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Public procurement for innovation: a novel e-government services scheme in Greek local authorities

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Abstract

Despite the renewed interest among policy makers and academic scholars on Public Procurement for Innovation (PPI) as an important demand-side policy instrument that triggers innovation, there is relatively little empirical evidence on the implementation of PPI practices and such research has been mainly focused on the demand side without taking into account the supply-side perceptions.

This paper seeks to offer empirical evidence on the public procurement's role as tool for developing and diffusing innovation by examining a pioneer eGovernment project launched by the Central Union of Greek Municipalities. Our findings suggest that this project can be characterized as a PPI practice that attempts to address the challenge of providing value-added eGovernment services to citizens and businesses achieving at the same time a more efficient management of resources and organizational processes and significant scale economies for local authorities. A significant positive side effect of the project was that it created opportunities for knowledge-intensive entrepreneurship, while its main added value lies in its long-term potential as its design characteristics offer high possibilities of reusability and transferability at a national and regional level. However, a series of obstacles resulted in the delayed implementation and the partial completion of the project. In particular, several issues such as the insufficient expertise of

the purchasing agency, the relatively limited involvement of the end-users, the inefficient technical, risk and relationship procurement management, the legal framework of the project, and the weaknesses of the Greek ICT ecosystem constituted significant deficiencies to the successful overall realization of the project.

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This paper seeks to offer empirical evidence on the role public procurement as tool for developing and diffusing innovation by examining a pioneer eGovernment project launched by the Central Union of Greek Municipalities. Our findings suggest that this project can be characterized as a PPI practice that attempts to address the challenge of providing value-added eGovernment services to citizens and businesses achieving at the same time a more efficient management of resources and organizational processes and significant scale economies for local authorities. A significant positive side effect of the project was that it created opportunities for knowledge-intensive entrepreneurship, while its main added value lies in its long-term potential as its design characteristics offer high possibilities of reusability and transferability at a national and regional level. However, a series of obstacles resulted in the delayed implementation and the partial completion of the project. In particular, several issues such as the insufficient expertise of the purchasing agency, the relatively limited involvement of the end-users, the inefficient technical, risk and relationship procurement management, the legal framework of the project, and the weaknesses of the Greek ICT ecosystem constituted significant deficiencies to the successful overall realization of the project.

1. Introduction

In the last decade, a new interest at the European Union level has emerged in the use of public demand as an engine for the development and diffusion of innovations (Edquist et al, 2010). Public Procurement for Innovation (PPI) is widely acknowledged as an important demand-side innovation policy instrument which occurs when a public purchaser either

seeks to trigger innovation by demanding products that do not yet exist, or by choosing products which have innovative characteristics (Georghiou et al., 2013; Edquist and Zabala-Iturriagoitia 2012a).

The increasing EU policy attention for the innovative potential of public procurement has been communicated through a series of reports and recommendations that was in turn picked up by several EU countries and has found its way into national policy debates. However, only recently this has led to some actual public procurement initiatives by a small number of member states such as the Netherlands, UK and Belgium. Seeking more innovative procurement solutions can generate benefits for the public and the private sector as well as the wider society. Such benefits include the modernization of public sector, the improvement of public services, the competitiveness of firms in future markets, the stimulation of knowledge-intensive entrepreneurship and the tackle of contemporary societal challenges (Lember et al., 2010; Timmermans and Zabala-Iturriagoitia, 2013).

Despite the rising policy and academic interest on public procurement for innovation, there is relatively little empirical evidence on the implementation of PPI practices. In addition, empirical research has been mainly focused on the demand side itself, i.e. the procuring organizations, without taking into account the supply side perceptions (some notable exceptions are Georghiou et al., 2013 and Aschhoff and Sofka, 2009). Furthermore, existing evidence is not sufficient to provide a conclusive picture of the role of public procurement in promoting innovation in the field of information and communication technologies (ICT). Therefore, an analysis of selected case studies where public procurement has stimulated innovation and R&D is necessary (Nyiri et al., 2007).

Our paper adds to the PPI literature in several ways. First, it attempts to address the lack in empirical studies by offering empirical evidence on the role of PPI in the field of eGovernment. In doing so it focuses on the pilot project “Local Government Application Framework” (LGAF) that was launched by the Central Union of the Greek Municipalities (KEDE) aiming at the development of a centralized platform for the provision of high-quality eGovernment services to citizens and local businesses. Second, by investigating a quite complex project that involved a variety of actors from both the demand and the supply side it offers a rich illustration of the various procurement stages and the specific challenges encountered providing some interesting policy implications. Third, the empirical part of the

paper is based on case study work¹ guided by a series of in-depth interviews with the key supply actors of the project. This practically means that this study may improve our understanding on the principal difficulties faced by firms seeking to innovate in the context of the procurement process.

Our findings suggest that the LGAF project can be characterized as a PPI practice that attempts to address the challenge of providing value-added eGovernment services to citizens and businesses achieving at the same time a more efficient management of resources and organizational processes and significant scale economies for local authorities. In the Greek context, this new procurement approach can be considered as an effort to substitute the usual inefficient and ineffective practices whereby each local authority is buying an almost identical ICT package paying separate license fees. A significant positive side effect of the project was that it created opportunities for knowledge-intensive entrepreneurship, while its main added value lies in its long-term potential as its design characteristics offer high possibilities of reusability and transferability.

However, a series of obstacles resulted in the delayed implementation of the project. Most striking yet, its actual operation is still pending i.e. the LGAF platform is still not in use. The considerable delay in the system's development can be primarily related to its redesign short after the project's initiation. Nonetheless, several issues such as the insufficient expertise of the purchasing agency, the relatively limited involvement of the end-users, the inefficient technical, risk and relationship procurement management, the legal framework of the project, and the weaknesses of the Greek ICT ecosystem constituted significant deficiencies to the successful overall realization of the project.

The paper begins with a review of the relevant literature describing the rationale, definition and theoretical taxonomy of PPI, the related policies, the potential benefits and deficiencies of innovative procurement practices as well as the context of PPI in the ICT field in Europe. The third section provides a general picture of eGovernment services provision in Europe while the fourth section describes briefly the public procurement framework in Greece with emphasis on the procurement of ICT and eGovernment solutions at a national and local level. Then, it follows a detailed description of the case study and in particular the objective, the procurement process and the output of the LGAF project. The sixth section discusses the case study results highlighting the innovation character and potential benefits of this

¹ This case study was partially funded by the FP7 AEGIS (Advancing Knowledge-Intensive Entrepreneurship & Innovation for Economic Growth and Social Well-being in Europe) project (contract number: 225134)

initiative as well as the challenges associated with the management of the procurement process. The paper ends with a number of policy implications.

2. A review of the relevant literature

2.1 Public procurement for innovation

A demand-based innovation policy can be defined as a set of public measures that aim at increasing the demand for innovation, at improving the conditions for the adoption of innovations and/or improving the articulation of demand so as to foster the creation and diffusion of innovation (Edler, 2007). The rationale for demand-based innovation policies is spurred by the various market and system failures that affect the translation of needs into functioning markets for innovative products, the need for improvement of public services and the solution or mitigation of societal problems, and the strengthening of competitiveness through, for example, the creation of a lead market (Edler and Georghiou, 2007).

Public Procurement for Innovation (PPI) is an important demand-side innovation policy instrument (Edler and Georghiou, 2007; Geroski, 1990; Rothwell and Zegveld, 1981) which occurs when “a public organization places an order for the fulfillment of certain functions within a reasonable period of time through a new product” (Edquist and Zabala-Iturriagoitia, 2012a; p.2). This product might be “a good or a service or a combination of the two, which might be called a system” (Edquist and Zabala-Iturriagoitia, 2012a; p.2). The innovation-related activity occurs when a public purchaser either seeks to trigger innovation by demanding products that do yet exist, or by choosing products which have innovative characteristics (Georghiou et al. 2013).

Edquist and Zabala-Iturriagoitia (2012a) propose a taxonomy of PPI that is based on previous theoretical work (Edler, 2009; Edquist et al., 2000; Hommen and Rolfstam, 2009; Uyarra and Flanagan, 2010) and consists of two dimensions. The first focuses on the end-user of the resulting product and includes two different categories: direct and catalytic. Direct PPI occurs when the procuring organization is also the end-user of the purchased product whilst catalytic PPI is when the procuring agency functions as a catalyst and coordinator for different end-users. The second dimension refers to the character of the resulting innovation and consists of three categories: pre-commercial, adaptive and developmental procurement. Pre-commercial procurement (PCP) refers to the procurement of R&D-based solutions and not to the development of an actual product. Namely, it is a

matter of R&D funding geared towards very specific goals (Edquist and Zabala-Iturriagoitia, 2012b). Adaptive PPI occurs when the procured product is new only to the country (or region) of procurement and involves incremental innovation. Developmental PPI implies that completely new-to-the-world products are created as a result of the procurement process and it involves radical innovation (Edquist and Zabala-Iturriagoitia, 2012a).

In the last decade, a new interest at the European Union level has emerged in the meaning of demand-side approaches to innovation and, more concretely, in the use of public demand (procurement) as an engine for the development and diffusion of innovations (Edquist et al., 2010). Since 2003, a series of core policy papers and important reports have been issued (e.g. European Commission, 2003; Kok et al., 2004; European Council, 2005; Aho et al., 2006; Finland's EU Presidency, 2006; European Commission, 2007) that in general aim to raise awareness and interest in member states about the potentiality of public procurement and other demand-side innovation policies (regulation, standards, financial incentives etc.) for new research and innovation-intensive goods and services. In addition, EU provides guidance towards this goal through a series of consolidated public procurement directives ever since 2004. Finally, under the recently adopted "Innovation Union"² strategy, EU aims to develop a European scheme in order to support public procurement of innovation (European Commission, 2011).

As a result of the abovementioned European level activities, the attention for the innovative potential of public procurement was picked up by several European Member States and has found its way into national policy debates. However, only recently this has led to some actual public procurement initiatives by a small number of countries such as the UK, Netherlands and Belgium. Countries such as Sweden, Germany and France recognize public procurement as a policy instrument to enhance innovation but policy on PPI is at an earlier stage of development (OMC-PTP, 2009). Nevertheless, the EU public procurement market is not sufficiently encouraging innovation in comparison with countries such as the US, Japan and Korea that have more explicit policies to orientate public demand towards promoting innovation. Furthermore, they have applied pre-commercial procurement much more systematically and comprehensively than European countries and give emphasis on the participation of SMEs in pre-commercial procurement projects.

² One of the seven flagship initiatives of the "Europe 2020 strategy".

2.2. Potential benefits and deficiencies related to innovative procurement practices

Seeking more innovative procurement solutions can generate benefits for the public and the private sector as well as the wider society. Such benefits include the modernization of public sector, the enhancement of public services efficiency, effectiveness and quality and, generally, the encounter of contemporary societal challenges. Nevertheless, the concept of PPI provides considerable opportunities for increasing of firm competitiveness and stimulating innovative entrepreneurship at a local, regional, national and even European level. A study of six Nordic–Baltic Sea cities (Lember et al., 2010) reveals a positive connection between public procurement for innovative solutions and urban competitiveness. This is evidenced by “the increased exports and, most importantly, changes in companies’ routines regarding how innovation is approached” (Lember et al., 2010; p.18). In addition, Aschhoff and Sofka (2009), through a survey of 1100 firms in Germany, support that public procurement has heterogeneous effects on firms’ innovation performance and is more effective for smaller firms in regional areas under economic stress and in distributive and technological services. Furthermore, Timmermans and Zabala-Iturriagoitia (2013) investigate the role PPI can play in the promotion of knowledge-intensive entrepreneurship (KIE). They refer two ways in which PPI stimulate knowledge-intensive entrepreneurship. First, PPI could support knowledge firms that already exist by involving them in the procurement process. Second, PPI could eventually lead to the establishment of new firms with all the characteristics of KIE (Timmermans and Zabala-Iturriagoitia, 2013).

Despite the large variety of expected benefits, there are many deficiencies and obstacles that have to be encountered through policy measures for the successful implementation of PPI initiatives. PPI is a costly and time-consuming process, which requires strong coordination among stakeholders, constant evaluation and learning and includes transaction costs (Lember et al., 2010). Georghiou et al. (2013) establish a broad taxonomy that categorizes deficiencies of procurement policies-practices and instruments to address them under four main headings: a) framework conditions, b) organisation capabilities, c) identification, specification and signaling of needs and, d) incentivizing innovative solutions. They tested the deficiencies of this taxonomy through a dedicated survey of 800 public sector suppliers in the UK.

Framework deficiencies refer to the procurement regulations that “are driven by competition logic at the expense of innovation logic”, and to the “requirements of public

tenders that are unfavourable to small-medium sized enterprises” particularly in Europe (Georghiou et al., 2013; p. 4). A serious contextual obstacle can also be considered the inadequate capacity of suppliers to respond to innovation-related and demanding procurement initiatives especially in small countries and regions (Georghiou et al., 2010; Peck and Cabras, 2011).

Public organizations are facing the need to develop capabilities and skills to carry out more effectively and efficiently these novel procurement practices. The technical competences (e.g. knowledge of the subject field) and organisational capabilities (e.g. a dedicated procurement team) required to successfully procure technologically complex projects are often in scarcity within public organisations (Sylvest, 2008). Few European countries have actually deployed (mainly soft) capacity-building policy measures such as awareness raising, training in ICT and procurement skills, and exchange of good practice (Nyiri et al., 2007) to remedy the abovementioned deficiencies.

An important factor for the beneficial implementation of a PPI practice is the appropriate identification and specification of needs. However, the absence of a well defined and long-term strategy on public needs and the lack of a good knowledge and organized discourse about the innovation potential of the given supplying market is a usual phenomenon (Georghiou et al., 2013). Regarding catalytic procurement, very often there is a lack of communication-coordination among the purchasing agency and the end-users hindering the necessary feedback in various phases of the procurement process. For example lack of flexibility during the contact phase may constitute an important impediment to fostering innovation through public procurement. A close dialogue between procurer and supplier that allows for contract amendments in order to incorporate knowledge and experiences gained during the project might prove beneficial for its successful implementation (Sylvest, 2008).

Another significant obstacle for the diffusion of PPI practices is the risk aversion both of procurers and suppliers. Public organisations traditionally tend to favour low-risk procurement of proven technologies, giving emphasis on price rather than innovation. This is mainly due to the fact that “the rewards for being innovative in the public sector are small compared to the negative political and financial consequences of procuring a project that fails” (Sylvest, 2008; p. 2). Therefore, this problem should be addressed through an incentive structure that would generously reward entrepreneurial behaviour and innovation in the public sector. Regarding suppliers, evidence seem to indicate that they are more likely to take risks and propose innovative solutions if they can keep any resulting intellectual

property rights (Nyiri et al., 2007). The risk sharing between the supplier and the purchaser also increases the possibility of innovation. Risk mitigation and the provision of sufficient incentives are particularly crucial for small firms due to their limitations in financial capacity and human resources.

Finally, Valovirta (2012) suggests a tentative framework for managing PPI that emphasizes the interactive nature of innovation procurement at the interface between public demand and private supply as well as the issue of technological and economic risks that are inherent in the innovation process.

2.3 Public procurement for innovation in the ICT field

Today, ICT procurement initiatives account for approximately 20% of the EU procurement budget (Sylvest, 2008). This share is expected to grow as a result of current political objectives to increase efficiency and quality of public services, and the greater demand forecasted for several application areas such as eGovernment, health and education, transport, energy and environment, and public safety (Nyiri et al, 2007).

However, the main purpose of ICT procurement in the European public sector is currently the maintenance of existing products and services. Where innovative products are procured, they are often improvements and adaptations of existing products (incremental innovation) or even non-technological innovation characterised by organisational and management changes, rather than early-stage innovation of emerging technologies (Nyiri et al., 2007). Although there are countries and sectoral niches which are more innovative within areas such as defence, health, transport and taxation, public procurement in the ICT field is not actually realizing its full innovation potential (Nyiri et al., 2007). This is crucial as some of the required improvements in public services in order to address major socio-economic challenges in an efficient and sustainable way are so technologically demanding that either no commercially stable solution exists yet, or existing solutions exhibit shortcomings which require further R&D effort (Sylvest, 2008).

The main demand-side barriers for PPI in the field of ICT are: risk aversion, focus on cost savings and delivering short-term performance targets, lack of procurement and ICT skills, and lack of policy priority and commitment to innovation (Nyiri et al., 2007). In general, policy-makers and project managers are increasingly under pressure to avoid failures and achieve timely results considering the bad reputation that has been created by past failures of high-profile public projects (IDABC, 2005).

Furthermore, in spite of increasing aggregation of demand through, for example, central public procurement agencies, this trend regards mainly ICT commodity goods and services where joint procurement and economies of scale are easier to achieve. In the case of more sophisticated ICT products, the aggregation is negligible and the coordination effort is “softer” (guidelines, awareness raising etc.), and often limited to e-government. Therefore, public procurement remains very fragmented, not only at national level within and among different government functions (administration, health, education etc.) but also at regional and local level, where a significant share of procurement is carried out (Nyiri et al., 2007).

However, the rapid evolution of web-service technologies, open standards and architectures provides opportunities for the disintegration of traditional “black boxed” technologies and services (traditionally organized around oligopolistic IT suppliers/markets and departmental structures) and their reaggregation around the citizen in the form of services. In this way, government could become technology- and vendor-neutral as the standard business logic is separated from supporting applications. As a consequence, there would be a progressive convergence on standard “utility” public services supported by a plural and more innovative and cost-effective marketplace with significant implications for the role of the state as a technology (and service) procurer (Fishenden and Thompson, 2012).

3. Electronic government services in Europe

EGovernment (electronic government) refers to the utilization of ICTs, and other web-based telecommunication technologies to improve the efficiency and effectiveness of service delivery in the public sector (Jeong, 2007).

EGovernment changes considerably the way public services are delivered and generally the way in which government interacts with citizens and businesses. Thus, it can be considered as a field that provides significant room for public procurement for innovation. The benefits resulting from an extensive realization of eGovernment concern a large variety of actors. First, eGovernment can enhance the public sector’s productivity, increase transparency, and lead, in consequence, to less corruption, cost reductions and public revenue increase. At the same time, it can result in better delivery of public services to citizens by ensuring time and cost savings and generally by upgrading their quality of life. Furthermore, eGovernment can improve the interactions of government with industry strengthening in this way the private sector’s productivity, and competitiveness prospects.

EU's eGovernment services are becoming increasingly interactive and transactional, while the quality of service delivery has been significantly improved through time (European Commission, 2013). However, three key messages emerge from a recent eGovernment Benchmark Report (European Commission, 2013). First, there is an increasing challenge to meet the ever-growing citizens' expectations for simple, easily accessible and user-centric public services taking into account the opportunities that modern technologies provide. Second, governments are not fully reaping the potential benefits of eGovernment. At present, eGovernment use in the EU is on average at 46% and there is a slow progress in usage compared with the number of fully available online services. This causes the required investments in ICT for public service provision to be underutilized and thus inefficient in economic terms (e.g. the expected cost savings are partially realized). Thirdly, transformation is needed to accomplish a new generation of eGovernment services spurred by motives such as economic recovery, severe budget constraints and customer expectations. The design and delivery of new services should primarily adopt an 'outside-in' approach i.e. through the eyes of the users (citizens and businesses) rather than through the eyes of the provider. Public administrations should continuously adapt to rapidly shifting environments and, thus, flexible and fully interoperable organizations and systems are required.

Interoperability³ is considered as a crucial factor to address the abovementioned challenges, and the emphasis that the European Commission puts on this issue is very strong. In particular, the Digital Agenda for Europe (European Commission, 2010a) sets out a common and coherent approach to interoperability as well as priorities for actions. Moreover, it introduces a conceptual model for developing European cross-border and cross-sectoral⁴ life-event eGovernment services.⁵ It presents a building block approach to construct these allowing service components to be interconnected, and promotes the reuse of information, concepts, patterns, solutions, and specifications in Member States and at the European level (European Commission, 2010b).

³ Interoperability is the ability of disparate and diverse organizations to interact towards mutually beneficial and agreed common goals, involving the sharing of information and knowledge between the organizations, through the business processes they support, by means of the exchange of data between their respective ICT systems (European Commission, 2010b; p.2).

⁴ A sector is understood as a policy area, e.g. customs, police, eHealth, environment, agriculture, etc. (European Commission, 2010b; p.1)

⁵ The term "life-event service" can be defined as basket of services that are relevant in a particular point in time to a business or citizen. Such services – that are typically delivered in silos from individual agencies – are required to be streamlined across public (and at times private) organizations to adequately satisfy the customer (European Commission, 2013; p.5).

There are multiple significant benefits of achieving interoperability in an eGovernment context. From the standpoint of public services, interoperability allows for better coordination of government agencies, improved service delivery and access, and more efficient technology management and maintenance. Furthermore, public administration can avoid potential future costs such as reliance on a single vendor and the high price of new development by leveraging existing systems in new ways. From the standpoint of policy makers, eGovernment interoperability can improve data gathering and parsing techniques resulting in more efficient and accurate decision making. Finally, it can also promote international cooperation by assisting in the creation of infrastructure to address cross-border issues and to allow for the provision of cross-border services, i.e. services that require the coordination of public authorities in different Member States, an important pillar for the realization of a European single market (UNDP, 2007; Novakouski and Lewis, 2012).

Summing up, eGovernment in Europe can be realized in three levels. The first one refers to interactive and transactional basic services at a national level, the second concerns building interoperable life-event services at a national level, and the third regards cross-border life-event services at a EU level by enhancing interoperability of public authorities in different Member States. While the first eGovernment level appears to be adequately implemented, the realization of the next two, which implies much higher added value for citizens/businesses and the public administration, is still far from satisfactory and it appears to leave lot of room for innovative public procurement initiatives.

4. Public procurement for innovation in Greece

In Greece, the use of public procurement as a tool to stimulate demand for innovative products or services is fragmented and based on priorities and policies set by various public bodies (Nioras, 2011). Hence, the framework conditions for public procurement in Greece, including the legislative background and the broader governance that determines the degree of autonomy and centralization for particular types or sizes of purchase does not seem to favour PPI. Recently more emphasis is put on demand side measures supporting innovation (Nioras, 2011), however, cost effectiveness and cost rationalization still remain the dominant rules for any type of public spending (European Commission, 2012). Political hostilities in the past have created a very unfavourable climate for trust, an important prerequisite for PPI when other criteria than price are to play a critical role in the evaluation procedure. The lack of adequate human resources and skills on the buyer's side along with the bureaucracy governing the operation of the Greek public sector may be considered as

additional inhibitory factors (Edler et al., 2005). A characteristic case is procurement of military equipment. Greece has one of the highest levels of defence expenditure as a share of GDP among the EU and NATO countries. Nevertheless, according to a recent EU report the Ministry of Defence's R&D expenses account for less than 1% of the total government appropriations for R&D (European Commission, 2012).

An exception to the general implementation rules of the public procurement framework is the procurement of ICTs, co-financed by the EU in the context of the Community Support Framework. In this case, specific procedures are foreseen to ensure that the cost effective spending is accompanied with compliance to the technological developments (Edler et al., 2005).

However, a recent study (SEV/IOBE/NTUA, 2011) reveals that, in general, the Greek public sector cannot be considered as an intelligent buyer of ICT and eGovernment solutions. What's more, the usage of ICTs at all government levels (national, regional and local) is far from satisfactory, while the development and use of sophisticated eGovernment services is considerably low. This can be attributed to various factors such as insufficiency of human capital, resistance behaviors and other institutional aspects (SEV/IOBE/NTUA, 2011).

In particular, a large share of the public procurement processes are taking place in the context of co-funded EU-National projects due to the financial opportunities that they offer. Yet in the majority of cases, public authorities do not have the required human resources, knowledge and organizational capabilities for an efficient involvement in such projects i.e. they are not qualified to specify the functional and quality requirements, assess the different tenders, tightly monitor and evaluate the implementation progress and, finally, test and accept the delivered product or service. Moreover, by using strict-sometimes outdated and very restrictive- technical specifications rather than functional requirements in the relative calls, public authorities do not encourage the development of innovative products or services (SEV/IOBE/NTUA, 2011).

In addition, the legal framework favours large and well-established firms as prime contractors due to their previous experience and financial credibility, which are considered as two basic award criteria. This fact limits considerably the participation of younger, smaller and would be innovative ICT firms. Furthermore, in cases of public catalytic procurement (e.g. municipalities as end-users) (Edler and Georghiou, 2007; Edquist and Zabala-Iturriagagoitia, 2012a), Greek central public agencies do not usually develop complementary instruments (e.g. improve awareness and training of the members of the

municipalities' councils in ICTs) to ensure adequate involvement of end-users (SEV/IOBE/NTUA, 2011). Therefore, the specific weaknesses on the public demand side and the legal framework of the EU co-funded ICT projects can be assumed as barriers to creating innovative eGovernment services (SEV/IOBE/NTUA, 2011).

The same study suggests that not only the demand but also the supply side does not support innovation since firms active in the Greek IT industry are primarily offering products of low sophistication, specialization, and standardization. This can be partly attributed to the low quality of public demand, but it can also be related to private demand as well. The private sector's demand is primarily determined by the unconsolidated structure of the Greek economy i.e. the relative large number of small and especially micro firms that typically do not demand high-level IT solutions (SEV/IOBE/NTUA, 2011).

Therefore, the majority of firms in the IT sector appear not to have conceived the private and public demand for computer and eGovernment services as an opportunity to enhance their stock of knowledge and achieve sustainable competitive advantage but only as a means of temporarily increasing their profits. Due to this short-term business strategy, they are experiencing quite intensely the negative impacts of the current economic crisis (SEV/IOBE/NTUA, 2011).

The weakness of public demand in procuring innovative ICT products and services also seems to hold at the local government level. A recent large-scale survey (KEDE/NTUA, 2011) which examined the extent of ICT utilization in Greek municipalities and their relevant procurement practices revealed that they have not developed an explicit ICT strategy, and most importantly they seem not to have the required human resources and organizational capabilities for carrying out PPI practices in the ICT field. Thus, they cannot be characterized neither as intelligent customers nor as efficient users of IT and eGovernment solutions. In consequence the Greek local authorities offer citizen and business centered services of admittedly low quality and limited interactivity. More than half of them are not offering eGovernment services at all, while those that do so rely primarily on information-based eGovernment services. More interactive and transactional services are provided only by a small share of large and medium-sized municipalities. Accordingly, the demand for advanced e-government services remains extremely low.

Nevertheless, it must be noted that there is a relative small number of pioneer local authorities that appear to have the internal organization and capabilities needed in order to improve and further develop their eGovernment services.

5. The LGAF Project: Detailed case study description

The case study work presented in this paper examines the public procurement process and outcome in the context of the large-scale pilot project “Local Government Application Framework” (LGAF) which was launched by the Central Union of Greek Municipalities (KEDE). The ultimate goal of the project was the pilot offering of high-quality eGovernment services to eight municipalities of various size and geographic characteristics across Greece.

KEDE is the principal institution that represents the 325 municipalities in the country nationally and in European and International organizations aiming at the promotion of all issues concerning them. During the last 10 years in extensive consultation with academic experts has developed certain policy initiatives for the ICTs adoption and usage at the local government level.

The selection of this specific case study work was primarily based on the degree of the innovativeness of the project and the importance of the challenge addressed in the public domain by the specific solution. The LGAF pilot project by adopting open standards and service-oriented architecture can be considered as a public procurement practice that:

- a) drives both innovation and progressive convergence on cheaper standard utility public services by aiming at the promotion of interoperable, scalable and reusable IT systems and solutions,
- b) allows the government to become technology and vendor agnostic and limits its overdependence on proprietary systems and suppliers and consequent vendor lock-ins,
- c) provides high-quality e-government services to citizens and businesses.

The case study work was conducted using a semi-structured questionnaire focusing on different aspects of the specific public procurement process such as: a) the targeting of the LGAF project; b) the stages and the result of the procurement process; c) the obstacles to success; d) the project’s characteristics as a PPI practice; e) the importance of specific design and procurement management capabilities; and f) the long-term potential of the project. The case study protocol guided a series of in-depth interviews with the founders or CEOs of the firms and the research centre officials that played a key role in the design and execution of the project. The interviews were supplemented with extensive review of the project’s documentation.

5.1 The LGAF procurement process and output

In 2005, KEDE decided to exploit the financial opportunity offered by the EU Cohesion Policy Fund to carry out a pilot project with a total budget of € 1.6 Million-aiming at: a) the delivery of value-added on-line services to citizens and local businesses, and b) a more efficient management of local authorities' resources and organisational processes. This targeting was translated into the following design principles and functional requirements.

- 1) The development of a centralized platform using the “build once, use many” strategy which is a more efficient approach for government-rather than each agency spending time and resources to build their own e-government tools and systems (Gallerani, 2011).
- 2) The adoption of open standards to ensure the platform's technical interoperability with the municipalities' existing (legacy) systems and at the same time promote the scalability⁶ and reusability⁷of the platform and its potential –interoperability with other information systems of the public administration.
- 3) The implementation of this platform by using Open Source Software (OSS) i.e. software whose source is available for free and can be copied, modified, and expanded by any developer. The use of OSS allows the avoidance of future costs such as the obligation of license fees payment and inflexibility due to vendor lock-in⁸. Furthermore, it facilitates the transfer and use of the produced technological knowledge by other public authorities.

The procurement method for acquiring the platform was an open call which included the aforementioned requirements and suggested a number of OSS packages already in use by local governments in other European countries (UK, Sweden, etc.). The contract was awarded to a large, well-established Greek IT firm that decided to use one of the proposed OSS solutions (APLAWS) as the base for the new system's development. The carrying out of the work involved two basic stages:

1. The design and development of the platform and its delivery as a product to the purchasing agency (KEDE);
2. The platform's utilization by end-users for the pilot delivery of eGovernment services.

⁶ “Scalability” is defined as the usability, adaptability and responsiveness of applications as requirements change and demands fluctuate (UNDP, 2007; p.5).

⁷ Reusability” is defined as the degree to which a software module or other work product can be used in contexts other than its original, intended or main purpose (European Commission, 2010b; p.33).

⁸<http://open-source.gbdirect.co.uk>

In 2007, KEDE and the prime contractor decided the redesign of the project towards a more state-of-the-art technological solution⁹ that could meet more effectively the prescribed functional requirements and especially enhance the interoperability, scalability and reusability of the platform. In particular, the main argument for the project's technical reorientation was that although the adopted solution was a pioneer project at the time it was first developed, it could not be easily adapted to the new technological context of the rapidly evolving web-service technologies.

Web-service technologies support the adoption of more flexible system architectures such as the Service Oriented Architecture (SOA). SOA is an enterprise-wide IT architecture that offers a better way of designing integrable, re-usable application assets, orchestrated from existing services rather than rebuilt from scratch¹⁰. Its main characteristic is its implementation of a service platform consisting of many services that signify elements of business processes that can be combined and recombined into different solutions and scenarios, as determined by the business needs (Bieberte et al., 2006). This capability provides organizations with the flexibility needed to respond quickly and effectively to new situations and requirements (UNDP, 2007).

In order to exploit the technological and operational advantages that the SOA approach offers, KEDE and the prime contractor agreed to build a new and more complex platform consisting of different components¹¹. The advantages of the platforms' redesign compared to the initially adopted solution are threefold: a) higher levels of interoperability with municipalities' existing systems; b) adaptation and responsiveness to required changes and increased reusability potential; and c) possibility of interoperation with other information systems of the public administration

The project's reorientation raised substantially the need for specialized software providers' (subcontractors) with expertise in SOA architecture due to the various platform components that had to be developed. Hence, the project team has been progressively transformed into a network of specialized "service providers" (consisting of two research labs and several small and micro firms) which undertook the development of the specific components of this architecture.

⁹ A notable fact reported during the interviews which may have also intensified the need for redesign was that the initial survey of existing technical solutions was rather narrow because it focused on the field of local government. This limited considerably the range of the proposed software packages and probably counted out more state-of-the-art technical solutions.

¹⁰ Bringing SOA Value Patterns to Life: An Oracle White Paper, p 5.

See: <http://www.oracle.com/technologies/soa/soa-value-patterns.pdf>

¹¹ A part of the core components of the platform would be based on existing OSS packages.

The development process of the platform components also demanded an active involvement of the end users (municipalities), so that their actual needs would be properly addressed. Nevertheless, only one participating municipality contributed to the development of one of the core component of the platform i.e. the business process management system by reengineering and modeling the specific organisational processes that would underlie the delivered services. In any case it should be noticed that the end-users selection criteria were primarily based on size and geography -following the concept of representativeness included in the directives of the 3rd Community Support Framework- and not on their actual interest in the project or their real capacity to get involved in it.

Furthermore, the project's implementation required a high-level technical management for the efficient coordination of the specialized providers and the integration of the produced components. However, the prime contractor did not seem to be familiar with such a division of innovative labor. The technical management became quickly a non-cooperative bargaining game, where the main project participants pushed towards different technical directions. As a result, the project passed through several "transit states", and the work delayed considerably.

As already mentioned the redesign of the project resulted in assigning part of the contract tasks to subcontractors which were mainly small and young firms. This raised the need for more flexible and steady funding flow to reduce the financial risk of those actors whose involvement in the LGAF project constituted a significant part of their total economic activity. However, the contract designated that the payment of the largest part of the budget would follow the successful closing of the project. As a consequence, serious finance problems were caused to the micro and small partners slowing down at the same time even more the implementation of the project.

In addition, the contract agreement had initially foreseen that only 10% of the total budget would be dedicated to the initial stage of the LGAF project i.e. the platform development. This is because the main part of the budget would support the participating municipalities in the pilot testing and use of the platform. But, although the budget allocation might have been appropriate for the implementation of the platform through the modification of an already existing package it proved insufficient for the design and development of a more novel and complex system.

Due to the inconsistencies of the financial flux¹² and/or their limited capacity to meet the project's technical requirements¹³ some of the subcontractors withdrew from the project. However, a larger firm (employing approximately 40 employees) joined the consortium and proved to be very helpful in accelerating the technical work and completing the first basic stage of the project i.e. the development of the LGAF platform.

The extensive delays in platform delivery essentially resulted in the partial completion of the project in December 2011. This practically means that the completion of the second stage of the project is still pending i.e. the LGAF platform has not been put into operation. The efficient utilization of the platform further requires: a) technical interoperability with the municipalities' legacy systems, and b) preparatory organizational work, namely redesign and modeling of municipalities' internal processes in a uniform way for the production of eGovernment services. In financial terms, it demands the creation of a business plan that will determine the way in which the operation cost will be covered.

6. Discussion of the case study results

6.1 Innovative character and potential benefits of the LGAF project

The LGAF project can be characterized as a PPI practice that attempts to address the challenge of providing upgraded eGovernment services to citizens and businesses achieving at the same time a more efficient management of resources and organizational processes and significant economies of scale for local authorities. It has aspects of both direct and catalytic procurement (Edler and Georghiou, 2007; Edquist and Zabala-Iturriagoitia, 2012a) as one central public authority (KEDE) organizes and coordinates the project whose product (platform) will be used mainly by other peripheral public authorities (municipalities).

The innovative character of the LGAF project is closely related to its initial design principles; however, it was further enhanced by taking up the SOA architecture. The adoption of this architecture is actually the main source of technological innovation as it supported the combination of various state-of-the-art or beyond-state-of-the-art technologies for the creation of a new integrated system. This combination process required extensive coordination and resulted in the individual components' enrichment and modification by the specialized developers. As a consequence, the LGAF project can be considered as an

¹² Apart from the work delay, another reason was that Greece had entered a period of severe economic crisis that also affected the absorption of EU funds and, consequently, the funding of several ongoing technology projects.

¹³ The Greek market appears to be rather narrow in terms of providing specialized software developers for this type of innovative projects.

adaptive PPI (Edquist and Zabala-Iturriagoitia, 2012a) as it leads to a significant incremental innovation through the integration of various advanced technologies.

It is important to note that as the ultimate objective of this procurement process was the delivery of product-based services (Technopolis, 2011), the created technological innovation can constitute the technical base for extensive organisational innovation. However, this stage of the project remains to be completed and requires the harmonization of the municipalities' internal business processes that will in turn lead to the delivery of high quality digitized services.

A significant positive side effect of the LGAF project was that it created opportunities for knowledge-intensive entrepreneurship (Malerba and McKelvey, 2010; Radosevic et al., 2010; Edquist et al., 2010; Timmermans and Zabala-Iturriagoitia, 2013). The embraced service oriented architecture resulted in the creation of a complex platform consisting of different components and provided subcontracting opportunities to specialized software developers. What's more, the use of OSS, due to its positive propensity to knowledge exploration, stimulated even more the participation of small-sized software providers that are highly efficient 'knowledge absorbers'. Hence, the LGAF's innovative characteristics actually supported the creation of a knowledge network among micro and small knowledge-intensive organizations (firms and research/academic institutions) which ultimately led to the system's development. On top of that, the future operation of the platform may create more opportunities for KIE through the support services to the system's end users.

The main added value of the LGAF project lies in its long-term potential i.e. the productivity benefits for public and private. In particular, its design characteristics offer high possibilities of reusability and transferability. This practically means that the technological knowledge accumulated during the design and development of the platform can be leveraged and also transferred to other government levels (central/national, regional) and functions (economic affairs, health, education, social protection, public order and safety etc.) leading to proliferative benefits. Even more, its architectural features support its interconnection and interoperability with other information systems of the public sector in Greece and other EU countries so that cross-sectoral and cross-border services could be provided in the future.

6.2 Challenges associated with the management of the LGAF procurement process

As governments are adopting public procurement for innovation as a crucial instrument for demand-driven innovation policies, public organizations are facing the need to develop

capabilities and skills to manage these novel procurement practices. The innovation perspective sets new challenges for the public agencies and the procurement process itself (Valovirta, 2012).

Although this case study indicates that KEDE has been involved in an innovative public procurement, this central agency and the Greek local authorities in general cannot be characterized as advanced and established buyers of innovative ICT solutions. They also do not seem to have a well-articulated procurement strategy with explicit goals that stimulate innovation. However, with the first experience at hand, they can gradually build their capacity to support PPI and improve their relevant management capabilities and skills.

Public procurement for innovation can contribute to improved efficiency and effectiveness of public services delivery. However, technological risks may lead to a non-completion, under-performance or false performance of procured products or services. It should be acknowledged that risks are inherent in the innovation process and thus can never be fully eliminated. However, managing technology risks that may result in lower than expected performance is a key element in public procurement for innovation (Valovirta, 2012).

The case study findings suggest that KEDE could not effectively manage the technology risks related to the platform's development which is up to now partially completed. More specifically, KEDE was not able to communicate effectively the goals of the procurement among the selected end-users (municipalities) and find ways to increase their engagement in the project's implementation.

Knowledge of the market and interaction with suppliers is a key management issue. Our case study findings suggest that once the project's redesign was determined there was a more or less effective interaction with the market which led to the enlargement of the project team with small and more innovative subcontractors that were essential to the development of the new technological solution. However, there is a challenge regarding the process of awarding contracts that actually limits the supplier base and leaves public agencies with a fewer options to choose from. The current institutional framework -defined by EU-directives that try to limit fraud and safeguard delivery of the projects, favours the selection of well-established providers and at the same time reduces the chances of young innovative firms without a track record in similar projects to obtain a contract. In this respect, the case study shows that the LGAF project was awarded to a large well-established Greek firm that most importantly did not have sufficient technical competence to play a critical role in this type of PPI practice.

The relationship and coordination management of the various entities that were responsible for the platform's creation was of high importance due to its increased technical complexity. However, KEDE appeared not to be able to support effectively the different actors' coordination during the procurement process. The prime contractor who was responsible for the partner's technical coordination appeared not to have sufficient technical capacity to undertake this particular new way of developing and implementing an ICT project in the Greek context. As a consequence, the coordination of the partners' work was not as efficient as required by the LGAF-like division of labour scheme. Especially during the first development phases of the platform, each partner did not have an explicitly determined role. Furthermore, at least temporarily, the number of participating actors had been excessively increased because the main partners were attempting to find the more suitable specialized providers for the development of the platform's components. As a result, there was a significant knowledge accumulation in each individual component but the effective combination of these components for the development of the integrated platform was delayed.

The effective operation of the platform in the near future demands an extensive coordination and communication among the local authorities, KEDE and the supply-side actors so as to achieve the appropriate reengineering and integration of the municipalities' internal business processes that underlie the digitized services. This practically means that KEDE should put additional effort in communicating the LGAF's goals and expected benefits to the politically elected decision makers in municipalities and manage collaboration between the interested parties in order to attain the pilot use of the system and pilot delivery of eGovernment services.

Finally, an extended and economically viable utilization of the LGAF platform demands the cooperation of the potential end-users and supply-side entities for the creation of a business scheme that will cover the system's operational cost. For instance, Public Private Partnerships (PPPs) in combination with outsourcing practices constitute an efficient risk management instrument as they contribute to risk sharing between public customers and suppliers. Generally, in complex projects like LGAF that produce composite products (systems) and bundles of services, partnership based approaches are more appropriate (Schapper et al, 2006; Caldwell & Howard, 2011).

7. Policy implications

The stylized facts illustrating the characteristics and deficiencies of PPI in Greece presented in section 4 along with the findings of the case study research allows for some policy implications. The first area of potential policy intervention comes in rendering framework conditions more conducive to innovation. This can be accomplished with the introduction of innovation-friendly regulations not driven by mere cost effectiveness rationalization. For example national regulations should explicitly allow functional specifications, technical dialogue and transfer of intellectual property to suppliers. Furthermore, framework conditions should facilitate the access of small and medium-sized firms to public procurement by simplifying and providing easier access to tender procedures.

Our findings suggest that the successful realization of PPIs related to e-government projects of increased complexity demands for specific capabilities and skills on the public authorities' side in order to manage these novel procurement practices. A second area of policy action can be directed towards supporting broad awareness and commitment of a public organization to innovation procurement by developing high-level strategies to embed PPI practises. On the other hand, specific policy measures should be directed towards developing and strengthening employee skills and competencies to support the implementation of innovative public procurements. Such measures could include spreading of expertise through best practice networks, training schemes and financial support to public buyers to reduce the overheads of learning to use innovation-friendly procedures.

A third area of policy measures in support of PPI is the communication of needs for innovation from buyers to suppliers. This requires that the needs of the public agency (internal use) as well as those of end-users (e.g. citizens) have been clearly identified, articulated and translated into specific requirements that can form the subject of a procurement process. One means for longer oriented articulation of needs is the use of long-term approaches to get future intelligence about demand and supply. Large-scale initiatives such as the LGAF project could be set in the domain of pre-commercial procurement. Initiatives in this domain support the development of prototypes by financing the R&D effort as a starting point for general procurement. These initiatives address a range of shortcomings such as lack of active dialogue between the public buyers and potential suppliers, exclusion of small companies from access to government contracts and risk aversion on both the public and private sides (Georgiou et al., 2013).

Finally, taking into account that innovative projects may lead to lower than expected results public sector buyers are typically more risk averse than the private sector. However, several policies can be designed either to offer incentives for innovative solutions or to offset risks of various types (Georgiou et al. 2013). One approach for managing risk in practice is through providing a financial cushion. For example, financial incentives targeted at reducing the perceived risk of procuring from innovative small firms.

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