Can IT Innovation become a Tool against Fiscal Crisis?
Findings from Europe

Leonidas G. Anthopoulos, Business School, Technological Education Institute of Thessaly, Thessaly, Greece

Panagiotis Siozos, Department of Computer Science, Aristotle University, Thessaloniki, Greece

ABSTRACT

Economic recession has expanded during the last five years from U.S.A. to Europe and sprawls at an international level. Governments try to redefine their strategies and policies in order to recognize and deal with this unexpected environment, while they prioritize alternative methods in order to return to growth and to control national and supranational economics. Some of these strategic changes emphasize on innovation and research as the means to overcome this recession. The aim of this paper is to question and illustrate the connection between innovation and fiscal growth and in this order to explore whether Governments can capitalize innovation against fiscal crisis. Emphasis will be given on Information Technology (IT) innovation initiatives that are being undertataken with these updated strategies. Literature findings depict such an interconnection, while findings from the latest European strategies are compared to data from other countries regarding innovation's capitalization against fiscal recession and national downturn.

Keywords: Digital Agenda, Europe 2020, Fiscal Crisis, Framework Programs, Horizon 2020, Innovation, IT Innovation, Lisbon Strategy, R&D Policy

1. INTRODUCTION

Recent economic recession has become a worldwide reality since 2008 (Antonevich, 2010), which was mainly triggered by a bank "collapse" with various economic and social implications in U.S.A. (Alliance for Innovation, 2009). By that time, U.S. Federal Government reacted with huge fiscal packages, while Governments in Europe mainly focused on their fiscal policies rather than re-

DOI: 10.4018/ijpada.2015010103

considering their strategies and prevent their nations from a "domino effect" in time, which later appeared. Even then, European member states agreeded on fiscal stimulous packages, whose effectiveness against downturn has been questioned (Berry & Berry, 1992; Watt & Nikolova, 2010). On the other hand, Asian countries appear more stable against this recent recession; they had faced an economic crisis by the end of '90s. Asian states had not reacted with similar means against that unprecedented crisis; neither had they converged on more open or "liberal" economic norms. Instead, they had superimposed change at the margins, seeking unique techno-hybrid solutions to build capabilities to compete in local, regional, and even global markets (Kamarck, 2003; Keller & Samuels, 2003). An extensive information technology (IT) industry is the result of these Asian states' investments, which generates competitive innovative products and still the Asian industry leads the international arena.

This paper follows the above observations regarding the alternative Government approach across nations against recent fiscal recession and focuses on Europe in order to address the following questions: a) *can innovation and IT innovation respectively be considered as a means against fiscal crisis?* And b) *how has or does Europe perform regarding innovation's and IT innovation's capitalization against recent fiscal crisis?* The first question sounds trivial, but this connection with economic growth is crucial to be clarified and understood by policy makers. The second question is very important to be answered, since European fiscal performance flows, while European States have just updated their common strategy to "Europe 2020", where innovation's and IT innovation's prioritization is useful to be identified. Both these questions are answered with bibliographic findings, with data from international organizations and from narrative descriptions, which are based on empirical data from the European Parliament.

The remaining of this paper is structured as follows: in the following section 2, the interconnection between innovation and fiscal growth is determined. Section 3 describes Lisbon strategy's failure in its mission and objectives, together with forthcoming Europe 2020 formulation and characteristics. Section 4 describes old and new European political obstacles regarding research and innovation, which may impact future strategic development. Finally, section 5 contains conclusions and future thoughts.

2. IT INNOVATION AND FISCAL GROWTH

The first question that this paper seeks to answer sounds trivial or obvious, while it can be considered "cliché to say so" (Lederman, 2010). However, it is important for innovation to be defined in economic terms and its relation with fiscal growth to be identified by policy makers. Schumpeter (1949) was the first scholar who discussed about innovation with economic terms during the decade of 30s and defines it as

"opportunity identification, ideation or invention to development, prototyping, production marketing and sales, while entrepreneurship only needs to involve commercialization". Moreover, Ettlie (2006) describes innovation as "invention capitalization", while Porter (2003) commercializes innovation, aligns it to entrepreneurship's strategic and competitive context, and positions it to the top level of national competitiveness. Innovation has to do more than technology; it deals with management systems that drive growth. Drucker (1985) defines innovation as "the action that endows resources with a new capacity to create wealth". For example, in the beginning of the nineteenth century harvesting machines were not affordable to the farmers. Eventually one of the many harvesting-machine inventors, Cyrus McCormick, invented installment buying. This enabled the farmer to buy a harvesting machine with future earnings.

Innovation is also considered as the adoption of novel ideas by an organization. Today it also means rapid adaptation to new innovations (products, processes, strategies, organization, etc.) and a "new school" in strategic management encourages the adaptive method for business evolution, instead of planning and predicting (Wiltbank et al., 2006). Although the objectives of innovation traditionally concern the delivery of new products or processes, recently refer to new business models, such as the way a firm delivers value and secures profits.

Innovation has also a lot to do with Government management (Kamarck, 2003; Nordfors, 2003): an innovation driven economy demands from a country to improve its ability to compete and create a high living standard. Historical data show that a nation can upgrade from a factor-driven to an investment-driven and further to an innovation-driven economy. The final economic form is characterized by a large degree of cluster interaction, highly skilled workforce and advanced research institutions. The simplest way to watch the worldwide attention on "innovation policy" is Google crawl: Google returns almost a billion of records on this term, meaning that Governments have paid enough attention to the significant role of innovation. European innovation policy's web site is among the first top ten Google results, a fact that depicts that Europe prioritizes innovation today.

Finally, innovation offers fiscal growth opportunities. Porter (2003) associates economic growth with economic upgrading, in which national business environment encourages and supports innovative (increasingly sophisticated) competition ways between local firms. The interrelation between innovation and economic upgrading can be also confirmed in the following paragraphs with an analysis of international organizations' data.

IT innovation focuses on either adoption of IT-based solutions by traditional enterprises or on the development of novel IT-based solutions by the IT industry. IT has been considered an opportunity by Governments for public administration's transformation; market growth; knowledge development; and democratic evolution by almost all

Government IT strategies since the late '90s. Anthopoulos and Fitsilis (2013) in their e-strategic comparison illustrate different paths and performances that Governments followed and their results can justify respective differences in IT evolution across the examined nations.

Governments considered a connection between fiscal growth and IT in their e-strategic planning, which can be justified by various works: Van Ark and Piatkowski (2004) identify an interrelation between ICT-Production and ICT-use to Growth; Gust and Marquez (2004) discuss how (IT) are credited with acceleration in productivity and growth, while they perform an international comparison, which illustrates delays in adopting IT technology have negative implications for economy-wide productivity. However, IT is not a panacea and the appropriate Government commitment to IT innovation strategy and efficient strategic management, accompanied by innovative companies are necessary. Anthopoulos and Fitsilis (2013) depict variances among performances between nations, while Bekkers and Homburg (2009) discuss several myths with regard to the contribution of IT innovation and e-Government to better Government.

Following previous Porter's and Schumpeter's definitions a question raises whether the investment on innovation and on IT innovation generates opportunities for economic growth (Lederman, 2010): Sweden (EUROSTAT, 2012; OECD 2012; Worldbank 2013; Worldbank 2012) for instance, has evolved to one of the greatest "knowledge based economies", since it allocates to research and development (R&D) –so called Gross domestic expenditure on R&D (GERD) index- an average of 3.65 percentage of gross domestic product (GDP) during the last devade and to education a 7.3 percentage of GDP in 2009. Although Sweden does not produce the highest number of patents, it can deliver innovation appropriately to its national growth and market, accompanied with political strategies that support innovation's penetration. This can be confirmed by the existence of famous Swedish innovative companies, which have rapidly evolved during the last decade (i.e., Ericsson, Volvo, Pharmacia etc.). OECD (Organization for Economic Cooperation and Development) (OECD, 2012) data for Sweden illustrate a significant labor growth in the last decade, and a 2.8 percent GDP growth since 1989.

Finland in 2008, allocated a 3.72 and a 6.1 percent of GDP to R&D and to education investments respectively (EUROSTAT, 2011; OECD 2009; Worldbank 2013; Worldbank 2012); South Korea a 3.36 percent and a 4.8 respectively; while Japan a 3.4 and a 3.45 percent respectively in the same year and scores first in GERD index (OECD 2012). Moreover, South Korea (OECD 2009) performs a 53.8 value for BERD (percent of business expenditure on R&D), it spends a 7.35 percent of GDP on education and many challenging innovation projects are under development and testing (i.e., the New Songdo and 21 other ubiquitous cities developed from the scratch) have attracted many international firms to

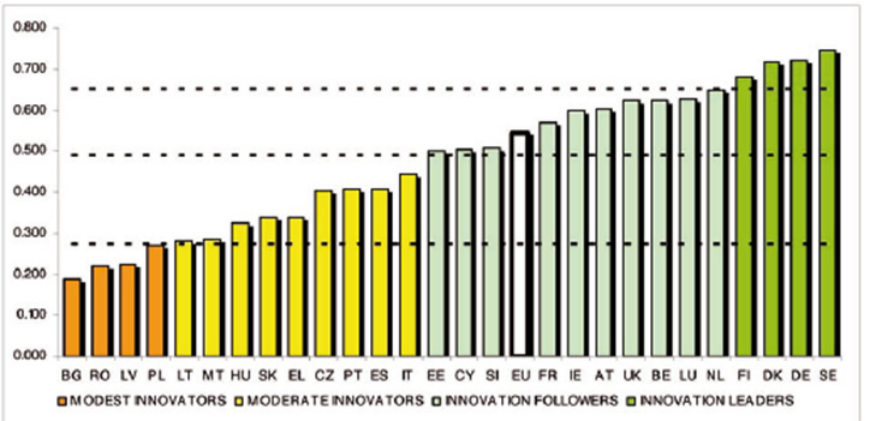
invest in these areas) showing a rapidly evolved knowledge-based market. According to OECD (2009), South Korea scores a 5.6 percent (2nd rank) value of GDP growth since 1989, and good values on labor service growth too.

In the same period (1989-today) the average European (EU 27) values show a 1.77 ranking for GERD, and a 37.1 value for BERD (OECD 2009). European states adopted the Lisbon strategy by the year 2000 in order to evolve the EU to the "most dynamic and competitive knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion and respect for the environment by 2010". European Union (EU) leaders updated the Lisbon strategy twice on 2005 and 2008, giving priority on "more and better jobs" and on "knowledge economy", while they prioritized the common referenced "education-research-innovation" triangle.

Today, that Lisbon strategy has come to its end (European Commission, 2010 (a)) and Europe faces the challenges of 2020 (European Commission, 2010 (b)), it invests a 3.2 percent on Education, a value that is far behind the ranks of U.S.A., Japan and South Korea. On the other hand, EU has the advantage of internal analysis for decision making: different EU States perform differently on knowledge economy (Veugelers & Mrak, 2009) and on innovation according to the Innovation Union Scoreboard (European Commission, 2013; 2009). In this order, the European States have defined complex indexes (i.e., Summary Innovation Index (SII) (Figure 1)) to measure innovation and growth performances. These European findings confirm an existing significant innovation gap between EU27 and South Korea, U.S.A. and Japan; while they introduce a possible dimension of lower economic growth due to lack of a knowledge economy basis.

Last but not least, the above European analysis gives another dimension (Veugelers & Mrak, 2009): economic growth that is mainly based on imported innovation is questionable and consider-

Figure 1. EU Member States' innovation performance (European Commission, 2013)



able vulnerabilities to the development of a robust knowledge-based economy arise; the example from Ireland's behavior in this period of economic crisis justifies this dimension. Additionally, the dependence of some states' economy on foreign markets, foreign investors and foreign know-how sources make their innovation and economic growth process more vulnerable, as current economic crisis has made clear (Lane, 2010).

All the above findings question the requirement for investing on innovation and on IT innovation. EU invests huge on innovation though the Framework Programmes (FP), while on the other hand European e-Strategies *eEurope* and *i2010* (Anthopoulos & Fitsilis, 2014) have mainly funded IT innovative solutions for the public sector rather than supporting private investments by the IT industry. FP7 has come to its end and the following FP8 ("Horizon 2020") has just completed its design process with the contribution of the experiences from previous programmes. EU investigations show a clear positive correlation between innovation and economic growth for all EU countries; these investigations also return evidence regarding the conditions that influence economic growth performance. In Greece and other southern countries for instance, Governments have emphasized since 1982 on innovative program planning and on public funds absorption, which did not provide the expected market growth, while universities, research centers and innovative companies did not align to the European strategies. On the other hand, European innovation leaders, which have succeeded in Lisbon targets, are not willing to share their profit with their followers in order to close the existing innovation gap. This evidence concerns national conditions such as the institution quality, internal market openness and maturity, IT availability and use, human resource development, and innovation capacity drivers' existence.

The European findings describe a potential behavior concerning the capitalization of innovation and IT innovation against the economic crisis: if the economic crisis has damaged some of the internal national capitals that influence economic growth, Europe must first treat them. In this direction, Europe extends the triangle "education-research-innovation" to a square: it adds policy making on research, framework programmes and funding on innovation.

Previously, innovation was defined clearly with financial terms; the transformation of innovative ideas into profit was illustrated, while international data depicted how different countries approach GDP growth via innovation. Finally, EU advantages were identified in order to analyze the contribution of innovation in economic growth. Moreover, current incongruity in European States' market and behavior can lead European policy making for innovation against the economic crisis. It is clear that the proper policy making for R&D agenda's formulation is the right tool to shape a knowledge-economy first, to develop a significantly independent economy from foreign know-how's, and to capitalize national capacities for innovation. Furthermore, shared knowl-

edge and increased interaction between different professions (business clusters), academics and politicians can strengthen the national innovation systems.

3. EUROPEAN STRATEGIC FAILURES AND IT INNOVATION

The second question that this paper aims to answer, concerns the European behavior regarding innovation and IT innovation capitalization against fiscal crisis. In this order, the strategic findings from past Lisbon strategy (European Commission, 2010 (a)) and the under development Europe 2020 (European Commission, 2010 (b)) are illustrated and discussed with useful empirical information from the European Parliament. Moreover, the following section illustrates the existing obstacles and divergencies in Europe and the decisions that European Governments have taken with Europe 2020, which could deal or not with these phenomena.

Technology, innovation, and firm performance are interrelated and existing evidence depicts alternative performance across Europe (Koellinger, 2008). European States formulated Lisbon Strategy in 2000, where they determined the challenge regarding becoming European Union "the most competitive knowledge-based economy in the world". This ambitious strategy has been revised twice (2005 and 2008) (Commission of the European Communities, 2007): it incorporated the vision for "more and better jobs", it focused on a knowledge-based economy and formed the triangle "education-research-innovation".

The 7th framework programme ("FP7 - 7th framework programme of the European Community for research, technological development and demonstration activities (2007-2013)") (European Council, 2006), with a budget of 50,521 million EUR was the "vehicle" for R&D investments under Lisbon strategy and the largest single funding program for R&D in the world. FP7 accounted for roughly 3 percent of the total EU R&D budget as the GERD was at 245,673 million EUR in the EU 27 in 2010 (EUROSTAT, 2012). Yet as a single programme with a massive number of calls, FP7 defined the pace for R&D conducted in Europe and, with its international participation, is a point of reference globally.

Moreover, FP7 was a huge logistics challenge. According to the latest published FP7 monitoring report (European Commision, 2012) in its first five years, 307 concluded calls received more than 79,000 proposals (involving than 386,000 applicants) were evaluated, leading to more than 16,000 negotiated proposals (involving more than 85,000 participants organizations and individuals) for an EU funding of 25,7 billion euro. From 2005 to 2009 the GERD to GDP ratio increased from modestly from 1.83 percent to 2.01 percent. In 2010 there was a small decline to 2.00 percent.

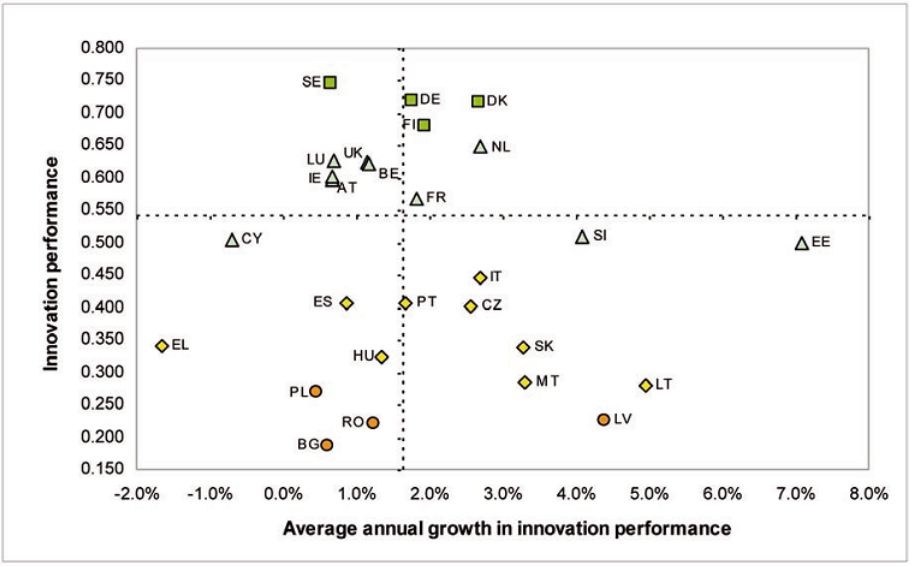
Among the EU Member States, the highest R&D intensities in 2010 were recorded in Finland (3.87 percent), Sweden (3.42 percent) and Denmark (3.06 percent). There were nine Member

States that reported R&D expenditure accounting for less than 1 percent of their GDP in 2010; The Member States with the lowest R&D intensity were generally in southern and Eastern Europe. Innovation Union Scoreboard (2013) captures an annual innovation growth for almost all EU27 (except Greece and Cyprus) (Figure 2).

With regard to the ICT innovation, European e-Strategies (e-Europe and i2010) have been launched and developed, encouraging –among others- innovative IT solutions rather for Government and less for economic growth. Different results can be observed across Europe (Sonntagbauer et al., 2010) concerning e-Government development index and e-readiness, showing high performance results for northern states and lower performance in the Balkans and the Mediterranean regions. These IT divergencies comprise a strategic failure too. Northern countries appear more robust regarding IT contribution to productivity too (Hempell et al., 2004).

Lisbon strategy ended in 2010 and its mid-term evaluation and divergencies can be illustrated between strattegic objectives and strategic success and that EU cannot compete their existing or forthcoming competitors (European Commission, 2010 (a)). The Lisbon strategy defined the EU an objective of devoting 3 percent of its GDP to R&D activities by 2010. The 3 percent target was not reached yet was maintained, forming one of five key targets within the forthcoming Europe 2020 strategy adopted in 2010. In this context, although Europe recognized its challenges for 2020, still spends a low amount of GDP in R&D, while U.S.A. invests the 5.6 percent despite the financial recession. Investments on state-of-the-art technologies such as, Information Technology,

Figure 2. Growth in innovation performance 2008-2012 (European Commission, 2013)



biotechnology, nanotechnology and cloud computing remain significantly below U.S.A., Japan and South Korea. Moreover, Europe has not impeded the "brain drain" phenomenon to other countries. European researchers seem to prefer moving to the U.S.A., while researchers from China, India and other deveping countries do not move to Europe.

EU's failure to achieve the Lisbon Agenda objectives (i.e., R&D investments of 3 percent of the GDP) is not just a simple failure to reach some arbitrary numbers. It is a strategic mistake in a policy that is crucial for Europe's future. One can argue that underinvestment in R&D is not a simple effect but a root cause of the economic crisis.

Europe 2020 (European Commission, 2010 (b)) is the updated forthcoming European strategy, which defines targets for the year 2020. More specifically, European Governments prioritized Smart Growth, Sustainable Growth and Inclusive Growth, emphasizing on knowledge, innovation and green technologies as the means for competitiveness, cohesion and employment. This European strategy is analyzed in seven flagships: Innovation Union; Youth on the Move; A Digital Agenda for Europe; Resource Efficient Europe; an Industrial Policy for the Globalization era; an Agenda for new skills and jobs; and European Platform against povery. From the first look, Europe puts innovation first and recognizes the requirements for a knowledge-based economy.

The shortcomings of the previous FPs and lessons learned have presumably led EU policy makers towards a reconceptualisation of funding practices in Horizon 2020, which replaces the FP7. During the consultation that led to the Horizon 2020, interested parties have sent clear messages asking for rationalization of the geographical distribution of research participants and more transparent funding that is based on merit and that has research excellence as its only objective. Results-based approaches, project-specific lump sums and allocation of prizes and awards have been proposed as alternatives for funding projects.

Horizon 2020, although with a much smaller budget than initially foreseen, remains – especially in a time of shrinking national budgets – a key-driver of European Research and Development and Innovation (R&D&I) efforts. Moreover, Horizon 2020 is what largely will determine whether the European Union can meet the challenges ahead. It is targeted on the main societal challenges that Europe and the world are facing and is aiming to provide solutions that will turn into innovation and entrepreneurship, paving the way towards sustainable development and social wealth.

The transformation of the EU into an innovative, knowledge-based society is an absolute necessity, now more than ever. Not only is this independent of the current economic crisis, but Europe's investment in research and innovation is the only path that predictably and credibly would lead the EU into a path of long-term growth conditions in a highly turbulent world of dwindling natural resources and increased competition.

If the EU believes in the "knowledge economy" then it has to invest heavily in its capacity to research and innovate its way out of the crisis.

4. EUROPEAN POLITICAL OBSTACLES REGARDING RESEARCH AND IT INNOVATION

The above findings are alarming for Europe, since innovation and the transformation to a knowledge-based society are prerequisite to sustainable growth (Lederman, 2010). Lisbon strategic failures do not simply concern numerical divergencies, but they probably indicate strategic planning mistakes in a crucial field for European future. Moreover, Europe mainly adopts financial measures against fiscal crisis, which has already been questioned regarding its effectiveness (Berry & Berry, 1992; Watt & Nikolova, 2010).

However, European Union is not homogenous and different performance regarding innovation and knowledge-based society can be observed among the member states. Sweden for instance, has been recognized earlier as an exemplar in innovation and knowledge-based economy and high ranked research institutes, skilled labor and various business clusters exist.

European performance regarding innovation and R&D is problematic, it is not a result of financial recession since Europe scored this performance even in a prosperous time -but it is rather a cause- and appears that the related policies must be reconsidered. European relative policies are fragmented:

1. Fail to recognize international trends;
2. Has not a clear view of the challenges that Europe faces; and
3. Cannot focus on long-term objectives.

European policies regarding R&D are distributed in various horizontal action plans (i.e., research programs, framework programs, initiatives etc.), which in many cases do not align to national policies and to state priorities. Additionally, more than 2,000 innovation groups (islets) were structured, from which only a few have an international recognition. A representative fact of European failures regarding R&D policies is that after a 30 year period of efforts, Europe has not founded an organization for copyright protection or a common European patent. Moreover than not, the cost for a patent protection across Europe reaches 70,000 EUR and demands 27 separate applications to all member-states, when at the same time the cost in U.S.A. is ten times lower. The foundation of such a common organization for copyright protection is a prerequisite for the development of a favor innovative environment in Europe.

Moreover than not, the experience gathered by the 7th Framework Programme depicted that current procedures and the tools used for funding research are accompanied by a legacy of complexities, inherited by all six previous framework programmes. The

progress reports for FP7 point out that the simplification of procedures remains a challenge and conclude that a new balance should be achieved between trusting researchers to spend funds wisely on the one hand and carrying out extensive assessments and audits on the other. EU research funds are allocated through five Directorate Generals (DGs), each one with its unique procedures, forms, manuals and culture.

Recently, Europe finalized the formulation of and launched Europe 2020 strategy, which prioritizes smart and green economy. However, this strategic update lacks in the appropriate alignment across Europe of R&D and innovation activities that have to face recent challenges, which the strategy recognizes, such as climate change, renewable energy sources, ageing, security and social cohesion. These challenges overcome the capacity of each member State as well as the distributed research teams. In this context, Europe 2020 can become viable only if the strategic development must focus on the motivation and unification of the distributed researchers across Europe. The establishment of the European Institute of Technology (EIT) is a step towards this direction, while a continuous monitoring and analysis of international data has to be performed by the European organizations.

Furthermore, exemplars from other countries demonstrate that openness, cooperation and competitiveness between enterprises, universities, research centers and public organizations are necessary for the establishment of a prosperous innovation environment (Phene & Almeida, 2008). These premises demand the interconnection between research centers and the capitalization of the information technologies –i.e., Web 2.0 and Web 3.0- for the development of a common virtual research environment, which will enable knowledge and ideas exchange and mobility in Europe. Today, only 1,000 institutes and 2 million researchers are interconnected across member States. Towards this direction, 2.5 billion euros are planned to be invested by 2020 on R&D infrastructures with a worldwide range, which are based on information technologies (e-infrastructure).

In parallel, Europe must become more extrovert and cooperative with research partners in developing countries. European Union External Action (EEAS) in cooperation with the European Research Council (ERC) have started working in this direction, providing with funding opportunities networks of researchers between Europe and Asia. With such activities, Europe can strengthen its advantages and can invest on other countries' pros (Sethi et al., 2003).

However, a significant disadvantage for Europe is the limited funding on R&D and innovation. Horizon 2020 started with an ambitious target of 100 billion EUR of funding which was subsequently matched by 80 billion EUR from the European Commission (including budgetary lines for the EIT and the Competitiveness and Innovation Framework Programme (CIP)). Finally, EU leaders Summit that was carried out on February 2013, allocated to Horizon

2020 the amount of 48 billion EUR on research projects, which is 6 billion EUR less than the previous Lisbon strategy had offered for public R&D funding. This justifies that Europe has not realized the significance of innovation for economic growth, neither that it innovation can become a "vehicle" against economic recession. The EU's reluctance to sufficiently fund the Horizon 2020 program makes it even more difficult to achieve the goal of the 3 percent of GDP R&D funding. Only this time Europe cannot afford to fail. Moreover, these funding cuts affect mainly the countries in South-Eastern Europe, which have not achieved closed enough in Lisbon targets, in contrast to the advanced European economies, which can invest more than 3 percent of their GDP on R&D. This divergence will impact economic development in the following decade.

Further to the above, European policies have not effectively encouraged private R&D investments, which during this fiscal crisis have decreased. Europe could treat this phenomenon with efficient funding mechanisms (i.e., funding by the European Investment Bank), together with the elimination of bureaucracy regarding R&D projects' funding. Europe is in need of more companies, especially small and medium sized enterprises (SMEs) that are capable of either researching or innovating, or making good use of the R&D results that European universities and research organizations are producing.

A final obstactle that European Union must overcome concerns internal negotiation and political competition regading the maintenance of political balancies and of a social cohesion. European R&D policies must be disconnected and differentiated from social policies and from "sensitive" European balancies and must focus on Excellence in order to succeed.

Additionally, European e-strategies that accompany the Lisbon and the Europe2020 have not emphasized in private innovative investments and they mainly encourage public IT-based innovative solutions. ICT innovative achievements that have been developed in Europe as a result of European e-strategies cannot be disregarded (i.e., e-Government Interoperability Framework (e-GIF), the Pan-European Public Procurement Online (PEPPOL) etc.), while innovative IT products are being developed mainly by the northern States' IT industry. However, the previously mentioned European obstacles regarding innovation performance affect IT innovation too.

5. CONCLUSION AND FUTURE THOUGHTS

This paper discussed a crucial issue regarding the contribution of innovation and IT innovation against recent fiscal recession. At first, innovation was defined with economic terms and findings from studies, which were carried out by international organizations determined that indeed innovation can support national economic growth and employment. Countries that invest huge on education and innovation appear more

competitive, increase their GDP and develop knowledge-based economies, in contrast to the others. In this context, international competition encloses R&D and innovation (Phene & Almeida, 2008; Sethi et al., 2003), while innovation appears the primary propulsion force for the formulation of a knowledge-based economy against the fiscal crisis (Lane, 2010).

However, innovation cannot be considered a "panacea". Sayings regarding "to invest on innovation during an economic crisis is equivalent to deal with your health only when you face a death disease" appear to be true. Innovation cannot be a free willing neither it's simply a top-down procedure. European strategies justify these sayings. When the Lisbon strategy failed to achieve in its primary objectives regarging the development of the most competitive knowledge-based economy in the world, while studies show that other countries evolved faster via investing on R&D, European Governments have planned their forthcoming strategy with a smaller budget on R&D. In this context, Europe seems to be losing the battle of innovation and competitiveness, both externally, in relation to other parts of the world, and internally, as some member states, especially in the South, struggle to compete the innovation leaders within the European Union. These internal divergencies are not planned to be shortened and can increase in the future due to the fiscal crisis. It is left to future European strategic evaluation to prove whether or not these European decisions will affect the achievement of recent demanding challenges for 2020. All current predictions do not favor Europe. The world in 2025 will be a much more difficult arena for European companies. Only through research and innovation will European societies, companies and universities be able to cope with this reality. These European innovation obstacles affect IT innovation too. During the last decade IT innovation has been encouraged and publicly funded under the European e-Strategies that accompanied the Lisbon strategy, but it mainly concerned innovative solutions for the public sector. It is left to the forthcoming Digital Agenda (Anthopoulos & Fitsilis, 2014) to show whether or not European Governments have learnt from their failures, but recent strategic planning generate pessimism.

Further to the above, economic growth which is based on imported innovation is arguable and has weaknesses. The example of Ireland justifies this innovation dimension, where the dependence of an economy on foreign markets and on imported "know-how" results in vulnerabilities. Economic growth and innovation must be endogenous and accompanied by a balance between private and public R&D investments.

ACKNOWLEDGMENT

The context of this paper has been part of the speech given by Professor Ioannis A. Tsoukalas, Member of the European Parliament, at Microsoft "EU Leaders

Outreach" event, December 9, 2009, Bruxelles, Belgium. Moreover, parts of this paper have been presented during political negotiations, which were carried out in European Parliament during Horizon 2020 formulation.

REFERENCES

Alliance for Innovation. (2009). Navigating the Fiscal Crisis: Tested Strategies for Local Leaders. A White Paper from the Alliance for Innovation commissioned by the International City/County Management Association (ICMA). Retrieved May 10, 2013 from http://transformgov.org/en/knowledge_network/documents/kn/document/300890/navigating_the_fiscal_crisis_tested_strategies_for_local_leaders

Anthopoulos, L., & Fitsilis, P. (2014). Trends in e-Strategic Management: How do Governments Transform their Policies? [IJPADA]. *International Journal of Public Administration in the Digital Age*, *1*(1), 15–38. doi:10.4018/ijpada.2014010102

Antonevich, K. (2010). *Fiscal policy in Sweden: Analyzing the effectiveness of fiscal policy during the recent business cycle*. Master's Thesis in Economics, Jönköping International Business School, Jönköping University.

Bekkers, V., & Homburg, V. (2009). The Myths and Ceremonies of EGovernment: Beyond the Hype of a New and Better Government? In Meijer, Boersma and Wagenaar (Eds) ICTs, Citizens and Governace: After the Hype! IOS Press, Amsterdam.

Berry, F. S., & Berry, W. D. (1992). Tax Innovation in the States: Capitalizing on Political Opportunity. *American Journal of Political Science*, *36*(3), 715–742. doi:10.2307/2111588

Commission of the European Communities. (2007). *COM 803 final part I: Keeping up the pace of change*. Strategic report on the renewed Lisbon strategy for growth and jobs: launching the new cycle (2008-2010). Retrieved November 24, 2009 from http://ec.europa.eu/growthandjobs/pdf/european-dimension-200712-annual-progress-report/200712-annual-report_en.pdf

Drucker, F. P. (1985). *Innovation and Entrepreneurship: Practice and Principles*. New York: Harper & Row.

Ettlie, J. E. (2006). *Managing Innovation* (2nd ed.). Oxford, U.K.: ElSevier Publishing.

European Commission. (2009). European Innovation Scoreboard (EIS, 2009). Retrieved May 10, 2013 from http://ec.europa.eu/enterprise/policies/innovation/files/proinno/eis-2009_en.pdf

European Commission. (2010) (a). The Lisbon Strategy 2000-2010. An analysis and evaluation of the methods used and results achieved. Retrieved March 20, 2013 from http://www.europarl.europa.eu/document/activities/cont/201107/20110718ATT24270/20110718ATT24270EN.pdf

European Commission. (2010) (b). EUROPE 2020: A strategy for smart, sustainable and inclusive growth. Retrieved March 20, 2013 from http://ec.europa.eu/eu2020/pdf/COMPLET%20EN%20BARROSO%20%20%20007%20-%20Europe%202020%20-%20EN%20version.pdf

European Commission. (2012). Fifth FP7 Monitoring Report 2011. European Commission, DG Research & Innovation. Retrieved, March 20, 2013 from http://ec.europa.eu/research/evaluations/pdf/archive/fp7_monitoring_reports/fifth_fp7_monitoring_report.pdf

European Commission. (2013). *Innovation Union Scoreboard 2013*. Retrieved May 10, 2013 from http://ec.europa.eu/enterprise/policies/innovation/files/ius-2013_en.pdf

European Council. (2006). Amended proposal for a DECISION OF THE EUROPEAN PARLIAMENT AND THE COUNCIL concerning the 7th framework programme of the European Community for research, technological development and demonstration activities (2007-2013). Retrieved March 20, 2013 from ftp://ftp.cordis.europa.eu/pub/fp7/docs/ ec_fp7_amended_en.pdf

EUROSTAT. (2012). R&D Expenditure. Data from October 2012. Retrieved, March 2013 from http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/R_%26_D_expenditure

Gust, C., & Marquez, J. (2004). International comparisons of productivity growth: The role of information technology and regulatory practices. *Labour Economics*, *11*(1), 33–58. doi:10.1016/S0927-5371(03)00055-1

Hempell, T., Van Leeuwen, G., & Van Der Wiel, H. (2004). ICT, Innovation and Business Performance in Services: Evidence for Germany and the Netherlands. ZEW - Centre for European Economic Research Discussion Paper No. 04-006. Retrieved May 10, 2013 from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=545183

Kamarck, E. C. (2003). *Government Innovation around the World*. Harvard University Press.

Keller, W. W., & Samuels, R. J. (2003). Innovation and the Asian Economies. In W. W. Keller & R. J. Samuels (Eds.), *Crisis and Innovation in Asian Technology*. Cambridge University Press.

Koellinger, P. (2008). The relationship between technology, innovation, and firm performance—Empirical evidence from e-business in Europe. *Research Policy*, *37*(8), 1317–1328. doi:10.1016/j.respol.2008.04.024

Lane, P. R. (2010). Some Lessons for Fiscal Policy from the Financial Crisis. In *Fiscal Consequences of the Crisis*. Dublin, Ireland: Institute for International Integration Studies Publishing.

Lederman, D. (2010). An international multilevel analysis of product innovation. *Journal of International Business Studies*, *41*(4), 606–619. doi:10.1057/jibs.2009.30

Nordfors, D. (2003). The concept of innovation journalism and a programme for developing it. Retrieved November 20, 2009, from http://www.innovationjournalism.org/archive/INJO-1-1.pdf

OECD. (2012). Main Science and Technology Indicators: volume 2012/1. Retrieved March 20, 2013 from http://www.oecd.org/sti/sci-tech/keyFigures_20112_1_EN.pdf

Phene, A., & Almeida, P. (2008). Innovation in multinational subsidiaries: The role of knowledge assimilation and subsidiary capabilities. *Journal of International Business Studies*, *39*(5), 901–919. doi:10.1057/palgrave.jibs.8400383

Porter, M. (2003). *Building the Microeconomic Foundations of Prosperity.* In *Global Competitiveness Report 2002-2003*, (pp. 29-56), World Economic Forum Publishing.

Schumpeter, J. (1949). Economic Theory and Entrepreneurial History, Change and the Entrepreneur, (pp. 63-84). Reprinted in Schumpeter, J. (1989). Essays on Entrepreneurs, Innovations, Business Cycles and the Evolution of Capitalism, (pp. 231- 253). New Brunswick, N.J.: Transaction Publishers.

Sethi, D., Guisinger, S. E., Phelan, S. E., & Berg, D. M. (2003). Trends in foreign direct investment flows: A theoretical and empirical analysis. *Journal of International Business Studies*, *34*(4), 315–326. doi:10.1057/palgrave.jibs.8400034

Sonntagbauer, P., Gusev, M., Rotim, S. T., Stefanovic, N., Kiroski, K., & Kostoska, M. (2010). e-Government and e-Business in Western Balkans 2010. In *Second International Conference, ICT Innovations 2010*. NewYork, Springer.

Van Ark, B., & Piatkowski, M. (2004). Productivity, Innovation and ICT in Old and New Europe. *International Economics and Economic Policy*, *1*(2-3), 215–246. doi:10.1007/s10368-004-0012-y

Veugelers, R., & Mrak, M. (2009). Knowledge Economists Policy Brief n° 5 May 2009: Catching-up Member States and the Knowledge Economy of the European Union. Retrieved November 24, 2009 from http://ec.europa.eu/invest-in-research/monitoring/knowledge_en.htm

Watt, A., & Nikolova, M. (2010). *A quantum of solace? An assessment of fiscal stimulus packages by EU Member States in response to the economic crisis*. European Trade Union Institute Working Paper.

Wiltbank, R., Dew, N., Read, S., & Sarasvathy, S. D. (2006). What to do next? The case for non-predictive strategy. *Strategic Management Journal*, *27*(10), 981–998. doi:10.1002/smj.555

Worldbank (2012). Public Spending on Research and Development. Retrieved December 9, 2012 from http://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS

Worldbank (2013). Public Spending on Education. Retrieved March 20, 2013 from http://data.worldbank.org/indicator/SE.XPD.TOTL.GD.ZS

Leonidas Anthopoulos is an Associate Professor at the School of Business and Business School of the TEI of Thessaly, Greece. Dr. Anthopoulos has extensive IT research, planning and Management experience with the development and deployment of municipal and organizational IT environments. At his previous job positions, as an Expert Counselor at the Hellenic Ministry of Foreign Affairs in e-Government and e-Diplomacy areas, as an IT researcher and manager at the Research Committee of the Aristotle University of Thessaloniki (Greece), Municipality of Trikala (Greece), Administration of Secondary Education of Trikala (Greece) and Information Society S.A. (Greece), he was responsible for planning and managing of multiple IT projects for Greek Government and for various Public Organizations. Among them it worth mentioning the Smart City of Trikala (e-Trikala) project, the SYZEFXIS and Police-online projects, the e-Government portal for the Hellenic Ministry of Foreign Affairs etc. He is the author of several articles published on prestigious scientific journals, books and international conferences. His research interests concern, among others, smart cities, e-Government, Enterprise Architecture, engineering management, strategic management, etc.

Panagiotis D. Siozos has a PhD in Educational Technology from the Computer Science Department, Aristotle University of Thessaloniki, Greece. He holds a BSc from the same department. He has extensive work experience as a computer science educator and as a software engineer. He has taken part as a researcher in many EU funded research projects. He served the European Parliament as a science and policy advisor. His areas of expertise include On-line Educational Environments, Computer Assisted Assessment, Research and Innovation policy, ICT and information society.