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Public-sector Digitization: An Analytical Cost-effective Framework

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PUBLIC-SECTOR DIGITIZATION: AN ANALYTICAL COST-EFFECTIVENESS FRAMEWORK

Research full-length paper

Track: New Directions for Digital Governance: Towards Government 3.0

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Abstract

It is an enduring request to reform and advance the quality of governmental systems according to the needs of society and economy. Some of the most critical tools for this purpose are the information and communication technologies (ICT). Electronic government, among other things, has been documented to increase efficiency of government operations and to provide better and more customized services to citizens and businesses. However, a review of the recent literature has uncovered both an inability to quantify the value creation of ICT implementation in public domains and a lack of an analytical cost-effectiveness framework to evaluate the monetary impacts of digitization on governance structures. This study offers an analytical method to quantify the gains from public services' digitization and focuses on electronic justice (e-justice), a sector with huge challenges ahead for public governance. We provide specific cashable financial gains for administrations that might originate from the digitization of judi-cial systems. The proposed method can make up a framework for setting digital priorities and helping governments seize the opportunities that digitization offers.

Keywords: E-justice, Cost-effectiveness framework, Digitization.

1 Introduction

E-justice is a specific field under the more general framework of e-government (e-Gov). E-Gov is understood as the use of technology, especially Web-based applications to enhance access to and efficiently deliver government information and services (Yildiz, 2007). E-Gov can improve efficiency, decrease budget and increase trust between society and governments (Hasan, 2014; Rosa, Teixeira and Pinto, 2013). However, more and more decision-makers are considering e-justice as something more than another e-government application (Politis, Donos, Christou, Giannakopoulos and Papanagiotou-Leza, 2008). E-justice is a concept with multiple interpretations. Velicogna aptly reminds that power and organizational borders alter, as 'who-does-what' changes in the translation of procedures from paper to digital and from one form of digital to another (Velicogna, 2017). Policy makers need to tackle complex structural problems for the beneficial introduction of digital technologies into judicial systems. Pointing out this multifaceted challenge, e-justice involves a plurality of actors such as lawyers, administrative personnel, and judges, inter-organizational relationships taking place inside and outside the courts and of course an interplay of technological, organizational and normative components (Fabri, 2009).

At least since the 1990s, there has been a strong interest in the use of ICT in support of judicial procedures (Velicogna, 2007). The Austrian administration of justice was the first country that has introduced e-Filing, a tool for data exchange and communication between representatives, courts and public prosecution offices. Portugal started with simpler experiences to solve smaller problems (e.g. e-mail integration) and evolved to systems capable of handling entire cases (Rosa, Teixeira and Pinto, 2013). In addition, in France, the e-Barreu was a system that enabled lawyers and the courts to exchange judicial data. The real challenge to the development of this system did not lie in the proper integration of the technology but in the motivation of the users to actively participate (Velicogna, Errera and Derlange, 2011). The development of the Finnish integrated justice chain for the criminal justice, called Sakari can be considered another success story. Sakari is a case management system and its design philosophy was built around the concept of workflow among different organizations (Fabri and Lupo, 2012). A review of the literature reveals a long list of advantages offered by the digitization of judiciary systems, such as an increase in productivity by reducing transaction costs, shorter trial length, greater access to justice and more transparency. At the same time, this review uncovers an inability to quantify the value creation produced through ICT introduction in judiciary systems. Carnevali and Resca (2012) comment that in Italy, the Civil Trial On-Line Project implementation strategy has shown that there was not a balance between costs and benefits and a situation of limited reward to stakeholders. So, the current challenge and the research aim of this study is the quantification process of the financial gains for e-justice. This formalization will allow for a straightforward method for public organizations to concentrate on optimizing costs, to quantify anticipated returns and wisely selecting IT investments on a step-by-step approach.

The remainder of the paper is structured as follows: section 2 provides the corresponding literature review on e-justice and e-Gov evaluation frameworks. Section 3 describes the applied methodology and the case context, while section 4 provides the results of this study. Finally, section 5 starts with the research's limitations, continues with theoretical and policy contributions and ends with future research recommendations.

2   Literature review

There is no consensus on the definition of e-justice; a broad definition of e-justice can cover ICT usage in the areas of crime prevention, administration of justice and law enforcement (Aaltonen, Laarni and Tammela, 2015). Velicogna (2007) offered some indicative examples of e-justice applications; these applications can provide direct support to judges and judicial staff through key technologies such as word processing, e-mail exchange and local archiving. Likewise, e-justice enables effective case management (CMS) via automatic assignment of a case to an officer, electronic handling of court cases and monitoring of the state of affairs. Apart from the CMS, some of these ICT applications have a more strategic focus; the provision of performance-based monitoring systems can support strategic decision making, by identifying factors that cause, for example, low case clearance rates and high costs. The introduction of digital technologies to justice coupled with modern management procedures can be powerful tools to increase the effectiveness of judicial systems. Effective justice systems are crucial not only for greater transparency and expanded access to justice but also play a key role in strengthening a business-friendly environment. Timely decisions are essential for citizens and business and the efficiency with which a judicial system in a country handles litigation is hence an important factor (European Commission, 2016). Although it is important to examine the effects of ICT in the broader context of justice, this study focuses on the cost-effectiveness and the productivity of the electronic courts and judiciary.

In times of crisis it is vital for governments to justify the substantial budgetary commitments to develop and implement e-justice applications. Although digital government is often employed as an innovation mechanism to obtain greater levels of efficiency and effectiveness (Brown, 2007), looking back at possible cost-effectiveness-oriented studies in judicial functions, there is a noticeable research gap in the literature; there is an absence in studies that provide quantitative key outcomes from the imple-

mentation of e-justice applications. Before embarking upon creating new e-justice applications there is a real need to recognize their potential impacts on a cost-effectiveness basis.

For the moment, what seems to prevail in the literature is the use of the evolution and the service quality-based evaluation models (Córdoba, 2014). On the one hand, the evolution-based models emphasize on the degree of implementation achieved in the different stages of e-Government evolution. The evolutionary perspective signifies that information systems grow through a specific number of stages before reaching maturity, from simple information portals to fully customized, integrated and interoperable e-Gov systems (Irani, Al-Sebie and Elliman, 2006). Baum and Di Maio (2000) demonstrated the progression of e-government through a four phases model moving from simple web presence, i.e. posting basic information to public, to transformation, meaning that governments transform the current operational processes to provide more efficient, integrated, unified and personalized services. Layne and Lee (2001) regarded e-government as an evolutionary phenomenon and proposed a four-stage model that advances from the 'catalogue' phase, up to the 'horizontal integration' phase which focuses on integrated and interoperable systems to provide users unified and seamless services. However, the existence of numerous evolution-based models raises two significant problems. First, most of the stage models are case-specific and seem to be incongruent with one another and second, the external validity of those attributes appears to be poor (Fan and Luo, 2014).

On the other hand, service quality-based models are more citizen-centric and attempt to measure users' satisfaction with public services and intention to or actual use. Service quality and information technology acceptance research has yielded a plethora of competing models, each with diverse groups of acceptance and usage determinants. For instance, the SERVQUAL model is designed to measure service quality by capturing respondents' expectations and perceptions (Parasuraman, Zeithaml and Berry, 1988). SERVQUAL along with its five dimensions of service quality, reliability, empathy, tangibles, assurance and responsiveness, were successfully applied in measuring the level of public service quality (Chatzoglou, Chatzoudes, Vraimaki and Diamantidis, 2013). Furthermore, prior studies in the e-Gov context, largely adapt Technology Acceptance Models (TAM) and apply constructs, such as perceived ease of use and usefulness to predict how the individual will eventually behave (Wirtz and Piehler, 2016). Additionally, theories such as the Theory of Planned Behaviour and Unified Theory of Acceptance and Use of Technology (UTAUT) attempt to take also into account social influences as determinants of future intentions. Subjective norm has been identified as strong predictor of first-time adoption of mGovernment services (Chen, Vogel and Wang, 2016).

Nevertheless, with evolution and service quality-based models, immediate and tangible benefits are hard to perceive and observe. In overall, such public value-based evaluation frameworks mostly include user-centric measures to track satisfaction and primarily attempt to provide guidelines for policy makers to continuously improve the quality of e-Government services (Fan and Yang, 2015; Papadomichelaki and Mentzas, 2012). In a period of crisis, governments seek for evaluation tools to prioritize their e-Gov initiatives based on direct financial gains. In a recent case study (Microsoft Cases, 2012), it is mentioned that the San Diego County has lately adopted a strategic direction to promote workforce effectiveness. Juvenile justice agencies in San Diego County all run on paper. To help their employees work more and effectively, these agencies adopted a Justice Electronic Library System (JELS), with which it is expected to avoid about US$400,000 in costs a year. With JELS, attorneys save twenty-five percent of their time dealing with a case and the government benefits from a fifty percent increase in the productivity of support staff. This increase in productivity of the support staff is equivalent of six full-time positions, which in turn leads to about $400,000 decrease in annual costs. Furthermore, the Juvenile Prosecution Section saves both the cost of installation of new paper records in storage, and the cost of recovery of archived files when offenders break the law again. It is estimated that this saving equates to $20,000 annually. In overall, the county incurred about $170,000 in initial system development and implementation costs. Given its expected $400,000 in cost avoidance for the first full year of implementation, the county anticipates an initial ROI of more than 100 percent.

Administrations' savings can incur from data sharing, document automation, e-filing, organized information, statistical reporting, and so forth. Jackson and Lapsley (2003) have verified that local authorities and government agencies are heavily involved with innovative techniques in performance measurement. Methodologies like standard cost model, activity-based costing and business process management can now be combined with analytical tools to develop robust simulation tools, able to calculate the positive impact of various what-if scenarios (Charalabidis and Askounis, 2010; Charalabidis, Stamoulis and Androutsopoulou, 2017).

eGEP Measurement Framework was a pioneering effort of looking at efficiency in the public sector (Codagnone, Boccardelli and Leone, 2006). Although, this measurement framework provides a multidimensional assessment of the public value potentially generated by eGovernment, through the three generic value drivers of efficiency, democracy, and effectiveness, here we emphasized on just the strictly quantitative financial impacts. Hence, the eGEP model approached and modelled the cost of the administrative burden and its associated cashable financial gains with indicators such as percentage change in case handled per processing full time, percentage change in average length of time to process a standard case, percentage change K€ full time equivalent gains, and percentage change K€ in overhead costs (postage, paper, print).

eGEP-2.0 represents the evolution and improvement of the eGEP measurement framework. It overcomes many of the limitations of existing frameworks, and more importantly leads the way for an effective impact assessment of e-Government initiatives, in relation to the policy-making process and related governance needed for their design and implementation (Savoldelli, Misuraca and Codagnone, 2013).

In the same line of reasoning, in the sense that there is a shortage of analytical impact assessment tools, Charalabidis and Askounis in 2010 presented the eGOVSIM model, a flexible, parametrizable and analytical tool for estimating the cashable financial gains that administrations and citizens or businesses might have from service on-line availability (Charalabidis and Askounis, 2010). The eGOVSIM model is combining elements from standard cost modelling (for measuring the processing requirements for each service provider or user, based on the specific information needs), activity-based costing (for calculating various cost elements per service step) and business process management (for decomposing each of the governmental services) based techniques for methodically calculating the overall gains for all stakeholders. Finally, the model results are reached through an iterative calculation process for each service, service step and cost need for administrations or citizens / businesses. This exploratory research adopts the latter approach and our study's results are reached through an iterative calculation process for each service, service step and cost need for administrations and key stakeholders (e.g. lawyers).

3 Research method

The study is the result of a process of discussion and sharing of experiences among stakeholders in the Greek judicial system. Thirty-six face-to-face interviews were conducted with key representatives, who were experts on specific judicial processes. Eight judges, four judges' support staff and twenty-four lawyers participated in this study. Each participant was interviewed separately to discuss in detail the eGOVSIM model (Fig 1), its applicability in the Greek e-justice system and especially the time savings derived from the use of e-justice in four specific judicial procedures. A lawyer was recruited to facilitate the 30- to 40-minute discussion about the selected topic, in a relaxed environment. All interviews took place for approximately two months and the overall goal was to reflect on performance indices and reach an agreement upon the quantifiable time savings and their respective financial gains.
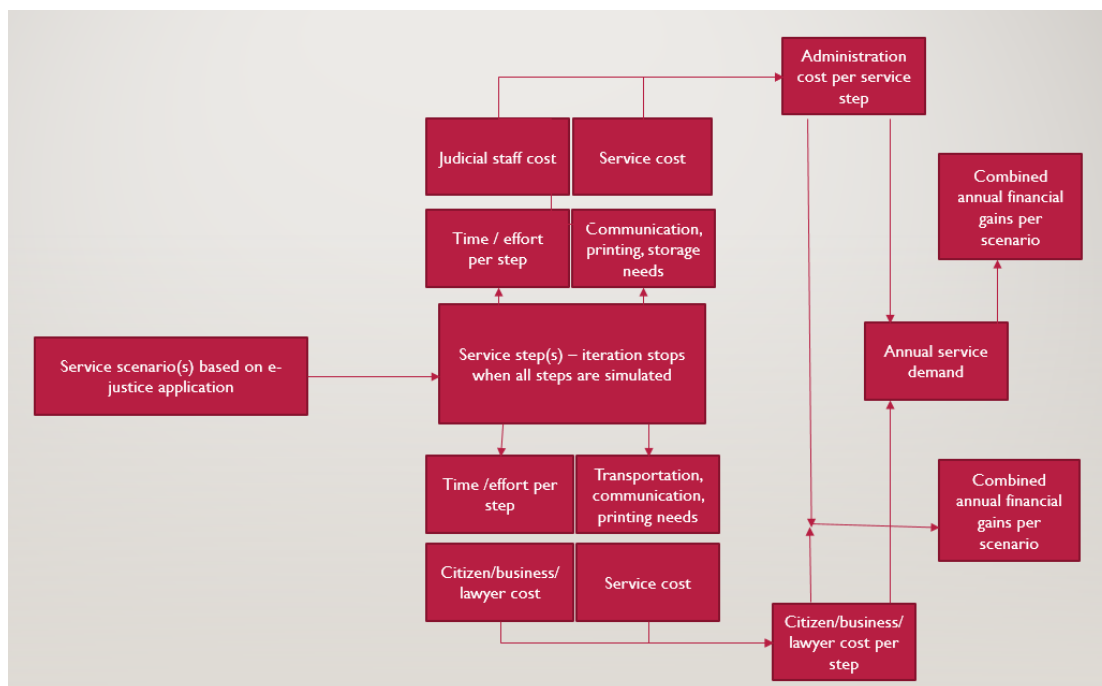
Figure 1.   E-justice and the eGOVSIM model

3.1   Case context

Overall, the Greek Judiciary has a very poor track record. A comparison of the Greek judicial system with its European counterparts shows that the required time for first instance litigation in civil and commercial disputes has increased from 190 days in 2010, to 460 days in 2012 (European Commission, 2016). This performance is the third worst in the EU (where data available). Regarding the efficiency of the judicial system, the same study has shown that Greece has the lowest performance among member-states (where data available). The rate of first instance litigation in civil and commercial disputes fell from 79 per cent in 2010 to 59 per cent in 2012.

Some of the straightforward factors that can be accounted for this judicial inefficiency are the lack of human and financial resources, the increasing complexity of cases (e.g. terrorism), the bureaucratic law system and overregulation, the ease of appealing to judicial decisions, the unpopularity of alternative dispute resolution methods and of course the underutilization of e-justice systems. In the meantime, the Greek judicial system has integrated several ICT applications such as, electronic access to national legislation, European law and court decisions, e-services for the facilitation of lawyers like issuing of certificates, access to the land registry and samples of legal documents, e-mail hosting, e-filing at courts of first instance and electronic docket.

3.2   Units of analysis

For IT innovations in the court processes to actually improve court processes and not detract from them, the judiciary's leadership and the IT function both need to understand how information works in the courts (Reiling, 2012). Therefore, we apply the eGOVSIM model into four generic judicial services, namely insolvency, order for payment, tax-related disputes and annulment proceedings. These four procedures were intentionally selected since they play a key role in instilling confidence throughout the entire business cycle and by strengthening business- and investment-friendly environment; judicial systems have a direct positive impact socio-economic growth (Lichand and Soares, 2014). For example, the average duration of insolvency proceedings in Greece in calendar years, including all appeals and delays, is now 3,5 (Doing Business Project, 2015). The recovery rate which calculates

how many cents on the dollar secured creditors recover from an insolvent firm at the end of insolvency proceedings is 34,9 per cent. Available data have shown a linear relationship between time duration of insolvency proceedings and recovery rate. Shortening the duration of insolvency proceedings with full deployment of e-justice will therefore improve the ability of creditors to recover most of the money owed. The next step was to break down each procedure into a series of simple steps.

3.3 Service scenarios

According to the eGOVSIM model each of the procedures (service scenarios) should be decomposed into various process steps, derived from a process driven analysis of each service. The work break-down structures for the first two service scenarios are depicted in the following figures (since these procedures vary by country, it is redundant to decipher them all in this article).
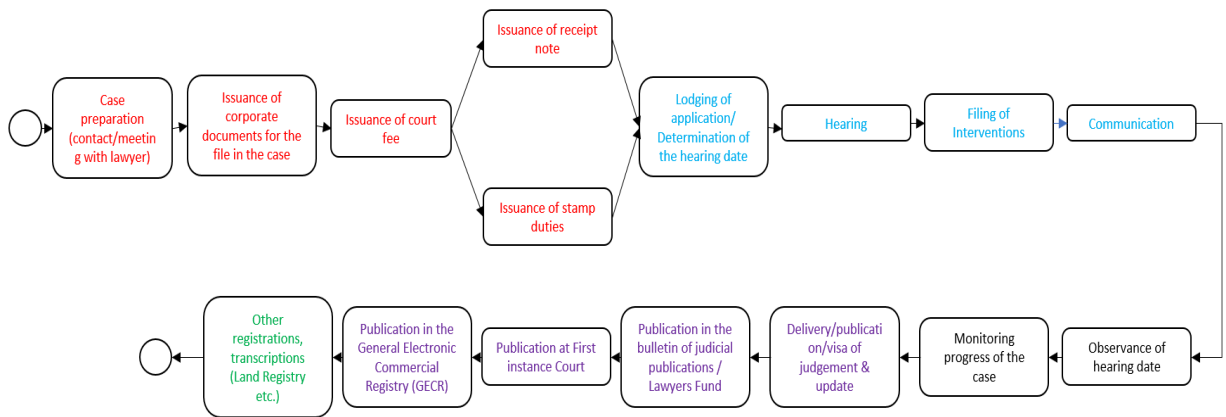

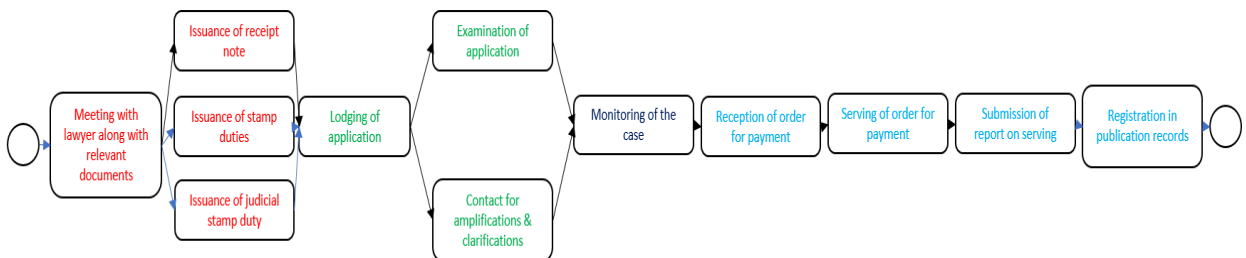*Figure 2.   Insolvency procedure step-by-step*

Figure 3.   Procedure of credit instruments – Order for payment procedure step-by step

Finally, it is important to note that the analysis of all four service scenarios was based on the following assumptions:

1. In every step of the process we estimate time-savings (minutes) for each participating entity (lawyer, judge and so forth).
2. These saved working minutes are then converted into full-time equivalent (FTE)
3. Note also that time-savings correspond only to administrative tasks and not to the actual examination of a case, which may vary substantially.
4. The estimate of time savings relates only to the productive time of the parties involved and does not include the 'dead' time, i.e. the time when the case file is in a 'standby' state.
5. The scope of the analysis is limited to lawyer and administration costs, excluding businesses' gains.

6. Printing and storage costs were not estimated due to unavailability of relevant data.

4 Analysis and discussion

4.1 Model inputs

Administration average costs: to calculate cost per minute for each employee category, the following parameters were considered:

1. Expenditure per minute of judge work-time was estimated at EUR 0,27.
2. Expenditure per minute of judicial officer work-time was estimated at EUR 0,23 (this estimation applies also to other involved public servants).

Average labour costs per minute of all Greek business units were estimated at EUR 0,1 (based on per capita income as set in 2013). This cost also applies for the judicial curator. Average lawyer fees per minute were also estimated at EUR 1,3. Finally, the overall annual demand of the modelled services was 300 for the insolvency cases, 50.000 for the order for payment cases, 8.000 for the tax-related disputes and 4.000 for the annulment proceedings.

4.2 Model outputs

The outputs for each processed judicial service are (a) time savings for each digitalization scenario, decomposed into savings per step, for administration, lawyers and businesses, (b) financial gains for each process, decomposed into gains per step, for administration, lawyers or businesses and finally (c) on a macro-level analysis, overall financial gains of the digital transformation per service which are estimated by multiplying annual demand and total gains of each judicial process.

The following tables show the foregone gains per service type and per stakeholder that follow from adopting e-justice.

	Benefits per stake-holder	Business	Lawyer	Judicial officer	Other involved public servants	Judge	Judicial curator	Advocatus
Phase A: Preparatory actions	Time (min)	-	176	0	18,5	0	0	0
	Financial (EUR)	-	228,8	0	4,255	0	0	0
Phase B: Deposit and Procedural actions before examination of substance	Time (min)	-	106	14	0	3	110	0
	Financial (EUR)	-	137,8	3,22	0	0,81	11	0
Phase C: Examination of the case and hearing	Time (min)	-	130	13	0	0	0	0
	Financial (EUR)	-	169	2,99	0	0	0	0
Phase D: Delivery of the judgment and	Time (min)	-	100	28	65	55	0	160
	Financial (EUR)	-	130	6,44	14,95	14,85	0	16

consequent actions							
Total	Time (min)	-	512	55	83,5	58	110	160
	Financial (EUR)	-	665,6	12,65	19,205	15,66	11	16

Table 1. Insolvency and a breakdown of the digitization benefits

	Benefits per stakeholder	Business	Lawyer	Judicial officer	Other involved public servants	Judge	Judicial curator
Phase A: Preparatory actions	Time (min)	-	17	0	4,5	0	0
	Financial (EUR)	-	22,1	0	1,035	0	0
Phase B: Deposit and Procedural actions be-fore examination of substance	Time (min)	-	35	8	0	0	0
	Financial (EUR)	-	45,5	1,84	0	0	0
Phase C: Examination of the case and hearing	Time (min)	-	10	0	0	30	0
	Financial (EUR)	-	13	0	0	8,1	0
Phase D: Delivery of the judgment and consequent actions	Time (min)	-	96	17	0	25	114
	Financial (EUR)	-	124,8	3,91	0	6,75	11,4
Total	Time (min)	-	158	25	4,5	55	114
	Financial (EUR)	-	205,4	5,75	1,035	14,85	11,4

Table 2. Order for payment and a breakdown of the digitization benefits

	Benefits per stakeholder	Business	Lawyer	Judicial officer	Other involved public servants	Judge	Judicial curator
Phase A: Preparatory actions	Time (min)	-	37	0	5,5	0	0
	Financial (EUR)	-	48,1	0	1,265	0	0
Phase B: Deposit and Procedural actions be-fore	Time (min)	-	120	39	13	39	230
	Financial (EUR)	-	156	8,97	2,99	10,53	23

examination of substance						
Phase C: Examination of the case and hearing	Time (min)	-	140	23	115	249	0
	Financial (EUR)	-	182	5,29	26,45	67,23	0
Phase D: Delivery of the judgment and consequent actions	Time (min)	-	100	21	0	82	50
	Financial (EUR)	-	130	4,83	0	22,14	5
Total	Time (min)	-	397	83	133,5	370	280
	Financial (EUR)	-	516,1	19,09	30,705	99,9	28

Table 3.   Tax-related disputes and a breakdown of the digitization benefits

	Benefits per stakeholder	Business	Lawyer	Judicial officer	Other involved public servants	Judge	Judicial curator
Phase A: Preparatory actions	Time (min)	-	17	0	18,5	0	10
	Financial (EUR)	-	22,1	0	4,255	0	1
Phase B: Deposit and Procedural actions be-fore examination of substance	Time (min)	-	25	37	0	52	100
	Financial (EUR)	-	32,5	8,51	0	14,04	10
Phase C: Examination of the case and hearing	Time (min)	-	75	9	180	88	0
	Financial (EUR)	-	97,5	2,07	41,4	23,76	0
Phase D: Delivery of the judgment and consequent actions	Time (min)	-	90	16	0	0	110
	Financial (EUR)	-	117	3,68	0	0	11
Total	Time (min)	-	207	62	198,5	140	220
	Financial (EUR)	-	269,1	14,26	45,655	37,8	22

Table 4.   Annulment proceedings and a breakdown of the digitization benefits

As shown by the results, the total average time savings for the insolvency scenario is estimated at 978.5 minutes, while total financial gains for just one case are estimated at EUR 740. Annual demand of the modelled service as observed throughout the period 2013 (latest available data) was 300 cases

and therefore overall financial gains from the digitization of this procedure could be up to EUR 222,000. In addition, there were 50,000 orders for payment resulting to EUR 11,921,750 overall financial gains. Moreover, tax-related disputes reached 8,000 in 2013, thus overall financial gains from the digitization of this procedure could be up to EUR 5,550,360. Finally, the annual number of annulment proceedings grows up to 4,000 cases, leading to a EUR 1,555,260 financial gain. The overall benefit derived from the use of ICT in the field of justice on an annual basis could be:

- 19.25 million EUR from a decrease in administrative time for only these four judicial processes;

- 65,700 man-days of productive time;

- Annual estimated benefit of 800,000 man-days and a corresponding economic benefit of € 235 million (if the above average benefits are also applicable to more than 760,000 cases in 2013 in all the courts of the country).

5   Discussion

Digital services can become a key enabler for growth in any economy. They increase innovation performance, create added value and new services for enterprises, contribute to fiscal savings, increase government revenues and create the right conditions for developing new business and jobs. Experience in digitally mature European countries shows that electronic workflows in courts, introduce numerous advantages to the judicial system, such as acceleration of clearance rate and ease of access to the judicial system, hence strengthening the economy with new high-skilled jobs and boosting entrepreneurship (Lichand and Soares, 2014). However, governments are under pressure to improve public sector performance and at the same time hold expenditures below budget. Citizens are demanding that governments be made more accountable for what they achieve with taxpayers' money (Curristine, Lonti and Joumard, 2007). Therefore, this research primarily aimed to provide an informed and a step-by-step method for both academics and practitioners on how to design and successfully plan e-Gov projects that entail technological, administrative, and organizational interplay.

Undeniably, there are several limitations in this research. First, we concentrated on trial length and its associated costs because they can be quantitatively measured and straightforwardly allow for transnational comparisons. A cost-effectiveness analysis obviously cannot entirely assess the impact of ICT applications in a judicial system. The performance of judicial systems, apart from time and fiscal efficiencies, comprises various dimensions, including independence, accountability and fairness of adjudication (Palumbo, Giupponi, Nunziata and Mora-Sanguinetti, 2013). While concepts such as cost-effectiveness and return on investment (ROI) can be easily used to define the success of a project in the private sector, within the public sector the created 'public value' has the biggest weighting (Halachmi and Bovaird, 1997). Second, the application of this model considers only the activity-related costs, leaving the calculation of the infrastructure costs to be performed externally. A third important limitation is the exploratory nature of the study. A large-scale qualitative longitudinal study seems a logical next step that will enable a greater depth and understanding of the whole spectrum and the true impact of e-justice implementations across the entire value chain and for all key stakeholders. Finally, no printing/storage costs were included in the calculations and therefore the savings reported are conservative, and the gains will be higher.

Our research contribution is an in-depth analysis and work break-down of judicial procedures while at the same time providing a decision support model based on expected financial gains. This study can assist in making justified decisions before a large investment has been made. Public organizations have increasingly limited resources due to the current economic crisis, so new investments should be made carefully. The overall aim was to provide a step-by-step quantification method for forecasting the overall financial gains that will result from public sector ICT projects and the reduction of administrative burdens. This study, which has been developed on the basis of the eGOVSIM guidelines, examined four procedures which heavily relate to entrepreneurship, namely insolvency, orders for pay-

ment, tax-related disputes and annulment proceedings. For instance, it is evident from our analysis that phases A and B and more precisely the electronic handling of court cases can lead to a rapid resolution of court cases, cost affordability for enterprises, removal of institutional and administrative barriers, improvement of service to citizens and enterprises and finally, a steady increase of public revenue. To support this argument, since 2013, the Italian legislation has introduced as mandatory for lawyers and assessors (including notaries) to e-file all acts and documents in all civil cases in tribunals introduced after that date, and since 2015 for all civil cases in Courts of Appeals. According to the Italian Ministry of Justice, more than 1 million external users are interacting with the 'Processo Civile Telematico' (250.000 lawyers and 4500 judges). The institution of the 'Electronic Trial' has provided several benefits to the world of the civil justice and in particular reducing the length of the trial at least of 6 months and speeding up of the cases at least of the 20 per cent (Nicolosi, 2009).

Another contribution of this research is that the results of this process clearly showed that the possible gains for administrations exceed the needed budgetary investments in e-justice systems and applications; the introduction of e-justice can save up to 800,000 person-days, while the annual combined financial gains can amount up to 235m € – an amount well above the investment for an integrated trial court management solution. Yet to realize these benefits at least four crucial interventions have to occur. First, the implementation of an integrated management system for court case handling. The electronic handling of court cases and workflows will drastically improve the efficiency of the judicial system and especially the clearance rate of the courts. Complementary to the case management system, is the development of interoperable systems that will allow for seamless interaction with legacy systems, such as those of bar associations and other public agencies. Third, it is imperative to set up a performance monitoring system and through the use of real-time data and analytics it will support strategic decision making, will allow for the identification of factors that affect the performance of the judicial system and lastly it will transform data into plans that will trigger appropriate organizational actions. Finally, institutional interventions to facilitate adoption of e-justice services are also very important. Removal of institutional barriers that hinder the support of the judicial process by electronic means (e.g. establishment of digital signatures), enactment of the mandatory use of e-justice by all stakeholders and incentives for the use of the new e-services by citizens, businesses and lawyers are the lessons learnt from the Italian case. At the post-implementation phase of e-justice, external pressures such as those from government, industry and citizens can contribute to the successful adoption of innovative digital services (Hu, Sharif, and Baark, 2014; Vatanasakdakul, Aoun and Chen, 2014).

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