



[WWW.JAQM.RO](http://WWW.JAQM.RO)

**JOURNAL  
OF  
APPLIED  
QUANTITATIVE  
METHODS**

**Quantitative Methods Inquires**

**Vol. 10  
No. 2  
Summer  
2015**

**ISSN 1842-4562**

## JAQM Editorial Board

### Editors

**Ion Ivan**, Bucharest University of Economic Studies, Romania

**Claudiu Herteliu**, Bucharest University of Economic Studies, Romania

**Gheorghe Nosca**, Association for Development through Science and Education, Romania

### Editorial Team

**Cristian Amancei**, Bucharest University of Economic Studies, Romania

**Catalin Boja**, Bucharest University of Economic Studies, Romania

**Radu Chirvasuta**, Imperial College Healthcare NHS Trust, London, UK

**Ștefan Cristian Ciucu**, Bucharest University of Economic Studies, Romania

**Irina Maria Dragan**, Bucharest University of Economic Studies, Romania

**Eugen Dumitrascu**, Craiova University, Romania

**Matthew Elbeck**, Troy University, Dothan, USA

**Nicu Enescu**, Craiova University, Romania

**Bogdan Vasile Ileanu**, Bucharest University of Economic Studies, Romania

**Miruna Mazurencu Marinescu**, Bucharest University of Economic Studies, Romania

**Daniel Traian Pele**, Bucharest University of Economic Studies, Romania

**Ciprian Costin Popescu**, Bucharest University of Economic Studies, Romania

**Aura Popa**, YouGov, UK

**Marius Popa**, Bucharest University of Economic Studies, Romania

**Mihai Sacala**, Bucharest University of Economic Studies, Romania

**Cristian Toma**, Bucharest University of Economic Studies, Romania

**Erika Tusa**, Bucharest University of Economic Studies, Romania

**Adrian Visoiu**, Bucharest University of Economic Studies, Romania

### Manuscript Editor

**Lucian Naie**, SDL Tridion



## JAQM Advisory Board

**Luigi D'Ambra**, University of Naples "Federico II", Italy  
**Kim Viborg Andersen**, Copenhagen Business School, Denmark  
**Tudorel Andrei**, Bucharest University of Economic Studies, Romania  
**Gabriel Badescu**, Babes-Bolyai University, Romania  
**Catalin Balescu**, National University of Arts, Romania  
**Avner Ben-Yair**, SCE - Shamoon College of Engineering, Beer-Sheva, Israel  
**Ion Bolun**, Academy of Economic Studies of Moldova  
**Recep Boztemur**, Middle East Technical University Ankara, Turkey  
**Constantin Bratianu**, Bucharest University of Economic Studies, Romania  
**Ilie Costas**, Academy of Economic Studies of Moldova  
**Valentin Cristea**, University Politehnica of Bucharest, Romania  
**Marian-Pompiliu Cristescu**, Lucian Blaga University, Romania  
**Victor Croitoru**, University Politehnica of Bucharest, Romania  
**Gurjeet Dhesi**, London South Bank University, UK  
**Cristian Pop Eleches**, Columbia University, USA  
**Michele Gallo**, University of Naples L'Orientale, Italy  
**Angel Garrido**, National University of Distance Learning (UNED), Spain  
**Anatol Godonoaga**, Academy of Economic Studies of Moldova  
**Alexandru Isaic-Maniu**, Bucharest University of Economic Studies, Romania  
**Ion Ivan**, Bucharest University of Economic Studies, Romania  
**Adrian Mihalache**, University Politehnica of Bucharest, Romania  
**Constantin Mitrut**, Bucharest University of Economic Studies, Romania  
**Mihaela Muntean**, Western University Timisoara, Romania  
**Peter Nijkamp**, Free University De Boelelaan, The Netherlands  
**Bogdan Oancea**, Titu Maiorescu University, Romania  
**Victor Valeriu Patriciu**, Military Technical Academy, Romania  
**Dan Petrovici**, Kent University, UK  
**Gabriel Popescu**, Bucharest University of Economic Studies, Romania  
**Mihai Roman**, Bucharest University of Economic Studies, Romania  
**Satish Chand Sharma**, Janta Vedic College, Baraut, India  
**Ion Smeureanu**, Bucharest University of Economic Studies, Romania  
**Nicolae Tapus**, University Politehnica of Bucharest, Romania  
**Timothy Kheng Guan Teo**, University of Auckland, New Zealand  
**Daniel Teodorescu**, Emory University, USA  
**Dumitru Todoroi**, Academy of Economic Studies of Moldova  
**Nicolae Tomai**, Babes-Bolyai University, Romania  
**Pasquale Sarnacchiaro**, Unitelma Sapienza University, Italy  
**Vergil Voineagu**, Bucharest University of Economic Studies, Romania

	Page
<b>Quantitative Methods Inquires</b>	
<b>Adrian PANA, Adriana CIUVICA, Ionel JIANU</b> Socio-economic Analysis of Burden of Premature Deliveries in Romania	1
<b>Carlo CUSATELLI, Massimiliano GIACALONE</b> ICT Use by Judiciary Systems in European Union	8
<b>Iustina Alina BOITAN</b> Measuring Social Responsible Banks' Efficiency and Productivity – a Nonparametric Approach	14
<b>Emmanuel John EKPENYONG, Pius Ida OKO</b> Analysis of Reported Cases of Road Traffic Accidents in Umuahia Metropolis	27
<b>Maricica MOSCALU</b> Integration between the Romanian and the Euro Area Banking Markets: An Application of the Johansen Cointegration Test to Interest Rates on Loans to Non-Financial Corporations	37
<b>Erika SZTOJANOV, Grigore STAMATESCU</b> Adaptive Neuro-Fuzzy Model Tuning for Early-Warning of Financial Crises	53
<b>Zizi GOSCHIN</b> Endogenous Regional Development in Romania. A Knowledge Production Function Model	64
<b>Adee ATHIYAMAN</b> Identifying High Potential Biomass-Home-Heating Customers: A Bayesian Classification	76
<b>Ovidiu TURCOANE</b> A Proposed Contextual Evaluation of Referendum Quorum Using Fuzzy Logics	83
<b>Stefan-Alexandru IONESCU</b> Using PCA in Financial Markets Field	94
<b>Emanuel Eduard HERTELIU</b> Means of Automating the Process of Evaluating the Quality of Citizen Oriented Software Solutions using Software Metrics	105

## ICT USE BY JUDICIARY SYSTEMS IN EUROPEAN UNION

### Carlo CUSATELLI

PhD, Ionian Department, University of Bari, Italy

E-mail: carlo.cusatelli@uniba.it



### Massimiliano GIACALONE

School of Economics, Management and Statistics,  
University of Bologna, Italy

E-mail: massimilia.giacalone@unibo.it



### Abstract

*The new technologies have become essential, thanks to the enormous possibilities that they can offer, as the immediate transfer of a document from one continent to another with just a click, saving both time and money and also allowing many simultaneous interpersonal exchanges, that considerably speed up the decision-making processes which involve numerous individuals located in various places. Moreover, we have witnessed over a very short period of time, that most of the human activities which were carried out manually have given space to much more efficient digital implementations. For instance, we can consider the serious problems that the vast documental archives have created in its management, and how centralized computer databases helped to solve most of these problems, speeding up and optimizing all research operations and data mining. This natural easiness of data exchange is still being expanded and facilitated by the development of computer networks, and in particular by the internet.*

**Keywords:** Information and Communication Technology, ICT, Judiciary systems

### 1. Introduction

The need for strong regulatory and valid instruments is clear in contemporary society to resolve disputes in a timely manner and penalize wrongdoing. The judicial function must be measured against this complexity, in order to ensure the safety of citizens, social

cohesion, and economic competitiveness at an international level. The Information and Communication Technology (ICT), that facilitates knowledge and exchange of data and information through an analytical approach to problem solving, has been one of the main levers of change for the judicial authorities. The information systems have entered the offices promising greater operational efficiency, increased transparency, the online exchange of data and documents between offices and litigants. The comparative analysis of experiences in different countries has allowed us to identify both approaches and traps into which some policy makers have fallen (Carnevali, 2010). Understanding the processes of innovation and their peculiarities in highly formalized systems, such as the courts, is therefore a necessary step to be able to support and guide.

ICT in the administration of justice offers possible solutions, improving the administration of justice and helping to streamline procedures and reduce costs. The new concept of electronic justice (e-justice) represents an initial response to the threefold need to improve access to justice, cooperation between legal authorities and the effectiveness of justice. Massive investments in ICT are taking place in all judicial systems to improve the quality of administration of justice and, therefore, better protect the rights and safety of citizens. The ICT projects in the justice sector are quite different and range from the creation of websites for the courts, electronic filing, distance learning, the alternative dispute resolution through web-based technologies. These are projects that are usually accompanied or take place within a broader framework of reforms that affect the entire judicial system, and that often contribute to opening up new possibilities for institutional change, judicial cooperation and even integration between judicial authorities of different countries. It's important to immediately report how the introduction of ICT in judicial systems must necessarily be contextualized within the proper legal and institutional framework that characterizes each country.

## **2. Introducing technology in Courts**

The European Commission, with the Commission Communication COM (2013) 160 final, has developed an evaluation framework of EU justice as a tool to promote effective justice and growth, to ensure a more effective European justice system by identifying reliable and comparable information on the functioning of the judicial systems of the Member States; among the indicators of the Scoreboard, the length of proceedings and the timing of treatment, the turnover rate (defined as the ratio of the completed and introduced judgments) and the number of pending cases, elements have been defined which are absolutely relevant to be considered and optimized in order to increase the quality of the judicial system. Indicators show that the availability of ICT systems for recording and case management and for communication and exchange of information between courts and their context is a determining factor for the effectiveness of justice, for example, electronic forms available on the internet, websites of the courts, follow-ups of suits online, electronic records, electronic processing of small claims and the recovery of uncontested claims, electronic submission of applications and videoconferencing.

The strong drive for innovation of the judicial system is based on three key moments: the introduction of technology, which is able to streamline all the procedures for which discretion of the court is required; a legal system that is capable of facilitating the availability of regulatory instruments which are flexible and capable of adapting to

continuous stress; the internal structure of an organization is able to exploit its possibilities. This has been pursued with approaches related to the idea of cultivation, a method of development of complex systems based on local planning interventions aimed at conversion, adaptation and connection of systems, components and functionality already available, in part, for the purpose of assembling configuration systems that can then be put to the next test. This has allowed, for example, to achieve, in a relatively simple way, applications that would facilitate access to information on the procedures provided by the courts to involved parties or to exchange data necessary for the definition of cases (April, 2011).

Electronic justice initiative at Community level is carried out by the Council of the Union (Justice and Home Affairs) and the European Commission (Justice, Freedom and Security General Directorate) under which a specific Action Plan is defined; such plan includes, among other things, the creation of the "European e-Justice Portal" which supplements the initiatives of computerization of individual Member States and access point privileged access to information, applications and case law on the part of citizens, businesses, professionals and judicial authorities: e-justice can be defined as the use of ICT to improve citizens' access to justice and the effectiveness of the judicial action seen as any kind of activity to resolve a dispute or punishment of criminal behavior. The Commission has always encouraged the use of videoconferencing and the electronic transmission of documents between judicial authorities and actively participated in the project of interconnection of criminal records. The potential scope of e-justice is very broad and likely to evolve in the light of progress within the European Judicial Area and technological developments.

There is, however, another e-justice that, applying the technologies of automatic extraction of information to the court orders, can not only enrich the decision-making process of the actors of the proceedings but may also provide new and interesting perspectives for the management of the courts. Besides the specific scientific techniques related to information extraction, data and text mining, judicial decisions that are so elaborate allow performing synchronic, diachronic and comparative analysis on the functioning of the judicial administration. It is an innovative and original result that clears the way for justice monitoring, without which it is almost unthinkable to identify concrete and effective solutions that improve performances. Online, it is possible to find information on legal systems, legislation and case law; electronic communication systems are developing between the parties and the courts, and in some cases entirely electronic procedures are available (Fabri, 2006). The use of electronic means to record hearings is increasing as well. At a European level, several professional organizations are developing particularly interesting projects for the exchange of information or interconnection, for example, the website of the Association of the Councils of State, the common portal on the jurisprudence of the Supreme Courts or the European register of wills. Several projects in the field of e-justice are currently being developed. In addition to the examples mentioned above, it is appropriate to recall all the projects relating to legal documentation undertaken by the European Union or from institutional and private operators (Seibert-Fohr, 2012).

The Commission supports these projects, but also considers as important factors increasing readability, accessibility and efficiency of EU action in the judiciary field, and to emphasize projects that will truly add value to the European judicial area. Indeed, while the law in the legal field has developed considerably, its impact often remains limited due to the difficulties of transposition (especially in criminal matters) and the operators who often lack

in knowledge.

### 3. ICT usage in European Courts

The European e-justice wants to target the use and development of ICT at the service of the judicial systems of the Member States, in particular in cross-border situations, so as to enable citizens, businesses and legal practitioners with a greater access to justice and judicial information and to facilitate cooperation between judicial authorities of the Member States. It aims at improving the effectiveness of justice itself, while respecting the independence and diversity of the legal systems of the Member States, as well as of fundamental rights. It is appropriate to ensure that users of the European e-justice system, including citizens, can take advantage quickly of concrete electronic tools.

In Table 1, three ICT partial composite unweighted indicators

$${}_{ITC}P_i = \sum_{j=1}^{w_i} r_j / w_i \quad (i = 1, 2, 3; w_1=5, w_2=4, w_3=9) \quad (3.1)$$

have been calculated by averaging the usage rates  $r_i$  of the  $w_i$  computer facilities within each of the three uses of technologies in courts, on the basis of data collected through multiple questions no. 62 (direct assistance to the judges and court clerks), no. 63 (administration and management) and no. 64 (electronic communication and exchange of information) of the ultimate European Commission for the Efficiency of Justice evaluation scheme (CEPEJ, 2014).

The overall synthetic indicator, weighted by respective number of facilities,

$${}_{ITC}S = \sum_{i=1}^3 w_i P_i / 18 \quad (3.2)$$

summarizes the previous partial ones: it shows almost a three-quarter judicial ICT completeness in Europe; Romania, Spain, Germany (representing the median unit with exactly 75% of completeness if UK is considered in its unity) and Netherlands (representing the median unit with precisely the same average 76.7% of completeness considering UK divided in three parts) range around that level, but Greece (the last, with 18.6%), Belgium and Cyprus lie below fifty percent of such computerization, while Austria, Estonia, Malta and Portugal have already completed it.

The results obtained, the limitations encountered and the targets set for the future require a comprehensive European strategy on e-justice to bring the commitment and involvement at a strategic level. The new European e-justice 2014-2018 strategy intends to shift from work already undertaken so that there is a greater use of electronic applications, electronic transmission of documents, video conferencing and the interconnection of registers and administrative records, in order to further reduce the costs of litigation out of court by establishing a mechanism to ensure that future legislation is designed to be used by means of online applications.

Several Member States have already developed and participated in a series of pilot projects in the field of e-justice and an infrastructure for European e-justice is gradually developing: since 2011, a number of Ministries of Justice and central authorities of several European countries have embarked on such a large scale project (<http://www.e-codex.eu>) in which they have concretely experienced some applications in the field of cross-border proceedings, starting with the European payment order, established by specific Community regulations.



**Table 1.** Percentage indicators estimated on the basis of 2012 data collected through 5<sup>th</sup> CEPEJ report

Use of technologies in courts (computer facilities)	Austria	Belgium	Bulgaria	Cyprus	Czech Rep.	Denmark	Estonia	Finland	France	Germany
<i>Direct assistance to the judges and court clerks (word processing, electronic database of case-law, electronic files, email, Internet connection)</i>	100.0	100.0	100.0	80.0	86.0	100.0	100.0	100.0	95.0	81.0
<i>Administration and management (case registration system, court management information system, financial information system, videoconferencing)</i>	100.0	46.3	76.3	50.0	57.5	100.0	100.0	100.0	100.0	76.3
<i>Electronic communication and exchange of information between the courts and their environment (electronic web forms, websites, follow-up of cases online, electronic registers, electronic processing of small claims, electronic processing of undisputed debt recovery, electronic submission of claims, videoconferencing, other)</i>	100.0	10.0	33.9	22.2	92.2	33.3	100.0	88.9	40.0	71.1
<i>Overall ICT (average of the previous three composite indicators weighted by number of computer facilities)</i>	100.0	43.1	61.7	44.4	82.8	66.7	100.0	94.4	68.6	75.0

  

Use of technologies in courts (computer facilities)	Greece	Hungary	Ireland	Italy	Latvia	Lithuania	Luxembourg	Malta	Netherlands	Poland
<i>Direct assistance to the judges and court clerks (word processing, electronic database of case-law, electronic files, email, Internet connection)</i>	30.0	86.0	100.0	100.0	100.0	100.0	100.0	100.0	81.0	81.0
<i>Administration and management (case registration system, court management information system, financial information system, videoconferencing)</i>	17.5	75.0	58.8	87.5	76.3	87.5	100.0	100.0	93.8	76.3
<i>Electronic communication and exchange of information between the courts and their environment (electronic web forms, websites, follow-up of cases online, electronic registers, electronic processing of small claims, electronic processing of undisputed debt recovery, electronic submission of claims, videoconferencing, other)</i>	12.8	61.1	52.8	77.8	100.0	97.2	44.4	100.0	66.7	39.4
<i>Overall ICT (average of the previous three composite indicators weighted by number of computer facilities)</i>	18.6	71.1	67.2	86.1	94.7	95.8	72.2	100.0	76.7	59.2

  

Use of technologies in courts (computer facilities)	Portugal	Romania	Slovakia	Slovenia	Spain	Sweden	England and Wales	North. Ireland	Scotland	Average
<i>Direct assistance to the judges and court clerks (word processing, electronic database of case-law, electronic files, email, Internet connection)</i>	100.0	76.0	81.0	95.0	100.0	100.0	100.0	100.0	100.0	92.1
<i>Administration and management (case registration system, court management information system, financial information system, videoconferencing)</i>	100.0	87.5	76.3	100.0	93.8	100.0	93.8	93.8	100.0	83.6
<i>Electronic communication and exchange of information between the courts and their environment (electronic web forms, websites, follow-up of cases online, electronic registers, electronic processing of small claims, electronic processing of undisputed debt recovery, electronic submission of claims, videoconferencing, other)</i>	100.0	67.8	46.1	75.6	51.7	88.9	72.8	71.1	66.7	65.0
<i>Overall ICT (average of the previous three composite indicators weighted by number of computer facilities)</i>	100.0	74.4	62.5	86.4	74.4	94.4	85.0	84.2	83.3	76.7

#### 4. Conclusions

The ICT indicators showed that when the process of computerization will be completed, which seems to be quite realistic even in the short term, the next step should include a coordination to ensure, while still respecting the local autonomy and cognitive needs peculiar to different contexts, a common information base homogeneous and shared on a European level.

The problems of data reliability, the provision of appropriate classifications in survey forms and, more generally, the quality of data are attributable, directly or indirectly, to the degree of computerization in statistical-judicial production. In fact, in the presence of a fully computerized detection system (also at the level of case management records) the possibility of transcription errors, manipulation and interpretation of the information required will drastically reduce (due to the non-perfect correspondence between the classification adopted in models of detection and what is recovered in the official records), as well as the time-lag in some cases considerable, between data recording and the actual time/instant of reference; on the other hand, the detailing of the information collected could increase a result of a greater and more appropriate articulation of the detection patterns (certainly not feasible, beyond a given limit, in cases of manual detection) and the activation of an automatic check on the consistency of the data would be possible, not only ex-post, but during the same stage in which information is entered.

The last aspect concerning the quality of production processes regards their duration, which is also highly dependent on the degree of computerization of various systems. In fact, with the completion of the automation, the time of data acquisition will be strongly contracted and the frequency of detections will also increase.

#### References

1. Aprile, S. **Rapporto ICT Giustizia. Gestione dall'aprile 2009 al novembre 2011**, Direzione Generale Sistemi Informativi Automatizzati, Roma, 2011
2. Carnevali, D. **Soggetti Smarriti. Perché innovazione e giustizia non si incontrano quasi mai**, Franco Angeli, Milano, 2010
3. Fabri, M. **Amministrare la giustizia. Governance, organizzazione, sistemi informativi**, Clueb, Bologna, 2006
4. Seibert-Fohr, A. **Judicial Independence in Transition**, Springer, Heidelberg, 2012
5. \* \* \* **Evaluation report on European judicial systems - 2012 data**, CEPEJ (European Commission for the Efficiency of Justice), Council of Europe Publishing, Strasbourg, 2014