

## Exploring How Public Policies on ICTs Could Contribute to Economic Growth in Greece

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### ABSTRACT:

In the public discussion on the economic problem of Greece and in the search of causes of the way out from the current crisis, a sector that is absent is the dimension of: technology and innovation combined with the knowledge of the institutions/mechanisms that exploit and promote them. The Greek economy faces a double problem. Apart from the crucial fiscal problem, there is a very important problem as for its place in the international distribution of work (situation of strategic enclosing called “stuck in the middle”). The information and modern communication technologies (ICTs) in conjunction with the General Secretary of Digital Policy and the “Information Society” organization, that promote them, could contribute considerably in the solution of the problem. In the present study, we attempt to describe briefly the use and the functional exploitation of ICTs.

**Keywords:** *Innovation, Digital Policies, ICT, E-Government, Economic Growth*

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### INTRODUCTION

In the first half of 2010, a massive speculative attack on Greek government bonds almost led to the destabilization of the eurozone (Frangakis, 2011). According to the typology of countries by type of banking crisis, Greece is considered to be a “borderline case”, that is, one in which the crisis was not systemic, in the sense that there were no significant indications of financial distress in the banking system (as indicated by critical bank-runs, losses in the banking system and bank liquidations), neither were there any noteworthy policy intervention measures in light of significant losses in the banking system (Frangakis, 2011). The above-mentioned signs of bank losses became severe on 5<sup>th</sup> July 2015 when the Greek voters said “no” to the austerity

measures through a referendum, while the banks restricted ATM withdrawals to 60 Euros per day (Amadeo, 2019).

At the beginning of the Greek crisis in 2007, the public debt of Greece was at 25.1 per cent of the Gross Domestic Product (GDP), its deficit was at 95.7 per cent of GDP and it had also a large current account deficit in relation to GDP, which in 2007 had come up to 214.7 per cent of GDP (Frangakis, 2011). As a result of the above, Greece was exposed to the pressures of the financial markets and along came the financial crisis. On May 2010, the Eurogroup formally launched a financial assistance mechanism, with the condition that the Greek authorities would implement a program of economic adjustment, in

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coordination with the European Central Bank (ECB) and the International Monetary Fund (IMF). Currently, further privatization is being pursued in the short future in relation to pensions, healthcare and education along with liberalization of the Greek market.

We would say that the Greek economic crisis has two interrelated dimensions. The first one consists of the intensive crisis of budgetary/macro-economic sizes and the second one of the deteriorations of the place of Greek economy in the international distribution of work. Nevertheless, until now, in the public discussion about the confrontation of crisis, the question of macro-economic parameters dominates (level of wage of/pensions, tax rates etc.) and the dimension of technology, innovation and knowledge is absent, along with the mechanisms/institutions that develop and promote them. It is estimated that the implementation of twenty-four main Information and Communication Technology actions (e.g. e-national registry, geo-informatics, improved broadband infrastructure etc.) will enforce the state budget with more than ten billion euros per year.

Until the beginning of the crisis (2008) Greece met a long course of economic enlargement (from 1993) which was supported to a large extent in the big projects of infrastructure that were financed mainly by the Community Support Frames (CSF). However, this economic development was characterized from important systemic delays in the interconnection of productive/enterprising system with technology, innovation and knowledge. When the international environment was reversed, the developmental course of Greece was interrupted abruptly and the country entered an extended process of recession, also because of the quite painful meters of budgetary discipline.

The timeline of the Greek debt crisis from 2008 to 2019 has proved that just austerity measures, capital controls and constant bank recapitalizations do not contribute at all to the reintroduction of the Country in the development. Every year the situation gets even worse (Amadeo, 2019). On the other hand, Information and Communication Technologies (ICTs) could play a vital role since they constitute technology of general scope, concerning all aspects of the economic and social life. Firstly, the more essential exploitation of ICTs in the public administration, self-government and wider public

sector will have as a result the increase of their productivity with basic benefits the saving of expenses, the improvement of their income as well as the transparency support. Simultaneously, it will lead to improvement of provided services to citizens/enterprises, fact that leads to saving of time and improvement of the quality of citizens' life. The productivity and competitiveness of enterprises will also be increased. More clearly, make the whole Greek state work as an open platform which will allow all people to innovate either they belong to the government or not. Great Britain, USA, Australia and New Zealand follow the approach of open platform and every year rank among top 10 positions concerning the indexes of all sectors (NDSG, 2016).

Moreover, the ICTs constitute a tool for the improvement of productivity and the adaptation of the whole private productive system in the new conditions. Emphasis should be given in sectors with 1) big participation in the Gross National Product, 2) traditionally powerful presence, and 3) prospects of rapid growth. The diffusion and improvement of the use of ICTs in the productive system can contribute in lots of directions. More specifically, the production cost will be reduced, and innovative actions of enterprises will be supported, so that new differentiated and standardized products/services can be produced, thus access in new, international markets being facilitated.

#### **Institutions for the Promotions of ICTs Policies and Relevant Problems**

In a complex economic situation like the current crisis in Greece, it is crucial to make the right policies, by providing fast and safe access to all available information required and taking the right decisions. The planning of public policies on ICTs hence should not be separated or extracted from its implementation. The organization and the strategic administration of implementation, with the configuration of a functional operational plan in combination with the clarification of the real issues of each public intervention, are very important. It is not enough that the ICTs will be placed where they should be. They must be integrated in the operations and the activities of public administration, organisms, enterprises as well as in the work and life of citizens.

ICTs need people. Any organism, public or private, that wants to functionally exploit the

ICTs, needs the person and/or the team that will undertake to coordinate and promote the whole venture. The lack of mechanisms of technical support for the use and the operational exploitation of ICTs in the public sector, but also for the provision of business-based support services to the enterprises and the individual users, also constitutes one of the main causes of slow spread of use. The functional exploitation of ICTs certainly requires financial resources too. However, the critical question is the effective and efficient use of the available resources. Many times, money has been overspent pointlessly. Due to the economic crisis, this phenomenon has become even more intense since 2010. Financial resources provided from the European Union are wasted for the coverage of other short-term needs without any powerful strategic plan (NDSG, 2016). In Greece, there are several organizations that deal with developmental policies having to do with ICTs. Information Society S.A. is a company devoted to lead to the information society in Greece (Information Society, 2019), which as we mentioned before aims to put into force and promote policies and actions on ICTs both in the public and in the private sector, in research and business context too. Such an action is the initiative “Enforcing Digital Skills in Greece – National Action plan for enforcing digital skills in Greece” (Nikolaidis et al., 2017). The Information Society is too serious affair to leave it only in the experts of ICTs. It requires the motivation and the effective collaboration of all the society sectors. Due to this fact, the Ministry of Digital Policy, Telecommunications and Media was established in November 2016. Its main tasks are: to approve the ICT projects of other ministries, to implement vital digital projects (i.e. Central Electronic Document Management System in the public sector, intelligent agriculture, the Digital Single Portal for Digitalized Transactions between citizens, businesses and the State, etc.) to invest money for the development of fiber optic networks and to subsidize the production of audiovisual works through the National Centre of Audiovisual Media and Communication (MDPTM, 2016).

As far as the Information Society is concerned, important goals of this organization are the reorientation, the reformation and the upgrade of various sectors of ICTs with directions: 1) the

stop of breaking to pieces, 2) the settlement of pendency, 3) the connection and collaboration of enterprises with the world of research, 4) the provision of services and 5) the specialization and the long-lasting investment in faculties.

The development of the Information Society requires powerful but also efficient public intervention. The role of the public sector as: effective regulator, brilliant purchaser, efficient financier and active instigator and coordinator of a national effort that places and promotes ambitious objectives for the exploitation of ICTs remains irreplaceable. The public intervention should aim: a) in the configuration of a “critical mass” of users, electronic infrastructures and services provided in real time as well as digital content states available, b) in the motivation of market and enterprises, c) in the support of necessary research activity, and mainly d) in the motivation of the society (SDFARF, 2018).

A sector of the Information Society is the “Observatory for Digital Greece” that provides accurate and up-to-date information on Information Society (IS) indicators (Observatory for Digital Greece, 2014). The Observatory measures and evaluates the national progress made towards the Information Society and contributes to the accomplishment of the IS strategic goals on a national level. According to the National Digital Strategy of Greece 2016 – 2021, the General Secretariat of Digital Policy is obliged to publish the report of the operational progress monitoring to the Internet every six months. The same happens with the impact assessment report (NDSG, 2016). Another important organization with active presence in the field of ICTs is the National Network of Research and Technology, which aims to connect the research with the education and generally contribute to their progress.

Near to all those efforts is the phenomenon characterized as “Greek paradox”. The Greek research teams activated in the ICTs participate in competitive research programs that are financed by the European Union in extent disproportionately big compared to the numerical and other data that characterize our research and national system of innovation in general. Nevertheless, this important research activity does not find satisfactory way out to the domestic offer of ICTs, due to: 1) lack of project ownership, 2) ineffective rules of

between suggestion and implementation sectors, 3) wrong implementation method (waterfall method instead of agile method) (NDSG, 2016). However, the most hopeful ascertainment is the motivation of an important number of young people - that in voluntary or semi-professional base work for: the growth of open software, the upgrade of wireless networks, the networked application development for rural regions (Stratigea, 2011), the growth and operation of academic and school networks etc.

#### Data for the Diffusion of ICTs in Greece

The low performance of Greece in the penetration area of ICTs is also proved by its place in the five major categories of ICT interventions: 1) connectivity, 2) digital skills of human resources, 3) use of Internet, 4) integration of digital technology and 5) digital public services. Specifically, according to the Digital Economy & Society Index – DESI, Greece is in the 26th position among the EU member countries. The above are depicted in Figure 1 from the National Digital Strategy of Greece 2016-2021.

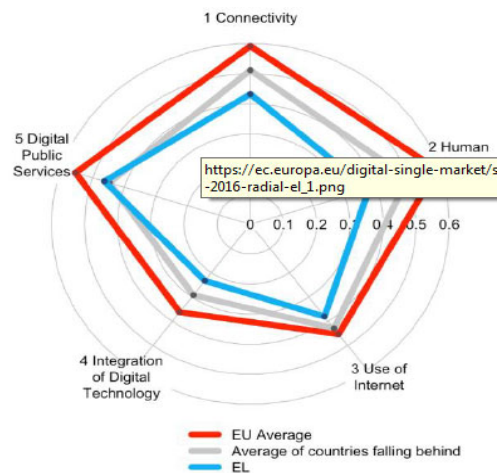


Figure 1: Performance of Greece in ICTs for the period of 2016-2021 (NDSG, 2016)

Table 1: Performance of Greece in EGDI and EPI

E-Government Development Index	2018	United Nations (193 countries)	35
E-Government Development Index	2016	United Nations (193 countries)	43
E-Government Development Index	2014	United Nations (193 countries)	34
E-Government Development Index	2012	United Nations (193 countries)	37
E-Government Development Index	2010	United Nations (193 countries)	41
E-Participation Index	2018	United Nations (193 countries)	34
E-Participation Index	2016	United Nations (193 countries)	65
E-Participation Index	2014	United Nations (193 countries)	17
E-Participation Index	2012	United Nations (193 countries)	45
E-Participation Index	2010	United Nations (193 countries)	48

Furthermore, the Table 1 shows the rank of Greece among the 193 countries of the United Nations as far as the E-Government Development Index (EGDI) and the E-Participation Index are concerned.

In addition, the percentage of the Greek population in the EGDI sub-indexes of online service, telecommunication infrastructure and human capital is seen in Table 2 (Global Information Technology Report, 2015). It is noticed that the percentage of these sub-indexes has not either a stable ascending or descending course. More specifically, the online service index and the telecommunication infrastructure index have ascending course from 2010 to 2014, descending course from 2014 to 2016 and ascending course from 2016 to 2018. The human capital index has exactly the opposite course.

The hesitation of the Greek citizens in front of the ICTs also becomes apparent from the relative data of Eurostat. The gap with the EU grows even more in the bigger ages and in the citizens with low educational level. This means that the danger of their digital isolation is visible. During the year 2011 – 2012, this is more obvious from the rank of Greece in the indexes about: 1) the positive effects of ICTs in level of economy and society (77th position out of 142 countries), 2) the political regulating economic environment and

innovation (69th position out of 142 countries), 3) the use of ICTs from citizens, enterprises and state (66th position out of 142 countries) and 4) the networked readiness of world economic forum (59th position out of 142 countries). Additionally, in 2010 Greece ranked 31st out of 31 countries (including EU Members and Turkey) as far as the indexes of European Committee about electronic services. Moreover, in 2010 and 2012 the rank of the Greek EGDI was 22 and 20 out of the 28 EU members, respectively. However, according to Europe’s Digital Process Report (EDPR) (EDPR, 2017), Greece does not have much difference from the European mean in simple information services, such as search of information, studying of newspapers, use of social media etc. Table 3 shows the population percentage for some ICTs metrics in Greece and the EU (Eurostat, 2020).

It is worth observed that from 2015 to 2018 the percentage of the metric “Internet use: obtaining information from public authorities’ websites” is greater for Greece rather than for EU. This confirms the statement of the National Digital Strategy of Greece 2016 – 2021 that most times Greek citizens interact with the government e-services when they want to download and/or print certificates (NDSG, 2016).

Table 2: Performance of Greece in ICT General Sub-Indexes

Subindex	Year	Greek users’ percentage of EGDI sub-indexes
Online Service	2018	81.94%
Online Service	2016	57.97%
Online Service	2014	60.63%
Online Service	2012	57.52%
Online Service	2010	35.55%
Telecommunication Infrastructure	2018	64.39%
Telecommunication Infrastructure	2016	60.32%
Telecommunication Infrastructure	2014	65.49%
Telecommunication Infrastructure	2012	55.31%
Telecommunication Infrastructure	2010	38.29%
Human Capital	2018	88.67%
Human Capital	2016	89.01%
Human Capital	2014	87.41%
Human Capital	2012	93.32%
Human Capital	2010	98.04%

Table 3: Comparison of Greece and Europe in ICTs according to Eurostat

Metric	Year	Greece	European Union (28 countries)
Internet use: interaction with public authorities	2018	50%	52%
Internet use: interaction with public authorities	2017	47%	49%
Internet use: interaction with public authorities	2016	49%	48%
Internet use: interaction with public authorities	2015	46%	46%
Internet use: interaction with public authorities	2014	45%	47%
Internet use: interaction with public authorities	2013	36%	41%
Internet use: interaction with public authorities	2012	34%	44%
Internet use: interaction with public authorities	2011	27%	41%
Internet use: interaction with public authorities	2010	16%	41%
Internet use: obtaining information from public authorities' websites	2018	47%	44%
Internet use: obtaining information from public authorities' websites	2017	45%	41%
Internet use: obtaining information from public authorities' websites	2016	44%	42%
Internet use: obtaining information from public authorities' websites	2015	42%	40%
Internet use: obtaining information from public authorities' websites	2014	38%	41%
Internet use: obtaining information from public authorities' websites	2013	32%	37%
Internet use: obtaining information from public authorities' websites	2012	29%	39%
Internet use: obtaining information from public authorities' websites	2011	22%	35%
Internet use: obtaining information from public authorities' websites	2010	13%	37%
Internet use: downloading official forms	2018	29%	31%
Internet use: downloading official forms	2017	28%	30%
Internet use: downloading official forms	2016	27%	29%
Internet use: downloading official forms	2015	24%	28%
Internet use: downloading official forms	2014	21%	29%
Internet use: downloading official forms	2013	19%	25%
Internet use: downloading official forms	2012	17%	27%
Internet use: downloading official forms	2011	15%	25%
Internet use: downloading official forms	2010	7%	26%
Internet use: submitting completed forms	2018	24%	34%
Internet use: submitting completed forms	2017	24%	30%

<b>Internet use: submitting completed forms</b>	2016	26%	28%
<b>Internet use: submitting completed forms</b>	2015	25%	26%
<b>Internet use: submitting completed forms</b>	2014	24%	26%
<b>Internet use: submitting completed forms</b>	2013	20%	21%
<b>Internet use: submitting completed forms</b>	2012	18%	22%
<b>Internet use: submitting completed forms</b>	2011	13%	20%
<b>Internet use: submitting completed forms</b>	2010	7%	21%
<b>General use of the internet</b>	2017	42%	48%
<b>General use of the internet</b>	2016	39%	45%
<b>General use of the internet</b>	2011	37%	56%
<b>Turnover of e-commerce as a percentage of all the enterprises turnover</b>	2016	5.9%	9.4%
<b>Turnover of e-commerce as a percentage of all the enterprises turnover</b>	2010	4%	14%

### Strategy and Foresight

There is a growing need for national and regional governments to better adapt and manage change and uncertainty. Decision-making and policy-settings will benefit from explorations of the future in short-, medium- and long-term (Gordon et al., 2005). The ability to foresee future events has become increasingly important for a country or a society in order to move towards desirable goals, as reaching good levels of sustainable development, creating wealth and improving the quality of life (Phaal et al., 2004).

a tool used in long-term strategic planning and in decision making is strategic foresight. Strategic foresight combines the concepts of strategy and foresight and is aligned with the idea that the future is built based on the present. It tries to “build knowledge”, that is, to add value to the information from the present thereby transforming that information into knowledge (Coelho et al., 2012). Foresight is a process rather than a set of techniques, which can support a diversity of methods and techniques.

Foresight has emerged from the convergence of the three disciplines and practices of policy: development, strategic planning and future studies (Andersen and Borup, 2009). The strategy, or at least a part of it, should be based on

forecast. In turn, every forecasting situation should involve foreseeing and realistic evaluation of the uncertainties involved (Makridakis, 1996).

One of the characteristics of future studies is the use of different methods, techniques and tools (Halicka, 2016) that can be classified by the type of approach (exploratory or normative), method (qualitative, semi-quantitative or quantitative) or source of knowledge (creativity, expertise, interaction or evidence). Various methods and techniques are proposed by the General Secretariat for Research and Technology (2014 – 2020) to be used for strategic foresight, including: SWOT, surveys, expert panels, multi-criteria analysis, interviews, indicators, benchmarking etc. (GSRT, 2020).

Within the landscape of strategic intelligence and policy-advising, foresight also coexists, collaborates and competes with complementary or alternative approaches such as: evaluation, impact assessment, risk assessment, technology assessment, technology forecasting, strategic planning, policy analysis, innovation studies and futures studies. For the case of public policies of ICTs, we propose to combine strategic foresight with impact assessment and judgmental forecasting.



### Impact Assessment

A significant task related to those policies and crucial for their success is the impact assessment. Impact assessment is closely connected to foresight of planning strategies. It would be valuable if it took place before other techniques used to foresight a strategy, such as forecasting. Impact assessment is based on a framework that focuses on three key functions of foresight in relation to policy making: informing, counseling, and facilitating policy making at short-, medium- and long-term (Weber et al., 2009). In the EU, there is a well-established methodology about impact assessment (European Union, 2019).

Basic role of the European Commission is to propose new initiatives. The economic, social and environmental assessment of the impact of those initiatives is essential. Impact assessment is a process that comprises of a set of logical steps and prepares evidence for political decision-makers on the advantages and weaknesses of various policy options and plans (Haniotis, 2016).

The Commission believes that one of the most effective ways of improving the quality of new policy proposals is by making those people who are responsible for policy development also responsible for assessing the impact of what they propose. For this purpose, the Commission has introduced a wide-ranging impact assessment system. It is based on an improved, integrated approach which analyses both benefits and costs, and addresses all significant economic, social and environmental impacts of possible new initiatives (Smismans and Minto, 2017).

This methodology guarantees that all significant ability inside the Commission is utilized, together with contributions from stakeholders. In doing as such, it likewise improves the lucidness of activities crosswise over arrangement territories (Commission of the European Communities, 2009). The Commission's system is both accountable and transparent. It strives for full involvement of stakeholders. Once the Commission embraces a proposal, it distributes online all impact assessments and all opinions of the Impact Assessment Board on their quality (RELU-RUF, 2019).

Impact assessment also helps to the explanation of why an action is necessary at the EU level and why the proposed response is an appropriate choice. It may of course also

demonstrate why no action at the EU level should be taken.

### Forecasting of Public Policies

The forecast of the success of the policies of the Information Society is an important process, where little emphasis has been neither given in Greece nor in Europe generally. More stress is given in the planning of these policies, where one or more consultants collaborate with the governmental factors that modulate them. There are certainly some measurable objectives for the success and the positive results of the policies but a more difficult, full and structured methodology for their forecast is used. The forecasting process could help in the saving of time and money that arise from the actions. In Greece, there are organizations that could deal officially with such a task, such as: The Information Society, the Networking Research and Education (NRE, 2020) etc.

One of the few attempts done in the field of forecasting of financial crisis is FOC (Forecasting Financial Crises) (FOC II, 2014). FOC is a scientific project funded by the European Commission's FET Open Scheme for ICT with scope to significantly improve the understanding of systemic risk in financial markets and if possible, to forecast global financial instabilities. It lasted from 1st September 2010 to 28th February 2014 but since then, it is being updated constantly. Specifically, its last update was on 1<sup>st</sup> August 2019. Through FOC, it is also possible to develop methods that can help forecast the future evolution of financial systems, coupled with the possibility of testing the effect of policy actions.

A forecasting attempt on ICTs, made by Johnson (Johnson et al., 2010) was to develop a model explicitly to forecast technological competitiveness for emerging economies. The model had four input indicators (National Orientation, Socioeconomic Infrastructure, Technological Infrastructure and Productive Capacity) and one output indicator (Technological Standing). Each of these five indicators blends statistical data with expert opinions.

As last example, we provide forecasting with Delphi in Japan. The most prominent “forecasting studies” in the Country until 2000 are undertaken by the MITI (Ministry of International Trade and Industry). MITI releases medium to long-term



visions regarding the direction of technology development. Other organizations also use the Delphi data for their priority-setting and decision-making processes. During the forecasting activities, technologies with a major socio-economic impact are selected, as an attempt to assess technological impacts. With the recession in Japan, the political restructuring efforts have been insufficient to create a national strategy since the political parties are more split and there is little consensus among the strategic managers (Cuhls, 2001).

For the case of Greece, we anticipate that forecasting of policies on ICT could help confronting the financial crisis, however no such attempt has been done so far. This lack led to a relevant experiment of forecasting that was accomplished by the Forecasting and Strategy Unit of N.T.U.A. Even if it took place in academic and research level, it had satisfactory results (Spithourakis et al., 2011). The scope of the experiment is the forecast of the success of some serial actions of the Information Society and the Networking Research and Education, for which the knowledge of experts will be used but with a more structured and organized way (Petropoulos and Assimakopoulos, 2011).

For this purpose, the actions were organized as forecasting problems using methods of *judgmental forecasting* as for instance the fore-mentioned Delphi method (Nikolopoulos et al., 2015). It was the impossibility of forecasting the success of the actions solely from past data that led us to use judgmental forecasting, which can incorporate qualitative, non-quantifiable parameters such as the plans and behavior of actors, and socio-cultural factors (Godet, 1989). Both experts and students participated in the research and produced individual and group forecasts (Nikolopoulos et al., 2015).

The objective of the case study is the comparison of these forecasts with the real, available results so that it becomes apparent which method gives the most precise forecasts. This method could be used later to forecast the success of future policies. There were either face-to-face meetings or electronic communication with the participants. The technique of questionnaires was the one mainly used in the experiment, where either individual or group forecasts were produced by the experts. In a next phase, in-depth interviews with experts also took

place. Apart from explaining the given forecasts, the scope of the interviews was to produce insights about strategies, behavior and characteristics of public policies which fund ICT research, development, innovation and adoption (Nikolopoulos et al., 2015).

In the context of the case study, an on-line information system was implemented that incorporates all the processes of the experiment. It is very important that the system support and simulate the whole process of the forecast, from the beginning that a problem of strategy and the forecasts for its success are determined, up to the end where its results are evaluated. Towards this direction, it is underlined that by adopting such completed methodologies officially by the Greek state (e.g. like in Japan), it will be really proven with ordinary scientific numbers if the judgmental forecasting is indeed able to become a main factor that will pull Greece out of the vicious cycle of the economic and social crisis.

#### **The Strategic Plan for Economic Growth and Development through ICTs Areas of Future-Oriented Technology Analysis**

Three areas of future-oriented technology analysis can be identified: 1) technology forecasting that analyses the conditions and potential of technological development within a concrete framework, 2) technology assessment that supports decision-making by generating technology or problem-specific options arising from new developments and 3) technology foresight that addresses the impacts of technological development on a broader scale.

Technology forecasting consists of continuous monitoring of technological developments and their conditions, leading to early identification of promising future applications and an assessment of their impact and potential (Misuraca et al., 2010). This process considers broad technological developments and socio-economic aspects. The results of technology assessment support decision-making on technology through analysis of the social, economic and environmental potential of new scientific and technological developments. Technology assessments focus on either a specific technology (technology driven) or on societal problems arising from the application of a technology (problem-driven).

However useful these two methods may be, the growing knowledge-intensity, the pace of technological and societal changes and the increasingly distributed, networked character of the economy and governance processes cannot be explored using only technology oriented future studies. This requires a more comprehensive approach. In fact, designing scenarios relies on foresight methods, which are based on a much broader concept. It calls upon a wide range of themes and stakeholders' perspectives, in order to examine the social and economic aspects of future technological developments. The process is interactive, open-ended, bottom-up and paves the way to identifying possible breakthroughs and exploring implications and hypotheses that will support the definition of strategic directions and policy-related decision-making (Misuraca et al., 2010).

#### Operation of ICT During the Greek Economic Crisis

The outbreak of the crisis in Greece and the attempt to exploit the existing infrastructure and resources in the area of information systems in public administration in order operational targets of public policy to be accommodated in conjunction with the exploitation of new trends, results in a new agenda for carrying out major operations of Information and Communications Technologies (ICT). These actions could help the public sector to manage workforce effectively, to create new infrastructure in the direction of development, to enhance the educational process etc.

In Greece, the National Digital Strategy (EPSS) is the reference framework for the above-mentioned changes which will boost the economy and the employment as well as improve the quality of life and social cohesion (NDSG, 2016). It is worth-mentioned that despite the uncertain economic setting, the main analysts admit a rapid, global growth in the branch of ICTs (Bilan et al., 2019). Therefore, new ICT tools and technologies to forecast potential outcomes and impacts of proposed policy measures will be developed, something that Greece must exploit. The research actions that the Greek Government should include in the strategic planning of ICT policies are: 1) synthesis reports giving a critical analysis of the main studies published worldwide in relevant policies or actions, 2) forecasting reports

on the success of the actions that the Government intends to implement and 3) applied assessment studies on the implications and consequences of those actions, focusing on the challenges they might have for the society in the future.

According to the Digital Economy & Society Index (DESI), up to 2021, policy emphasis should be given on:

- the “business to business” (B2B) services in productive sectors like tourism and agriculture,
- the modernization of how the public ICT projects are designed, supplied and combined with flexible and effective methods,
- the available highly skilled human resources (NDSG, 2016). Consequently, there might be potential positive impacts on ICT employment resulting from government strategies. Greece is also member of the OECD (OECD, 2010) and should always take advantage of it. Greek government responses to the economic crisis should include even more measures targeting the ICT sector, promoting ICT-based innovation, diffusion and use, focusing on job creation coupled with a bias towards new technologies like “smart” investments and “green growth” (NDSG, 2016).

The main objective in relation with the ICTs is the creation of a national strategy so that it realizes a functional assessment of their difficult exploitation way up to present and far away to the future. This strategy will study the scientific and technological developments as well as their interactions with the economic and social changes in Greece. A global long-term analysis in relation to major objectives of Greece has to be provided. For this scope, arrangement between all the relative institutions should take place as well as contribution of the research teams that are activated in new technologies. This strategy should have the following interrelated goals:

- Support and bigger exploitation of broadband infrastructures and cloud computing
- Deeper and wider realization of Electronic Government in both levels of central public administration and local/regional self-government
- Important support of innovation, competitiveness and extroversion of Greek ICT ecosystem

- Spread and absorption of the use of ICTs from the Greek society/economy
- Stronger security and confidence of cloud computing services

The projects about ICTs should have explicit and as much as possible measurable operational targets (saving resources, provision of services etc.) and their specifications should be scheduled based on these objectives. Moreover, the process of implementation should be characterized from the modern international practice of step-by-step flexible actions (agile methodology) and not from the accomplishment of a perfect planning. In addition, it has great importance that forecasting take place from the beginning as concrete resources (financial and human resources) for the maintenance and the continuous upgrade of the projects. In this way, their unhindered and effective operation is ensured.

The Greek Government can help create a suitable environment for growth. This may include changing legislative policies to be friendly toward ICTs, making it easier for business and consumers to invest in ICTs, providing universal internet access by investing in broadband and encouraging technology innovation (NDSG, 2016). Countries that spend “strategically” today will find themselves more competitive tomorrow (Confronting the Crisis: ICT Stimulus Plans for Economic Growth, 2009). Greece should also take advantage of the financing and funding opportunities about the ICTs given by the EU and when possible, must study and apply best practices from other European Countries. For Greece, the budget may be restricted, thus efforts in order to cut down operational expenses should take place, such as merger of organisations.

#### **Required Funding Models for Greece**

Apart from the above, a subject that should be examined is the selection of new flexible funding models aiming at the faster implementation of actions as well as the faster achievement of operational objectives, such as the cooperation between public and private sector, the realisation of frame agreements etc. Forecasting the effectiveness of policy actions is a strong indicator of the financial investment required by each alternative implementation strategy [9, 38]. Particularly useful would also be the development of human networks between the executives in the

public and private sector with target the coding and the transmission of knowledge and experience.

As for the matter of the information systems and the electronic services that are provided through the actions, general directions should be adopted, such as: the cloud computing, the jointly exploitation of central systems and modular architectures, the simplification and digitalisation of processes, the open data, the open software, the adoption of functional specifications in ICT projects etc.

Particularly important are also the actions in the district. This applies even more, if it is taken into consideration that the main element of the current programmatic period of the EU is the finance of regional innovation in the direction of intelligent specialisation of each region in economic fields where it has or it can create comparative advantage. Example in this case constitutes the tourism, which has high importance for the whole country. The tourism could be exploited with investigation and diffusion of good practices that concern the promotion of local tourist product and cultural, archaeological and geophysical wealth of a place via the exploitation of new technologies.

Regarding the sector of information technology, the actions should be realized with aim to give emphasis in the support of the knowledge capital and the proportional (knowledge-based) services. Desirable actions would be also the collaboration of large “traditional” enterprises with small specialized enterprises of knowledge intensity (start-ups) and universities. Industrial clumps (clustering) and strategic collaborations with foreigner companies must be developed.

For the Greek Government, the first aim of prospective thought is to illuminate the choices of the present by the light of possible futures. Good forecasts are not necessarily the realized, but those which actively avoid the dangers and arrive at the desired objective. Considering all the aspects of the strategic planning described above, we can conclude that crises are also favorable times to make necessary adaptations and to undertake profound reforms that would otherwise have remained hampered by many obstacles to change. Crises bring with them the opportunity for social and organizational changes, and unfortunately are necessary for alter (Langan-Riekhof et al., 2017).

## CONCLUSIONS AND FUTURE WORK

ICT policies have changed considerably in the last ten years. As OECD Information Technology Outlook highlighted, they are now mainstream policies underpinning growth and jobs, increasing productivity, enhancing the delivery of public and private services, and achieving broad socio-economic objectives in the areas of health care and education, climate change, energy efficiency, employment and social development (OECD, 2010). ICT applications and services have become ubiquitous and essential for ensuring sustainability throughout the economy. This makes policy evaluation more crucial than ever to ensure that policy design and implementation are efficient and effective. In the present paper, we studied the role that the ICTs can play for the regeneration of the developmental dynamics of the Greek Economy and the active policies required for this to happen.

Main problems of policy implementation in Greece, that impair the success of the related actions and make the forecasting and assessment of them a difficult task, are: 1) the responsiveness of the Greek administrative system, 2) the program complexity, 3) the unsuitability of objectives, 4) the functional unsuitability of measures, 5) the adequacy of resources, 6) the spatial unsuitability of the program, 7) the bad coordination among the actors involved, 8) the inadequacy of program publicity, 9) the inadequacy of the monitoring system, 10) the lack of connectivity and cooperation among associated organizations, 11) the lack of planning long-term outcomes of the actions and 12) the small participation of the Universities and other research institutes (Georgiou, 1993).

The Information Society requires cooperation between the public and private sectors in a civic society where citizens participate in the shaping of its nature. Main targets towards the Information Society that have crucial importance in the context of the Greek crisis are: the dynamic economic growth (creation of new businesses, emergence of new sectors, increased productivity and competitiveness), the increasing employment (new jobs, improvements and adjustments to human resource skills for covering new labor market needs, development of new forms of work such as tele-working) and the better quality of life (ICT applications in the health and welfare, environment and transport sectors).

Other, more particular, targets are: 1) the improvement in services to citizens and businesses (modernizing how the State operates, greater transparency), 2) an education system and research adapted to the digital age (education employing new technologies, networking of schools and universities), 3) the highlighting and promoting of Greek culture via new media (documenting the cultural heritage, protecting the Greek language, contact with Greeks abroad), 4) the utilizing of new technologies in the mass media (suitable regulatory framework, ensuring diversity of views and freedom of expression), 5) the equal participation of the regions in the global arena (decentralization, encouraging initiatives at regional and local level), 6) the development of national communications infrastructure (developmental initiatives, deregulation of telecommunications, universal services) and 7) the protection of citizen and consumer rights in competition conditions.

On 1<sup>st</sup> October 2010, the Transparency Program initiative called “diavgeia” began in Greece. According to this, administrative acts and decisions are not valid if they are not published online. There is no doubt that since then, the way officials operate their executive power has been affected positively. Other similar systems are the ERMIS web portal (Government to Customer service, G2C), the system that supports the Citizen Service Centers (KEP) and the E-National Land Registry (G2C). However, much more progress is still necessary, especially as far as the G2G services are concerned. It is mandatory that all public management sectors be directed to the same webpage through a government web portal GOV.GR. This single platform should be configured for the different needs of each sector. New systems for each need of a sector must not be created (NDSG, 2016).

Investments in ICT can play a strong role in generating long-term economic growth in Greece, as they offer strong multiplier effects in returns on investment, strong externalities and reduced economic leakages (Salazar-Xirinachs et al., 2014). Government policies can be used to boost aggregate demand, thereby increasing economic activity and reducing unemployment. ICT investments can positively impact jobs, productivity, revenue growth and innovation. Moreover, experience suggests that although long-term, large-scale public infrastructure

investments take longer to plan and execute, infrastructure investments are likely to generate more robust and durable economic growth than other types of stimulus measures.

Forecasting formal expert-based approaches, blended with foresight and impact assessment, could play a major role in strategic planning. We propose judgmental forecasting methods to forecast the success of digital planning policies that could take better advantage of ICTs in Greece, lead to the growth of ICTs and contribute to the recovery of the Greek economy and society (Nikolopoulos et al., 2015). Although the prospective approach solidifies the construction of a development strategy that will lead to the direction of the desired future, the future remains multiple and uncertain. It is impossible all uncertainties to be eliminated by means of forecasting. The least that may be done is to organize and minimize the uncertainties (Godet, 2001).

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