An Empirical Investigation of the Effects of Economic Crisis on the Digital Transformation of Public Welfare - Some Unexpected Findings

EURIPIDIS LOUKIS, Information and Communication Systems Engineering, University of the Aegean Department of Information and Communication Systems Engineering, Samos, Greece
CHRYSO KAVALLARI, Information and Communication Systems Engineering, University of the Aegean Department of Information and Communication Systems Engineering, Samos, Greece

Economic crises are occurring with increasing frequency and duration in modern economies. They negatively affect both private and public sector organizations, but sometimes they can have some positive effects as well. However, the effects of economic crises with respect to the digitalization and digital transformation activities and aspects of organizations have been empirically investigated to a very limited extent, and only for private sector organizations. This study contributes to filling this research gap by empirically investigating the effects of economic crises on the digital transformation activities of the public organizations that perform one of the most critical functions of the modern state: public welfare. For this purpose, we have constructed a research model, based on the "Resource-based View" of the firm, and a comprehensive conceptualization of government digital transformation, as theoretical foundations. Our study has been conducted in Greece, a country hit by a strong economic crisis between 2010 and 2018. It has been concluded that this economic crisis resulted in a serious decrease of the ICT-related investment and operating expenses of the examined public welfare organizations. However, at the same time the economic crisis has unexpectedly led to a significant increase of digital transformation developments in these critical organizations, and a significant advancement in significant aspects of their digital transformation.

CCS Concepts: • **Information systems;** • **Applied computing → E-government**;

Additional Key Words and Phrases:: Digital transformation, economic crisis, welfare, social security, health, resource-based view, resources and capabilities

ACM Reference Format:
Euripidis Loukis and Chryso Kavallari. 2025. An Empirical Investigation of the Effects of Economic Crisis on the Digital Transformation of Public Welfare - Some Unexpected Findings. *Digit. Gov. Res. Pract.* 6, 3, Article 37 (August 2025), 25 pages. https://doi.org/10.1145/3719296

Authors' Contact Information: Euripidis Loukis (Corresponding author), Information and Communication Systems Engineering, University of the Aegean Department of Information and Communication Systems Engineering, Samos, North Aegean, Greece; e-mail: eloukis@aegean.gr; Chryso Kavallari, Information and Communication Systems Engineering, University of the Aegean Department of Information and Communication Systems Engineering, Samos, North Aegean, Greece; e-mail: kavallari@icsd.aegean.gr.

ACM 2639-0175/2025/08-ART37
https://doi.org/10.1145/3719296

1 Introduction

Economic crises, defined as serious contractions of economic activity, are occurring with increasing frequency and duration in modern economies, with "economically normal periods" becoming shorter and economic crisis periods longer [1–8]. However, economic crises have traditionally been a major problem of many national economies, though with lower frequency and shorter duration. In [1] are reported numerous economic crises that occurred in the last century, which have been initiated by various kinds of events, such as banking crises, hostilities between countries or groups, epidemics (such as the COVID-19 pandemic), droughts, large increases in the prices of important goods (e.g., oil, gas, food), and so forth, that led to "recessions," meant as serious contractions of economic activity. In 2007, we had the severe Global Financial Crisis [7], while recently we had another painful economic crisis caused by the COVID-19 pandemic [8]. According to the OECD report "Society at a Glance 2024—OECD Social Indicators" [9], the recent rapid succession of global crises, such as those caused by the COVID-19 pandemic, the Russian war against Ukraine, and so forth, have given rise to an increase in unemployment, poverty, and other social problems, and in general spread a feeling of uncertainty and unpredictability, which have to be addressed by appropriate public welfare policies and services. Economic crises, as explained in more detail in Section 2.2, negatively affect both private and public sector organizations; however, sometimes they can have some positive effects as well, as they put pressure on organizations to rationalize their processes and improve their efficiency [1–8].

Most of the research that has been conducted about various activities and aspects of organizations concerns "economically normal periods," while there has been much less research, particularly empirical research, concerning economic crisis periods, despite their increasing frequency, duration, and negative consequences. A brief review of this modest empirical research is provided in Section 2.2, which concludes that most of it is dealing with the effects of economic crises on financial activities and aspects of private sector firms, while limited research has been conducted about the effects of economic crises on their digitalization and digital transformation activities and aspects, despite wide recognition of the critical importance of the latter for modern organizations. So, it is necessary to conduct extensive empirical research about the effects of economic crises on various activities and aspects of both private and public sector organizations as well, with a strong emphasis on the effects on their digitalization and digital transformation activities and aspects. This research will generate useful relevant evidence that will enable better and more effective management of various activities and aspects of private and public sector organizations during future tough economic crisis periods, which are expected to be more frequent and longer than in the past.

This article contributes toward filling the above-mentioned research gap. It empirically investigates the effects of economic crisis on the digital transformation activities of public organizations; we focus on public organizations that perform one of the most critical functions of the modern state—public welfare—which includes the provision of various social security as well as health services. Public welfare is one of the most important and at the same time most costly functions of the modern state [10]. During economic crisis periods, public welfare organizations face a huge challenge: on the one hand, they must provide more public welfare services (e.g., due to the increase of unemployment and poverty), but on the other hand, they have fewer financial resources for this; this puts great pressure on them to drastically improve their efficiency.

Our study has been conducted in a highly appropriate national context: Greece, which has been hit by a strong economic crisis between 2010 and 2018, led to a 25% decrease of its GDP and a 26% level of unemployment [11, 12]; furthermore, Greece has lower "digital development" in comparison with the other EU countries, which is reflected in its low position in the "**Digital Economy and Society Index**" (**DESI**; https://digital-strategy.ec.europa.eu/el/policies/desi), and this creates an unfavorable environment for the digital transformation of the Greek public sector in general.

So, the research objectives of this study are

(a) to develop an appropriate comprehensive research model for investigating the effects of economic crisis on the digital transformation activities of public organizations; and
(b) to use this research model to investigate the effects of the strong economic crisis that hit Greece between 2010 and 2018 on the digital transformation activities of its main public welfare organizations.

Our article 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 then discussed in Section 5, while in the final Section 6 the conclusions are summarized, and future research directions are proposed

2 Background

2.1 Public Welfare and Use of Information and Communications Technologies

Public welfare organizations have been traditionally characterized by (a) complex internal processes for examining the numerous applications submitted by quite large numbers of citizens for the provision of various welfare services (e.g., pensions and many different kinds of benefits), and making relevant decisions about their acceptance or not, based on complex eligibility criteria defined strictly by laws; (b) extensive contacts and interactions with potential beneficiary citizens; and (c) management of huge amounts of financial resources. These are all labor intensive, and at the same time require extensive processing of information, so they necessitate extensive use of ICT, and this has led to a heavy reliance of public welfare organizations on ICT, resulting in a rapid advancement toward "digital welfare" [10, 13–18].

According to the OECD [10], the use of ICT is highly important for public welfare organizations in order to achieve high levels of (a) efficiency and productivity (concerning mainly the complex internal "back-office" administrative processes for examining the numerous applications for many different kinds of benefits and pensions, and finally making decisions); (b) policy effectiveness (through advanced exploitation of the vast data resources of public welfare organizations, using business analytics techniques, in order to monitor the provision of public welfare services and the financial resources spent for them, and also to design appropriate public welfare policies, services, and relevant eligibility criteria); and (c) good governance (through transparency and accountability). ICT is increasingly used both for the "production" of public welfare services, and for their "delivery" through electronic channels (e.g., websites where potential beneficiaries can obtain information about existing benefits, pensions, and so forth, and possibly apply for them using relevant e-services increasingly provided in these websites, reducing the high labor demands for this) [10, 15].

The increasing use of ICT in public welfare organizations gradually significantly changes the nature of their work, as well as the roles and the content of the jobs of their numerous public servants who have direct contact and interaction with the citizens, called "street-level bureaucrats" [19–22]. Their direct in-person contact with the citizens is gradually reduced, and initially they mainly examine application forms submitted by them and enter this information through a computer screen into an **information system (IS)**; this information is stored and then processed, providing some outputs that guide (or at least influence) to some extent the decision that has to be made by the street-level bureaucrat concerning each application. These significantly reduce the degree of discretion that the street-level bureaucrats have for making decisions and transform the form of bureaucracies: from "street-level bureaucracies" they become "screen-level bureaucracies" [19, 21]. Gradually, the role of the IS in determining the decision for each application increases, and the applications are entered by the citizens through the Internet using relevant e-services increasingly provided in the websites of public welfare organizations, and these further reduce the role of the "street-level" bureaucracy (they are dealing only with nonroutine cases, or with cases that have been initially handled by the computer, but the applicant citizen submits a complaint or notice of objection to the decision); this further transforms these bureaucracies to "system-level bureaucracies."

Furthermore, ICT enables important breakthrough innovations in public welfare, such as the "proactive" public welfare services' delivery [14, 17]; it is defined as the automated activation of a public welfare service (i.e., automatic provision of it to all citizens who are entitled to it), such as a benefit, without the need for an application of the beneficiaries, or an action of a public servant, based on data possessed by one or more government agencies, which indicate that relevant eligibility criteria for the delivery of the service are fulfilled.

In particular, healthcare service provider organizations (e.g., hospitals) make extensive use of ICT, aiming on the one hand, at cost reduction and efficiency, and on the other hand, at quality improvement of the healthcare services they provide [23–25]; for these purposes they use various different kinds of ISs, such as electronic health records IS, clinical IS, laboratories IS, administrative IS, and telehealth (or telemedicine) IS. Also, since a government is not only a "producer" of welfare services, but also a major "purchaser" of welfare services from private sector actors, such as private doctors, medical examination (diagnostic) centers, pharmacies, clinics, and so forth, which are provided to the citizens, e-prescription ISs are increasingly developed and used in many countries in order to support the electronic transmission of medical information among public welfare organizations and all these private actors [26, 27].

2.2 Effects of Economic Crises on Organizations

According to relevant economic literature [1–7], economic crises result in significant contractions of economic activity, referred to as "recessions," and have quite negative effects on organizations, both private and public sector: they decrease their financial resources and this leads to a decrease of their investment activities and expenses, as well as their operational activities and expenses; the latter include personnel salaries' reduction or even dismissals (leading to an increase of unemployment, poverty, and social exclusion), as well as a reduction in the procurement of equipment and materials (leading to propagation of the crisis to the suppliers of them). However, the above relevant economic literature mentions that crises can also have some positive effects on organizations, as they put pressure on them to make significant improvements in and rationalizations of their processes and work practices, which reduce costs and increase efficiencies, as well as to more effectively and better utilize their resources (personnel, equipment, etc.).

As mentioned in the Introduction, some empirical research has been conducted about the effects of economic crises on various activities and aspects of organizations. However, most of this empirical research is dealing with the private sector and has a financial perspective: it investigates the effects of the 2008 global economic crisis on the financial activities and aspects of private sector firms, such as their investment and its finance, in various countries [28–33]. In particular, [28] investigates the impact of the above crisis on the corporate investment of USA firms, as well as its dependence on a firm's cash reserve and short-term debt. A study presented in [29] examines how the shocks to the supply of credit during this crisis affected the financing and investment policies of UK private companies. In [30], the effects of the crisis on the access to capital and the investment expenditures are examined in USA firms, as well as the impact of the former on the latter: the impact of the reduction of banking lending capabilities on firms' investments. Similarly, [32] examines the impact of the same crisis on USA firms' financing and investment activities, and the role of corporate governance in alleviating the negative consequences of the crisis. An interesting study of the corporate investment in China during this crisis, as well as its dependence on the demand decrease, the financial constraints, and the uncertainty concerning a firm's stock returns, is presented in [31, 33], and focuses on the Dutch **small and medium-sized enterprises (SMEs)** and studies their investment behavior during the crisis, as well as its dependence on internal and external finance.

However, limited empirical research has been conducted about the effects of economic crises on the digitalization and digital transformation activities and aspects of organizations. There is only one study [34] that investigates empirically the effects of the economic crisis that hit Greece between 2010 and 2018 on its five major "system-relevant" banks.

It must be mentioned that only for the COVID-19 crisis has there been some empirical research concerning its effects on the digitalization and digital transformation of organizations (e.g., [35–39]). However, the COVID-19

crisis was not a typical recessionary crisis: on the one hand, it caused a recession, as it led to the reduction of activities of numerous organizations, and also the shutdown of many others (which reduced the available financial resources for digitalization and digital transformation, so it had a negative impact on these activities); but on the other hand, it necessitated an increased use of digital technologies for the operations and transactions of organizations during the COVID-19 period, in order to reduce face-to-face contacts and therefore the spread of the virus (which has strongly increased pressure for digitalization and digital transformation and had a positive impact on these activities). For this reason, the findings of this research concerning the impact of the COVID-19 pandemic on the digitalization and digital transformation of organizations do not hold for the "typical" recessionary economic crises, which are appearing with increasing frequency, duration, and consequences.

Therefore, much more empirical research must be conducted on the effects of the "typical" recessionary economic crises on various activities and aspects of both private and public sector organizations as well; especially on the latter as they have been under-researched from this perspective, placing a strong emphasis on the effects on their digitalization and digital transformation activities and aspects. This study contributes toward filling the above important research gap, by empirically investigating the effects of an economic crisis on the digital transformation activities of the public organizations that perform one of the most critical functions of the modern state: public welfare.

2.3 Government Digital Transformation

Digital transformation is the advanced use of ICT in an organization for "triggering significant changes to its properties" [40]; so, it goes beyond the simple digitalization of an organization, moving toward the ICT-based substantial change—transformation of fundamental elements and aspects of it. Initially, the digital transformation concept was adopted in the private sector, with many firms launching digital transformation projects; gradually, the digital transformation of private sector firms became a major trend in the world economy, crucial for the competitiveness and even the survival of firms, so it has attracted significant research attention; comprehensive reviews of this research are provided in [40–43]. This private sector trend has encouraged and motivated the public sector to start moving in this direction; however, adapting this digital transformation concept to its own objectives, challenges, and specificities; so, some interesting research has been conducted about these first government digital transformation initiatives [44–50], which, however, is still much less than the research that has been conducted on private sector digital transformation.

In [44], a conceptualization of government digital transformation has been developed, based on a series of interviews with experts; it includes the main reasons for government digital transformation, the main dimensions of it, the steps/processes it follows, and its results (outputs, outcomes, and impact). Quite interesting and useful for future research in this area are the main dimensions of government digital transformation it has identified, which include ICT-based transformations of (a) internal processes of government organizations, (b) public services provided by them to the citizens, as well as (c) products, (d) relationships with citizens and with other government organizations, (e) technology, and (f) business models.

Some interesting studies have been conducted concerning the challenges and difficulties of the implementation of government digital transformation. In [45], the implementation of government digital transformation in the administrative divisions of the Zhejiang Province in China is empirically investigated. How digital transformation is implemented in a hierarchical bureaucracy context and how the required flexibility can be created to enable its progression is examined. A study that aims to provide a better understanding of the factors that cause complexity in government digital transformation projects through an in-depth case study is described in [46]. It analyzes the main complexity elements concerning the dimensions of organization, technology, and innovation, as well as the interplay between them. The problem of a lack of the required knowledge for implementing digital transformation in local government is analyzed in [47]. Based on interviews with the chief information officers of 11 Canadian local government organizations, the knowledge that local government managers require in order to implement and lead digital transformation is determined, and then a theoretical model concerning the

acquisition of this knowledge through public-private partnerships is developed. The driving and the impeding factors of government digital transformation are investigated in [48] using a quantitative approach. Data are collected through a survey from 491 Italian government organizations (mainly large municipalities), which are used in order to estimate a structural equation model that reveals the main driving and impending factors of government digital transformation. A case study of the perceptions of the employees of a department within the Federal Government of Lower Austria concerning the implementation, the benefits, and the barriers of different phases of digital transformation is presented in [49]; the results indicate that the main emphasis of the digital transformation initiatives should not focus on the continuous development and introduction of new digital tools, but on fostering cultural change among the personnel; and the development of new work practices of them [50] focuses on the digital transformation of tax administration and compliance; it conducts a systematic literature review on e-invoicing and prefilled returns, which reveals the important benefits they generate both for firms, and especially for developing ones, and also for tax administration authorities.

Also, there are two studies concerning digital transformation in the COVID-19 crisis period [38, 39]. In [38], the influence on the success of the digital transformation initiatives undertaken by three countries (Austria, Denmark, and Republic of Korea) during the COVID-19 crisis period of the approaches they adopted to governance and multistakeholder cooperation is investigated. The effects of the COVID-19 pandemic on several important dimensions of government digital transformation are investigated in [39], for the cases of 10 Austrian federal government organizations. However, such investigations have not been conducted for recessionary economic crises, which appear much more frequently in the modern economy. This article contributes to filling this research gap.

2.4 Resource-based View of the Firm

The **"Resource-based view" (RBV)** of the firm [51–55] is a foundational and widely recognized theory in management science, which has been extensively used in both research and practice. This theory posits that a firm's performance is determined by its "resources"—including various kinds of assets, such as equipment, buildings, and personnel—and its "capabilities," which are the firm's abilities for managing and utilizing these resources in order to carry out its core activities efficiently and effectively. While originally developed for the private sector, the RBV theory has also been subsequently used for public sector organizations as well [56–58].

The RBV theory applies not only to the organization as a whole, but also to each of its individual activities, including the ICT-related activities. Extensive research that has been conducted on the ICT-related activities of organizations [59–68] has shown that their output (development of IS for supporting/transforming their activities) depends on

(a) their ICT-related resources: they encompass ICT hardware, ICT software, ICT personnel, as well as external ICT services; and also
(b) their ICT-related capabilities: according to relevant literature [59–68], they include the abilities to develop ICT plans; manage ICT projects; procure ICT equipment and services; manage ICT contracts; develop, modify, and integrate software; conduct ICT/IS operations; support ICT/IS users; and foster both internal and external ICT partnerships.

Therefore, in order to conduct a comprehensive analysis of the effects of an economic crisis on the digital transformation of an organization it is necessary to examine the effects (i) on the availability of ICT-related resources (acquired through both ICT-related investments in hardware, software, and so forth, and also through ICT-related operating expenses); (b) on its ICT-related capabilities; and finally (c) on its ICT-related output (developments of IS for the digital transformation of the organization). These form the basis of our research model described in the following section.

3 Method and Data

3.1 Research Model

In order to develop a comprehensive research model for investigating the effects of an economic crisis on the digital transformation activities of public organizations (i.e., development of ISs that change and transform fundamental elements and aspects of them), we have considered the conclusions of relevant economic research [1–7], which have been discussed in Section 2.1, and which indicate that economic crises

(i) have negative effects on organizations by reducing their financial resources, thereby leading to a decrease in both investment and operational activities and expenses, but
(ii) can also have some positive effects as well, by compelling organizations to make significant improvements and rationalizations of their processes, leading to cost reductions and higher efficiencies, and make better utilization and exploitation of resources, thereby increasing relevant capabilities.

So, given that economic crises influence both organizational resources (according to the above point (i)) and capabilities (according to the above point (ii)) of organizations, the RBV outlined in Section 2.4 provides an appropriate theoretical foundation for a comprehensive investigation of the effects of economic crises on organizations. This approach allows us to identify both the negative impacts (concerning the reduction of resources) and the potential positive ones (concerning the improvement of capabilities as well as resources utilization).

Consequently, our research model, illustrated in Figure 1, comprises four components that correspond to the three core elements of the RBV: they involve analysis of the effects of economic crises on ICT-related resources, with a distinction between ICT-related investment and ICT-related operational expenses, as well as on ICT-related capabilities, and finally on digital transformation. For each component, we have defined a general metric as well as a set of more specific metrics to guide our investigation.

(a) The first component includes five metrics, which concern the effects of the economic crisis on ICT-related investment in general, as well as on each of the main kinds of ICT-related investment: in ICT hardware, in ICT software, and in training of ICT personnel as well as of ICT users.
(b) The second component includes six metrics, which concern the effects of the economic crisis on ICT-related operating expenses in general, as well as on the main kinds of ICT-related operating expenses: for ICT personnel payroll, for new ICT personnel, for ICT consulting services, for ICT outsourcing, and for cloud services.
(c) The third component includes nine metrics, which concern the effects of the economic crisis on the improvement and rationalization of the ICT-related processes and practices in general, and therefore on the improvement of ICT-related capabilities in general, as well as on the main particular ICT-related processes/practices, and therefore on the improvement of the corresponding more specific ICT-related capabilities (as they are defined in relevant literature [59–68]): for the development of ICT plans; for the implementation and management of ICT projects; for the procurement of ICT hardware, software, and services; for the internal development, modification, and integration of software; for the operation and support of IS; for the support of the ICT users; for the cooperation of the ICT unit with the business units that use ICT (ICT internal partnership) and for the cooperation of the ICT unit with the external suppliers of ICT hardware, software, and services (ICT external partnership).
(d) The fourth component includes eight metrics, which concern the effects of the economic crisis on the output of the digital transformation activities in general (i.e., developments of ISs that change substantially and transform fundamental elements and aspects of the organization), as well as with respect to the main dimensions of government digital transformation, which are defined in the conceptualization of government digital transformation proposed in [44]: digital transformation of processes, services, products,

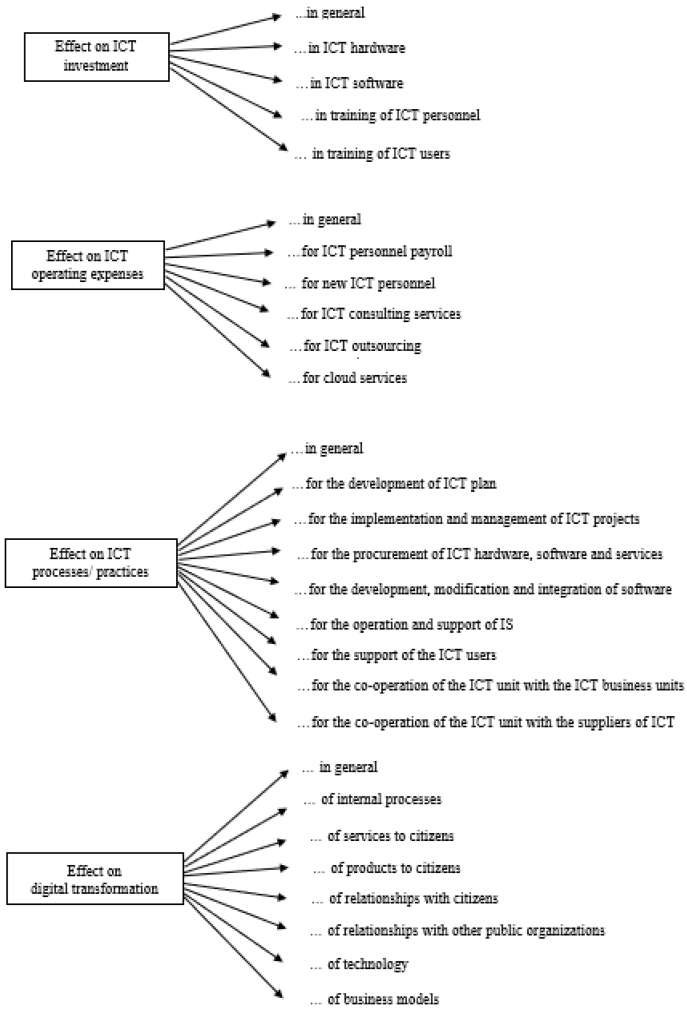

Fig. 1. Research model.

relationships with citizens, relationships with other government organizations, technology, and business models.

Summarizing, our research model for investigating the effects of economic crisis on the digital transformation activities of public organizations combines the RBV applied to ICT-related activities, elaborating the ICT-related resources component of it by distinguishing between ICT-related investments and ICT-related operating expenses, with a comprehensive conceptualization of government digital transformation developed in digital government research [44].

3.2 The Landscape of the Greek Public Welfare

We have focused on the two main areas of public welfare in Greece: social security and healthcare provision. So, initially we examined the landscape of each of them, to better understand the context of our study, and to determine the specific public organizations from which we will collect data based on the above research model that has been described in the previous Section 3.1.

3.2.1 Social Security. The landscape of the Greek social security has been traditionally complex and problematic [69, 70]. There have been numerous social security organizations, offering varying amounts of benefits and pensions, with small sizes that did not allow them to achieve "economies" of scale; they were inefficient and had high deficits (as their expenses exceeded their incomes), which were financed by government, resulting in a significant increase of public debt. With respect to ICT, they had small ICT units, with small numbers of ICT personnel.

So, it became imperative and a central policy during the crisis to drastically reduce social security expenses by unifying and rationalizing the criteria for the provision of various benefits and pensions, adjusting their financial scale, and reducing administrative costs. For these purposes in the beginning of 2017 these numerous social security organizations were merged into the "Single Social Security Entity" (EFKA; https://www.efka.gov.gr).

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

—the "Social Security e-Government Organization (IDIKA; https://www.idika.gr), which is a large historic government organization (with 220 employees; mainly highly specialized ICT personnel) responsible for the design, development, operation, and maintenance of ISs for the public social security organizations, and also hospitals as well, with highly skilled ICT personnel and long experience in this area. The IDIKA has historically played a significant role in the digitalization of social security organizations, since, as mentioned above, most of them had quite limited ICT personnel and relevant knowledge; only the largest of the social security organizations, the Social Security Agency (IKA), developed their own IS through outsourcing to a leading Greek ICT company; and
—the ICT units of multiple social security organizations, and after their merging in the beginning of 2017, the ICT unit of the EFKA (which included mainly the personnel of the ICT units of the merged social security organizations).

3.2.2 Healthcare Provision. The landscape of the Greek public healthcare provision has also been traditionally complex and problematic [71–74]. Public healthcare in Greece is characterized by high fragmentation, with health services provided by a large number of public hospitals and primary health centers (131 and 220, respectively, in the beginning of the economic crisis) all over the country; they are supervised by the Ministry of Health, which holds the central responsibility for the provision of healthcare services in Greece. Furthermore, health services are provided to the citizens by many private sector actors as well, such as doctors, diagnostic centers, pharmacies, clinics, and so forth, which are contracted by the Ministry of Health. The public healthcare services provided by public hospitals and primary health centers are characterized by high and continuously increasing costs, and at the same time low quality, and are funded by the social security organizations; however, public hospitals have high levels of deficits, which are financed by the government, leading to a significant increase of public debt.

So, since the onset of the economic crisis, it became imperative and a central policy to drastically reduce the expenses for public healthcare services, and at the same time to improve their quality. For this purpose, it was decided to

(a) merge the healthcare service provision departments of all social security organizations into the "National Organization for Healthcare Services Provision" (EOPYY; https:// https://www.eopyy.gov.gr/);
(b) implement strict central monitoring by the Ministry of Health of the key financial and operational aspects (revenue, expenses, procurements, numbers of patients, health services provided, etc.) of public hospitals and primary health centers; and
(c) consolidate the procurement of medicines and medical supplies of the hospitals, through the establishment of the "Health Procurement Committee" (EPY), to conduct fewer procurement tenders, but for larger quantities each, to achieve lower unit prices.

The same specificity mentioned above concerning the digitalization responsibilities of the Greek social security holds for the Greek public healthcare provision as well: they are divided among the following three actors:

- The "Social Security e-Government Organization" (IDIKA).
- The ICT unit of the Ministry of Health.
- The ICT units of the public hospitals.

3.3 Data Collection and Processing

Based on the above examination of the landscapes of the Greek social security and healthcare provision, we decided to collect data from the three main actors of their digitalization: the IDIKA, the ICT unit of the EFKA, and the ICT unit of the Ministry of Health. For collecting data from them about the components and individual metrics of our research model described in Section 3.1, we adopted a "mixed methods approach" [75]: a combination of qualitative and quantitative techniques. The qualitative techniques offer the advantage of enabling a more in-depth examination of the phenomenon we investigate, and lead to the generation of deeper knowledge about it, not limited to a predefined number of variables (as in the quantitative techniques), enabling a better and richer understanding of "why" and "how" things happened; however, the quantitative techniques offer the advantage of enabling a summarization of a large quantity of evidence into a few numbers (e.g., averages), which is useful for drawing conclusions [75]. So, a combination of qualitative and quantitative techniques allows us to benefit from the advantages and capabilities of both.

In particular, we conducted one focus group in the IDIKA, in which the president participated, as well as three highly experienced directors, who had good knowledge of the IS development activities over the crisis period 2010–2018; a second focus group was conducted in the EFKA, in which the ICT director participated, as well as four experienced former ICT directors of social security organizations (that were merged into EFKA); finally a third focus group was conducted in the Ministry of Health, in which the ICT director participated, and three experienced staff members of the ICT unit.

In each of the three focus groups, participants first collaborated to complete a questionnaire, which included one question for each of the general and the specific metrics of the four components of our research model (through discussion, each focus group reached a consensus response for each question), which can be found in the Appendix. We can see that it includes a first section with the four general questions of the above four components, and then one section for each component with its more specific questions. After completing each of these five sections of the questionnaire, there was an in-depth qualitative discussion, in which the participants justified their responses to its questions and provided further explanations and clarifications on them. The responses of the three focus groups were used to construct the tables presented in Section 4. The qualitative discussions were recorded, transcribed, and coded, using an open coding approach [75], to extract the main points, which are also outlined in the following section. The process we followed in each focus group is shown in Figure 2.

The participants in these three focus groups are the "key informants" for our purposes, as they have a complete and deep knowledge about the effects of the crisis on the above four components of our research model (i.e., effects on ICT-related investments, ICT-related operating expenses, ICT-related processes/capabilities, and on the digital transformation outcome performance).

4 Results

4.1 General/Overall Effects

In Table 1, we can see the responses of the three focus groups (IDIKA, EFKA, and Ministry of Health) to the four general 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 digital transformation activities and developments.

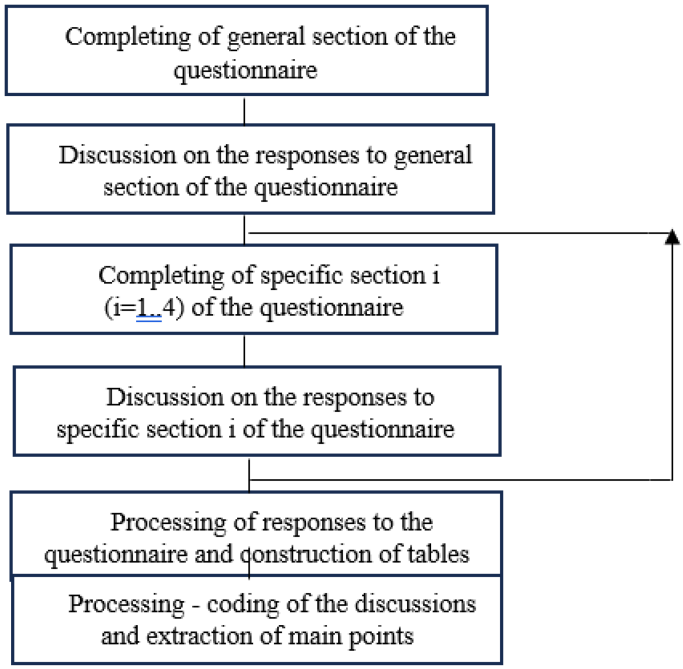

Fig. 2. Process followed in each focus group.

Table 1. General/Overall Effects of the Economic Crisis

	IDIKA	EFKA	Ministry of Health
On ICT-related investments	7	6 in 2010–2016 3 in 2017–2018	6
On ICT-related operating expenses	7	6	3
On the improvement/rationalization of ICT-related processes	3	4	3
On the digital transformation activities and developments	1	6 in 2010–2016 3 in 2017–2018	1

The first, second, and fourth questions are answered using a 7-point Likert scale (1 = large increase, 2 = moderate increase, 3 = small increase, 4 = no effect, 5 = small decrease, 6 = moderate decrease, 7 = large decrease); the third question is answered using a 5-point Likert 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).

4.1.1 General/Overall Effects on ICT-related Investment. In the above Table 1, we can see that during the crisis period 2010–2018 there has been a large decrease of ICT-related investments in IDIKA, and also a moderate decrease of them in the individual social security organizations in the period 2010–2016 before their merging, but a small increase after their merging in the period 2017–2018; furthermore, in the Ministry of Health there was a moderate decrease of ICT-related investments during the crisis period. In all three qualitative focus-group discussions it was mentioned that the main reason for this was the strict austerity programs that had been put into effect for overcoming the crisis, which included a reduction of funding from the central government that negatively affected all kinds of investment, including the ICT-related ones. In the qualitative focus-group discussions in IDIKA and EFKA it was mentioned that in most social security organizations there has been a

large decrease of ICT investment in this period, and only in the IKA, which was the biggest social security organization, was there stability in the ICT investments, in order to continue the development of its integrated IS that had started several years before the beginning of the crisis. However, after their merging into the EFKA in the 2017–2018 period, it was necessary to make a small increase of ICT-related investment of the EFKA, in order to

(a) address the challenges brought by the merger; these included integrating the digital registers of insured citizens from various social security organizations, which faced issues like inconsistent data quality, structure, and coding; and
(b) provide enhanced digital support that was needed to tackle long-standing problems in Greek social security, such as improving the collection of insurance contributions and controlling high expenses—both of which had historically contributed to significant deficits and were major factors in the crisis.

A more elaborate picture concerning the effects of the crisis on different kinds of ICT-related investment is provided in Section 4.2.

4.1.2 General/Overall Effects on ICT-related Operating Expenses. As we can see in Table 1, during the crisis period 2010–2018 we had a large decrease of ICT-related operating expenses in the IDIKA, a moderate decrease of them in the social security organizations, and later in the EFKA, but a small increase of them in the Ministry of Health. In all three qualitative focus-group discussions it was reported that the above-mentioned reduction of central government funding led to a decrease of ICT-related operating expenses for ICT personnel, as retiring employees were not replaced, and contracts for temporary ICT staff were terminated. However, in the qualitative focus-group discussions we conducted in the Ministry of Health, it was pointed out that besides this reduction of expenses for ICT personnel, they also had to increase expenses for ICT-related consulting services that had to be provided to them by highly experienced consulting firms, which were needed for the rapid development of some new highly complex ISs that were absolutely necessary during the crisis period (they are described later in this section); so, the overall effect of the crisis on the ICT-related operating expenses in the Ministry of Health was a small increase of them. A more elaborate picture concerning the effects of the crisis on different kinds of ICT-related operating expenses is provided in Section 4.3.

4.1.3 General/Overall Effects on ICT-related Processes/Practices. However, in Table 1 we can see that the crisis has led to a large improvement and rationalization of the ICT-related processes, practices, and in general corresponding capabilities of the individual social security organizations and later of the EFKA, which, as mentioned in the qualitative focus-group discussion we had in the EFKA, before the crisis had small and immature ICT units that lacked efficient ICT-related processes and practices, so there was a significant need as well as margin for improvement. Furthermore, from this table we can see that the crisis led to a moderate improvement and rationalization of the ICT-related processes and corresponding capabilities of the IDIKA; in the qualitative focus-group discussion in IDIKA, it was mentioned that this improvement 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. Also, from the same table we can see that in the Ministry of Health the crisis led to a moderate improvement and rationalization of the ICT-related processes and corresponding capabilities, especially concerning the management of ICT projects; in the qualitative focus-group discussion we had in this Ministry, it was pointed out that these improvements and rationalizations of their ICT-related processes/practices and corresponding capabilities were quite important for the successful implementation of some new highly demanding ICT projects, in which were developed highly complex ISs (much more complex than the IS they had developed in the past) that were absolutely necessary during the crisis period for supporting core policies for overcoming the crisis. A more elaborate picture concerning the effects of the crisis on each of the ICT-related processes/practices we examined is provided in Section 4.4.

4.1.4 General/Overall Effects on Digital Transformation Activities (Developments). Furthermore, in the last line of Table 1, we can see that unexpectedly during the crisis period there has been a large increase of digital transformation activities and developments of the HDIKA, which significantly transformed the Greek social security and public healthcare provision; in the individual social security organizations there was overall a moderate decrease of digital transformation activities and developments until their merging into EFKA (during the 2010–2016 period), followed by a small increase after their merging (for the reasons discussed above). In the Ministry of Health there has been also a large increase of digital transformation activities and developments during the crisis period.

In the qualitative focus-group discussion we conducted in IDIKA, they emphasized that during the crisis period, despite a large decrease in available financial resources for ICT-related investments and operating costs, and also in ICT personnel and ICT-related training, there was an "explosion" of developments of new highly important large and complex ISs for social security and healthcare, which substantially transformed the operation of these critical state functions (one of the participants said that "In this crisis period were developed some of the largest, most complex, and also most important and transformative ISs ever developed in the areas of public social security and healthcare provision."). The most important of them were mentioned.

—The "e-prescription" Internet-based IS, which enables the cooperation and seamless flow of data between all the actors involved in public healthcare services provision, such as doctors, pharmacies, medical examination centers/laboratories, hospitals, and social security organizations, and dramatically increases the efficiencies of all these actors; it also provides large amounts of data concerning the provision of these public welfare services, which can be used for the monitoring, analysis, and control of the huge financial resources spent for them, and also for relevant decision and policy making support purposes, e.g., by enabling the assessment of the impact of possible changes/rationalizations under consideration in relevant policies and regulations (by running various "what-if scenarios" based on these data).
—A number of new Internet-based ISs that were developed, which enable citizens to submit applications 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 preexisting benefits as well; and also, several new internal ISs that were developed for the automated processing of these applications, based on complex eligibility criteria defined by relevant legislation.
—The substantial enhancement of the ICT infrastructures of all hospitals, so that it finally includes an "**Enterprise Resource Planning (ERP)**" component (that supports their administrative and financial functions), a "**Laboratory Information System**" **(LIS)** component, as well as an "Electronic Health Records" component; furthermore, compliance of the hospitals' ICT infrastructures with relevant international standards was also developed, which enabled interoperability among them and with the Ministry of Health (enabling the seamless exchange of data). This was a huge ICT project and IDIKA was responsible for the management of it. —Also, IDIKA played a key role in the merging of the digital registers of insured citizens of the numerous social security organizations.

The participants in the IDIKA focus-group discussion identified some key factors that contributed to IDIKA's exceptionally high performance in developing large new highly complex as well as highly important ISs during the crisis period, despite the drastic reduction of resources they experienced:

(a) The high levels of government spending on social security and healthcare were major contributors to Greece's high levels of fiscal deficits and public debts, which were among the main factors that caused the economic crisis. As a result, there were significant policies and strong pressures to drastically reduce expenses in social security and healthcare; this included cutting administrative costs, as well as reducing spending for social security benefits, pensions, and healthcare services by rationalizing the criteria for their provision and adjusting their financial scale. These necessitated and exerted strong pressure for the

development of large, complex, and highly transformative ISs that automate/support relevant complex administrative processes, and also provide high-quality data for monitoring the financial resources spent for social security and healthcare provision, and also for supporting relevant decision and policy making, e.g., by enabling the assessment of the impact of possible changes/rationalizations under consideration in relevant policies' and regulations' (through "what-if scenarios" based on these data).

(b) Although IDIKA was a large and experienced ICT organization, with mature and efficient ICT-related processes, work practices, and capabilities, during the crisis they made further improvements of them, to meet the above-mentioned demands for developing large, new, and highly complex ISs with significantly reduced resources.

(c) They also made better utilization of existing highly knowledgeable and experienced ICT personnel, who were previously underutilized (as they were assigned less development tasks, of lower complexity, that did not fully leverage their true development and programming abilities).

(d) Furthermore, they made better utilization of the existing ICT equipment, which was already obsolete before the beginning of the crisis, and it was not possible to replace or upgrade it due to the above-mentioned large decrease of financial resources for this during the economic crisis.

In the qualitative focus-group discussion we conducted in the Ministry of Health, it was similarly stated that during the crisis period, despite the large decrease of ICT-related investment, ICT personnel, and ICT-related training, there has been a substantial advancement of the digital transformation of the public healthcare provision; in particular, there were unprecedented developments of new highly important, large, and complex ISs for the Ministry of Health, hospitals, and primary health centers, which substantially transformed important aspects of their operation. The most important of them were highlighted: the above-mentioned "e-prescription" Internet-based IS, as well as the substantial enhancements of the ICT infrastructures of all hospitals, as well as the following:

—The "esy.net" Internet-based IS, which allows all the hospitals and primary health centers to submit through the Internet to the Ministry of Health monthly key financial and operational information (e.g., revenue, expenses, procurements, numbers of patients, health services provided); the submission of these data is mandatory for all hospitals and primary health centers, and are quite useful, as they enable the Ministry of Health to closely monitor the key financial and operational aspects of them, identify overspending and underperformance (so that appropriate measures can be taken), make comparisons among them (and fostering a form of "competition" among them), and also calculate objective measures of performance of their management teams. Also, these data are valuable for decision and policy making support, as they allow the assessment of the impacts of various decisions and policies by running relevant "what-if" scenarios. Subsequently, the esy.net was interconnected/integrated with the ERP systems of the hospitals, so that the above key financial and operational information is automatically retrieved from them, instead of being manually entered.

—The "**Business Intelligence (BI)**–Health" system, which enables both basic processing of the financial and operational information collected through the esy.net (e.g., calculation of various aggregations and key indicators, data warehousing, creation of charts) as well as more advanced processing of them (e.g., data mining, association analysis). It enables an even better monitoring of the key financial and operational aspects of the hospitals and primary health centers, as well as better decision and policy making support.

—The ICT infrastructure of the EOPYY (the new organization that was established through the merging of the healthcare service provision departments of all social security organizations; see Section 3.2.2), as well as of the "Health Procurement Committee" (responsible for the centralized consolidated procurement of medicines and medical supplies of the hospitals; see Section 3.2.2).

—The "Center of Health Data," which was developed by the government organization "National Infrastructures for Research and Technology" (EDYTE), and provides to all hospitals some valuable cloud services

Table 2. Effects of the Economic Crisis on the Main Kinds of ICT Investment

	IDIKA	EFKA	Ministry of Health
In ICT hardware	5	5	4
In ICT software	4	5	4
In training of ICT personnel	5	5 in 2010–2016 2 in 2017–2018	5
In training of ICT users	4	4 in 2010–2016 2 in 2017–2018	5

All four questions are answered using a 5-point Likert scale (1 = increase, 2 = small increase, 3 = no effect, 4 = small decrease, 5 = decrease).

concerning the storage and processing of big data generated by modern imaging systems (e.g., medical images and high-resolution videos), as well as the digital support of important clinical and research activities.
—The telemedicine services that were developed initially for small Aegean islands.

The participants in the focus-group discussion we conducted in the Ministry of Health also identified some key factors that contributed to this exceptionally high performance in developing during the crisis period these large, new, highly complex and highly important ISs (most of them were similar with the ones mentioned by IDIKA):

(i) The high levels of government spending for healthcare services were a major contributor to the high fiscal deficits and public debts that caused the economic crisis, so they had to be reduced drastically. This necessitated substantial efficiency improvements of the public healthcare service providers (hospitals and primary health centers), a reduction of the administrative costs of their provision (leading to the establishment of the "National Organization for Healthcare Services Provision"), as well as a reduction of the cost of the procurement of the required medicines and medical supplies (leading to the establishment of the central "Health Procurement Committee" for their consolidation); additionally, it necessitated strict monitoring of the key financial and operational aspects of hospitals and primary health centers. All these relied heavily on the development of new, large and complex ISs, and this generated strong political pressure for this.
(ii) During the crisis they proceeded to some improvements of their ICT-related processes, work practices, and capabilities.
(iii) They also made better utilization of existing highly knowledgeable and experienced ICT personnel, who were previously underutilized, as well as of existing ICT equipment (though it was already obsolete).
(iv) Furthermore, they proceeded with the renegotiation of prices with their suppliers of ICT equipment, software, and services, which led to significant reductions of them; this saved them valuable financial resources that were used for the above important new IS developments.
(v) Finally, highly important was the contribution of some existing government computerization organizations (who possessed much higher relevant knowledge and experience than individual government organizations), such as the IDIKA and the EDYTE, and of some highly experienced consulting firms they hired.

4.2 Effects on the Main Kinds of ICT-related Investment

In Table 2 are shown the responses of the three focus groups to the more detailed questions concerning the effects of the economic crisis on the main kinds of ICT-related investment.

In Table 2, we can see that in IDIKA the crisis led to a decrease of the investments in ICT hardware, and a smaller decrease in the investments in ICT software; furthermore, there was a decrease in the investments

Table 3. Effects of Economic Crisis on the Main Kinds of ICT Operating Expenses

	IDIKA	EFKA	Ministry of Health
For ICT personnel payroll	4	4 in 2010–2016 2 in 2017–2018	4
For new ICT personnel	5	5 in 2010–2016 1 in 2017–2018	5
For ICT consulting services	5	5 in 2010–2016 1 in 2017–2018	2
For ICT outsourcing	5	4 in 2010–2016 1 in 2017–2018	4
For cloud services	4	4	2

All five questions are answered using a 5-point Likert scale (1 = increase, 2 = small increase, 3 = no effect, 4 = small decrease, 5 = decrease).

in training of ICT personnel and a smaller decrease in the training of ICT users. The same happened in the individual social security organizations before their merger (i.e., during the 2010–2016 period); however, after the merging there was a small increase of the investment in the training of ICT personnel and users, to meet some needs of the newly established EFKA. Similarly, in the Ministry of Health there was a small decrease in their investments in ICT hardware and software, and a larger decrease in the "soft" ones in training of ICT personnel and users. So, we can conclude that we had a homogeneous negative effect of the crisis across all four examined kinds of ICT-related investment, with the only exception that of the soft ones in ICT-related training that had a small increase in the social security organizations after their merging into EFKA. In all three qualitative focus-group discussions, it was pointed out that due to the dramatic reduction of funding from the central government during the crisis, only absolutely necessary ICT hardware and software procurements and training were made. It was also pointed out that the decrease of ICT-related investments was also due to the new and more demanding regulations for public procurement that were established during the crisis; these new regulations excessively increased the workload required for their implementation (which was a big problem due to the above-mentioned decrease of the ICT personnel), and also imposed overly demanding requirements that could not be met within the strict deadlines they set.

4.3 Effects on the Main Kinds of ICT-related Operating Expenses

In Table 3 are shown the responses of the three focus groups to the more detailed questions concerning the effects of the economic crisis on the main kinds of ICT-related operating expenses.

In Table 3, we can see that in IDIKA the crisis led to a decrease in the expenses for the recruitment of new ICT personnel, and for ICT-related consulting services as well as for ICT-related outsourcing, and a smaller decrease in the expenses for ICT personnel payroll and cloud services. The participants in the IDIKA focus-group discussion stated that there was a significant reduction of the ICT personnel during the crisis period, as there was no recruitment of new ICT personnel for replacing the older ones who retired; also, there was a central government policy for a "horizontal" reduction of all salaries in the public sector. Furthermore, it was also pointed out that due to the dramatic reduction of the funding from the central government during the crisis, they had to reduce all ICT-related operating expenses to the absolutely necessary ones, which led to a large decrease in the use of ICT-related consulting and outsourcing services, as well as cloud services.

From Table 3, we can also see that a similar situation occurred in the individual social security organizations before their merging (in the 2010–2016 period). However, after their merging into EFKA there was recruitment of new ICT personnel that was required, and therefore an increase in ICT personnel payroll expenses, as well as an increase in the use of ICT-related consulting and outsourcing services. In the focus-group discussion in EFKA,

Table 4. Effects of Economic Crisis on the Improvement and Rationalization of the Main ICT Processes/Practices

	IDIKA	EFKA	Ministry of Health
For the development of an ICT plan	2	3	2
For the implementation and management of ICT projects	2	4	3
For the procurement of ICT hardware, software, and services	2	4	2
For the internal development, modification, and integration of software	3	3	2
For the operation and support of ISs	2	4	2
For the support of the ICT users	1	3	2
For the cooperation of the ICT unit with the business units	3	3	3

All eight questions are answered using a 5-point Likert 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).

it was explained that in order to develop the above-mentioned large and complex absolutely necessary IS (see Section 4.1.4), and also to meet the needs of the newly established EFKA, they had to make use of some external consulting services; however, these were kept as focused and limited as possible (on specific highly specialized tasks that could not be undertaken by the ICT personnel of the Ministry of Health) due to their high cost.

Finally, from the above Table 3 we can see that there were similar effects of the crisis in the Ministry of Health with respect to the expenses for ICT personnel payroll, new ICT personnel, and ICT-related outsourcing; however, there was a small increase in the expenses for ICT-related consulting and cloud services. In the focus-group discussion, it was explained that these services were necessary for supporting and assisting the reduced ICT personnel of the Ministry in the highly demanding developments of the large and highly complex new IS (outlined in Section 4.1.4) that took place during the crisis period.

4.4 Effects on the Main ICT-related Processes/Capabilities

In Table 4 are shown the responses of the three focus groups to the more detailed questions concerning the effects of the economic crisis on the improvement and rationalization of important individual ICT-related processes and practices.

We can see in Table 4 that in IDIKA the crisis led to moderate improvements and rationalizations of two of the examined ICT-related processes/practices and corresponding capabilities: those for (a) the internal development, modification, and integration of software (in the focus-group discussion it was mentioned that this was necessary, since the IDIKA had to develop in this period some critical and highly complex ISs (outlined in Section 4.1.4) that were absolutely necessary for achieving core policy objectives in the areas of social security and healthcare provision); and (b) for the cooperation of its ICT unit with the business units (it was mentioned that this was quite important, since for the development of these critical and highly complex ISs a close cooperation between ICT and business units was required). Also, the crisis led to a smaller extent to improvements and rationalizations of all the other examined ICT-related processes/capabilities of IDIKA (with the only exception that of the processes/capabilities for the support of ICT users). In the qualitative focus-group discussion in IDIKA, it was mentioned also that they already had mature and efficient ICT-related processes and practices in place before the crisis, as IDIKA is a large and experienced ICT organization, with a long history of successful ICT projects for Greek public welfare organizations; however, the crisis was a strong driver for further improving their ICT-related processes and practices, and corresponding capabilities.

Table 5. Effects of Economic Crisis on the Main Dimensions of Digital Transformation

	IDIKA	EFKA	Ministry of Health
Of internal processes	2	2	1
Of services to citizens	1	1	1
Of products to citizens	3	3	3
Of relationships with citizens	1	1	1
Of relationships with other public organizations	1	1	1
Of technology	3	3	2
Of business models	3	3	2

All seven questions are answered using a 5-point Likert scale (1 = increase, 2 = small increase, 3 = no effect, 4 = small decrease, 5 = decrease).

Furthermore, in the above Table 4, we can see that in the individual social security organizations, and later after their merging in the EFKA, there has been an even larger improvement of their ICT-related processes/practices and corresponding capabilities during the crisis. In particular, the crisis led to large improvements and rationalizations of their processes/practices for the implementation and management of ICT projects; for the procurement of ICT hardware, software, and services; for the operation and support of ISs; and for the cooperation of the ICT unit with the suppliers of ICT. Furthermore, the crisis led to moderate improvements and rationalizations of the other four examined ICT-related processes/practices. In the qualitative focus-group discussion we had with EFKA, they mentioned that before the crisis the social security organizations (with the only exception being the largest one—the IKA) lacked mature and efficient ICT-related processes/capabilities, so there was a significant need as well as margin and pressure for improvement.

Finally, from the above Table 4, we can see that in the Ministry of Health the crisis led to moderate improvements and rationalizations of two of the examined ICT-related processes, practices, and corresponding capabilities: those for (i) the implementation and management of ICT projects and (ii) the cooperation of the ICT unit internally with business units and externally with ICT suppliers. Furthermore, there was a smaller improvement and rationalization of the other five examined ICT-related practices and corresponding capabilities. In the focus-group discussion, it was highlighted that improvement/rationalization of their processes/practices for ICT projects implementation and management, as well as for cooperation with business units, were necessary for the successful development of large and complex ISs for the healthcare provision area that took place during the economic crisis period (outlined in Section 4.1.4).

4.5 Effects on the Main Dimensions of Digital Transformation

In Table 5 are shown the responses of the three focus groups to the more detailed questions concerning the effects of the economic crisis on the main dimensions of the digital transformation of the public social security (columns 2 and 3) and healthcare provision (column 4).

From columns 2 and 3 of the above Table 5, we can see that both the IDIKA and EFKA focus groups agree that the economic crisis led to an increase of the digital transformation activities and developments concerning the services that social security organizations provide to the citizens, their relationships with the citizens, as well as their relationships with other government organizations; also, they agree that the economic crisis led also to a smaller increase of the digital transformation activities and developments concerning the internal processes of the social security organizations, but has not affected the digital transformation activities and developments concerning the other three dimensions of their digital transformation: products provided to citizens, their technologies, and their business models.

In the two qualitative focus-group discussions with IDIKA and EFKA, it was mentioned that during the economic crisis period the government had to introduce several new benefits in order to support citizens who had

been severely hit by the crisis; however, the distribution and management of these new benefits, as well as of all the preexisting ones, had to be handled by the reduced personnel of the social security organizations, as due to the strict austerity programs that had been put into effect for overcoming the crisis there were not recruitments of new personnel for replacing the older ones who retired. Therefore, it was imperative to develop and put into operation new ISs, which (a) on the one hand enable the citizens to apply electronically through the Internet for these benefits (eliminating the need for personnel to service the numerous applicant citizens and receive their applications, and at the same time offering a higher quality service to these citizens, by sparing them the inconvenience of visiting social security offices and waiting in long queues) and (b) on the other hand, enable the immediate automated processing of these numerous applications by the social security organizations (which requires extensive checking whether complex conditions and eligibility criteria specified by the legislation are met, based on data that have to be retrieved from several different government ISs, such as taxation and citizen register ISs). These resulted in a significant digital transformation concerning the services provided by the social security organizations to the citizens—both their production through internal processes and their delivery, as well as the relationships between the citizens and the social security organizations, as the former can apply for various kinds of benefits and functions to the latter, and also get them directly through the Internet, without the need for intermediation of public servants (who might have positive or negative attitudes). Furthermore, both focus groups highlighted that the economic crisis was a major catalyst for the rapid development and widespread adoption of the e-prescription IS, which leads to a dramatic digital transformation in the cooperation and the whole relationships of the social security organizations with all the government as well as private actors involved in the public healthcare service provision. They also mentioned that the large quantities of data collected through the above IS enable a dramatic digital transformation of their practices for policy making concerning social security benefits, pensions, and healthcare services (so that it becomes fairer and more focused to those who really need them, and also waste of financial resources is reduced, and fraud cases are eliminated), making them more "evidence based." So, the participants in the IDIKA focus-group discussion suggested adding another dimension related to policy making practices to the main dimensions of government digital transformation we are examining in this study (see Table 4); this would be a valuable enhancement to the conceptualization of government digital transformation proposed in [44]. However, they mentioned that they did not proceed to digital transformations in their business models during the crisis, such as the introduction of "proactive" delivery of some public welfare services [14, 17], though there were some discussions in this direction.

Furthermore, from column 4 of Table 4 we can see that in the public healthcare providers the economic crisis has led to an increase of their digital transformation activities and developments concerning their internal processes, their services to the citizens, their relationships with them, as well as their relationships with other government organizations; also, the crisis led to a smaller increase of their digital transformation activities and developments concerning their business models and their technology, but has not affected the ones concerning the products provided to the citizens.

In the qualitative focus-group discussion we conducted in the Ministry of Health, it was mentioned that as healthcare provision costs were very high and continuously increasing, regarded as one of the main causes of the high fiscal deficits and public debts that led to the economic crisis, they had to be drastically reduced. This necessitated the improvement of the efficiencies both of the internal processes and operations of the public hospitals and primary health centers, and of the delivery of these services to the citizens; so there was a pressing need to develop ISs that transform both the above internal processes, and also the delivery of health services to the citizens, and in general reshape the whole relationship with them (as outlined in Section 4.1.4). Similar to the IDIKA and EFKA focus groups, it was pointed out that the need to reduce administrative costs led to the development and widespread adoption of the e-prescription IS, which transforms the cooperation and the whole relationship among all public and private actors of the public healthcare provision value chain. Also, the reduction of financial resources for ICT hardware and software during the crisis led to an important technological transformation: the adoption of cloud technologies/services provided by the government organization EDYTE (see Section 4.1.4).

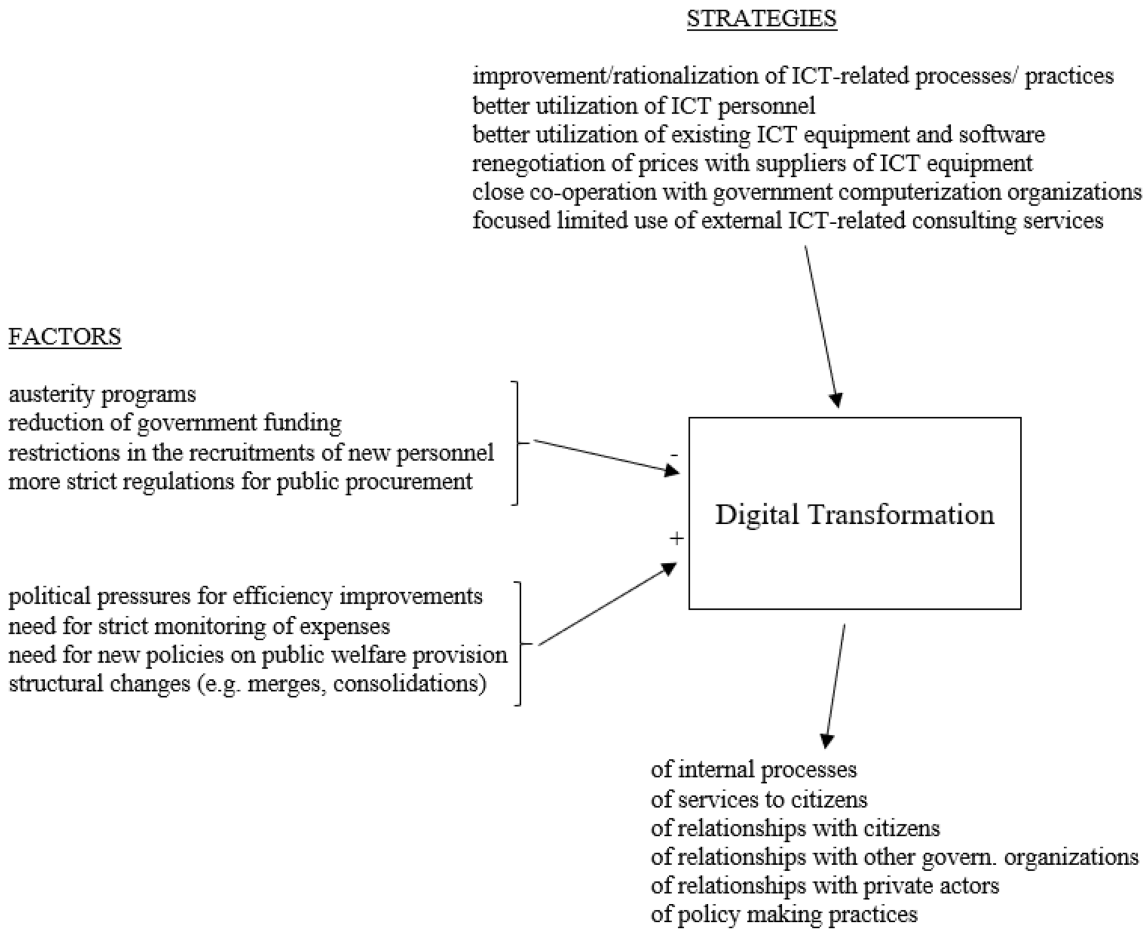

Fig. 3. Influential factors, strategies, outcomes/main dimensions of digital transformation.

Furthermore, the introduction of telemedicine services for small Aegean islands (see Section 4.1.4) can be viewed as some kind of business model transformation. Finally, it was pointed out that the crisis was a major catalyst for the development of the esy.net and BI-health system (see Section 4.1.4), which radically transformed decision and policy making practices, making them more "evidence based"; this provides more support to the above suggested enhancement of the conceptualization of government digital transformation proposed in [44].

5 Discussion

The results of our study described in the previous section provide interesting and useful insights into the whole landscape of the digital transformation of some important public organizations during a period of economic crisis (influential factors, strategies, outcomes/main dimensions), which include some unexpected findings, illustrated in Figure 3.

The economic crisis, on the one hand, created some factors that negatively impacted the digital transformation of the examined public organizations: austerity programs, reductions of government funding, big restrictions in the recruitment of new personnel and also more strict, demanding, and bureaucratic regulations for public

procurement. However, on the other hand, the economic crisis created some factors that positively impacted the digital transformation of the examined public organizations: strong political pressures and support for drastic efficiency improvements and expense reductions, the need for strict monitoring of expenses, the need for new policies regarding public welfare provisions that change significantly and rationalize the criteria for providing public welfare benefits as well as their scale, and also structural changes (such as the merging of social security organizations into EFKA, the consolidation of public health services provisions through the EOPYY, and the centralization of the procurement of medicines and medical supplies through the EPY); all these necessitated the development of large and highly complex ISs, which do not simply digitalize, but bring substantial digital transformations of significant aspects of public welfare provisions.

While we expected that the impact of the first group of negative factors would be larger than the impact of the second group of positive factors, and finally have a negative overall impact of the economic crisis on the digital transformation of these public organizations, the opposite happened: the impact of the second group of positive factors exceeded that of the first group of negative factors, so the economic crisis was finally a strong driver of important digital transformations of these public organizations. In particular, the crisis led to some substantial digital transformations of their internal processes, the services they provide to citizens, their relationships with them, their relationships with other public and private organizations, as well as their policy making practices, which were considered as quite valuable in this tough period. This was an unexpected finding, however quite positive: it indicates that even tough periods of recessionary economic crisis and resource scarcity can create positive conditions for digital transformation.

Furthermore, our study has identified some strategies that were adopted by the examined organizations for advancing digital transformation during the economic crisis period, despite resource scarcity and the other abovementioned negative factors:

- Improvement and rationalization of ICT-related processes and practices and therefore an increase of ICT-related capabilities.
- Better utilization of existing highly skilled and experienced ICT personnel, who were underutilized previously; this agrees with previous relevant literature (e.g., [76]), which has found that in the public sector there is often underutilization of skilled personnel, which negatively impacts both organizational performance and employee morale.
- Better utilization of existing ICT equipment and software, which were underutilized due to insufficient knowledge of their full capabilities; this will probably require the assistance and cooperation of their suppliers.
- Renegotiation of prices with their suppliers of ICT equipment, software, and services, which can lead to substantial reductions of them; during economic crises prices usually drop, so public welfare organizations can take advantage of this, due to their size and strong negotiating power.
- Take advantage of and have close cooperation with public sector organizations having as their mission and specializing in government computerization, which exist in most countries, and possess high levels of relevant skills, knowledge, and experience, as they have implemented—or at least participated in—numerous ICT projects in government settings, many more than any single government organization.
- Use of external ICT-related consulting services, however quite focused (on specific specialized tasks that cannot be undertaken by existing ICT personnel) and limited.

6 Conclusions

As recessionary economic crises become increasingly frequent, with increasing duration and consequences, the "economically normal periods" become shorter and the economic crisis ones longer, so it becomes highly important to investigate the effects of economic crises on various activities and aspects of organizations, both private

and public, and their behavior during economic crisis periods. This study contributes in this direction: it empirically investigates the effects of economic crisis on the digital transformation activities of the public organizations that perform one of the most critical functions of the modern state: public welfare. For this purpose, we have constructed a research framework, based on the RBV of the firm, as well as a comprehensive conceptualization of government digital transformation, as theoretical foundations. Our study has been conducted in a highly appropriate national context: Greece, which has been hit by a strong economic crisis between 2010 and 2018; we have collected data using both qualitative and quantitative techniques from the main actors of the digitalization of the Greek public welfare: the IDIKA, the ICT unit of the EFKA, and the ICT unit of the Ministry of Health.

It has been concluded that, as we initially expected, the economic crisis resulted, on the one hand, in a serious decrease of the ICT-related investment and operating expenses of the examined public welfare organizations. However, on the other hand, we reached an unexpected finding: despite the above decreases, the economic crisis has led to a significant increase of the digital transformation activities and developments in these critical organizations, and a significant advancement in significant aspects of their digital transformation. During the economic crisis period, some of the largest, most complex, and most important ISs ever developed in the Greek public welfare were implemented, which were crucial for achieving core policy objectives during this tough period. Furthermore, our study revealed some successful strategies that were adopted by the examined organizations to advance digital transformation during the economic crisis period, despite the above-mentioned resources scarcity (outlined in the previous section).

This study has quite interesting implications for both research and practice. With respect to research, it makes a contribution to the limited research as well as to the existing body of knowledge about the effects of a recessionary economic crisis on the digital transformation of organizations, focusing on the public sector that has been heavily under-researched from this perspective. Also, for this purpose we have developed a research model with sound theoretical foundations that can be useful for the extensive required future relevant research (both in the public and in the private sector). Furthermore, our results lead to an enrichment of the conceptualization of government digital transformation proposed in [44] with two additional digital transformation dimensions concerning the relationships with cooperating private sector organizations and the policy making practices. With respect to practice, our study shows that government digital transformation can advance even in tough periods of recessionary economic crisis and resource scarcity. Furthermore, it has revealed six dimensions—kinds of government digital transformation (outlined in the previous section)—and some specific examples of ISs in each of them, which can be highly useful for government organizations for managing future economic crises (expected to be more frequent and longer than in the past). Similarly useful can be the strategies we have identified for advancing digital transformation during an economic crisis period, despite resource scarcity and other negative factors.

The main limitation of our study is that it has been conducted in the main public welfare organizations of Greece. So, more similar research is required for other types of government organizations, with different levels of importance as well as different initial levels of digitalization (before the crisis), and also possibly in the private sector as well, 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.

References

[1] B. Keeley and P. Love. 2012. *From crisis to recovery—The causes. Course and Consequences of the Great Recession.* OECD Publishing, Paris.
[2] T. A. Knoop. 2015. *Recessions and Depressions: Understanding Business Cycles* (2nd ed.). Praeger, Santa Barbara, CA.
[3] R. E. Allen. 2017. *Financial Crises and Recession in the Global Economy* (4th ed.). Edward Elgar Publications, Cheltenham.
[4] S. M. Scott. 2019. Languages of economic crises: Narrating, resisting, speaking otherwise. *Journal of Cultural Economy* 12, 5 (2019), 353–360.

[5] X. De Scheemaekere, K. Oosterlinck, and A. Szafarz. 2015. Identifying economic crises: Insights from history. *Financial History Review* 22, 1 (2015), 1–18.
[6] T. P. Vartanian. 2021. *200 Years of American Financial Panics: Crashes, Recessions, Depressions, and the Technology that Will Change It All*. Prometheus Books, Guilford, CT.
[7] M. J. Austin. 2008. *An Analysis of the Financial Crisis of 2008: Causes and Solutions*. Available at SSRN: https://ssrn.com/abstract=1295344 or http://dx.doi.org/10.2139/ssrn.1295344
[8] R. Baldwin and B. W. Di Mauro. 2020. *Mitigating the COVID Economic Crisis: Act Fast and do Whatever it Takes*. Center of Economic Policy Research Press, London.
[9] OECD. 2024. *Society at a Glance 2024 - OECD Social Indicators*. OECD Publishing, Paris.
[10] OECD. 2016. *Digital Government Strategies for Transforming Public Services in the Welfare Areas*. OECD Publishing, Paris.
[11] P. O. Gourinchas, T. Philippon, and D. Vayianos. 2016. The analytics of the greek crisis. *National Bureau of Economic Research (NBER) Macroeconomics Annual* 31, 1 (2016), 1–81.
[12] C. Meghir, C. Pissarides, D. Vayanos, and N. Vettas (Eds.). 2017. *Beyond Austerity: Reforming the Greek Economy*. MIT Press, Cambridge MA. DOI: 10.7551/mitpress/10082.001.0001
[13] R. McKinnon. 2019. Introduction: Social security and the digital economy–Managing transformation. *International Social Security Review* 72, 3 (2019), 5–16.
[14] H. Scholta, W. Mertens, M. Kowalkiewicz, and J. Becker. 2019. From one-stop shop to no-stop shop: An e-government stage model. In *Government Information Quarterly* 36, 1 (2019), 11–26.
[15] A. Larsson and R. Teigland. 2020. *Digital Transformation and Public Services: Societal Impacts in Sweden and Beyond*. Routledge, Oxon, UK. Available at SSRN: https://ssrn.com/abstract=3502524
[16] L. Coles-Kemp, D. Ashenden, A. Morris, and J. Yuille. 2020. Digital welfare: Designing for more nuanced forms of access. *Policy Design and Practice* 3, 2 (2020), 177–188.
[17] K. K. Larsson and M. Haldar. 2021. Can computers automate welfare? Norwegian efforts to make welfare policy more effective. *Journal of Extreme Anthropology* 5, 1 (2021), 56–77.
[18] Z. W. Larasati, T. K. Yuda, and A. R. Syafa'at. 2023. Digital welfare state and problem arising: An exploration and future research agenda. *International Journal of Sociology and Social Policy* 43, 5/6 (2023), 537–549.
[19] M. Bovens and S. Zouridis. 2002. From street-level to system-level bureaucracies: How information and communication technology is transforming administrative discretion and constitutional control. *Public Administration Review* 62 (2002), 174–184.
[20] L. Tummers and V. Bekkers. 2014. Policy implementation, street-level bureaucracy, and the importance of discretion. *Public Management Review* 16, 4 (2014), 527–547.
[21] A. Buffat. 2015. Street-level bureaucracy and e-government. *Public Management Review* 17 (2015), 149–161.
[22] P. A. Busch and H. Z. Henriksen. 2018. Digital discretion: A systematic literature review of ICT and street-level discretion. *Information Polity* 23 (2018), 3–28.
[23] J. V. Carvalho, A. Rocha, and A. Abreu. 2016. Maturity models of healthcare information systems and technologies: A literature review. *Journal of Medical Systems* 40 (2016), 131–141.
[24] C. S. Kruse and A. Beane. 2018. Health information technology continues to show positive effect on medical outcomes: Systematic review. *Journal of Medical Internet Research* 20, 2 (2018), e41.
[25] K. A. Wager, F. W. Lee, and J. P. Glaser. 2022. Health Care Information Systems: A Practical Approach for Health Care Management (5th ed.). Jossey-Bass.
[26] L. Parv, P. Kruus, K. Mötte, and P. Ross. 2016. An evaluation of e-prescribing at a national level. *Informatics for Health and Social Care* 41, 1 (2016), 78–95.
[27] P. Lau, M. T. Tran, R. Y. Kim, A. H. Alrefae, S. Ryu, and J. C. The. 2024. E-prescription: Views and acceptance of general practitioners and pharmacists in Greater Sydney. *Australian Journal of Primary Health* 30 (2024), PY22240.
[28] R. Duchin, O. Ozbas, and A. Sensoy. 2010. Costly external finance, corporate investment, and the subprime mortgage credit crisis. *Journal of Financial Economics* 97, 3 (2010), 418–435.
[29] S. Akbar, S. Ur Rehman, and P. Ormrod. 2013. The impact of recent financial shocks on the financing and investment policies of UK private firms. *International Review of Financial Analysis* 26, C (2013), 59–70.
[30] K. Kahle and R. M. Stulz. 2013. Access to capital, investment, and the financial crisis. *Journal of Financial Economics* 110, 2 (2013), 280–299.
[31] H. Bo, C. Driver, and H.-C. M. Lin. 2014. Corporate investment during the financial crisis: Evidence from China. *International Review of Financial Analysis* 35 (2014), 1–12.
[32] T. Nguyen, H. G. (Lilly) Nguyen, and X. Yin. 2015. Corporate governance and corporate financing and investment during the 2007–2008 financial crisis. *Financial Management* 44, 1 (2015), 115–146.
[33] S. Zubair, R. Kabir, and X. Huang. 2020. Does the financial crisis change the effect on financing on investment? Evidence from private SMEs. *Journal of Business Research* 110 (2020), 456–463.

[34] E. Loukis, S. Arvanitis, and D. Myrtidis. 2021. ICT-related behaviour of Greek banks in the economic crisis. *Information Systems Management* 38, 1 (2021), 79–91.
[35] N. Iivari, S. Sharma, and L. Ventä-Olkkonen. 2020. Digital transformation of everyday life—How COVID-19 pandemic transformed the basic education of the young generation and why information management research should care? *International Journal of Information Management* 55 (2020), 102183.
[36] S. Rahi, M. M. Khan, and M. Alghizzawi. 2021. Factors influencing the adoption of telemedicine health services during COVID-19 pandemic crisis: an integrative research model. *Enterprise Information Systems* 15, 6 (2021), 769–793.
[37] M. Mandviwalla and R. Flanagan. 2021. Small business digital transformation in the context of the pandemic. *European Journal of Information Systems* 30, 4 (2021), 359–375.
[38] M. M. Nielsen and Z. Jordanoski. 2023. Digital transformation, governance, and coordination in times of crisis: An analysis of Australia, Denmark, and the Republic of Korea. *Digital Government: Research and Practice* 4, 4, Article 19 (2023), 19:1–19:20.
[39] B. Moser-Plautz and L. Schmidthuber. 2023. Digital government transformation as an organizational response to the COVID-19 pandemic. *Government Information Quarterly* 37, 4 (2023), 101474.
[40] G. Vial. 2019. Understanding digital transformation: A review and a research agenda. *Journal of Strategic Information Systems* 28, 2 (2019), 118–144.
[41] A. Hanelt, R. Bohnsack, D. Marz, and C. A. Marante. 2021. A systematic review of the literature on digital transformation: Insights and implications for strategy and organizational change. *Journal of Management Studies* 58, 5 (2021), 1159–1197.
[42] P. C. Verhoef, T. Broekhuizen, Y. Bart, A. Bhattacharya, J. Q. Dong, N. Fabian, and M. Haenlein. 2021. Digital transformation: A multidisciplinary reflection and research agenda. *Journal of Business Research* 122 (2021), 889–901.
[43] S. Nadkarni and R. Prügl. 2021. Digital transformation: A review, synthesis and opportunities for future research. *Management Review Quarterly* 71 (2021), 233–341.
[44] J. Mergel, N. Edelmann, and N. Haug. 2019. Defining digital transformation: Results from expert interviews. *Government Information Quarterly* 36, 4 (2019), 101385.
[45] Y. Gong, J. Yang, and X. Shi. 2020. Towards a comprehensive understanding of digital transformation in government: Analysis of flexibility and enterprise architecture. *Government Information Quarterly* 37, 3 (2020), 101487.
[46] K. Hafseld, H. Hussein, and A. Rauzy. 2021. An attempt to understand complexity in a government digital transformation project. *International Journal of Information Systems and Project Management* 9, 3 (2021), 70–91.
[47] J. J. Pittaway and A. R. Montazemi. 2020. Know-how to lead digital transformation: The case of local governments. *Government Information Quarterly* 37, 4 (2020), 101474.
[48] L. Tangi, M. Janssen, M. Benedetti, and G. Noci. 2021. Digital government transformation: A structural equation modelling analysis of driving and impeding factors. *International Journal of Information Management* 60 (2021), 10235.
[49] N. Edelmann, K. Steiner, and G. Misuraca. 2023. The view from the inside: A case study on the perceptions of digital transformation phases in public administrations. *Digital Government: Research and Practice* 4, 2 (2023), 7:1–7:20.
[50] S. Hesami, H. Jenkins, and G. P. Jenkins. 2024. Digital transformation of tax administration and compliance: A systematic literature review on E-Invoicing and prefilled returns. *Digital Government: Research and Practice* 5, 3 (2024), 18.
[51] B. Wernerfelt. 1984. A resource-based view of the firm. *Strategic Management Journal* 5, 2 (1984), 171–180.
[52] J. B. Barney. 1991. Firm resources and sustained competitive advantage. *Journal of Management* 17, 1 (1991), 99–120.
[53] J. B. Barney. 2001. Is the resource-based "view" a useful perspective for strategic management research? *Academy of Management Review* 26, 1 (2001), 41–56.
[54] J. B. Barney. 2007. Resource-Based Theory: Creating and Sustaining Competitive Advantage. Oxford University Press, New York.
[55] R. S. Nason and J. Wiklund. 2018. An assessment of resource-based theorizing on firm growth and suggestions for the future. *Journal of Management* 44, 1 (2018), 32–60.
[56] P. Klein, J. Mahoney, A. McGahan, and C. Pitelis. 2011. Resources, Capabilities, and Routines in Public Organizations. Rotman School of Management Working Paper No. 1550028, Atlanta Competitive Advantage Conference 2010 Paper, Available at SSRN: https://ssrn.com/abstract=1550028 or http://dx.doi.org/10.2139/ssrn.1550028
[57] A. Melián-González, R. M. Batista-Canino, and A. Sánchez-Medina. 2010. Identifying and assessing valuable resources and core capabilities in public organizations. *International Review of Administrative Sciences* 76, 1 (2010), 49–72.
[58] M. S. Pang, G. Lee, and W. H. DeLone. 2014. IT resources, organizational capabilities, and value creation in public-sector organizations: A public-value management perspective. *Journal of Information Technology* 29 (2014), 187–205.
[59] F. J. Mata, W. L. Fuerst, and J. B. Barney. 1995. Information technology and sustained competitive advantage: A resource-based analysis. *MIS Quarterly* 19:4 (1995), 487–505.
[60] D. F. Feeny and L. P. Willcocks. 1998. Core IT capabilities for exploiting information technology. *Sloan Management Review* 39, 3 (1998), 9–21.
[61] A. Bharadwaj. 2000. A resource-based perspective on information technology capability and firm performance: An empirical investigation. *MIS Quarterly* 24, 1 (2000), 169–196.

[62] M. Wade and J. Hulland. 2004. Review: The resource-based view and information systems research: Review, extension, and suggestions for future research. *MIS Quarterly* 28, 1 (2004), 107–142.
[63] T. Ravichandran and C. Lertwongsatien. 2005. Effect of information system resources and capabilities on firm performance: A resource-based perspective. *Journal of Management Information Systems* 21, 4 (2005), 237–276.
[64] T. P. Liang, J. J. You, and C. C. Liu. 2010. A resource-based perspective on information technology and firm performance: A meta-analysis. *Industrial Management & Data Systems* 110, 8 (2010), 1138–1158.
[65] J. W. Gu and H. W. Jung. 2013. The effects of IS resources, capabilities, and qualities on organizational performance: An integrated approach. *Information & Management* 50, 2–3 (2013), 87–97.
[66] G. Garrison, R. L. Wakefield, and S. Kim. 2015. The effects of IT capabilities and delivery model on cloud computing success and firm performance for cloud supported processes and operations. *International Journal of Information Management* 35, 4 (2015), 377–393.
[67] T. Ravichandran. 2018. Exploring the relationships between IT competence, innovation capacity and organizational agility. *Journal of Strategic Information Systems* 27 (2018), 22–42.
[68] L. Raymond, S. Uwizeyemungu, B. Fabi, and H. St-Pierre. 2018. IT capabilities for product innovation in SMEs: A configurational approach. *Information Technology and Management* 19 (2018), 75–87.
[69] S. Zambarloukou. 2015. Greece after the crisis: Still a south European welfare model? *European Societies* 17, 5 (2015), 653–673.
[70] Law N° 4387 of 2016 introducing the Unified System of Social Insurance, providing for the reform of the social protection system and pension scheme and regulating the tax income and taxation for chance-games and inserting other provisions. Text in Greek, Ethniko Tipografio, Efimeris tis Kivernisseos Part A', 85, 2187-2262, 2016-05-12, Athens.
[71] E. Mossialos, S. Allin, and K. Davaki. 2005. Analysing the Greek health system: A tale of fragmentation and inertia. *Health Economics* 14, 1 (2005), S151–S168.
[72] V. Notara, S. A. Kouridis, E. Vaga, and I. A. Grammatikopoulos. 2010. Economic crisis and challenges for the Greek healthcare system: The emergent role of nursing management. *Journal of Nursing Management* 18 (2010), 501–504.
[73] C. Milionis. 2013. Provision of healthcare in the context of financial crisis: Approaches to the Greek health system and international implications. *Nursing Philosophy* 14 (2013), 17–27.
[74] E. Simou and E. Koutsogeorgou. 2014. Effects of the economic crisis on health and healthcare in Greece in the literature from 2009 to 2013: A systematic review. *Health Policy* 115, 2–3 (2014), 111–119.
[75] H. Maylor, K. Blackmon, and M. Huemann. 2017. *Researching Business & Management.* (2nd ed.), Macmillan.
[76] P. Leisink and E. Knies. 2018. Public personnel reforms and public sector HRM in Europe. In *Public Administration and Public Management in Europe* (1st ed.), E. Ongaro and Sandra van Thiel (Eds.), Palgrave Macmillan, United Kingdom, 243–259.

Received 9 October 2024; revised 11 February 2025; accepted 13 February 2025