

# Organizational changes for Digital Transformation: a literature review for defining Digital Dynamic Capabilities

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## Abstract

*Digital transformation (DT) is a growing phenomenon that is generating a wide and articulated debate requiring an alignment between technology and organization moving from the development of new dynamic capabilities (DC), necessary to successfully lead the transformation. The analysis of the intersection of the two areas (Dynamic capabilities and Digital Transformation) is an important step to consolidate the research stream and outline possible future developments. For this reason, the paper provides a structured literature analyzing 75 article. Findings demonstrate the novelty of the research and the need of a deep investigation about the role of the required dynamic capabilities for implementing the novel work in the DT process. Descriptive, bibliographic and content analysis provided an in-depth knowledge and understanding about digital transformation and dynamic capabilities, revealing five research areas: 1) Dynamic capabilities for digital transition in specific industries; 2) Dynamic capabilities for Value creation in Digital transformation; 3) Dynamic capabilities for Digital Technology enhanced organisation Transformation; 4) Developing dynamic capabilities for organisational digital transformation and 5) Sustaining digital transformation in family firms and SMEs. Invariant elements for each cluster have been underlined. Implications for theory and practices conclude the paper.*

**Keyword:** digital transformation, dynamic capabilities, digital transition, value creation, systematic review of the literature

## 1. Introduction

Digital Transformation impacted on society and all organisations in consequence to the diffusion of digital technologies, such as Internet of things (IoTs), Additive Manufacturing, Big Data, Artificial Intelligence, Cloud Computing and Augmented and Virtual reality (Vial, 2019; Sousa-Zomer et al., 2020; Cappa et al., 2021; Maki et al., 2022). Digital Transformation refers to all changes in organizational activities and processes, business environment, competitive scenario requiring the

definition of new business model, strategies and capabilities and allowing the entrant of new market players (Vial, 2019). All these changes require organizational changes and the development of novel skills and capabilities to reshape the way companies create value and how to create opportunities to work and collaborate in novel ways. The effect that these revolutions are having on work is greater than the sum of the three and is still unknown. Digital technologies impacted on business processes, business environment, competitive scenario and the way of interaction with customer, supplier and within company and allowed the creation of new organizational structure and new digital competences able to adapt and to respond to technological innovation (Vial, 2019). Literature affirms that the process of digital transformation, i.e. the improvement of the value creation (Koch and Windsperger, 2018) process thanks to the use of digital technologies, can only be pursued through a process of progressive alignment between digital technologies, business models, structures and processes. Organizational change and individual skills improvement, the direct involvement of entrepreneurs and manager to promote and sustain digital transition (Benner, 2009; Matarazzo et al., 2021) are fundamental. Moreover an alignment between technology and organization based on the development of new dynamic capabilities is also required. These capabilities are defined as a firm specific ability to reconfigure their organizational network in order to achieve a sustainable competitive advantage after the transition to digital.

In recent years, it has been registered an increasing number of studies aimed to understand the relationship among digital transformation and related capabilities, as sources of a re-thinking of the organisational design, to make it more data-driven and agile. Digital transformation is a complex and challenging phenomenon (Hess et al., 2016), and it is so far under investigated both in theory and practice (Lanzolla et al., 2018; Vial, 2019). Specifically, there is a lack in the literature in the understanding on what and how dynamic capabilities could sustain the process work of digital transformation for competitiveness in digital era, facilitating the discovering of new opportunities offered by digital technologies. Previous studies have mainly focused on capabilities internal to the organization with little attention to inter-organizational processes, and to the role of specific capabilities (the so called digital capabilities) (Annarelli et al., 2021). This study contributes to cover this research gap by providing a Theoretical Framework built around key dynamic capabilities that support companies in the digitalization of their work and the organizational aspects in different sectors.

Based on the above premises and on the existing academic and industry-related research this paper provides a Structured Literature Review (SLR) focusing on Digital Transformation and Dynamic Capabilities to investigate the following research questions: *What are the building block of dynamic capabilities that sustain digital transformation of companies? How to define Digital Dynamic capabilities for business performance in digital era?*

Descriptive, bibliographic and content analysis provided an in-depth knowledge and understanding about digital transformation and dynamic capabilities, revealing five clusters of research areas delineating this promising phenomena as an ongoing process of strategic renewal: 1) *Dynamic capabilities for digital transition in specific industries*; 2) *Dynamic capabilities for Value creation in Digital transformation*; 3) *Dynamic capabilities for Digital Technology enhanced organisation Transformation*; 4) *Developing dynamic capabilities for organisational digital transformation and* 5) *Sustaining digital transformation in family firms and SMEs*. Implications for theory and practices conclude the paper.

## 2. Research Methods

To address the research questions of the study a Structured Literature Review (SLR) was performed on the topic of dynamic capabilities and digital transformation. This methodology has the advantages to categorize/classify and synthesize the state of the art on a given topic (Vrontis et al., 2021; Vrontis and Christofi, 2021; Christofi et al., 2019; Danese et al., 2018; Nofal et al., 2018; Tranfield et al., 2003; Wang and Chugh, 2014). SLR was appropriate to understand the relationship between the process of digital transformation and dynamic capabilities. Moreover, it allow to define future research agenda as well as trends and implications for both theory and practice.

The methodology starts with the definition of articulated research questions in order to increase SLR's reliability and validity (Leonidou et al., 2020; Nguyen et al., 2018; Massaro et al., 2016; Petticrew and Roberts, 2006; Tranfield et al., 2003) and to identify the significant research papers to be included in the study sample. For the study we define the following research questions:

RQ1. *What are the building block of dynamic capabilities that sustain the digital transformation of companies?* RQ2. *How to define Digital Dynamic capabilities for business work organisation in digital era?*

The RQ1 allow to describe the state of the art in the existing literature in the field of dynamic capabilities for digital transformation. The RQ2 aims to analyze the relationship between business performance and dynamic capabilities in digital transformation process. Both RQs contribute in the definition of a future research agenda.

To construct the study sample a set of inclusion and exclusion criteria was defined. The inclusion criteria refers to search query, time as well as search boundaries (Dada, 2018; Wang and Chugh, 2014). Using the key words ("dynamic capabilit\*" and "digital transformation" or "digital technolog\*") in title, abstract and keyword, 89 research papers have been extracted from Scopus database, in the time frame 2009 – 2022 (before 2009 no paper have been published). Scopus is the most comprehensive databases, including ISI and indexed academic outlets and a larger number of paper than Web-of-Science (WoS) (Thelwall, 2018) moreover most of the papers indexed in Web of Science (WoS) are included in Scopus as well (97%) (Snyder, 2019; Christofi et al., 2019; Waltman, 2016; Zott et al., 2011).

The exclusion/inclusion criteria gave us a final sample only the relevant paper to address our research questions composed by 75 articles (Kauppi et al., 2018; Christofi et al., 2019). published in a variety of academic journals specialized in the field of Business Management, Technology and Information Science that has been analyzed through a content and a bibliometric analysis to identify areas of thematic specializations.

The steps followed in the review process are illustrated in Figure 1.

FIGURE 1 METHODOLOGY FRAMEWORK

### **3. Findings**

#### *3.1 Descriptive analysis*

Descriptive analysis started with the study of the evolution of publications over time, as shown in figure 2, The trend from 2009, year of the first publication, to 2018 remain stable with a number of publications that range from 0 to 2, from 2019 trend starts to growth till to peak in 2021 with 38 publications. A growing trend is also expected for 2022, considering that 6 papers have already been published in the first two months. This demonstrates that the research streams of the study is actually and require a deep investigation in order to study the new dynamic capabilities required in a digital era.

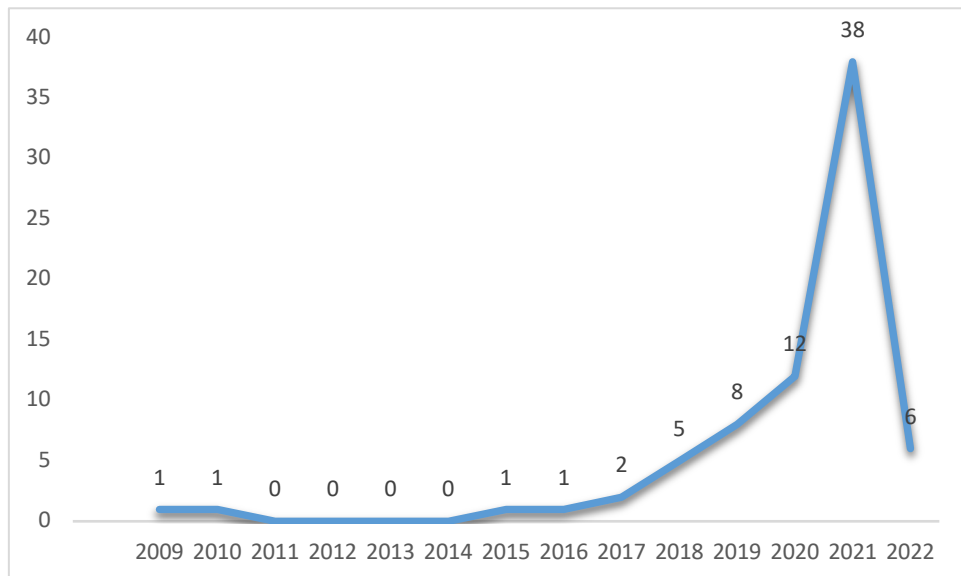


FIGURE 2 - PUBLICATIONS TREND

In figure 3 is represented the distribution of publications by Country, in terms of number of articles and related citations .

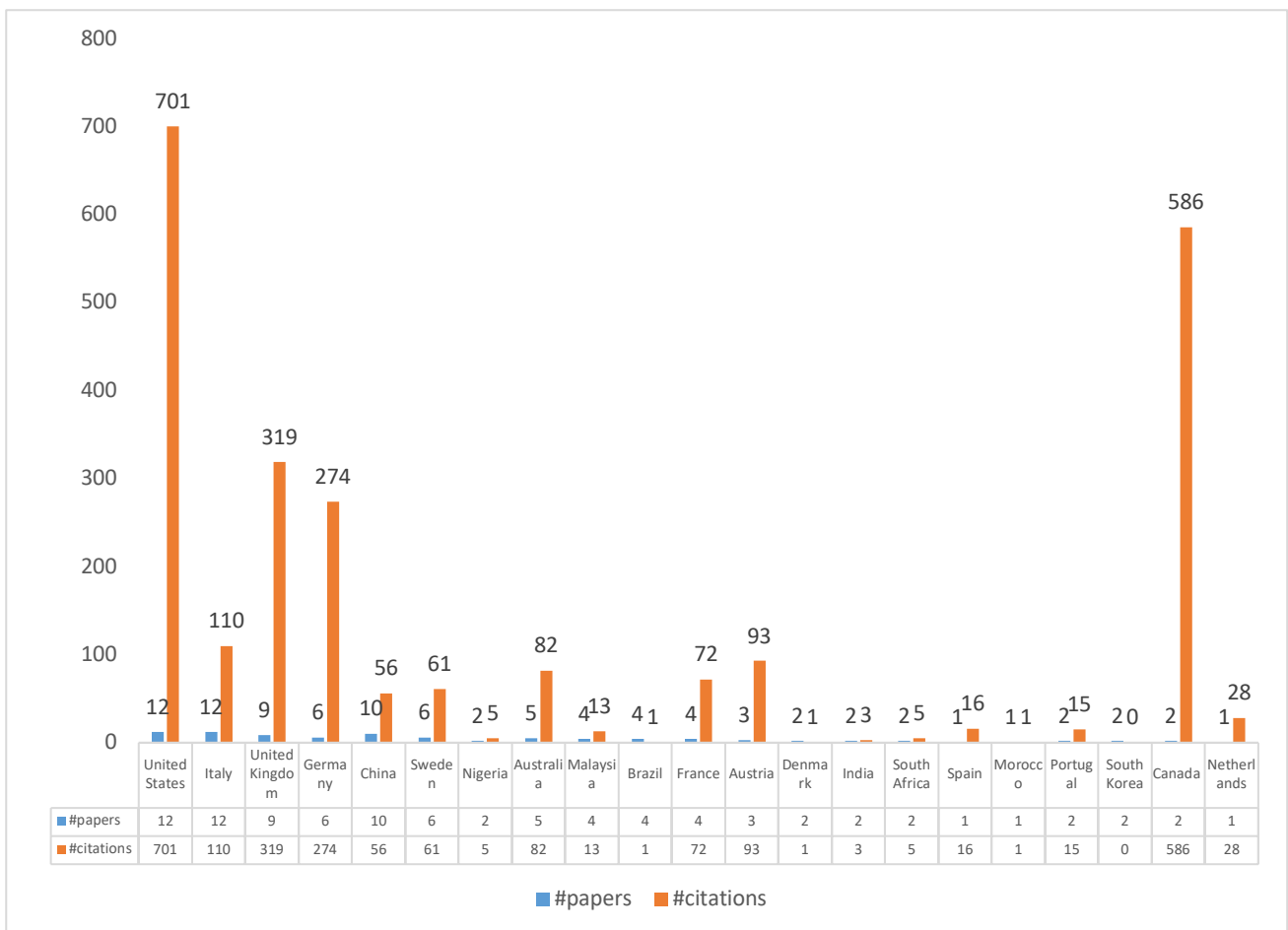


FIGURE 3 TREND PUBLICATIONS AND CITATIONS PER COUNTRIES

As it can be seen from figure 4, the distribution of citations by country is a little different than that relating to the number of publications (figure 3). The total number of country involved in this research topic are 21. Italy and United State are the first countries with the high number of

publication, equal to 12, followed by China (10 publications) and United Kingdom (9 publications). Other countries has worked on a range from 1 to 5, with the exception of Sweden and Germany that have 6 publications. The top three countries in terms of citations are: United States (701 publications), Canada (586 publications) and United Kingdom (319 publications). Italy, which was first in the ranking by number of publications, is in the fifth position, with 110 citations. It was very interesting the case of Canada, only two publications received a high number of citations, equal to 582 (figure 4).

Figure 4 shows the trend of publications and citations over the time, in the monitored period 2009-2022. The trend is increasing with three peak in 2010, 2015 and 2019. Specifically, in 2010 the only one paper published, El Sawy, Malhotra, Park and Pavlou - “Seeking the configurations of digital ecodynamics: It takes three to tango”, received 279 citations and it was in the second place in the top three articles by citations. Likewise the only paper published in 2015, Karimi and Walter - “The role of dynamic capabilities in responding to digital disruption: A factor-based study of the newspaper industry” has registered 215 citations. In 2019 there was the overall peak with 893 citations for 8 articles. In this year were published the first and third papers, in the ranking of papers by citations (table 3), Vial - “Understanding digital transformation: A review and a research agenda”, that is the most cited article with 580 citations and also the first article in the CPY (citations per year) ranking (table 4); and Warner & Wäger - “Building dynamic capabilities for digital transformation: An ongoing process of strategic renewal, with 235 citations.

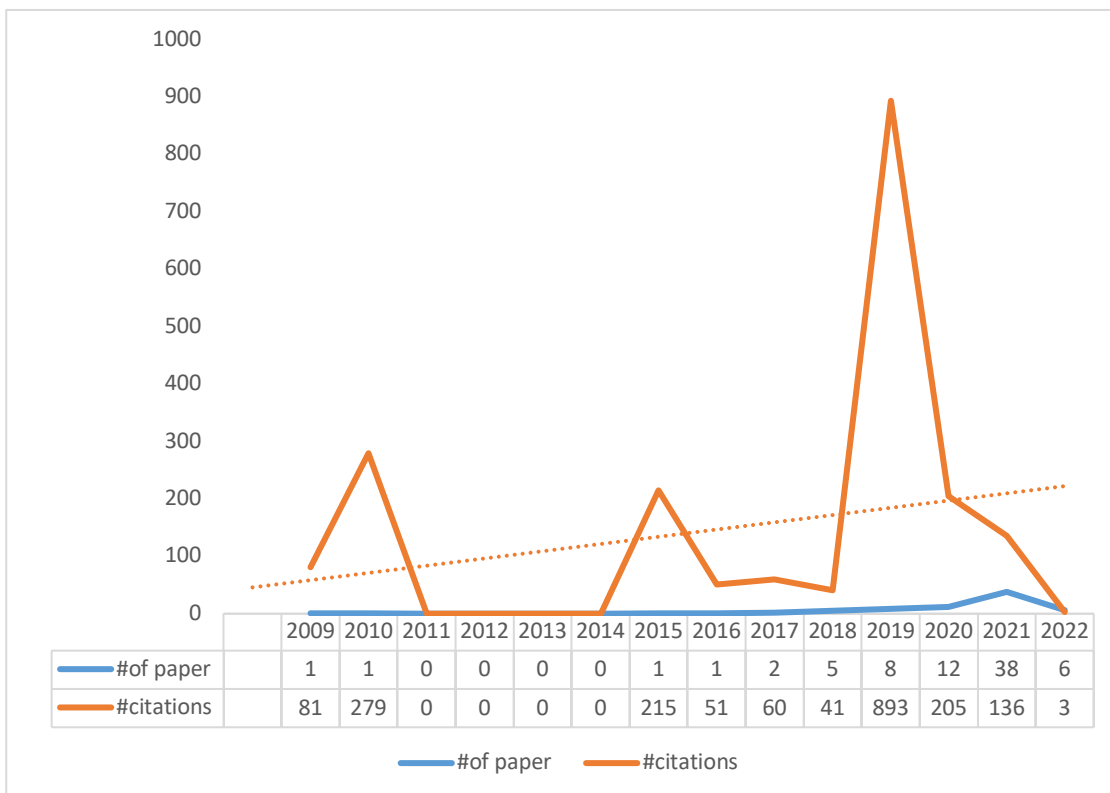


FIGURE 4. NUMBER OF CITATIONS RECEIVED BY ARTICLES OVER THE TIMEFRAME 2009-2022

In the following table 3 are ranked the top 10 article in terms of citations and the ranking in terms of citations per year (CPY) (Massaro et al., 2016) that take in consideration the time useful for a paper to “garner citations” (Dumay, 2014). The most cited paper, Vial (2019) was published in Journal of Strategic Information Systems that is focused on the introduction of ITC in strategic management and business. This paper represents a fundamental theoretical pillars for researchers in the field of

digital transformations and it ranked in the first place in the top ten papers in terms of citations and in terms of CPY (calculated dividing number of citations by the time from publications to period monitored), equal to 145.

<b>Vial G.</b>	Understanding digital transformation: A review and a research agenda	2019	<i>Journal of Strategic Information Systems</i>	580	145,00	<b>1 (→)</b>
<b>Warner K.S.R., Wäger M.</b>	Building dynamic capabilities for digital transformation: An ongoing process of strategic renewal	2019	<i>Long Range Planning</i>	235	58,75	<b>2 (↑)</b>
<b>Karimi J., Walter Z.</b>	The role of dynamic capabilities in responding to digital disruption: A factor-based study of the newspaper industry	2015	<i>Journal of Management Information Systems</i>	215	26,88	<b>3 (↑)</b>
<b>El Sawy O.A., Malhotra A., Park Y., Pavlou P.A.</b>	Seeking the configurations of digital ecodynamics: It takes three to tango	2010	<i>Information Systems Research</i>	279	21,46	<b>4 (↓)</b>
<b>Matarazzo M., Penco L., Profumo G., Quaglia R.</b>	Digital transformation and customer value creation in Made in Italy SMEs: A dynamic capabilities perspective	2021	<i>Journal of Business Research</i>	41	20,05	<b>5 (↑)</b>
<b>Björkdahl J.</b>	Strategies for Digitalization in Manufacturing Firms	2020	<i>California Management Review</i>	43	14,33	<b>6 (↑)</b>
<b>Chatfield A.T., Reddick C.G.</b>	A framework for Internet of Things-enabled smart government: A case of IoT cybersecurity policies and use cases in U.S. federal government	2019	<i>Government Information Quarterly</i>	54	13,50	<b>7 (→)</b>
<b>Koch T., Windsperger J.</b>	Seeing through the network: Competitive advantage in the digital economy	2017	<i>Journal of Organization Design</i>	58	9,67	<b>8 (↓)</b>
<b>Day G.S., Schoemaker P.J.H.</b>	Adapting to fast-changing markets and technologies	2016	<i>California Management Review</i>	51	7,29	<b>9 (↓)</b>
<b>Benner M.J.</b>	Dynamic or static capabilities? Process management practices and response to technological change	2009	<i>Journal of Product Innovation Management</i>	81	5,79	<b>10 (↓)</b>

TABLE 3. TOP TEN ARTICLES

### 3.2 Cluster analysis: bibliographic coupling

This section presents the results of bibliographic coupling analysis (Kessler, 1963) performed through VosViewer software that measured the connectivity of each research papers of the sample on the basis of the references that they share (Boyack & Klavans, 2010). The strength of relatedness increase when a document receives more citations. This kind of analysis provides the similarities of the tow works' subject matter in the forms of papers, sources, authors, organization and countries. For the aim of this study the unit of analysis were documents and the threshold defined is minimum 4 documents in commons. The result of this analysis produced 5 clusters, with 35 papers, using the clustering algorithm proposed by (Van Eck & Waltman, 2014; 2017) as shown in figure 5.

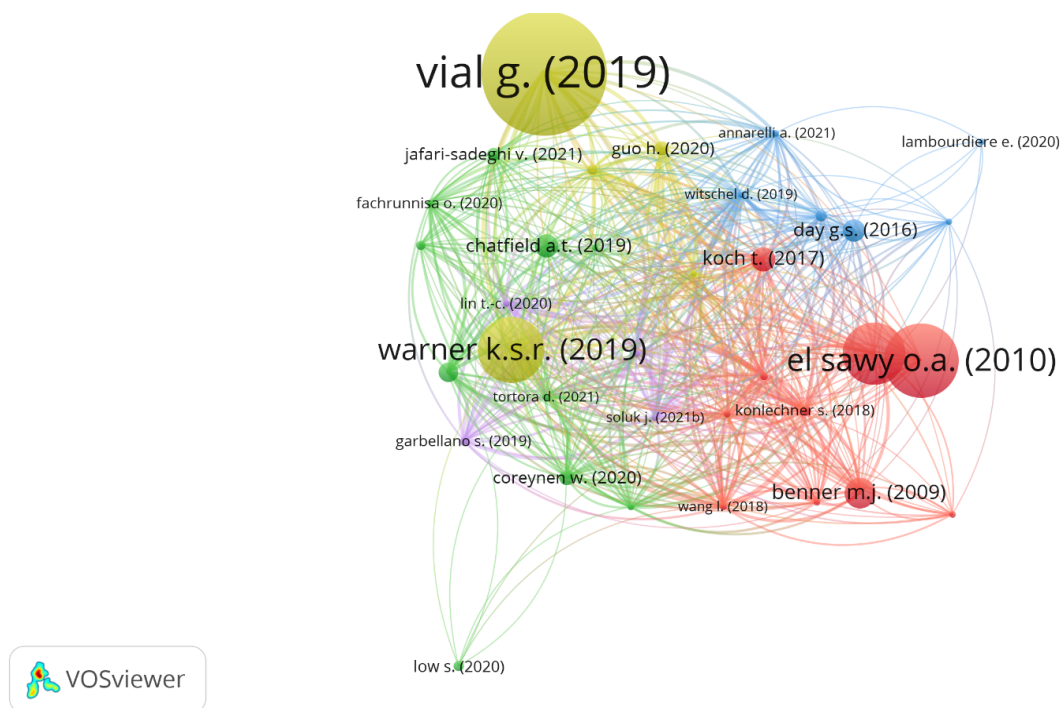


FIGURE 5 BIBLIOGRAPHIC COUPLING

#### CONTENT ANALYSIS

To provide a complete understanding of the main emerging research areas, a deep content analysis was performed. Each authors are independently involved in this analysis by reading all appear of the clusters with the final aims to identify research areas and main authors of each clusters. This kind analysis allowed to define 5 research areas in the field of digital transformation and dynamic capabilities.

#### *Research Area 1: Dynamic capabilities for digital transition in specific industries.*

Benner (2009) investigates the contribution of organizational routines, and specific management practices, for digital transition in changing technology environments, by focusing on the process of new product development. Resources and capabilities associated to digital manufacturing transformation at factory level are the research focus of the recent paper of Demeter et al. (2021). The analysis reveals four stage of transformation: Sensing digital (digital applications improving processes); Sensing experiments (pilot factories); Sensing – turn suboptimal efforts at factory level to HQ initiative; Sensing – going beyond experiments in order to obtain financial impact. El Sawy et al. (2010) introduce the terms of digital ecodynamics, as the holistic confluence among



environmental turbulence, dynamic capabilities, and IT systems. It is strategic imperative for firms the effective use of IT and to develop dynamic capabilities to predict the future.

Hsu and colleagues (2018) investigate the role of IT department in non-ICT-oriented organizations. authors studied the ICT-enabled services developed by the museum and illustrated the microfoundations of the sensing–seizing–transforming process by focusing on the difficult-to-imitate skills, such as business models, branding, leadership, culture. Newspaper Industry is the sector analysed in the paper of Karimi and Walter (2015) clarifies the role of first-order dynamic capabilities in responding to digital disruption. This requires the development of digital platform capabilities to connect to consumers and platforms to connect to businesses. Evidences describes a positive relation between first-order dynamic capabilities and digital platform capabilities.

Oliver (2018) investigates the digitalisation of media firms demonstrating that organisations which invests and adapts resources to produce new and dynamic capabilities has the possibility to produce superior firm performance in the long-term. Rubbio et al.(2020) examines the capabilities that enable healthcare resilience and digital technologies that support these dynamic capabilities. They found six capabilities that influence each other, and the combination of which enables resilience behavior, healthcare knowledge, collaboration, readiness, patient-knowledge, flexibility and response, and they analyzed the related digital technologies to support resilience in hospital.

Construction organizations are investigated in the paper of Aghimien et al .(2021) that analyse the competence required for these firms after the advent of fourth industrial revolution (4IR). Evidences reveals that these firms need to acquire transformation capabilities in relation to technology, knowledge management, project management in order to gain a better competitive advantage. Finally, Wang et al (2018) focuses on imaging industry by presenting the analysis of Kodak's response to digital transformation, exploring the role of managerial cognition on the development of dynamic capabilities. A process model with three sequences is proposed: external environment (technological discontinuity, alien competitors, customer behavior changes), organizational schema (perception of industry, competitors, consumer behavior, technology and resources and capabilities) and internal routines (entrepreneurial activities, routine disruption, deliberate leaning).

### Research Area 2: Dynamic capabilities for Value creation in Digital transformation

Koch and Windsperger (2018) analyses the process of value creation of companies to achieve a sustainable competitive advantage. Findings demonstrates that the main source of competitive advantage in environment with dissolving industry boundaries and digital technology as focal point of value creation is represented by inter-organizational network. A specific focus on services is presented by Coreynen and colleagues (2020), that examines the relationship between organizational mechanisms and firm's orientation to digitization, servitization and digital servitization . The success of digital servitization depends on the ability to exploit or explore, adapting current capabilities to breakthrough technologies.

Moreover, the value creation process is studied by Jafari-Sadeghi et al. (2021) to analyse the effects of digital transformation on value creation process. The role of the capacity to develop technology entrepreneurship and technological market expansion is considered as part of dynamic capabilities required to embrace digital innovation. A smart digital marketing strategy and digital capabilities in

the marketing process are the focus of the paper of Low et al. (2020) which presents a case of Malaysian property development industry to investigate how firms obtain real-time customer insights and to create value through digital marketing transformation.

Another contribution to value creation is offered by Matarazzo and colleagues (2021) that analyses the impact of digital transformation in the value creation process of the Made in Italy SMEs. Through a multi-case study the most important dynamic capabilities that help workforce of these particular firms to stem the challenges of digitalization, are identified as: sensing, learning and integration/coordinating. The strategic relevance of the dynamic capabilities framework, sensing, seizing and transforming, is highlighted by Day and Schoemaker (2020) that investigate their contribution to the process of digital transformation underlying the importance role of strategic leaders that need to adapt and modify the capabilities to rapid change.

The relationship between organisations' innovation and digitalization is analysed in the paper of Tajudeen et al. (2021) which explores the antecedents of the process of innovation, such as digitalization vision, IT flexibility, IT integration, IT agility, sensing and responding collecting data from 153 public listed organisations in Malaysia. Business model innovation is the focus of the paper of Witschel and colleagues (2019) that analyses the conditions enabling the development of digital business model and allow firms to create and capture value for customers. Authors carry out a multiple case study of German firms in order to identify capabilities, processes and challenges to respond digital disruption. They identify 4 critical capabilities in early recognition of market dynamics and trends; integration of customers into the ideation phase; modelling value proposition and value capturing mechanism and involvement of external partners. A comprehensive framework on the relationship between dynamic capabilities and organizational factors is presented.

Tortora and colleagues focuses on how digital technologies contribute to the creation of new offerings, processes or solutions through a quantitative analysis of 210 firms in Italy. Evidences demonstrates a positive relationship between knowledge acquisition capabilities and digital innovation and the important contribution of social media for this relationship.

### Research Area 3: Dynamic capabilities for Digital Technology enhanced organisation Transformation.

Annarelli and Palombi (2021) provides a literature review on approaches and models for cyber resilience and digitalization capabilities. The capabilities such, employing heterogeneous resources, improvisational capabilities, online informational capabilities, promoting continuous learning, scanning evolution of digital environment, timely reconfiguration of resources, are reported according to the phase of cyber resilience defined by the literature.

The potential of cybersecurity policy and IoT (Internet of things) to create a digital government is presented in the paper of Chatfield and Reddick (2019) that proposes a framework for IoT-enabled smart government performance by integrating IoT cybersecurity policy, digital technology policy and IoT-enabled dynamic capabilities. The digital transformation of Industry 4.0 applications in European manufacturing industries under sustainability dimensions perspective (economic, environmental, and social) is studied by Felsberger et al. (2020). The study analyses the internal and external factors that activate technological development for competitive advantage by

demonstrating their positive impact in the performance of production processes and entire supply chain with different KPIs.

Lambourdiere and Corbin (2020) focuses their research on the maritime supply chains to analyse the possible application of block chain technology (BCT). The results demonstrate the relationship between block chain technology BTC (information sharing, coordination and visibility) and maritime supply chains underlying the need to transform the classical lean supply chain to dynamic capabilities-base supply chains. Another systematic literature review focused on analytics- based data-driven innovation (DDI) in big data economy is presented by Sultana e al. (2021). Authors identifies 7 phases of DDI: product conceptualization, data acquisition, refinement, storage and retrieval, distribution, presentation and market feedback. Moreover the study underlines the importance of creativity for organizational change required in market-driven innovation.

#### Research Area 4: Developing dynamic capabilities for organisational digital transformation.

Through an extensive analysis of the literature, Vial (2019) defines a framework that intends to explain the fundamental dynamics underlying digital transformation that requires With respect to these radical changes, the organization defines new strategic objectives which, however, require structural changes and the overcoming of some organizational barriers to be achieved. Structural changes affect organizational structure and culture, leadership style and employee roles and skills. The main barriers are organizational inertia and individual resistance to change. The author proposes the dynamic capabilities as a theoretical framework to analyze the response of organizations to disruptions caused by digital technologies.

Warner and Wagner (2019) aim to analyze at the micro level the factors that facilitate digital transformation. Through a multiple case study of large corporations involved in digital transformation, the authors conclude that organizations involved in digital transformation need to develop a complex of dynamic micro-capabilities including: digital scouting and digital scenario, digital sensing capabilities, digital mindset crafting, rapid prototyping, strategic agility, balancing digital portfolios, navigating innovation ecosystems, redesigning internal structures, improving digital maturity.

Zomer and colleagues (2020) want to investigate the factors that favour digital transformation and hypothesize that the digital transformation capacity consists of sub-capacities (i.e. digital savvy skills, conditions for action and interaction and digital intensity) in turn favoured by the presence of factors at the level individual and organizational. Through a quantitative survey of over 400 companies, they identify a positive impact of individual factors such as the digital skills of managers and employees, agile structure and risk-oriented culture, external partnerships and investments in digital technologies.

Chirumalla (2021) adopts a contingent approach by linking the characteristics of digital transformation to the industrial sector considered. Focusing on the process industries, the author identifies barriers and facilitators to digital transformation. Specifically, through a multiple case study, it identifies four main barriers (i.e., poor data strategy and readiness, lack of standardization practices for change, competence and culture gaps, and ad-hoc problem solving) and four key enablers (i.e., infrastructure and methodological definition, preparation for predictive and analytical

readiness, proactive management practices, and plan for a digital maturity for each function and department).

#### Research Area 5: Sustaining digital transformation in family firms and SMEs

Garbellano and Do Rosario Da Veiga (2019), on the basis of a qualitative and cross-case analysis in 27 innovative Italian industrial SMEs highlighted that, in implementing of digital technologies, these companies had been engaged in organizational and managerial renewal through introduction of lean production. The authors also highlighted that the digital transformation required a mindset change for the firms in the sample. The research carried out by the authors highlighted that DC are “changed-oriented culture” but rooted in the history of the company. The adoption of digital technologies allowed to overcome traditional cultural constraints of innovation in SMEs and has prompted the companies to mitigate their mistrust towards partnership with large corporations, universities and research centres. The study also confirmed in the case of digital transformation of SMEs the importance of the role of the entrepreneur as orchestrator in combining and organizing resources to create value.

Soluk and Kammerlander (2021), in their research based on a sample of 15 family firms in Germany, identified the following digital dynamic capabilities: Effective strategic decision making; Ability to recognize, assimilate and commercialise new information; Ability to continuously renew the firm; Ability of employees to learn quickly; Strategic partnerships; Reorganization of routines; Brand management. Fachrunnisa et al. (2020) in a survey on a large sample of Malaysia and Indonesia SMEs highlighted as main features of digital dynamic capabilities of SMEs the integration between sensing capability, adaptive capability, innovation capability and learning capability. A strong and positive relationship between digital dynamic capabilities and strategic flexibility of SMEs is identified as well as a strong and positive relationship between strategic flexibility and digital transformation.

Finally, Guo et al, (2020) based on a survey on a large sample of SMEs located in China showed digital dynamic capabilities enabled Chinese SMEs not only to respond effectively to the crisis of COVID-19, but also to improve their performance. Highly digitalized firms can leverage their dynamic capabilities to sense a crisis, seize opportunities during the crisis and reconfigure resources to cope with crisis.

#### **4. Discussions and conclusions**

The results of cluster and content analysis allow to define some elements that the existing literature has in common in relation to the new dynamic capabilities required to start and sustain a process of digital transformation in high-velocity markets (Warner and Wager, 2019). Findings demonstrated that digital transformation includes multi-faced drivers that involve firm-specific characteristics, context and technological aspects, but all the paper analyzed underlined the importance of a reconfiguration of existing organization, in terms of skills, business model and routines to adapt to technological changes for digital disruption.

The papers included in Research area 1) *Dynamic capabilities for digital transition in specific industries*, analyze the factors that enable the digital transformation in some industries, by

analyzing the change required in both organization and technological system. In most of them is underlined the contribution of the organizational routines and project management practices to sustain digital transition, although this process could be considered not sector specific but firm specific. Dynamic capabilities could be organized in three level: organizational (e.g. Benner, 2000), technological (e.g. El Sawy et al. 2010, Hsu et al., 2018) and internal routines (e.g. Wang et al 2018). In all sectors analyzed the process of digital transformation required a transformation capabilities based on the integration of technology capabilities, knowledge management and project management to increase the competitiveness in the turbulent scenario. Moreover capabilities such resilience, flexibility to change, collaboration, leadership, business modelling and culture are considered fundamental for this process.

The content analysis of the papers included in Research area 2) *Dynamic capabilities for Value creation in Digital transformation* highlights some specific characteristics of the digital transformation in the process of value creation, with a specific attention to the customer perspective. The drivers of this process could both internal (e.g existing dynamic capabilities) and external (market turbulence). Dynamics capabilities analyzed in this cluster are considered as a firm specific ability to reconfigure their organizational network in order to achieve a sustainable competitive advantage after the transition to digital. Coreynen et al. (2020) underlined that the success of digitalization is based on the ability of the firms to adapt existing capabilities with technological innovation. The role of entrepreneurial orientation and strategic leaders are also required to modify the internal organization and capabilities to rapid change and to enhance value for customer (e.g Day et al. 2016; Jafari et al. 2021). Matarazzo et al. (2021) underlines the strategic role of entrepreneurs/family for the promotion of digital transformation and the involvement of external managers in the adoption and implementation of digital strategy. To summarize, the papers of this cluster investigates the enabling factors that allow firms to increase value for customers and identifies some relevant dynamic capabilities, in the marketing perspective, such as sensing, technology exploration and exploitation, integration and coordination, IT flexibility, customer knowledge acquisition, organization vision, context and interorganizational factors. Without these abilities and the re-defining of existing organizational models to breakthrough technologies, the digitalization process is more likely to fail. Also the environment in which firms are active should be recognized.

The analysis of research area 3) *Dynamic capabilities for Digital Technology enhanced organisation Transformation* focuses on some specific processes impacted by the diffusion of a particular digital technology that requires a process-based radical change. With the exception of Chatfield and Reddick (2019) which investigates the capabilities for smart government, all papers analyses the relationship between technology disruption and dynamic capabilities in a firms. Annarelli and Palombi (2021) provides a systematization of the definitions of digitization capabilities based on digital integration capabilities, digital platform capabilities and digital innovation capabilities for cyber resilience. Felsberger et al. (2020) and Lambourdiere and Corbin (2020) focuses on the technology that radical changes the supply chain management that should be shifting form the classical “lean” to more to dynamic capabilities-based more suitable to tackle a dynamic business environment, while Sultana et al. (2021) suggest to define optimal strategy for data-driven innovation by extracting hidden value from data for improving decision making. From the content analysis of this cluster emerges that the reconfiguration of a firm-specific process for

adapting to digital technology requires organizational capabilities that combine digital assets and business resources in order to maintain a sustainable competitive advantage. These integration of internal competences as well as external competences give firms the ability to overcome digital transformation challenges.

The analysis of research area 4) *Research Area 4: Developing dynamic capabilities for organisational digital transformation.* focuses on the factors that, within the organization, condition and are conditioned by digital transformation. In this group of articles, dynamic capabilities are seen as organizational properties that arise from a combination of multi-level factors: individual (Zomer et al. 2020) and organizational (Chirumalla, 2021). The studies by Warner and Wagner (2019) and by Zomer and colleagues (2020) identify the individual capabilities needed to recognize the need for a transformation and to successfully complete it (e.g. digital scouting, digital sensing capabilities, digital savvy skills). The two studies provide useful lists of elementary skills to be generated in individuals and organizations. With the exception of Chirumalla (2021) that focuses on industry level antecedents, all studies in the cluster identify organizational factors that represent antecedents of dynamic capabilities.

What emerges from the studies is that digital transformation has a systemic nature, involving multiple levels (i.e. individual and organizational) and multiple aspects (technological, organizational, cultural) in the organization. In a perspective not dissimilar to that assumed by the socio-technical approach (e.g. Sony and Naik, 2020), they propose dynamic abilities as holistic constructs, of which they renounce going into further detail, limiting themselves to researching the factors that facilitate or inhibit their presence. In other words, these studies: identify the dynamic capabilities useful for effective digital transformation; identify the antecedents that favor their formation; assume a certain level of self-organization of the organizational system guided by these dynamic capabilities, giving up a detailed design of processes and structures.

Finally, papers included in Research area 5) *Sustaining digital transformation in family firms and SMEs* are focused on\_ Family Firms and SMEs. Some common features of dynamic digital capabilities can be identified: Digital Dynamic capabilities in SMEs allow entrepreneur and her/his collaborators to develop the mindset change necessary for achieve successful digital transformation. They are “change-oriented culture” but, at some time, they are rooted in the history of the company. This is very important both in order not to create excessive discontinuity in the organizational transformation of the company and not to cause excessive resistance to change. Main sources of process of digital transformation are both the equipment suppliers and sons and daughters of entrepreneur. Particularly, the new entrepreneurial generation influence in a significant way the dynamic of digital transformation in SMEs. Finally, Digital Dynamic capabilities in SMEs allow firms to successful adopt digital technologies preserving their strategic and operational flexibility and can help entrepreneurs to face with crisis, through the adoption and reconfiguration of new resources to cope with the crisis. Particularly important are knowledge resources acquired in firms’ regional innovative ecosystem, thanks to cooperation with large corporations, universities and research centers. This cooperation allows to overcome traditional cultural constrains for innovation and mitigate the mistrust of SMEs entrepreneurs toward cooperation for innovation with other firms.

The study offers implications for theory and practice. As regard as *implications for theory*, findings of SLR allow to better understand the meaning and the implication of the dynamic capabilities required to sustain digital transformation of companies and to compete in digital era, by confirming scholars' growing interest in the comprehension of the multidimensional perspectives of the phenomenon. Furthermore, the research allows identifying industrial patterns and sectorial evidences about the suitable dynamic capabilities lying at the foundation of the competitive advantage for digital transformation. The study also provides *implications for practice*. The management of dynamic capabilities for digital transformation discloses several challenges that can be prioritized in terms of analysis of organizations' needs, assessment of the organization's digital maturity and definition of the coherent strategy to accompany companies in the digital transition .

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