to classify service innovation a four-dimensional model is based on: 1) service concept, 2) client interface, 3) service delivery, and 4) technology, thus establishing different patterns in the relationship of the supplier, service firm and client, which are related to personal, organizational, marketing and competing capabilities (den Hertog, 2000).

In the case of the client being a consumer, producer or both, the following concepts have been applied: service co-terminality, (Miles, 2008) and co-production (den Hertog, 2000) or client interaction (Kvålshaugen, et al., 2008).

According to a service-dominant logic (S-D logic) perspective⁶, four types of service innovation are presented based on two levels- high and low-, of two dimensions: *co-creation* between firm and customer; and *networked collaboration*, therefore firm needs to enhance their own capabilities for service innovation by applying the resources of all actors including suppliers and customers (Nam & Lee, 2010).

The question is how innovation applies to services:

- Many good innovation concepts apply readily to services.
- Working closely with customers to develop new solutions.

Thus, the relationship between user and producer in cooperation during the production and the innovation process could be classified considering: 1) what kind of production process is involved; and 2) what kind of services and how are related with goods, and whether or not they are part of marketing or financial activities.

4. Results

A method to generate an integrated typology of production with customer is proposed, first, based on technology change in the division of labour which is expressed through historical production organization's development: artisanal, manufacturing, machinery system, automation and scientific processes to which it is added a customization process.

The evolution of the labour process is classified into both services and goods used in production. The point of departure is the artisan process which needs hand instruments and knowledge related to specific skills.

Then follows the industrial revolution that has two phases: one, manufacturing based on the division of labour between workers and two, the introduction of machinery using steam energy. Therefore, machine-tool demand for different services from maintenance on up to specialized skills, organizational services and energy require prospection and energy distribution services (Table 2).

The information technology revolution, based on Information and Communications Technology, TIC, impact first production through automation; with a demand of services as supervision, control, information and computing services, as well as software and design; and second its application extends to all the labour processes including Science and Customer (Table 2).

⁶ Service-dominant (S-D) logic is tied to the *value-in-use*, then "roles of producers and consumers are not distinct, meaning that value is always co-created, jointly and reciprocally, in interactions among providers and beneficiaries through the integration of resources and application of competences". his logic primarily unifies the distinction between goods and services in terms of benefit provision. The traditional view is referred to as goods-dominant (G-D) logic and is based on the *value-in-exchange* (Vargo & Maglio, 2008).

The Scientific revolution which is based and produces knowledge services incorporates intellectual and creative knowledge, R&D services, information systems, and networks services into production of good and services.

Besides labour, machinery, energy, information and commodities, the consumer who also serves as co-producer is added, generating a kind of co-producer and self-service thus relating these processes and their main components to service technology convergence. Convergence is more important in manufacturing, machinery system and automation. Distributed energy is a clear tendency. Science and the client as co-producer are applied to all convergences (Table 3).

Table 2. Production processes and its components.

Production PROCESS->	COMPONENTS	Services			
		Technology	PSS	TES	Service
ARTISAN	LABOUR				
MANUFACTURING	MACHINERY	C			
MACHINERY SYSTEM	ENERGY	C→D	C/D	D	D
AUTOMATION	INFORMATION			X	C/D
SCIENTIFIC	RAW MATERIAL-Science	X	X	X	X
CUSTOMIZATION	CLIENT, CONSUMER-(as)PRODUCER	D	X	X	D
	PSS, Product Service System	TES, Technology Enabled Services	C, convergence D, distributed		

Then the questions are how costs are diminishing on the whole production process as the customer is participating in certain activities. And then, how much is increasing productivity and quality are increasing with regard to working hours versus those not paid by the customers?

In view of the fact that productivity in the service sector has increased more slowly than in the manufacturing sector (Ganz , et al., 2013), a typology of services is generating by ordering their importance to develop a new wave of productivity (Table 4):

- 1) The main service impacts on value creation are through *Information* based on the wide range of TIC's applications. An important economic aspect is the natural non-rival information. However, as the information accumulates as Big Data it generates tradable value.
- 2) *Scientific & Technological* labour process and output is expected to potentially produce larger productivity gains.
- 3) *Technology Enabled Services (TES), Product Service System (PSS) and Energy Service System (ESS)* are outsourcing services or new service development originated from industry. ESS considered complex energy service systems with multiple energy carriers including environmental impacts and consequences of different regulating regimes (Baken, et al., 2004). If technology is employed as a new and innovative source that can form the basis of the devel-

opment of entirely new services, it could be labelled as “New technology-originated service” (TOS). (Kuusisto, et al., 2013).

- 4) *Customer* involvement in outsourcing services, or developing new methods as well as participating in innovations and quality services. However, this is a result of the use of customers as resources and sometimes using their resources. Then productivity comes from diminishing costs via transferring production costs to the customer.
- 5) *Marketing* and *financing* services are necessary to ensure production and sales. With regards to marketing, this could be the retail or wholesale market depending on the economic sector. KIBS’ markets’ varies accordingly with the type of knowledge. New service markets are related with innovation products (goods and services). The customer is participating as co-producer but sometimes also in marketing and financing. Firms are implementing Customer Relationship Management (CRM) integrated and balanced approach to technology, process, and people (Chen & Popovich, 2003).

Table 3 Service’s Value Creation of Labour process

	LABOUR PROCESS	SERVICES	Services’ Value creation			Services for Value Realization	
			Production cost	Transaction cost	Quality	Marketing	Financing
	ARTISAN PROCESS	Skills, Capabilities, Knowledge, Intellectual and Physical work	commerce and bargaining	Low or null	Handcraft	retail market	Banking
INDUSTRIAL	MANUFACTURING	Maintenance	TES, Technology Enabled Services	outsourcing services	Standard	Retail and Wholesale market.	Consumption and investment financing
	MACHINE SYSTEM	Prospecting	PSS, Product Service System	outsourcing services	Control Laboratory		
		Electricity distribution	ESS, Energy Service System	Regulations for exchange	Commodity		
INFORMATIONAL	AUTOMATION / INFORMATION	Computer systems and information processing	non-rivalrous	Big Data generates tradable value	ACCURATE*	KIBS, Knowledge Intensive Business Services’ Markets	Banking System
SCIENTIFIC & TECHNOLOGICAL	SCIENTIFIC PROCESS/ Knowledge	Scientific networks	non-rivalrous	Regulations via patenting or confidentiality rules	Peer Review; Commercialization of knowledge	New service markets	Risk Capital

CUSTOMIZATION	SOCIETAL PROCESS/ Client-Customer	Customer involvement in service development. Use of new methods / Customers as resources / Utilization of user innovations	diminishing costs via transferring costs to customer	outsourcing services	customer participating in Quality	Customer requirement and consumption	Credit
		*ACCURATE, Complete, Cost-beneficial, User-targeted, Relevant, Authoritative, Timely, Easy to Use. (Murtala, 2012). Source: Author's elaboration					

5. Discussion

The changes in production processes, as part of the division of labour, imply a set of innovations which increase productivity achieved by:

- 1) Diminishing production costs;
- 2) Whenever the transaction costs of a productive activity are lower in the market, they tend to be moved outside the firm (Williamson, 2007-3); and
- 3) Regarding services, a way to diminish costs is through time and activities provided by the customer, as is the case of Self-service⁷.

The typology based on goods and labour processes applied to services and adding the recent participation of customer in production provides us with a framework to propose a typology of services. This typology emphasizes the need to ponder the value both in use and in exchange.

6. Conclusions

"The transition toward a service-based economy, however, calls for a revised understanding of value creation within organizations" (Pitelis, 2009).

It is necessary to consider not only the "value-in-use" of services to the customer, but also the "value-in-exchange", in order to return to services as a productive activity for value creation

⁷ Literature on Self-services mainly focus on the quality of the service and the customer acceptance. (Curran & Meuter, 2005).

Technological changes are defined on the basis of goods. Therefore, services are production inputs. From this point of view, services are directly affecting the way of producing with the Information and the Scientific and Technological revolutions and the development of Customization (Table3).

The typology proposed as a function of increasing productivity is the following:

1° *Information services* that are grouped with the Informational labour process based on the wide range of TIC's applications.

2° *Scientific & Technological services*.

3° *Product-Energy-Technology Enabled Services (PETS)*, which are associated with product, technology and energy changes and development.

4° *Customer involvement* in outsourcing services and developing new methods as well as participating in innovations and quality services.

5° *Marketing and financing services*.

6° *Public services*. Characterized in most cases by the circumstance of having no price, collective consumption and direct/indirect consumers.

There remains the question about how services, particularly KIBS (which might be of any of the above categories), could become agents to increased social productivity and give an impulse to a new "customization revolution".

New changes in services –innovations and customer participation- must be evaluated in function of their economic impacts and dynamics, depending on which sector and which technology is used as well as their relations with goods⁸.

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⁸ The debate is about whether innovations will remain bottled up in a few tech-intensive sectors that employ the highest-skilled professionals and account for a relatively small share of GDP, or spread to the bulk of the economy. The consequences of any innovation for productivity, employment, and equity ultimately depend on how quickly it diffuses through labor and product markets. (Rodrik , 2016).

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Table 4 Role of services in labor process & consumption

LABOUR PROCESS-->	ARTISAN PROCESS		MANUFACTURING		MACHINERY SYSTEM		AUTOMATION		SCIENTIFIC PROCESS		
COMPONENTS	Goods	Services	Goods		Goods	Services	Goods	Services	Goods	Services	
LABOR	Hand Tools	Skills, Capabilities, Knowledge, Physical work		Division of Labour		Labor: Routine tasks. subordination to the machine. Work specialization		Supervising & Maintenance	Training equipment	Researcher. Intellectual collective work. Development of creative abilities	
MACHINERY			Machine Tools powered by human muscle	Maintenance	Machine Tools powered electrically, hydraulically or ,line shaft via	Maintenance	Computer Numerical Control (CNC)	Specialized software	Laboratories: Phisycs, chemical, biology, nanotechnology	R&D	INDUSTRIAL
					Electric Motor		Robotics. Automation				
ENERGY					Gas Coal Oil.	Prospecting	New energy sources: nuclear, solar, biological	Prospecting	Technologies for renewable resources, TER	Design. Prototypes	INDUSTRIAL
					.Electricity	Electricity distribution	Power generation, transmission systems, and distribution systems	control system	Distributed Energy Resources (DER)	PPP electricity services	
INFORMATION							ICT Information and Communications Technology	Computer systems and information processing	Cloud Data Storage	Integration of information: Images, data & sounds	INFORMATION
RAW MATERIAL- Science (knowledge)									Science instruments: telescope, microscope, particles acceleration	Scientific networks	SCIENTIFIC & TECHNOLOGICAL
CONSUMER-(as)PRODUCER		Do it yourself (DIY)	Self service machines	Co-terminality or not (Miles, 2008)	Mass Industrial Production	Standardized Service	Flexible automation	Automated Teller Machine	Customer involvement in service development. Use of new methods / Customers as resources / Utilization of user innovations		customization

Source: Author elaboration based on (Corona-Treviño, 2015).

USING DIGITAL CO-CREATION FOR INNOVATION DEVELOPMENT

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The role of digitalisation in people's daily lives appear to be among the most touted stories of the century. It can be also seen that adopting new digital technologies is not easy for everyone. Thus there seems to be a demand for approaches which would support and motivate people in adapting digitalisation. Digital co-creation could be a powerful approach to enhance this adaptation. Yet, there seems to be a very little literature on digital co-creation. Hence, this is a theoretical paper which aims to map the current state of literature on digitalisation, co-creation and digital co-creation resulting a preliminary framework to better understand on how to explore the nature of digital co-creation.

1. Introduction

The role of digital technologies in people's daily lives appear to be among the most touted stories of the recent century. The advances in digital technologies are considered to form a megatrend with global impacts through the international interconnectivity and the ability of real-time information sharing (Lee *et al.*, 2012). While there is a high variety between countries in terms of adoption of digital technologies (Billon *et al.*, 2010), there seems to be a close link between digitalisation and economic development (Billion *et al.* 2009; Park *et al.*, 2015). It should be also noted that the technical development of information and communications technologies (ICT) can enhance productivity and create new services (Park *et al.*, 2015). Furthermore, it seems that the integration of ICT help businesses to remain competitiveness in digitalisation.

Companies tend to be keen on investing in the process of finding new ideas and technologies that enhance digitalisation. Additionally new technology can provide promising solutions. However, it can be seen that adopting new digital solutions is not easy for everyone and there seems to be certain kind of inequality how people are able to use digital solutions. Co-creation might offer an effective approach when creating and implementing new technology to develop for example new business models (Chesbrough, 2010). Co-creation seems to enhance the understanding and motivation of a digital business development as it allows stakeholders not only to collaborate but also learn while collaborating. Additionally, while increasing the organisation's understanding about their digital business development co-creation activities seem to bring new insights in the process of innovation. (Hakanen, 2014).

Moreover, looking from a face-to-face co-creation perspective user participation in a global context and with several stakeholders is a particular challenge but digital tools can offer promising solutions. (Friedrich, 2013; Sawhney *et al.*, 2005). Additionally, digital business development can be supported with inspiring physical or virtual co-creation spaces where users, designers and other stakeholders can meet formally/informally and as partners (Friedrich, 2013). Thus digital co-creation tools do not substitute face-to-face methods, but they could to complement them by enabling more constant interaction with users and lowering certain users' participation thresholds (Friedrich, 2013).

Furthermore, it seems that digitalisation and co-creation together could strengthen many business activities including innovation. Based on literature it seems that an increasing body of literature exists around digitalisation and co-creation. However, there seems to be a very little literature combing these areas of research. Hence the aim of this paper is first briefly to discuss digitalisation and co-creation literature to understand what is meant by digitalisation and co-creation, secondly to map the current state of literature on digital co-creation, and thirdly to present a preliminary framework to better understand on how to explore the nature of digital co-creation.

This paper is a part of on-going USCO research project between 2016-2018 (Using Digital Co-creation for Business Development) funded by TEKES (The Finnish Funding Agency for Innovation). The main research partners of this project are Laurea University of Applied Sciences and the University of Tampere, School of Management. USCO project focuses on digital business development, co-creation tools and innovation having eight Finnish service organisations as project partners. More specifically USCO project aims to understand what kind of: a) leadership, b) organizational culture, c) management practices, and d) co-creation processes digitalisation require. Thus the researchers of this paper have been familiarising themselves already earlier with wider perspective on digitalisation and co-creation and based on this interest combined with the interest of Finnish service organisations USCO project was built.

This paper is organized as follows. First, the definitions of digitalisation and co-creation on how they are understood in USCO research project are clarified. Secondly the literature on digital co-creation is discussed. And thirdly a preliminary framework on how to better understand the nature of digital co-creation is presented and conclusions are drawn.

2. Digitalisation

There seems to be no uniform definition for what the concept of digitalisation stands for, and in research articles digitalisation is often bound to a certain field of business or to an individual process. Different definitions vary in their scope from defining digitalisation as a global megatrend (Lee *et al.*, 2012, 818-819) to narrowing the term down as a the "digital representation of signals, information, and objects in binary code" (Stein, 2015, 2). Ilmarinen and Koskela (2012) note that instead of defining the concept of digitalisation itself, the term it is often described through examples.

Research literature also use terms "digitalisation" and "digitisation" interchangeably, and give both a number of definitions. Lipiäinen (2014, 20) defines the term

digitisation as a social phenomenon in which everyday communication channels are pivoting from traditional forms towards their digital counterparts. While Lipiäinen (2014) refers to digitisation as the context of communications, the focus of the definition is on the social phenomena, not on the technical process of transforming information to binary form. Tilson *et al.*, (2010, 749) take contradicting stance in stating that digitisation refers to a technical process, whereas digitalisation would be the proper term to use when the context is more of a social nature.

Definitions of both digitisation and digitalisation feature the same key component of transition from analog to digital. Digitisation, defined as moving conversion from analog to digital, is identified as a key driver for enhancing digitalisation (Ilmarinen and Koskela, 2015, 21). Aside from a transformation from analog to digital, the definition of the term appears to be highly contextual. Gartner's IT glossary (2016) defines digitalisation on a broad level and adopts a business transformation viewpoint; "Digitalisation is the use of digital technologies to change a business model and provide new revenue and value-producing opportunities; it is the process of moving to a digital business". While research in digitalisation is available in vast quantities, the numerous ways digitalisation is defined and interchanged with the term digitisation sets requirements to understand in which context the term is presented in research articles. This paper agrees mainly with Gartner's definition on digitalisation adding that the process of moving to a digital business should be seen also as a social phenomenon where stakeholders are involved.

3. Co-creation

Co-creation offers a powerful approach to foster innovations (e.g. Ramaswamy and Gouillart, 2010). The power of co-creation in innovation is its capability to combine the knowledge of stakeholders from different perspectives (Keränen, 2015). Grönroos and Voima (2013, 141) see that interactions "form a platform for co-creation of value" meaning that there needs to be certain kind of interactions in order to co-create value. Keränen (2015, 218) introduces a co-creation framework which focus is on face-to-face and B2B co-creation in service companies and continues that there are certain kind of characteristics in co-creation, which she calls pre-conditions and co-design manners, that seem to foster co-creation of value. Moreover, Keränen (2015) indicates that co-creation creates certain potentiality for strategic thinking and triggers are needed to enhance co-creation activities. The pre-conditions are two-way communication, orientation towards a long term relationship, trust, knowing in person, transparency, and ubiquitous interaction (Keränen, 2015). The co-design manners are sharing knowledge, listening and learning together, developing together, testing together, proactive attitude and focusing on value network. The potentiality for strategic thinking includes a good knowledge of each other's businesses, better understanding of value-in-use, better planning of future business activities, emerge of new ideas, and releasing resources from the selling activities. (Keränen, 2015.)

In Keränen's (2015) PhD research on co-creation there can be found a deep theoretical and empirical discussion about the nature of co-creation in the fields of service marketing and management, service design, and service innovation. Thus Keränen's research combines three fields of research related to co-creation. Based on Keränen (2015) co-creation can be defined in a following way: co-creation is a joint value creation process (Grönroos & Voima 2013) of developing solutions (e.g. Aarikka-Stenroos

& Jaakkola 2012; Hakanen & Jaakkola 2012), facilitating innovations (e.g. Kristensson et al. 2008), and creating strategic potentiality through co-design manners for the stakeholders involved (Keränen 2015, 222). As USCO's projects partners are all service organisations and one of the objectives in USCO's research is to focus on co-creation in relation to digitalisation Keränen's (2015) definition and framework seem to serve the preliminary understanding of co-creation for USCO's research project. For definitions see Figure 1 and for co-creation framework see Figure 3.

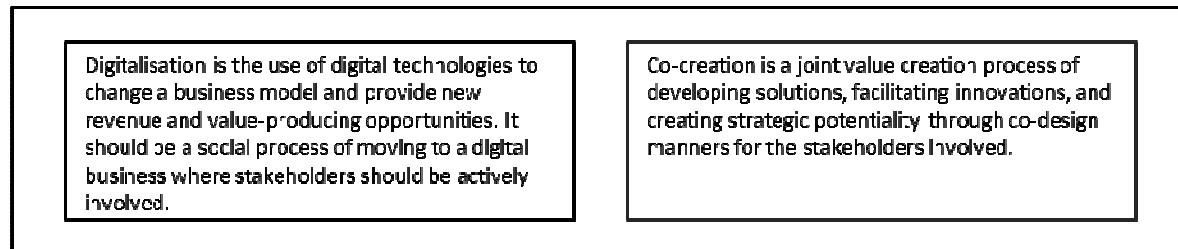


Figure 1. Definitions of the digitalisation and co-creation

4. Digital co-creation

To understand the current state of literature on digital co-creation a literature search was conducted. For this literature search as a primary source Science Direct was used and complementing searches were made using the references of the articles detected from Science Direct. During the first round the searches were limited to peer-reviewed articles having following words together in their title, abstract or keywords a) digitalisation/ digitalization/ digitisation/ digitization, and b) co-creation/ cocreation. The findings directed the authors to do complementary searches with the keywords ICT and co-creation/ cocreation. As a result of this search only a handful of articles were detected.

Hence based on the literature search it seems that digital co-creation is a largely unexplored area of research (Breibach and Maglio; 2016, Rai and Sambamurthy, 2006; Vargo *et al.*, 2008). The articles detected are focusing on opportunities and challenges (Soule *et al.*, 2014), consumers role in co-creating experiences in tourism (Neuhofer *et al.*, 2012), collaboration platforms (Mačiulienė and Skaržauskienė, 2016), motivating social participation using technology (Preece and Shneiderman, 2009), and using digitalisation to collaborate during meetings (Fast-Berglund *et al.*, 2015).

Soule *et al.* (2014) argued that having solid digital capabilities provide organisations flexibility to operate and to position themselves more effectively in their value network, enabling them to confront the possible challenges in generating financial value in digitalisation. Additionally, technology/ digitalisation can be a source of innovation in co-creation of services where consumers are enabled to play an active role by sharing their experiences (Neuhofer *et al.*, 2012). Digitalisation offers tools for co-creation of personal service experiences (Mačiulienė and Skaržauskienė, 2016), and users are empowered with technology to co-create whenever and wherever (Buhalis, 2003).

Additionally, digitalisation seems to open up possibilities for people to accomplish their aims together where individuals or single organisation could not do it alone (Preece and Shneiderman, 2009).

Moreover, the use of digitalisation in management has been a good way to work with and through others and to promote organisational learning (Fast-Berglund *et al.*, 2015). Digital co-creation in management can be effective in filtering and sharing information for example during online meetings. Furthermore, the use of digital tools can save time and allow to co-create with other employers (Preece and Shneiderman, 2009). Mačiulienė and Skaržauskienė (2016) state that new digital channels of communication enable innovative involvement for managers to collaborate with employers in shorter time. However, how to create digital surroundings, how to enhance collaboration and how to share knowledge with others might be challenging (Fast-Berglund *et al.*, 2015). Additionally, it seems that another challenge in digital co-creation is collaboration among different actors in different organisations (Mačiulienė and Skaržauskienė, 2016). Furthermore, Fast-Berglund *et al.* (2015) have noticed that collecting data with the help of digitalisation does not necessary give better information for business development. The challenge is how to use the collected data as there might be plenty of it.

Digital platforms seem to differ in terms of purpose, but they have some common characteristics for example: mass participation which allows greater intellectual capabilities, amount of ideas and use of ICT in technologies in creation of new knowledge (Mačiulienė and Skaržauskienė, 2016). Especially digital platforms seem to enable more effective co-creation than face-to-face co-creation (Hienerth, 2011). Digital platforms might also allow organisations to map new business potentiality in integrating users in the business development process (Hienerth, 2011). The ideal result could be the constant flow of new ideas and innovative involvement of people (Neuhofer *et al.*, 2012).

To conclude, there seems to be already some amount of digital co-creation platforms and some other methods which enable stakeholders to co-create and co-creation platforms are seen as a source of innovation. Digital capabilities seem also to support organisations in competition. Additionally, digital co-creation can offer tools for managers to connect and work more effectively with their personnel. Moreover, digital co-creation enables multiple stakeholders to co-create wherever and whenever. Then again there seems to be some challenges on how to create and manage digital co-creation and furthermore how to use the outcomes of the digital co-creation activities.

5. Discussion and conclusion

As the role of digital technologies in people's daily lives both in private and in work seems to be among the most touted stories of the century, and the advances in ICT seem to create possibilities to stay connected 24/7 the capabilities in adopting new digital technologies have become increasingly important. To keep up with the competition organisations seem to need more and more employers who can not only to use digital solutions but also develop them. Additionally, the digital skills of users need to be supported. Also, it can be seen that adopting new digital technologies is not easy for everyone. On the other hand, it has been stated that face-to-face co-

creation can be a powerful approach not only to foster innovations but also to motivate stakeholders involved in co-creation process. Thus co-creation approach could lower the threshold of adopting new things such as digitalisation.

There seems to be a vast amount of literature on digitalisation and co-creation but very little can be found on digital co-creation. Yet, it seems that digital co-creation could work even better than face-to-face co-creation in enhancing digitalisation. Hence it seemed important to seek the better understanding on digital co-creation.

To continue, digitalisation and co-creation could be seen as complementing to each other (see Figure 2). Digitalisation could enhance face-to-face co-creation in creation of digital co-creation platforms which would allow stakeholders to co-create from anywhere and anytime. Additionally, digital co-creation activities would definitely shape the current understanding on co-creation. The complementing aspect of co-creation to digitalisation could be the involvement of stakeholders in the digital development process. These kind of activities could also lead to innovate totally new solutions. Co-creation allows digitalisation to be a social phenomenon rather than just a technical process which could also be an important motivational factor.

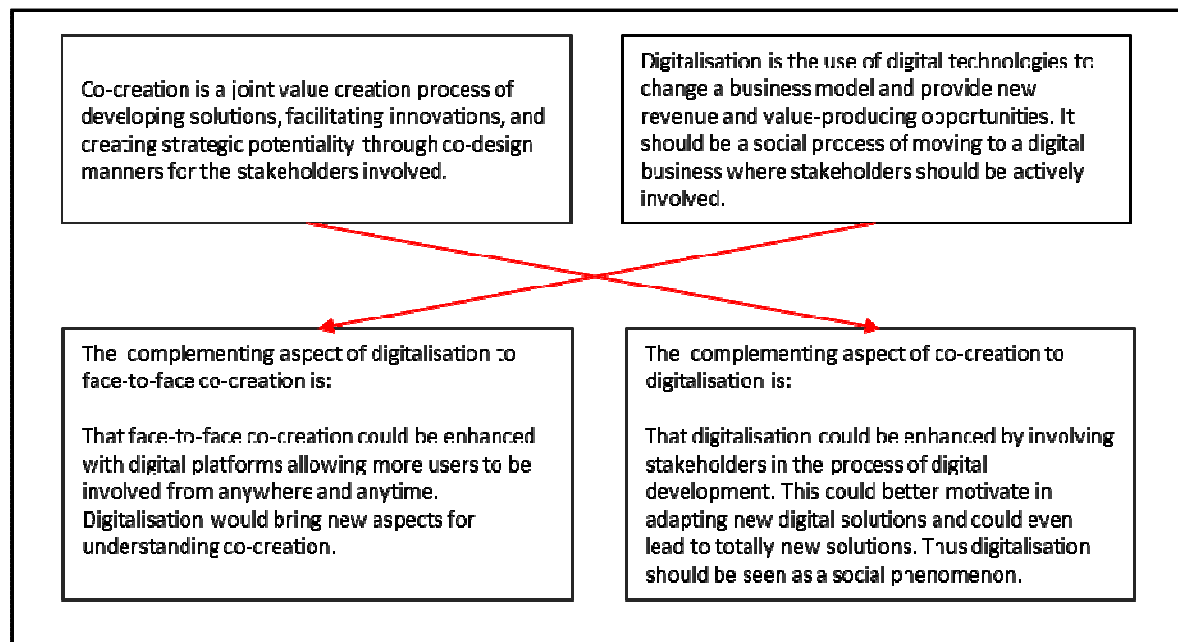


Figure 2. Co-creation and digitalisation complementing each other

Digital co-creation seems to involve a high amount of grey area activities meaning that it seems to be an area with a very little research.

To clarify on what topics the research on digital co-creation should focus on this paper uses the co-creation framework of Keränen (2015) on understanding co-creation (see Figure 3).

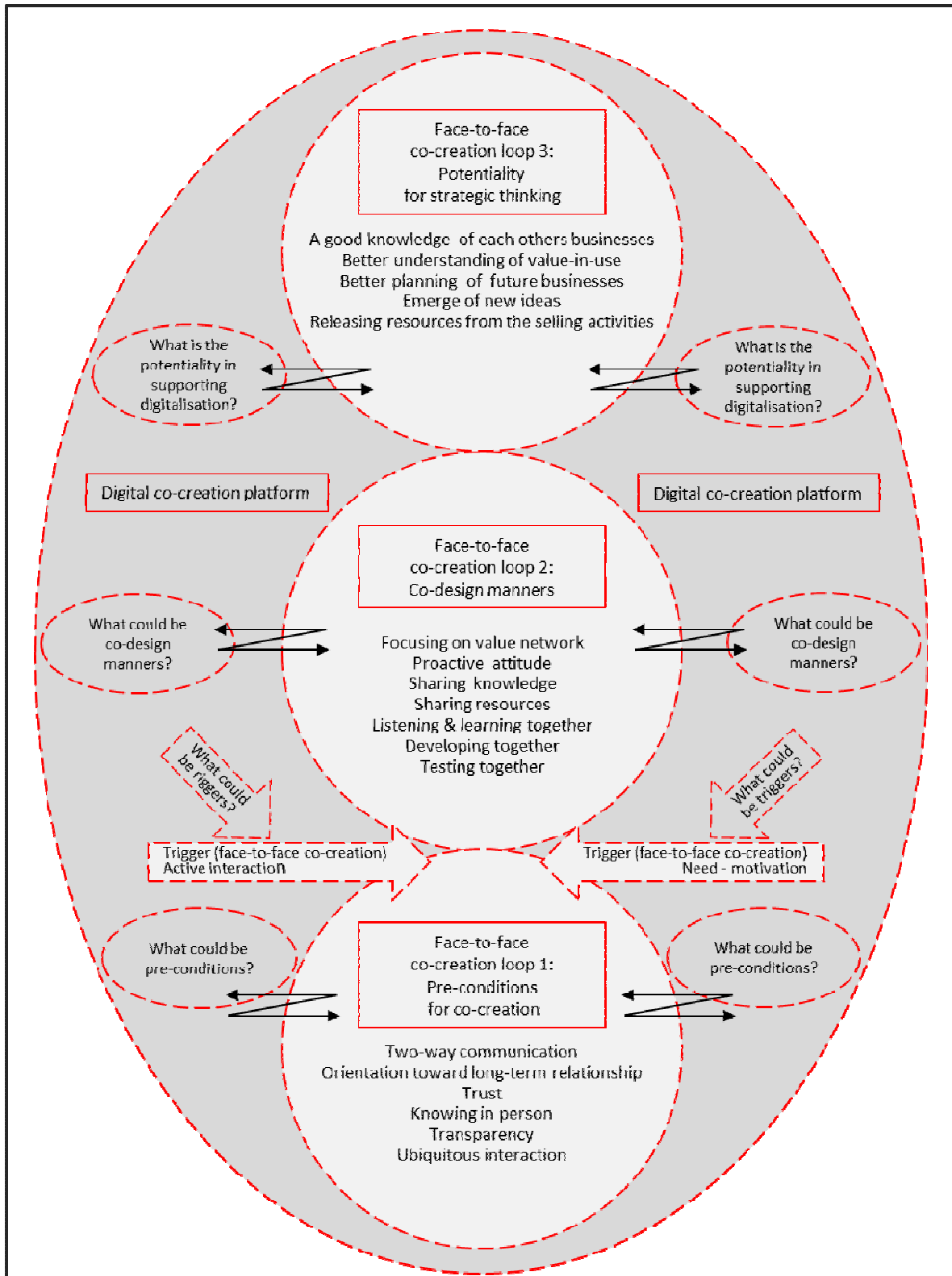


Figure 3: A preliminary framework to better understand on how to explore the nature of digital co-creation

As there seems to be already some amount of digital co-creation platforms the original face-to-face co-creation framework is placed on the top of imaginary digital co-

creation platform (grey area). The light round circles include Keränen's (2015) face-to-face co-creation loops one, two, and three which are introducing the characteristics of face-to-face and B2B co-creation. These loops demonstrate: 1) pre-conditions for co-creation, 2) co-design manners in co-creation process, and 3) potentiality that co-creation creates for strategic thinking. As the current literature on digital co-creation demonstrates that there seems to be some challenges on how to create and manage digital co-creation and furthermore how to use the outcomes of the digital co-creation activities Keränen's face-to-face co-creation framework might support in clarifying these aspects.

To conclude, the aim of this paper was first briefly to discuss digitalisation and co-creation literature to understand what is meant by digitalisation and co-creation, secondly to map the current state of literature on digital co-creation, and thirdly to present a preliminary framework to better understand on how to explore the nature of digital co-creation. The future research on digital co-creation could clarify what would be pre-conditions, triggers, and co-design manners for digital co-creation and what kind of potentiality digital co-creation could create for supporting digitalisation (see Figure 3). Then in turn the new understanding could perhaps respond: a) how to better tackle the challenges in digital co-creation, b) how could digital co-creation support in adopting digitalisation, and c) how could digital co-creation enhance innovation.

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VALUE CO-DESTRUCTION IN THE SERVICE ECOSYSTEM: THE VOLKSWAGEN CASE

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The paper aims to fill this gap by analysing the resulting effects of bad practices between multiple actors in the service ecosystem. We analyse a single case study, the recent emissions scandal involving the German automaker Volkswagen. The choice of this case study is motivated by its uniqueness, its spreading effects and its great resonance at the global level. We contribute to the theoretical debate over value co-creation literature, highlighting how interactive processes can result in negative ones and analysing how cascade adverse effects take place within a service ecosystem.

1. Introduction

Business history provides several examples of scandals and unethical behaviours of firms (Weiss, 2014); the line between good and bad practices is very thin (Ail, 2013; Trevino & Nelson, 2014). Nevertheless, scholars and practitioners have adopted mainly a normative and positive view towards how firms conduct business, addressing the consequences of their correct decisions on performances and competitive advantage (Purkayastha & Sharma, 2016; Rumelt, 1980; Zott et al., 2000).

The complexity of relationships in the business context implies a great variety of ways in which actors interact with each other (Claro et al., 2003; Gummesson, 1987; Hakansson & Snehota, 1995) and the analysis of the dynamics of such interactions is becoming a major challenge (Chandler & Vargo, 2011; Gummesson & Mele, 2010; Vargo et al., 2008), with a call for a more holistic view (Abosag, Yen, & Barnes, 2016).

The expression 'dark side' "suggests problems, challenges, difficulties and drawbacks related to structural issues that exist in business relationships" (Abosag et al., 2016, 5) and that negatively impact the interacting actors' performance (Samaha et al., 2011). This perspective has been analysed in business as well as consumer marketing, and more recently in some studies within service-dominant logic.

In business marketing literature, the dark side of interactions has been analysed with regards to atmospheric factors (Chowdhury et al., 2016), as opportunism (Joshi & Stump, 1999; Nunlee, 2005; Wathne & Heide, 2000, Williamson, 1975), conflict (Chang & Gotcher, 2010; Duarte & Davies, 2003; Mele, 2011), imbalanced power

conditions and the related asymmetry in a dyadic relationship like that of customer-supplier (Caniëls & Gelderman, 2007; Johnsen & Lacoste, 2016). All these factors affecting relationships have been treated as explanatory aspects of the potential adverse consequences because to recognize the sources affecting the dark side of a relationship is the first step to addressing them (Abosag et al., 2016). In such literature, the emphasis is more on antecedents and the consequences for business or network relationships, with scant analysis of the impact on value processes (Mele, 2011). They have inquired to a lesser extent on the ways in which actors can destroy value for themselves and for others through business interaction and the effects of these negative ways of doing things.

In regards to the consumer perspective, the negative side of service provision has been investigated in terms of service failures and service recovery (Smith & Bolton, 1999; Weun et al., 2004). Furthermore, scholars have addressed the fact that relational factors are not only antecedents to positive relational outcomes (Moorman, Zaltman, & Deshpandè, 1992), highlighting that “customers can think that service providers are taking advantage of the trust between the two parties and acting opportunistically” (Grayson & Ambler, 1999, 132). More recently, some studies have addressed issues related to exploring the underlying reasons for pitfalls, exploitation and unfairness in Customer Relationship Management (Frow et al., 2011; Nguyen, 2012; Nguyen & Simkin, 2013).

In S-D logic literature, value destruction is a recent topic (Echeverri & Skålén, 2011). Most studies on value co-creation reveal an over-optimistic and deterministic view of the value process that only leads to positive outcomes, failing to take into account the negative elements impacting value co-creation between actors, though recognizing that “service exchange and value co-creation can be asymmetric” (Edvardsson et al., 2011, 335).

Some scholars have analysed how a negative process occurs, first by focusing on a dyadic relationship and the related resource integration process (Plé & Chumpitaz, 2010; Plé, 2016), then by adopting a network approach through a study of the interaction between the focal firm and its network (Lefebvre & Plé, 2011). The understanding of value co-destruction in a wider systemic perspective is still missing despite the recent increasing role of the service ecosystem approach (Vargo & Lusch, 2011). A service ecosystem has been defined as a “relatively self-contained, self-adjusting system of resource integrating actors connected by shared institutional logics and mutual value creation through service exchange” (Lusch & Vargo, 2014, 161); such a perspective highlights the social aspects of context, the importance of institutions, and the multi-layered and complex processes in value co-creation between multiple actors (Lusch & Vargo, 2014; Wieland et al., 2015; Taillard et al., 2016).

This article aims to fill this gap by analysing the resulting effects of bad practices between multiple actors in the service ecosystem. We analyse a single case study, the recent emissions scandal involving the German automaker Volkswagen. The choice of this case study is motivated by its uniqueness, its spreading effects and its great resonance at the global level.

We contribute to the theoretical debate over value co-creation literature, highlighting how interactive processes can result in negative ones and analysing how cascade adverse effects take place within a service ecosystem.

The remainder of this article is structured as follows. The first part develops a literature review of the dark side of business interaction and of the process of value-co-destruction. Then we present the methodology, the case study and a discussion of the findings on value effects within the service ecosystem. We conclude with implications, research limitations and insights for further research.

2. The dark side of relationships and value processes

The dark side of relationships within value processes is a topic that is attracting growing interest in the recent debate between service scholars over value co-creation (Lefebvre & Plè, 2011; Plè & Chumpitaz Cáceres, 2010), although antecedents can be found in literature on business relationships (Anderson et al., 1994; Håkansson & Ford, 2002) and on customer relationship management (Nguyen, 2011; Nguyen & Mutum, 2012).

2.1 Business relationships

In business marketing, some studies have analysed the negative elements affecting relations, with a certain variety of the used lexicon (Abosag et al., 2016). The IMP scholars have identified five atmosphere dimensions framing exchanges and interactions among actors and thus affecting the development of a business relationship over time: trust-opportunism, power-dependence, closeness-distance, cooperation-conflict and expectations (Håkansson, 1982). Opportunism has played a central role in explaining adverse consequences when organizations interact with each other; it has been defined as “an effort to realize individual gains through a lack of candor or honesty in transactions” (Williamson, 1973, 317). By drawing upon the wide body of research on this construct, Wathne and Heide (2000) have distinguished between active and passive forms of opportunism that act differently in terms of the way in which value is created and distributed, and they needed different strategies to manage negative behaviours (Seggie & Griffith, 2013). The first form refers to the relationship in which one party behaves in ways that are explicitly or implicitly forbidden or acts to obtain concessions from the other part involved; the passive form of opportunism consists of escaping obligations or refusing to adapt to changing circumstances framing relationships.

Some studies addressed potential causes that precede the opportunism in a relationship, as dependence (Joshi & Stump, 1999; Provan & Skinner, 1989) and uncertainty (Moschandreas, 1997; Sako & Helper, 1998); others have proposed different mechanisms to reduce the likelihood of opportunistic behaviours, as social ones of inter-firm communication (Nunlee, 2005), the development of norms and values shared among parties (Brown, Dev, & Lee, 2000) and different forms of monitoring evoked at different stages of a relationship (Bergen, Dutta, & Walker, 1992; Williamson, 1995). Finally, a few scholars have also analysed the consequences of opportunistic behaviours in terms of relationship termination (Li & Ng, 2002).

Also, the concept of conflict has received much attention as a potential cause of opportunism in a relationship (Gruen & Shah, 2000). Conflict is defined as “the process that begins when one party perceives that the other has negatively affected, or is about to negatively affect, something that he or she cares about” (Thomas, 1990,

653). This definition has focused on the early stages of relationships; however, management literature has investigated different aspects of the phenomenon: antecedents of behavioural conflict, the different nuances with which it occurs, consequences on the actors involved in the relationship and the perception of a conflict situation (Duartern Davies, 2003).

Different categorizations of conflict types exist in management literature; past categorizations distinguish between affective and cognitive conflict (Aamason, 1996) and relationship, task and process conflict (Jehn & Mannix, 2001). In particular, similar to affective type, relationship conflict regards personal feelings such as frustration and irritation. Such a categorization has been criticized because conflict should be seen as a natural element of a relationship with both dark and light sides to be caught to understand the complexity of the phenomenon (Mele, 2011).

Recently, scholars have investigated the role played by conflicts, ambiguity, opportunism and power in the value co-creation process (Chowdhury et al., 2016), with the aim of incorporating the concept of relationship atmosphere into the current value co-creation framework.

2.2 Customer relationships

Studies of service failures and service recoveries have addressed the implications of negative relationships with customers (Smith & Bolton, 1999; Weun et al., 2004). Service recovery concerns processes that an organization incorporates in response to a service failure (Gronroos, 1988) to regain customer satisfaction and trust (Sparks & McColl-Kennedy, 2001). Recently, a major focus has been set on the potential risks of co-created services by examining the implications of customer co-creation in service failure episodes (Heidenreich et al., 2015).

Specific issues related to the dark side of customer relationships have been addressed in recent studies on Customer Relationship Management (CRM) (Frow et al., 2011; Nguyen, 2012; Nguyen & Simkin, 2013). The darker sides of CRM are five potential pitfalls in its implementation: the one-to-one dilemma, concerning unfairness issues due to the unequal distribution of outcomes; the related favouritism of some groups of customers; the (firm-customer) relationship symmetry; the negative use of consumers' data; and the role of trust (Nguyen, 2011). By addressing the improper use of CRM and consumers' perceptions, Nguyen and Simkin (2013) provide insight into how advantaged and disadvantaged customers perceive unfairness; an appropriate use of CRM processes by firms, indeed, requires that firms consider issues like consumer fairness, trust, symmetry, dependence and privacy because their lack of consideration, as well as the wrong use of CRM metrics, can lead to long-term failure (Boulding et al., 2005; Nguyen & Mutum, 2012).

Frow et al. (2011) have investigated the dark side of CRM, considered as a service provider's behaviour with the aim, more or less deliberately, to "take advantage of customers in unfair ways" (91). These authors identify different types of service providers' dark-side behaviours and their potential effects both on other actors of the society and on the environment.

These authors advise that an in-depth investigation into the economic and social impact of dark-side practices is needed, taking into account the phenomenon of behavioural contagion and interdependences among actors (Skarlicki et al., 2008)

2.3 Value co-destruction

Plè and Chumpitaz Cáceres (2010) provided a foundational paper for understanding value processes overall by distinguishing value co-creation from its opposite: i.e., value co-destruction. In line with the conceptual framework of S-D logic (Vargo & Lusch, 2014), they defined value co-destruction as “an interactional process between service systems that results in a decline in at least one of the systems’ well-being” (431). Such co-destruction can occur because of an intentionally or unconscious misuse, namely, a failure to integrate or apply resources in a way that is appropriate and expected by the other service system involved in the interaction. Mismatching between parties has also been recognized in terms of non-efficient resource integration due to consumers’ resource deficiencies (Robertson et al., 2014; Plé, 2016) or with reference to the interactive value formation linked to incongruent elements of practices between providers and customers (Echeverri & Skålén; 2011).

By recognizing that the dominant view of value co-destruction takes a dyadic perspective between the service provider and its consumers at the forefront, lacking the consideration of relationships that actors may have with third parties, in a further study Lefebvre and Plé (2011) extend the analysis of value co-destruction from focal firm to its network. Beyond the misuse as another antecedent of the co-destruction phenomenon, they propose the misalignment of business processes: “the situation in which one actor of a focal relationship has failed to adapt and coordinate (e.g. align) his processes with the ones of the other focal actor, and/or of the latter’s network, and/or of his own network in a manner that is considered as “appropriate” or “expected” by these other actors” (13).

In such contexts, value is not reciprocally created in interactions: co-creation for one actor may represent co-destruction for another, especially when the process happens in an intentional way (Stieler et al., 2013; Carù & Cova, 2015). One part involved in a relationship can deliberately adopt distorted behaviours, in the perspective of the other interacting actors, aiming to improve its own well-being to the detriment of that of the others.

However, the idea of others still remains vague and does not at all take into consideration a service ecosystem approach that instead is in focus in the value co-creation debate, whereas the viability or the well-being value can be considered an increase in the viability or well-being of a system.

There is a need to move beyond the focus on dyadic relationships among actors (Worthington & Durkin, 2012) or within a company’s network to adopt a broader approach able to catch the adverse processes during interactions and their determinants, and to address the domino effects that may occur in the whole service ecosystem (Lusch & Vargo, 2014)

3. Methodology

3.1 Research aim and methodology

In line with previous studies on value co-destruction, we chose a qualitative approach (Stieler et al., 2013) with a focus on a single case study (Säwe & Thelander, 2015) to refine and advance theory on the topic (Tsoukas, 2009). The focus is on the emissions scandal involving the German automaker Volkswagen and the actors linked to it in an ecosystem-based perspective. This case was selected because of its uniqueness (Simons, 2009; Thomas, 2015) and because of the fact that it gave us the chance to analyse negative processes not confined to the dyadic interaction between the company and its customer, but instead to actors' relationships from an ecosystem perspective.

3.2 Data collection and data analysis

We depicted the wide set of relationships between different actors moving around the focal ones between the firm and its customers. To outline the interactions and understand how the scandal affected processes related to value in the ecosystem as a whole, data have been collected through multiple sources available through the media; this choice is justified because of the complexity of the case (Saji et al., 2013) and the need to investigate in depth the perception of multiple actors. In detail, after an overview of the most relevant features of this case study, we collected information about the firm, employees, customers, dealers, government agencies, environmentalists, Volkswagen's suppliers, competitors and international media; in addition, we paid attention to relationships among them through official websites, official reports and communications released by national and supranational institutions, blogs reserved for Volkswagen owners, social networks, interviews, newspaper articles, public statements and other sources available online.

We triangulated data from interviews with data from published documents, using more than one technique to gather them (Bryman & Bell, 2003; Myers, 2011) to look at the same topic from different angles. Moreover, our research can be classified as investigator triangulation (Patton, 1990) because it utilises multiple observers, as opposed to a single researcher, to analyse data and compare findings seeking multiple meanings that give depth to the analysis (Denzin, 1989); this approach is helpful in decreasing subjectivity due to the perspective of a single author, as the researchers compared and debated the meanings they grasped from the data collected.

The usefulness of choosing triangulation is in acquiring new insights into the new phenomenon still to be understood in depth (Ordanini et al., 2011). In addition, this choice is useful in terms of enhancing the validity of findings when different issues are affecting a certain phenomenon (Dul & Hak, 2007), as it takes place in this case study, where several interactions shape Volkswagen's ecosystem.

4. The explosion of the VW scandal

The news that Volkswagen, one of the most successful automobile companies in the world, rigged its diesel engines to falsify emissions tests spread quickly in the business world as well as in society in 2015, but the affair dates back a couple of years.

The affair involving the German automaker began in May 2014, when a study on emission from modern diesel cars, carried out jointly by the International Council on Clean Transportation (ICCT) and West Virginia University's Centre for Alternative Fuels, was published. Its results were shared with the Environmental Protection Agency (EPA) and the California Air Resources Board (CARB), prompting these government agencies to start an investigation. The first is an agency of the U.S. federal government that was born with the aim of protecting human health and the environment. The CARB is a regulatory agency in the government of California, with goals similar to those of the EPA. To achieve such goals, these clean air agencies develop and enforce regulation and support companies in understanding environmental requirements.

By showing a lack of cooperation with authorities, Volkswagen said that its calibration was off. "[T]he discrepancies between test results had to do with the conditions under which the test was done" (Source: an interview with VW's engineer, reported on www.reuters.com; date: 24th September 2015), as stated by engineers of the German car-maker at meetings in the summer of 2014 among the CARB, the EPA and the company itself.

In the same year, Volkswagen published its Sustainability Report, in which one could read that environmental issues were key topics for the group.

"By 2018, the Volkswagen Group is aiming to be the world's most environmentally compatible automaker. In order to achieve this goal, we have set ourselves some ambitious targets, particularly with regard to environmental protection. In 2014 we continued our consistent pursuit of these goals. Our Environmental Strategy embraces all of our brands and regions, and extends throughout every stage of the value chain" (Source: www.volkswagen.com - Volkswagen Sustainability Report 2014, p. 86).

After the first government agencies' admonishments and more than a year of stonewalling by the German company, on the sidelines of an academic conference focused on green transportation (the Asilomar 2015 Biennial Conference on Transportation & Energy – August 2015), Volkswagen confessed; it admitted that it had installed defeat software in some of its diesel car models to bypass environmental standards in terms of pollutant emissions.

Formal acknowledgement came on 3 September 2015, as reported on the official U.S. government agency website. *"EPA issued a Notice of Violation of the Clean Air Act to Volkswagen AG, Audi AG, and Volkswagen Group of America, Inc. alleging that model year 2009 – 2015 Volkswagen and Audi diesel cars equipped with 2.0 liter engines included software that circumvents EPA emissions standards for nitrogen oxides. This software is a defeat device as defined by the Clean Air Act"* (Source: www.epa.gov; date: 3th September 2015).

The incriminated device reduced air pollution in the test regime, while on the road some of Volkswagen's diesel engines emitted nitrogen oxide pollutants at a level

much higher than the legal limit. The admission to regulators came after a year during which Volkswagen officials insisted to regulators that tests on its diesel engines showing pollution levels much higher than the legal limits on the road were in error. The scandal exploded.

The Chief Executive Officer of the group at the time of the scandal, Martin Winterkorn, said that his company had implemented incorrect behaviours, but that it would do anything to recover its reputation. “[H]ad broken the trust of our customers and the public [...] We do not and will not tolerate violations of any kind of our internal rules or of the law” (Source: public statement of the CEO of VW group, Martin Winterkorn; date: 20th September 2015)

5. News about the fraud spreads in the market

The first headlines announcing the affair started to appear, contributing to the rapid spread of the story. “What Volkswagen TDI owners Should Know” the press stated (Source: www.forbes.com; date: 23th September 2015).

Car owners started to flood the official Facebook page and Twitter profile of Volkswagen with messages, and used the hashtag “#dieselpgate” to tweet news of the scandal. What emerges more clearly is that, for the first time, a deep sense of incredulity pervaded Volkswagen owners. “Really?!?! So can we assume ALL VWs are compromised?” (Source: a consumer’s tweet with hashtag #dieselpgate; date: 4th November 2015).

Most of the comments concerned the sense of deception perceived by car owners, who not only no longer believed in the promise of lower environmental impact among Volkswagen engines, but also extended their distrust to all aspects of car performance.

“I purchased a VW SportWagen in 2009. My primary interests were in the durability, mileage and cleanliness of the diesel engine. I'm worried that any fix will affect these and make the car into the slow, problem prone VW diesel Rabbit of the 1970s” (Source: a consumer’s post reported on www.bbc.com; date: September 2015).

“I purchased a Golf Bluemotion specifically for low emissions to help do my bit for the environment. I and my son suffer from asthma, I’m disgusted by these actions,” a Scottish owner wrote in a post (Source: a consumer’s post reported on www.bbc.com; date: September 2015).

“What do you think has gotten us to a place where there isn't a flake of snow in mid-December? Every single contribution to pollution matters. Don't you have children or grandchildren? [...]. I loved my Q5! But now I HATE my car, I don't even want to look at it, much less drive it any more. I'm absolutely livid with VW and Audi for lying and covering up their greed” (Source: excerpt from a consumer’s post on the official VW Facebook page; 10th December 2015).

Some consumers were concerned about the reliability and safety of German vehicles. Others were more concerned about community health and environmental damage, and yet others were worried that the diesel engine performance in terms of power and fuel consumption would no longer be the same as a consequence of the cars’ being recalled and modified by the company, as well as because details on how the issue would be fixed were unclear.

"I am absolutely disgusted with this. I purchased my VW Golf due to the fantastic low emissions it was "claimed" to produce. [...] The reason I chose such a car was because VW was a well-known respectable company but this could not be further from the truth. I want to know as soon as possible if my car has been affected and if so what are the actions from this point on" (Source: excerpt from a consumer's post reported on www.bbc.com; date: September 2015).

In addition, many posts regarded the way in which the affair was managed by Volkswagen, complaining about a lack of information, poor timeliness and different treatment for different consumers. U.S. owners would receive \$1000 in compensation – \$500 in a pre-paid Visa card and \$500 in dealership credit. Meanwhile, consumers from other nations were not treated equally: *"Still waiting for a resolution. No news, nothing..."* (Source: a consumer's post on Facebook; date: 4th December 2015).

Some dealers also sued the company. *"What is really discouraging and led me to file this lawsuit is that Volkswagen has wholly failed to respond to dealer concerns in a substantive manner [...] It has talked for months about multiple plans, but done nothing and left us dealers in the red, and in limbo"* (source: public statement of a U.S. dealer reported on www.wsj.com – the Wall Street Journal; date: 6th April 2016).

Several months after the scandal exploded, a U.S. owner highlighted, in a post available online, an important issue. *"I just purchased a 2014 Volkswagen Jetta on March 7, 2016 and the dealership didn't mention any of this. But I'm sure they will not take the car back. What can I do."* (source: a consumer's post on www.consumerreports.org; date: 18th April 2016).

"It is a massive fraud. [...] As a Volkswagen dealer I feel defrauded. I am very concerned about my employees, the people that for many, many years have worked on these cars, were proud to represent them. When they go home they are being asked simple questions: Did you know about the fraud? Did you know that they were cheating" (Source: excerpt from an interview with the chairman of the Flemington Car & Truck family of dealerships in New Jersey as reported on www.cnbc.com; date: 7th October 2015).

6. First reactions of Volkswagen to the scandal

As news of the scandal exploded, the Volkswagen group tried to react. VW's CEO, Martin Winterkorn, announced that he was resigning. Matthias Muller, the former boss of Porsche, would take over as CEO.

Volkswagen commissioned a law firm to conduct a probe into how illegal software used to dupe emissions tests could have been installed in its cars. As reported by international newspapers, Volkswagen also suspended a larger number of engineers than previously acknowledged, following a recommendation from the appointee legal department. The suspended employees ranged from board-level executives to low-level technicians.

"We had to suspend everyone from this area to get them out of the way of the process [...] This is necessary for the investigation, but it's really hard for us because we are now missing their professional experience and knowledge." (Source: excerpt from a statement of a U.S.-based law firm with offices in Germany as reported on www.wsj.com - the Wall Street Journal; date: 26th October 2015).

In addition to the firm's investigation, the U.S. Justice Department and German prosecutors conducted criminal probes of still-unidentified people on suspicion of fraud in connection with the emissions scandal involving the German automaker.

In December 2015, the German automaker submitted a recall plan to the CARB in order to fix defeat vehicles, but the Board of California rejected it because of its inadequateness.

7. Much ado about scandal

Volkswagen's scandal directly or indirectly involved a wide set of actors: media, authorities, suppliers, environmentalists. They assiduously provided information on the development of events; at the same time, Volkswagen's supplier claims about the international media's attitude:

"You speak of 'Dieselgate' – but that is total insanity, if laws have been broken there must be sanctions, but that has nothing to do with the entire technology" (source: excerpt from an interview with Volkmar Denner, the CEO of Bosch, at the International Consumer Electronics Show in Las Vegas, as reported on www.global.handelsblatt.com; date: 8th January 2016).

Moreover, the U.S. authorities did not stop their investigation, also involving Bosch GmbH, the world's largest auto supplier as, in this particular case, supplier of the software installed in diesel engines to circumvent emission standards.

"Bosch is fully cooperating with authorities, assisting them in clarifying the facts concerning the exhaust-gas treatment issue" (Source: public statement of Rene Ziegler, Bosch spokesman, as reported by the Wall Street Journal on www.wsj.com; date: 16th December 2016).

The spokesman added that Bosch was responsible for the components provided, but Volkswagen was responsible for how the parts were applied and integrated: *"How these components are calibrated and integrated into complete vehicle systems is the responsibility of each automaker"* (Source: excerpt from an interview with Rene Ziegler, Bosch spokesman, published on www.reuters.com; date: 7th October 2015).

The affair caused concerns among many environmentalists; an example is provided by the China Biodiversity Conservation and Green Development Foundation, which is suing the German car manufacturer for having caused environmental problems. The foundation stated that the company *"produced the problematic vehicles for the pursuit of higher profits and circumvented Chinese laws, which has worsened the air pollution and has affected public health and rights"* (Source: public statement of China Biodiversity Conservation and Green Development Foundation posted on www.cbd.int; date: 12th December 2015).

Also, The Sierra Club, an environmental organization with the goal of promoting clean energy and protecting and preserving public health, has expressed its opinion on the matter.

"Volkswagen's actions were as dangerous as the sickening smog their vehicles left behind. The company's recall proposal needs to fix the polluting cars still on the road, make whole the consumers who trusted the vehicles were lower polluting, and compensate for the pollution the faulty cars already created" (Source: public statement of The Sierra Club posted on www.sierraclub.org; date: 9th January 2016).

The new CEO of the group, Muller, did not improve the situation. *"We didn't lie. We didn't understand the question first. And then we worked since 2014 to solve the problem. And we did it together and it was a default of VW that it needed such a long time"* (Source: excerpt from an interview conducted by National Public Radio during the North American International Auto Show; date: 11th January 2016). The following day, Muller apologized for his words and said that Volkswagen is working hard to regain the trust of all stakeholders.

Simultaneously, the authorities disapproved VW's first recovery initiatives. The CARB Chair, Mary D. Nichols, stated that *"they continued and compounded the lie and when they were caught they tried to deny it. The result is thousands of tons of nitrogen oxide that have harmed the health of Californians. They need to make it right. Today's action is a step in the direction of assuring that will happen"* (Source: public statement reported on www.bbc.com; date: 12th January 2016).

"VW has once again failed its obligation to comply with the law that protects clean air for all Americans [...] All companies should be playing by the same rules. EPA, with our state, and federal partners, will continue to investigate these serious matters, to secure the benefits of the Clean Air Act, ensure a level playing field for responsible businesses, and to ensure consumers get the environmental performance they expect". (Source: excerpt from an interview with Cynthia Giles, Assistant Administrator for the Office for EPA's Enforcement and Compliance Assurance, reported on www.cnbc.com; date: 2th November 2015).

Over the months, other notifications to Volkswagen followed; however, as stated by the Wall Street Journal, in January 2016 the California Air Resource Board (CARB), the environmental protection agency of California, joining the EPA, rejected the company's recall plan, defining it as too vague.

However, in contrast to expressed concerns, in February 2016 a move to veto current proposals for real-world driving emissions tests for diesel cars was rejected in the European Parliament. Substantially, the possibility of reducing pollution was thrown away.

The vote outcome was welcomed by European car manufacturers' organisation ACEA; it insisted that meeting the conditions of the new Real Driving Emission tests would be *"extremely difficult to reach in a short space of time"* (Source: public statement on www.acea.be; date: 1st march 2016).

Nevertheless, one of the latest statements of the German company is: *"The Volkswagen brand has initiated an efficiency program that is affecting all areas, including personnel cost. Cost can be cut by reducing temporary work contracts, filling vacancies internally and making fewer hirings"* (Source: a VW spokesman to the International press as reported on www.reuters.com; date: 10th March 2016).

However, difficulties persist. This has been confirmed by recent news on the latest recalled plan proposed by Volkswagen; in July 2016, it had been rejected again by authorities, again because of its lack of clarity. It did not describe and explain in a clear manner the proposed fixes, so it could not be evaluated.

Conversely, someone accused the authorities involved. *"The EPA can't wait a year while these cars spew out more and more Nox. Force them to pay a fine each day on each vehicle and get them moving. If they can't fix them, make them buy them back. If the potential fine is \$37k / vehicle, just have them pay owners that much to avoid a*

fine. Win-Win, but don't let this go on and on and on while pollutants continue to enter our air" (Source: a citizen's post on Facebook; date: 14th April 2016).

Currently, the California Air Resource Board, in collaboration with the EPA, is investigating further testing on Volkswagen engines, with additional aims to evaluate further technical proposals of the German automaker and to determine the punishment for the violation of U.S. laws.

Shortly after the scandal exploded, the government agency stated:

"[T]he agency has expanded its testing of pre-production, production, and customer-owned vehicles to screen for defeat devices, testing now extends to all 2015 and 2016 model year diesels and to any diesel that seeks EPA certification in the future" (Source: excerpt from an emailed statement of an agency representative of the EPA; date: 6th November 2015).

Furthermore, Volkswagen's competitors have been directly involved in the scandal, *"Half a year since disclosure of the emissions scandal at Volkswagen we have sent comprehensive evidence to the transportation ministry and foreign agencies citing possible defeat devices in the Opel Zafira, Renault Espace, Fiat 500x, Mercedes-Benz C 200 CDI and C 220 CDI and the Smart diesel and encouraged them to do their own official tests"* (Source: Resch, head of the German Environmental Aid, in an interview conducted by the Wall Street Journal – published on www.wsj.com; date: 22th April 2016).

8. Discussion

The Volkswagen scandal provides a suitable example of how negative value experiences for different actors - consumers, dealers, suppliers and partners - emerge progressively and with a snowball effect as long as information is spread out in the ecosystems and different truths arise. By adopting a service ecosystem perspective, the analysis allows us to recognise a multiplicity of value co-destruction issues due to relationships and interdependence among the actors. We identified three main aspects at the basis of the value co-destruction process (Table 1):

- 1) multi-actors' bad practices
- 2) actors' disvalue
- 3) ecosystem's ill-being

Each negatively affects the actors' value experiences and thus lets emerging and increasing rejection and pessimism into the service ecosystem as a whole (Lusch & Vargo, 2014; Vargo & Lusch, 2011).

First, the Volkswagen case builds on opportunistic behaviour (Gruen & Shah, 2000) and unfairness (Nguyen, 2012) behind the misuse of resources (Plé & Chumpitaz, 2010) and the misalignment of processes (Lefebvre & Plé, 2011), not only within the dyad of firm-customer, but based on multi-actors' interactions. By taking into account many interactions shaping the service ecosystem, our research shows that the bad practices within the ecosystem lead to cascade effects.

The opportunistic behaviour caused a distorted use of resources - i.e., misuse – that was manifested in the interaction between Volkswagen and Bosch. *“How these components are calibrated and integrated into complete vehicle systems is the responsibility of each automaker,”* noted Bosch spokesman Rene Ziegler. The supplier revealed, as expected, a different use of resources provided to the German automaker. This negative process triggered other adverse processes within the ecosystem; in addition, its effects have spread to other relationships among actors, affecting the misalignment of practices. Such misalignment regarding a situation in which there is no matching between processes, values and/or purposes that steer interacting actors (Gummesson & Mele, 2010), has occurred in Volkswagen’s ecosystem, as in the interaction between the German company and its customers and between the company and the dealers who had chosen Volkswagen.

A misalignment of processes, permeating values and purposes among actors has happened. As the following quote indicates, Volkswagen’s purposes were not in line with those of customers, creating an unfair way of doing things.

“My brother and his wife own two TDIs in New Zealand. I am sure he is like many owners in that he does not want to take the cars into the dealer for the ECU flash that Volkswagen is asking them [to] have done for fear that the flash will kill the fuel economy” (source: a consumer’s post on Facebook; date: 14th January 2016).

Second, the effects of these bad practices characterized by misuse and misalignment resulted in a value decline for many ecosystems’ actors, not only for the firm and its customers, what we have labelled “actor’s disvalue”. Different actors involved in the co-creation process can experience different outcomes, not always balanced (Edvardsson et al., 2011).

At the micro-level, big losses for dealers took place in terms of their reputation and the trust expressed by Volkswagen owners, which are vital resources for the company. Their non-consideration may undermine its long-term survival (Nguyen, 2011; Nguyen & Mutum, 2012). The environment has been - and continues to be - damaged by nitrogen oxide emissions caused by these diesel engines, many of which are still on the road; in addition, some Volkswagen employees are actually under investigation for destroying evidence of dieselgate, as reported by the international press, showing that negative results affected many actors. *“Should the future viability of Volkswagen be endangered by an unprecedented financial penalty, this will have dramatic social consequences”* (source: Volkswagen’s works council chairman at a meeting of workers in Wolfsburg, as reported on www.reuters.com; date: 8th March 2016).

Third, the consequences did not stop at the single actors’ value. The negative effects tend to extend, as they proceeded from a dyadic relationship to a broader set of interactions (Mele, 2011). There was a reduction in well-being for the ecosystem itself as a whole, which can be named an ill-being ecosystem. This is showed by consumers’ distrust in the entire industry.

“The same old soup. Most of the manufacturers do not comply with the emission limits when they continue to certify vehicles in the usual way. When you make a serious type-approval procedure, magically all manufacturers will become ‘honest’” (Source: interview with an Italian consumer; date: 12th June 2016).

Also, the institutions’ behaviour revealed some kind of values realignment at a lower level, as shown by the European Parliament’s decision not to veto the car emissions

test update. *“By allowing this illegal proposal, the European Parliament has aided and abetted the Commission in putting car Industry profit above people’s health”* (Source: statement of an air pollution lawyer at ClientEarth on www.clientearth.org; date: 25th February 2015).

These words of an activist lawyer shed light on the fact that economic interests have priority over public health. This observation was confirmed by the title of an article published on the official website of ClientEarth, a non-profit environmental law organisation: *“European Parliament lets car industry off the hook”* (Source: title of an article published on www.clientearth.org; date: 25th February 2015).

Table 1: Value co-destruction issues

Bad practices (misuse and misalignment)	<i>“I am shocked by the events of the past few days. Above all, I am stunned that misconduct on such a scale was possible in the Volkswagen Group” – [Source: excerpt from an interview with Winterkorn, the CEO at the time of the scandal; date: September 2015]</i>
	<i>“They intentionally sold a product with false specifications” – [Source: a consumer from the UK on Facebook, referring to the company; date: October 2015]</i>
	<i>“The EPA can’t wait a year while these cars spew out more and more Nox” – [Source: a citizen on Facebook]</i>
Actor’s dis-value	<i>“[W]hy US consumers should be compensate[d] whereas [E]uropean ones should not. This is unfair” – [Source: a consumer’s tweet utilizing #dieselgate; date: February 2016]</i>
	<i>“Volkswagen AG has suspended a larger number of engineers than previously acknowledged, following a recommendation from the law firm conducting an internal investigation into the auto maker’s emissions cheating scandal” – [Source: article on www.wsj.com - The Wall Street Journal; date: October, 2015]</i>
	<i>“Franchise owners are now left with lots full of Clean Diesel vehicles they are unable to sell, and these cars have suffered tremendous loss of value and take up inventory space and carrying costs” – [Source: excerpt from an interview with a U.S. dealer attorney, reported on www.dailyherald.com; date: July 2016]</i>
	<i>“Volkswagen AG has suspended a larger number of engineers than previously acknowledged, following a recommendation from the law firm conducting an internal investigation into the auto maker’s emissions cheating scandal” – [Source: The Wall Street Journal]</i>
	<i>“‘Made in Germany’ is a worldwide synonym for quality. I do not think that this is permanent and fundamental damage to German industry” – [Source: public statement of Sigmar Gabriel, the German vice-chancellor and economy minister, as reported on www.telegraph.co.uk; date: September 2015]</i>
Ecosystem’s ill-being	<i>“The final settlement needs to fix or remove all of the polluting cars still on the road, make whole the consumers who trusted the vehicles were lower-polluting, and compensate for the pollution the faulty cars created” – [Source: post of the Sierra Club’s California director on www.sierraclub.org; date: April 2016]</i>
	<i>“VW, Daimler, Nissan, Mitsubishi, GM: Can We Finally Agree That Dieselgate Is An Industry Problem?” – [Source: article published on www.forbes.com; date: May 2016]</i>
	<i>“VW scandal caused nearly 1m tonnes of extra pollution, analysis shows” – [Source: www.theguardian.com; date: September 2015]</i>

9. Implication for scholars

The dark side of value co-creation is an emerging theme in the business literature, although there are insightful antecedents in business and consumer studies. Our paper contributes to the research into interactive value processes by addressing three main issues that frame the value co-destruction phenomenon. First, the study provides new insights into the bad practices that occur due to misuse of resources and misalignment of processes by emphasizing that these processes not only occur in dyadic relationships, but are affected by interactions with and by third parties, not necessarily involving the focal firm. In this way, the role of interdependencies is taken into account.

Second, this research pinpoints how these adverse processes result in negative consequences at both the individual level (the micro-level) and at the meso- and macro-levels through ripple effects triggered by the bad practices that have occurred within the ecosystem. At the individual level, a value decrease for each actor shaping the service ecosystem takes place; at the meso-level, this value decline occurs in wider interactions, taking into account relationships with third parties and clusters of individual actors. Also, institutions framing the exchange within the ecosystem suffer negative effects, for example, by lowering the level of tolerance towards certain mistaken actions.

Although in the short term the process of value co-destruction can be unbalanced, namely, the value co-destruction for an actor can correspond to the value creation for another (Edvardsson et al., 2011; Echeverri & Skålén, 2011), in the long term the effects of bad practices spread to other actors and interactions, destroying value in the entire ecosystem. An ecosystem's ill-being occurs, leading towards realignment at a lower level in terms of value for all its components.

10. Managerial implications

Our research provides empirical evidence of potential detrimental effects that can occur when bad practices are adopted within a service ecosystem. This implies that managers should pay more attention to negative business behaviours and to cascade effects resulting from them by adopting a long-term vision and by taking into account the whole ecosystem in which they operate.

Understanding how adverse processes occur and spread, and the chain of disruptive events that can occur, is useful to avoid them and to prevent further significant damage to the entire ecosystem. With this aim, practitioners can improve communication both inside the company itself and outwards. Managers should first take into account dyadic interactions, for example, with customers and suppliers, and then consider all interactions with third parties that can affect the company itself. In fact, many actors involved in service-for-service exchanges should be considered in terms of their collective influence on the value co-creation process.

Furthermore, by considering the macro-level, firms have an important social responsibility because they contribute to well-being of the entire society - not only that of

their customers - and to the evolution of the social reality in a recursive relationship to it.

11. Limitations and further research

The analysis performed in the investigation on value co-destruction related to the Volkswagen case study is affected by the novelty of both the topics and the issue related to the context of our analysis. The results achieved are currently limited, as new resolutions and decisions are still occurring as regards both the carmaker and the other actors from its ecosystem.

In addition, the findings are based on data collected from different sources and are related to different actors, but some of them can be enhanced by focusing on direct interviews, namely car suppliers, environmental agencies and the firm itself.

Further research can be carried out by adopting a longitudinal study to better grasp the processes between actors. For example, the relationships between some governments (i.e., the USA) and Volkswagen to achieve some interventions to support customers is ongoing, and the perception of such interventions in terms of value process and outcomes must be investigated as soon as they emerge.

Furthermore, future studies examining the value co-destruction process can be conducted in different contexts and could investigate the more long-term effects of value-related processes.

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WHAT'S NEXT IN BRAND MANAGEMENT? THE EFFECT OF BRAND AUTHENTICITY ON BRAND LOVE

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In the last decade, consumer-brand relationships have gained much attention from both practitioners and academics. In this context, two parallel but distinct streams in the field of consumer research have gained increasing interest: studies on brand love, on the one hand, and brand authenticity, on the other. Both concepts are independently rooted in attachment theory implying that a relationship between the two constructs is justifiable. We conceptualize the influence of brand authenticity on brand love, proposing that brands need to be perceived as authentic in order to become loved. In a more comprehensive context, this research contributes to consumer research in general and research on brands in particular, as it calls for the integration of currently separated streams of research. In order to be able to unveil further profound results from current research, this article emphasizes the need to integrate and interlink these separate streams.

1. Introduction

Building a powerful brand is essential to sustain in highly competitive markets (Aaker, 1991). As such, the expressed objective of brand management is to develop brands that last for several generations (Aaker, 1996). In order to accomplish this goal, within the last decades, consumer-brand relationships have gained much attention from both practitioners and academics (Carroll & Ahuvia, 2006).

As consumers have allotted human attributes to brands (Levy, 1985), and as consumers can consider brands as partners in interpersonal relationships (Fournier, 1991), the increasing significance of emotions in consumer-brand relationships becomes evident (Bell, 1999; Roberts, 2005). In this regard, the concept of brand love has emerged, being “the most emotionally intense consumer-brand relationship” (Langner, Schmidt, & Fischer, 2015, 624). A strong emotional attachment is needed in order for brand love to emerge (Batra et al., 2012).

A parallel trend shows that consumers are increasingly searching for what is real, genuine, and authentic (Boyle 2005; Corbus and Guertin 2007). This tendency has been acknowledged as consumers are confronted with increasing commercialization, an overflow of the fake, and an omnipresence of meaningless market offers (Boyle, 2004), fostering consumers' desire to counteract and to consume what they perceive as authentic brands (Arnould and Price 2000; Boyle 2005; Gilmore and Pine 2007). The concept of authenticity has thus become essential for consumer behavior and branding (Beverland & Farrelly, 2010; Gilmore & Pine, 2007; Holt, 2002; Leigh, Peters, & Shelton, 2006; Newman & Dhar, 2014; Rose & Wood, 2005). Authenticity is

increasingly recognized as a desirable brand characteristic, leading to emotional brand attachment (Morhart et al., 2015).

Research contributions on brand love and brand authenticity reveal both streams to be rooted in attachment theory. Against this background, the underlying article seeks to shed light on the relationship between brand authenticity and brand love, proposing that perceived brand authenticity positively influences brand love. Based on the two streams of theory, a conceptual model is derived. As such, the article aims to advance both the theoretical and managerial understanding of brand love and brand authenticity and highlight the constructs' relevance for consumers' brand-related behaviours.

The purpose in this study is to examine whether brand authenticity has a positive influence on consumers to love their brands. The developed framework integrates brand love and brand authenticity along with constructs that are well-researched in the research field of consumer-brand relationships; i.e. brand trust and brand attachment. We also link them to WOM as an outcome of the relationship with a brand. The model builds upon the study of Carroll and Ahuvia (2006) who have identified some antecedents and consequences of brand love, and of Morhart et al. (2015) who have developed an integrative framework of the concept of brand authenticity.

Our paper is structured as follows: First, we introduce the concepts of brand authenticity and brand love to then synthesize the terms. Second, we present our conceptual model with our proposed hypotheses. This paper is a working paper. A qualitative analysis focusing on Millennials will follow. The goal of these interviews is to determine whether brand authenticity is an inevitable construct for a brand to be loved. In addition, the interview results provide the opportunity to redefine the conceptual model.

2. Literature Review

2.1. Brand Love

“Brand love is the most emotionally intense consumer-brand relationship” (Langner et al., 2015, 624). Loved brands exert many strong, positive effects on consumer behavior, including greater brand loyalty, positive word of mouth, resistance to negative information, forgiveness of failures, and increased willingness to pay (even irrationally high prices) for loved brands (Batra et al. 2012; Bauer, Heinrich, & Albrecht, 2009; Carroll & Ahuvia, 2006; Rossiter, 2012). Accordingly, brand love is a highly pertinent topic for marketing, and both researchers and practitioners seek insights into this powerful consumer-brand relationship.

Brand love has its roots in the theories of interpersonal love and relationships (Batra et al., 2012; Langner et al., 2015). Fournier (1991) was among the first scholars to provide evidence that consumers are able to emotionally bond with brands in a similar way to that observed in personal relationships. This has been supported by more recent research, which shows that consumers can develop a relationship with a brand that evokes emotions similar to love (Albert et al., 2008; Carroll & Ahuvia, 2006; Wallace et al., 2014). Emotions towards a brand have been found to play an especially strong role in the propensity to continue a relationship (Drennan et al.,

2015; Kudeshia et al., 2016). Although brand love is acknowledged as an important construct of consumer-brand relationships (Batra et al., 2012; Huber et al., 2015), research on its drivers and consequences for such relationships remains limited (Albert & Merunka, 2013; Fetscherin, 2014; Grisaffe & Nguyen, 2011). Responding to this, the following study aims at extending the literature on brand love.

Differences Between Brand Love and Related Marketing Constructs. Brand love should be distinguished from other constructs with which it might be correlated, such as brand attitude, satisfaction, and involvement.

Love is understood as a subjectively experienced combination of the dimensions of intimacy, passion and commitment (Aron & Westbay, 1996), whereas brand love is “the degree of passionate emotional attachment a satisfied consumer has for a particular trade name” (Carroll & Ahuvia, 2006, 5). Although brand love positively correlates with attitude, involvement and satisfaction, it is separate and distinct from those constructs (Albert & Merunka, 2013; Thomson et al., 2005). Positive attitude alone does not require the formation of brand love (Carroll & Ahuvia, 2006). Moreover, it does not link the brand to the self-concept, and does not cause an individual to maintain a relationship with the brand when more favorable alternatives are proposed (Thomson et al., 2005). In addition, although brand involvement shares some characteristics with brand love, such as both being based on needs, values and interests (Brakus et al., 2009) and being driven by perceived importance and personal relevance (Zaichkowsky, 1985), the constructs are distinct from each other. While brand love requires emotional attachment towards a brand in order to emerge, brand involvement is only connected with cognitions (Batra et al., 2012; Thomson et al., 2005).

Brand love also differs from satisfaction. Carroll and Ahuvia (2006) list several ways in which brand love differs from satisfaction, including: (1) satisfaction is conceptualized as a cognitive judgment, whereas brand love is more affective; (2) satisfaction is typically related to transactions, whereas brand love develops over time and is more related to long-term brand relationships; (3) satisfaction is related to expectancy disconfirmation, whereas brand love does not require these conditions and (4) satisfaction does not require integration of the brand into the consumer’s identity, or their willingness to declare love, whereas brand love does. Attachment to a brand, which is a precondition for brand love, develops over time and requires affective memories that connect the object to the self (Holmes, 2000). Hence, literature on brand love reveals the concept to be constructed on a variety of affective-laden perceptions, such as self–brand integration, passion-driven behaviors, positive emotional connections, a long-term relationship, positive overall attitude and separation distress (Batra et al., 2012; Thomson et al., 2005). Therefore, brand love is a sign of a far stronger consumer–brand relationship than mere positive brand attitude or satisfaction.

2.2. Brand Authenticity

Brand authenticity refers to a brand being perceived as honest, real and genuine (Alexander, 2009; Gilmore & Pine, 2007). An authentic brand differentiates itself through its sincerity, quality commitment and connection to heritage (Beverland, 2006; Napoli et al., 2014). Authentic brands have the ability to connect with consumers on an emotional level (Morhart et al., 2015). A recent conceptualization of consumers’ brand authenticity perceptions indicates that an authentic brand is dependable, cares for its

consumers, helps them define and construct their identity, and reflects continuity from the past into the future (Morhart et al., 2015).

A consideration of brand authenticity is relevant to marketers because authenticity creates a distinctive brand identity and contributes to brand status and equity (Beverland, 2006; Brown et al., 2003; Gilmore & Pine, 2007). Recent studies show that brand authenticity positively relates to brand attitude (Ilicic & Webster, 2014), purchase intentions (Ilicic & Webster, 2014; Napoli et al., 2014), as well as word-of-mouth communication, emotional brand attachment and brand choice likelihood (Morhart et al., 2015). The literature further suggests that authentic brands play a role in self-authentication behaviors, which occur when consumers reveal or create their true self (Arnould & Price, 2000; Beverland & Farrelly, 2010). Because authentic brands represent a meaningful resource in identity construction, they become instrumental in consumers' self-authentication behaviors (Beverland & Farrelly, 2010).

Consistent with the view that objects responding to an individual's need create strong attachments (La Guardia et al., 2000), this research proposes that by helping consumers satisfy important needs (i.e. the need to belong, the need to express one's authentic self), brand authenticity results in higher levels of emotional brand attachment when such needs are activated.

2.3. Synthesizing Brand Love and Brand Authenticity

The following paragraph intends to synthesize the aforementioned constructs brand love and brand authenticity by relating them to attachment theory.

The attachment literature suggests that feeling attached to a target increases when it fulfills a salient need (La Guardia et al., 2000). Strong attachments are associated with feelings of connection, affection, and love (Bowlby, 1969). Emotional brand attachment is thus defined as the bond that connects a consumer with a specific brand (Thomson et al., 2005). Although consumers interact with many brands, they develop strong attachment with only a few. Because of an authentic brand's ability to satisfy consumers' connection goals (Beverland & Farrelly, 2010), we expect emotional brand attachment to be positively influenced by authentic brands. The literature supports the role of authentic brands in helping consumers satisfy the need to belong and thus to connect: the need for connection is an important self-authentication goal that authentic brands and experiences contribute to (Beverland & Farrelly, 2010). Authentic brands remain relevant through time (Gilmore and Pine, 2007), induce connections across generations (Beverland & Farrelly, 2010; Gilmore & Pine, 2007) and provide consumers with a sense of continuity and common identification (Napoli et al., 2014). Moreover, as brand love requires emotional attachment towards a brand in order to emerge (Batra et al., 2012), emotional attachment is argued to be a precondition for brand love. Hence, the following two propositions are made for the constructs under study:

H1: Brand authenticity has a positive effect on emotional attachment.

H2: Emotional attachment positively influences brand love.

Combining those premises, the following proposition can be made: Arguing that brand love is the highest level of emotional brand attachment to be reached and brand authenticity positively influencing emotional attachment, it can thus be proposed that brand authenticity positively influences brand love, resulting in hypothesis three:

H3: Brand authenticity positively influences brand love.

3. Conceptual Model

The conceptual model and hypotheses of the present study are shown in Figure 1. We propose that brand trust, emotional attachment and brand authenticity are the antecedents of brand love. WOM serves as the behavioral outcomes of both brand love and brand authenticity.

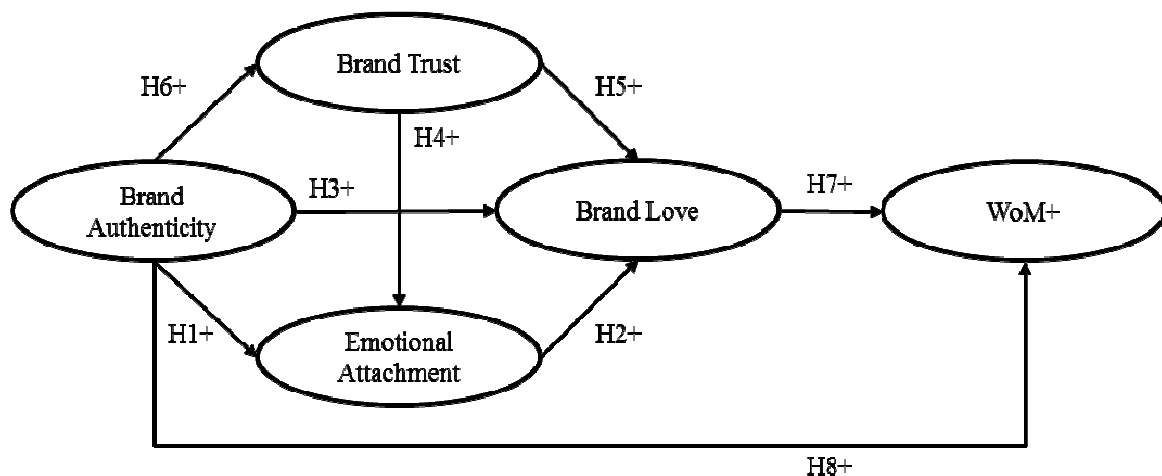


Figure 1 - Conceptual Model and Hypotheses

Brand Trust

Trust is a crucial factor of the formation of any long-term relationship (Morgan & Hunt, 1994), and is used as a mental shortcut to reduce uncertainty and the need for mental processing (Moorman et al., 1992). As the brand-consumer relationship is considered a substitute for human contact between the company and its customers (Matzler et al., 2008), brand trust is a necessary precondition for all long-term brand-consumer relationships (Matzler et al., 2008). According to Esch et al. (2006), brand trust refers to the consumers' affect-based experience of a particular brand, which leads them to rely on the performance of the brand and having faith in the brand promises communicated (Albert & Merunka, 2013). The characteristic of brand trust as an affective experience (Esch et al., 2006) related to the expectations of the brand's honesty, altruism and reliability (Albert and Merunka, 2013) means it is gradually built by the consumers' experiences and encounters with the brand. It is considered a driver of consumers' emotional attachment to a brand (Langner et al., 2015). Hence, strong trust in a brand leads to positive outcomes such as positive atti-

tudes, stronger commitment and loyalty, and is a focal factor contributing to brand love (Albert et al., 2008). Hence, the following can be concluded:

H4: Brand trust positively influences consumers' emotional attachment to a brand.

H5: Brand trust has a positive effect on brand love.

Moreover, brand trust is closely linked to brand authenticity. Consumers tend to trust a brand if they feel a brand will perform as expected or promised (Napoli et al., 2014). Authentic brands respond to the consumers' demand for an honest brand as they will act in the best interests of its customers and society (Beverland, 2005). Delivering an authentic brand experience, then, is imperative to building brand trust. Hence, the following proposition is made:

H6: Brand authenticity positively influences brand trust.

WOM

Word-of-mouth (WOM) can be understood as any positive or negative statement made by potential, actual or former customers about a product or a company (Hennig-Thurau et al., 2004). In connection with WOM, speaking about a brand to others is considered an important part of an individual's identity construction (Holt, 1997). It is motivated by the intention to do the receiver a favor, and also meets people's social needs by putting them in contact with others. In addition, various literature contributions show that a strong positive relationship exists between brand love and WOM. Therefore, brand love is considered to directly predict positive WOM (Carroll & Ahuvia, 2006; Batra et al., 2012; Fetscherin, 2014). Thus, we posit that:

H7: Brand love has a positive effect on positive WOM.

In addition, since consumers seek authenticity in consumption acts (Arnould & Price, 2000; Beverland & Farrelly, 2010; Boyle, 2004; Holt, 2002), they likely respond positively to brands that they perceive as authentic (Rose & Wood, 2005). Authentic brands offer meaning and identity-relevant benefits that entail positive consumer responses. In addition to such a privately held response to the brand, consumers are also more likely to make a public commitment to an authentic brand by engaging in positive word-of-mouth (Morhart et al., 2015). Hence, the following can be concluded:

H8: Brand authenticity has a positive effect on positive WOM.

4. Further Procedure

In order to gain profound results, the study will build on a qualitative method, consisting of thirty in-depth interviews with Millennials, aged between 18 and 35. The participants are university alumni, being young professionals, and current students. The different life stages and age groups are explicitly included in the research design to enrich the results in general and to determine whether age is an influencing factor in specific. The goal of these interviews is to determine whether brand authenticity is an inevitable construct for a brand to be loved. In addition, the interview results provide the opportunity to redefine the conceptual model.

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