

The Effects of Economic Crisis on the Digitalization of the Greek Social Security

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Abstract: Economic crises repeatedly appear in market-based economies and have serious consequences on them. They are causing serious decreases of the sales revenue and therefore the financial resources of organizations, as well as of their operations and investments. However, they can have some positive effects as well, leading to processes' rationalizations in important functions of them, improvements of their efficiency and better exploitation of their resources. In this paper we investigate the effects of the strong economic crisis that hit Greece between 2010-2018 on the digitization of one of the most important and costly domains of government activity: the social security. It has been concluded that during the economic crisis period there has been a large decrease of the ICT-related investment and operating expenses; however due to some improvement and rationalization of ICT-related processes and practices, as well as a better utilization of knowledgeable ICT personnel (mainly of the central 'Electronic Government Center for Social Security'), a significant increase in the digitalization of the Greek Social Security has been achieved during this difficult period.

Keywords: digitalization, social security, economic crisis, e-government, digital government

1 Introduction

Economic crises repeatedly appear in market-based economies and have serious consequences on them [1-4]. Recently we had the severe 2007 Global Financial Crisis, which had quite negative impact on the economies and the societies of most countries; furthermore, some years ago we had another economic crisis that was initiated by the COVID-19 pandemic [5]. They are causing serious decreases of the financial resources of organizations, as well as of their operations and investments. However, they can have some positive effects as well, leading to processes' rationalizations in important functions of them, improvements of their efficiency and better exploitation of their resources.

However, though we tend to have less and shorter economically 'normal' periods, and more and longer economic crisis periods, with quite serious consequences for the economy and the society, limited empirical research has been conducted on the effects

of the economic crises on various aspects of the functioning of organizations; a brief review of this research is provided in section 2.2. Furthermore, this limited empirical research has focused mainly on the effects of economic crises on the financial aspects of organizations. However, only a very small part of it is dealing with the effects of economic crises on the digitalization of organizations, despite the high importance of the latter for modern organizations. Another gap of this limited empirical research on the effects of the economic crises on aspects of organizations is that it has dealt exclusively with the private sector, but not with the public sector.

This paper contributes to filling these important research gaps. It investigates empirically the effects of the strong economic crisis that hit Greece between 2010 and 2018 [6] on the digitalization of one of the most critical and costly domains of government activity: the social security. Social security is of critical importance for modern societies, due to their aging population (a significant and continuously increasing proportion of the population of most countries are elderly individuals who receive pensions and need extensive health care), the increase of chronic diseases as well as the growing inequalities, unemployment and social exclusion (that necessitate large transfers of financial resources to the weakest individuals); furthermore, social security constitutes one of the largest areas of public expenditure in OECD countries [7]. For the above reasons the use of ICT is of critical importance for social security, and for welfare in general, in order to manage efficiently the huge number of beneficiary citizens, the complex administrative processes and rules for the provision of many different kinds of benefits and pensions, as well as the enormous financial resources, and there is a rapid advancement toward ‘digital social security’ and ‘digital welfare’ [8-11].

The research objectives of this paper are:

- a) to investigate the effects of the strong economic crisis that hit Greece between 2010 and 2018 on the digitalization of its social security (meant as development of IS for the support and digital transformation of social security organizations);
- b) to develop an appropriate research model for this, which enables the identification of both the negative effects and also the possible positive ones, based on sound theoretical foundations.

Our paper consists of five Sections. The following section 2 presents the background of our study, and then in section 3 its method and data are described. In Section 4 the results are presented and discussed in section 4, while in the final section 5 the conclusions are summarized, and future research directions are proposed.

2 Background

2.1 The Greek Social Security Landscape

The Greek social security has been traditionally problematic [12-13]. There has been a high fragmentation into a large number of individual social security organizations (with each of them being responsible for a specific professional group of citizens, such as lawyers, engineers, journalists, etc.), and this caused many problems: they could not have ‘economies of scale’, and also as sufficient specialized personnel for some

important sophisticated tasks, such as actuarial analyses, funds' investments and digitization; especially for the latter they had small ICT units, with small numbers of ICT personnel, and lack of specialized ICT personnel for some specific important digital technologies. Also, these numerous social security organizations offered different amounts of benefits and pensions and had different rules for granting them (determined mainly by the political power of the corresponding professional groups and their trade unions). Furthermore, the Greek social security traditionally had high levels of deficits, since the benefits and pensions offered were higher than the incomes (coming mainly from the contributions of employees and employers, as well as the ones from self-employed citizens); these deficits were financed by government, resulting in significant increase of government debt.

For these reasons in the beginning of 2017 these numerous social security organizations were merged into the 'Single Social Security Entity' (EFKA) (<https://www.efka.gov.gr>). So, in the last two years of the time period covered by our study (2010-2018) the Greek social security had this additional burden (beyond the multiple burdens that the economic crisis had generated) of merging these numerous social security organizations, with respect to their processes, rules for granting various kinds of benefits and pensions, as well as their levels/amounts, registries of beneficiaries and also their information systems.

Another specificity of the Greek social security is that the responsibility for its digitization divided between:

a) The Social Security e-Government Organization (IDIKA) (<https://www.idika.gr>), which is a large historic government organization (with 220 employees, mainly specialized ICT personnel) responsible for the design, development, operation and maintenance of information systems for social security organizations and also for hospitals, with highly skilled ICT personnel and long knowledge and experience in this area.

b) The ICT units of the multiple social security organizations, and after their merging in the beginning of 2017 the ICT unit of the EFKA (which includes mainly the personnel of the ICT units of the social security organizations).

Therefore, in order to investigate the effects of the economic crisis that hit Greece between 2010 and 2018 on the digitalization of its social security it is necessary to collect relevant data both from the IDIKA and the ICT unit of EFKA.

2.2 Effects of Economic Crises on Organizations

Limited empirical research has been conducted concerning the effects of the economic crises on various aspects of the functioning of organizations, despite the huge economic and social importance of this topic, as well as their increasing frequency in the new century. Most of this empirical research has a financial perspective: it investigates the effects of the 2008 global economic crisis on financial aspects of private sector firms, such as their corporate investment and its finance, in various countries [14-19].

Only the study presented in [20] investigates empirically the effects of economic crisis on firms' digitization; it examines the ICT-related behavior of the five main 'system-relevant' Greek banks in the strong economic crisis that Greece experienced. It has concluded that initially the Greek banks reacted defensively to the crisis by reducing

their reducing ICT-related expenses, however later they proceeded to a substantial rationalization of their ICT-related processes and therefore improvement of their relevant ICT capabilities. So, we can distinguish both negative and positive effects of the strong Greek economic crisis on the main banks with respect to digitization.

So, the paper makes a contribution to the limited research stream on this highly important topic, the effects of economic crises on organizations; focusing on the effects on digitization, which are quite under-researched, despite the importance of the use of digital technologies for modern organizations. Furthermore, since this research stream has dealt exclusively with private sector firms, we are focusing on the public sector, examining the effects of economic crisis on the digitization of an important class of government organizations, which are responsible for one of the most critical and costly domains of government activity: the social security. For this purpose, we will be based on the 'Resource-based View' (RBV) of the firm as theoretical foundation, which is outlined in the following section 2.3.

2.3 Resource-based View of the Firm

One of the most widely recognized and used theories in management science is the 'Resource-Based View' (RBV) of the firm [21-23]. According to this theory the main determinants of a firm's performance are on one hand its 'resources' (meant as all kinds of firm's assets, such as equipment, buildings, personnel, etc.) and on the other hand its 'capabilities' (meant as its abilities to select, deploy, exploit and manage these resources in order to perform the main functions and tasks of the firm efficiently and effectively); so performance differences among firms operating in the same external environment are mainly created by differences among them with respect to available resources and capabilities. The RBV theory, though initially developed for private sector firms, has been subsequently used successfully for public sector organizations as well [24-26].

The RBV theory holds not only for the whole firm, but also for each of its functions and tasks separately. So, for the case of the digitization of a firm (meant as the integration of digital technologies in the performance of firm's functions and tasks) there has been extensive relevant research [27-35], which has revealed that its performance and value is determined:

- on one hand by its ICT-related resources, such as ICT hardware, ICT software, ICT personnel, ICT-related external services, etc.,
- and on the other hand, by its ICT-related capabilities, meant as firm's abilities to select, deploy, exploit and manage ICT-related resources in order to increase the efficiency and the effectiveness of the firm.

3 Method and Data

In order to develop our research model we have taken into account that, as mentioned in the Introduction, according to relevant economic research [1-4], economic crises have on one hand negative effects on organizations, leading to decrease of the available

financial resources for performing their functions and tasks (i.e. for financing their operational and investment activities); however, on the other hand economic crises have positive effects as well, putting pressure on the organizations to improve the processes they follow for performing their functions and tasks, and exploit better their resources, improving their relevant capabilities. Therefore, economic crises affect both the resources and the capabilities of organizations, so the RBV is an appropriate theoretical foundation for examining the effects of economic crises on organizations (both the overall effects, and also the effects on specific functions or tasks of them), which enables identifying both the negative effects and also the possible positive ones.

So, focusing on the effects of the economic crisis on the digitization of the Greek social security, we examine its effects on the three main elements of the RBV (resources, capabilities, performance):

- a) on the financial resources spent for ICT, on one hand for ICT-related investments, and on the other hand for ICT-related operating expenses;
- b) on the main ICT-related processes and therefore the relevant firm's ICT-related capabilities;
- c) and on the performance of the digitization, meant as development of information systems (IS) for the support and digital transformation, of the Greek social security organizations.

The above multi-dimensional research model is shown in Fig.1.

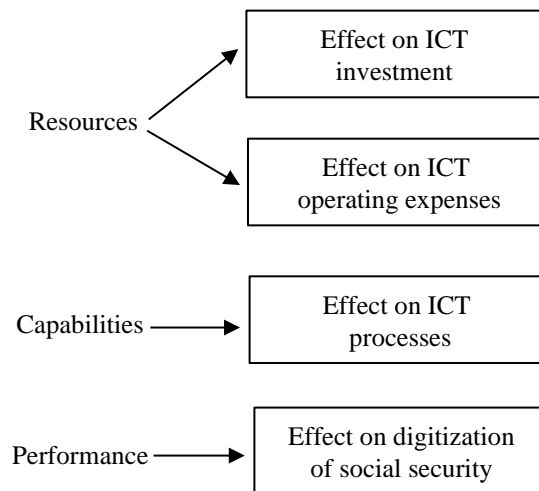


Fig.1. Research model

The above are examined for each of the two main actors of the digitization of the Greek social security described in 2.1: the IDIKA, and the ICT units of the individual social security organizations, which have now been consolidated and merged into the ICT unit of the EFKA.

For collecting data about the above components of our research model we used a combination of qualitative and quantitative techniques [36]. In particular, we conducted

one focus group in the IDIKA, in which participated the President of it, as well as three highly experienced Directors, who had a good knowledge of the development activities over the crisis period 2010-2018; and another focus group in the EFKA, in which participated the ICT Director of it, as well as four experienced former Directors of social security organizations (that were merged into EFKA). In each of these two focus groups the participants initially answered-filled collaboratively a questionnaire, which included one question for each of the sub-components of the four components of our abovementioned research model; for each question each focus group through some discussion arrived at one consensus response. Then followed an in-depth discussion about the answers than had been provided to these questions, in order to provide further clarifications and explanations about them.

4 Results

In Table 1 are shown the responses of the two focus groups (the IDIKA and the EFKA ones) to the four questions, which concern the general/overall effect of the economic crisis on the ICT-related investments, the ICT-related operating expenses, the improvement and rationalization of the ICT-related processes and the digitalization performance (development of IS for the support and digital transformation of social security organizations).

Table 1: General/overall effects of the economic crisis

	IDIKA	EFKA
on ICT-related investment	7	6 in 2010-2016 3 in 2017-2018
on ICT-related operating expenses	7	6
on the improvement/rationalization of ICT-related processes	3	4
on the digitization (development of IS for social security)	1	6 in 2010-2016 3 in 2017-2018

The first, second and fourth questions are assessed in a 7-points Lickert scale (1 = large increase, 2 = moderate increase, increase, 3 = small increase, 4 = no effect, 5 = small decrease, 6 = moderate decrease, 7 = large decrease); the third question is assessed in a 5-points Lickert scale (1 = not at all, 2 = to a small extent, 3 = to a moderate extent, 4 = to a large extent, 5 = to a very large extent).

We can see in Table 1 that in IDIKA there has been a large decrease of ICT-related investment in the crisis period 2010-2018, and also overall a moderate decrease in the individual social security organizations before their merging (in the 2010-2016 period). In the qualitative focus group discussions, it was mentioned that in most social security organizations there was a large decrease of ICT investment, and only in the ‘Social Security Foundation’ (IKA), which is the biggest social security organization, there was a stability in the ICT investments, in order to continue the development of its integrated IS. However, after their merging into the EFKA (in the 2017-2018 period) there was a

small increase of ICT-related investment of the EFKA, in order: a) to address the new needs posed by this merging, such as the merging of the digital registers of insured persons of the numerous merged social security organizations (which had problems of data quality, as well as different structure and coding); and b) the need for substantial digital support for overcoming some long-standing problems of the Greek social security, e.g. for the improvement of the collection of insurance contributions, as well as of the control of their high expenditures (both had been traditionally problematic, resulting in high deficits, which were one of the main causes of the crisis). So, overall, there has been a severe decrease of ICT investment during the period of the crisis (2010-2018); the main reason for this had been the reduction of the funding from the central government for social security, due to the strict austerity programs that had been put into effect for overcoming the crisis.

For the same reason, as we can see in Table 1, we had large decrease of the ICT-related operating expenses in the IDIKA, and also decrease of them in the social security organizations, and later in the EFKA. In the qualitative focus group discussions, it was mentioned that this was mainly due to the reduction of the ICT personnel, as there was not recruitment of new ICT personnel for replacing the older ones who retired, and also the contract temporary ICT personnel were terminated.

However, in Table 1 we can see that the crisis has led to a large extent to the improvement and rationalization of the ICT-related processes and corresponding capabilities of the individual social security organizations and later in the EKFA, which as mentioned in 2.1, and also in the qualitative focus group discussions, before the crisis had small and immature ICT units that lacked efficient processes and practices, so there was a significant margin for improvement. Furthermore, the crisis led to a moderate extent to the improvement and rationalization of the ICT-related processes and corresponding capabilities of the IDIKA; in the qualitative focus group discussions it was mentioned that this is quite important, since IDIKA is a large, experienced and mature ICT organization, which already had efficient ICT-related processes and practices in place before the crisis.

Furthermore, in the last line of Table 1 we can see that there was a very large increase of the digitization performance of the HDIKA, concerning the development of IS for the social security organizations, though in the individual social security organizations there was overall a moderate decrease until they merged into EFKA (during the 2010-2016 period), followed by a small increase after the merging (for the reasons discussed in 4.1). In the qualitative focus group discussion we had with IDIKA they emphasized that during the crisis period though there was a large decrease of the financial resources for ICT-related investments and operating costs, less ICT personnel as well as dramatic decrease of ICT-related training, there was an 'explosion' of new critical IS for social security, which transformed critical functions and tasks of it. The most important of them was the 'e-prescription' one, which enables a seamless flow of data between doctors, pharmacies, medical examination centers/laboratories, hospitals and social security organizations, and increases dramatically the efficiencies of all these actors, while it also provides large amounts of data to be used for the analysis, control and rationalization of the huge social security expenditures. Also, new IS were developed, which: a) on hand enabled citizens to apply digitally through the Internet for the new benefits

that were introduced for supporting citizens who had been severely hit by the crisis, and also for the pre-existing benefits as well as, and b) on the other hand enabled the automated processing of these applications (which is usually quite complex, requiring the application of multiple rules). These IS increased dramatically the efficiency and productivity of the social security organizations, enabling them to handle a much bigger workload (because of the increase of the benefits due to the crisis, as well as of the citizens eligible for them) with less personnel, and also to provide higher quality services to the citizens. Furthermore, IDIKA made a substantial contribution to the above-mentioned merging of the digital registers of insured persons of the numerous merged social security organizations, which was carried out by EFKA.

According to the participants in the IDIKA focus group the main reasons for this high performance of the IDIKA concerning the development of new IS for social security during the crisis period were the following:

a) Greece had signed binding agreements with the EU for receiving financial support from it, in order to overcome the crisis, which included strict obligations to rationalize its social security, and reduce its high deficits; this necessitated a substantial increase of its digitalization, and the development of some critical IS that were necessary for overcoming long-standing problems of the Greek social security. So, there was a big pressure from government to the IDIKA to proceed as soon as possible to the development of these critical IS with the available significantly reduced resources.

b) Though IDIKA was a large and experienced ICT organization, with mature and efficient ICT-related processes and capabilities, during the crisis it made further improvements of them, in order to meet the abovementioned digitization requirements with significantly reduced resources. For this purpose, they also proceeded to a better utilization of existing highly knowledgeable and experienced ICT personnel, who were underutilized previously (as they were assigned less development tasks, of lower complexity, that did not fully leverage their true abilities). Furthermore, they made better utilization of the existing equipment, with most of it being obsolete, since, as mentioned above, there has been a large decrease in the ICT hardware investments in ICT during the economic crisis.

5 Conclusions

As mentioned in the Introduction and in section 2.2 there has been quite limited empirical investigation of the effects of the most severe and disruptive event that often appears in firms' external environment, the economic crises, on their digitization; furthermore, this limited empirical investigation is dealing exclusively with private sector firms. This paper contributes to filling these important research gaps. It describes an empirical investigation of the effects of the strong economic crisis that hit Greece between 2010-2018 on the digitization of one of the most important for the society and costly domains of government activity: the social security. For this purpose, we have constructed a research framework, which is based on the RBV theory of the firm, as our theoretical foundation, examining ICT-related resources, capabilities and

performance; data have been collected through a combination of qualitative and quantitative techniques.

We have reached a quite interesting conclusion, which is to some extent counter-intuitive and different from our initial expectations: through during the economic crisis period there has been a large decrease of the ICT-related investment and operating expenses, due to some improvement and rationalization of ICT-related processes, as well as a better utilization of knowledgeable ICT personnel (mainly of the central ‘Electronic Government Center for Social Security’), a significant increase in the digitalization of the Greek Social Security has been achieved. Important IS have been developed for the support and digital transformation of the Greek social security organizations, with respect both to their internal functions and processes, and also their transaction with citizens and firms. The main reasons for this counter-intuitive and unexpected effects of the economic crisis are the high importance of this domain of government activity, and its long-standing problems and deficits, which due to the crisis had to be addressed immediately, through a substantial rationalization of the social security (for which there were binding agreements with the EU) that required a substantial increase of its digitalization.

Further empirical research is required for investigating the effects of economic crisis on the digitization of other types of government organizations, with different levels of importance (especially during crisis) as well as different initial levels of digitalization (before the crisis), and possibly in different national contexts, with different types and intensities of economic crises. For this research the research framework we have developed, based on the RBV theory of the firm, can be useful. Furthermore, this research framework can be further developed and enhanced, using additional theoretical foundations.

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