

Enterprise Architecture for e-Strategy Standardization and Management: Lessons Learnt from Greece

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Abstract

Enterprise Architecture (EA) is a dynamically evolved area, suggesting frameworks and methods to identify and close gaps, and to handle complexity and change in a private or public organization. Major e-Government strategies around the globe have developed and applied various EA frameworks that guide their implementations. EA in e-strategies support Governments by obliging various agencies to design, specify and implement their e-Government projects under common standards and directions, and to guarantee systems' interoperability. In Europe, European States implement their e-Strategies usually according to central political objectives, directives and frameworks, defined and agreed by the European Council. Recent European e-Strategy recognizes standardization's necessity, but it does not suggest a common EA for national or supranational projects. However, some European countries have developed their own EAs, while others have limited their standardization efforts in aligning their strategies to the European ones and in the specification of similar interoperability frameworks. In this paper we present some important EAs followed by major e-Strategies, together with their recent outcomes. On the contrary, we present e-Government implementation in Greece, where no EA was followed. We use some tenders' data in order to present how the absence of an EA leads to similar projects' differentiation on design, costing, implementation and sustainability.

Keywords:

E-Government, e-strategies, Enterprise Architecture, interoperability, standardization, digital public services.

1. Introduction

According to Doucet et al., the term "architecture", when used in the context of abstracting the enterprise in order to identify scope, function and relationships, describes the synthesis, integration and function of an organization [1]. Enterprise Architecture (EA) uses the abstracting results from the architecture to align strategic objectives, business methods and technology

elements across the organization, implementing a detailed blueprint of systems, data and technology. Furthermore, it provides the standards to implement best practices in the organization, such as strategic planning, capital planning, information technology (IT) libraries of standards, and program, quality and human resource management [2, 3]. EA is part of Enterprise Modeling (EM), which is the "art of externalizing enterprise knowledge" in order to determine the architecture of enterprise systems [4]. Knowledge is realized from the application purpose's and business unit's points of view: for some stakeholders, modeling the organization represents the identification of business strategy and plans, for others it means the selection of quality procedures, and for others it means the determination of the architecture of enterprise systems.

EA's benefits are usually defined in terms of "Return of Assets" [5], meaning how profitable the enterprise gets in generating revenue. However, in e-Government cases, revenue is not strictly measured with financial indexes (e.g. cost savings from digital transactions), but also with service improvement, service integration, citizen satisfaction, transparency etc. In this context, EA provides data about boundaries and gaps between public authorities, and delivers standards from best case studies for organization strategic alignment and operation, and for project design and implementation.

EA becomes the most highly adaptive technique for architecture modeling in both the public and the private sectors, suggesting frameworks and methods to handle complexity and change in an organization [6]. Most Governments adopted EA in order to coordinate and implement their e-Strategies. Major e-Government strategies followed different types of EA according to their willing to implement their missions and to their maturity, and they succeeded in achieving their primary targets such as the development of one-stop e-Government portals, and in modernizing the internal procedures in public administration.

In Europe, the European Member States' Governments agreed on common e-Europe and i2010 strategies [7], concerning their route towards a European Information Society for knowledge based economy, growth and employment. The recent European Digital Agenda strategic plan [7] recognizes current challenges for a common Digital

Single Market, for standardization, for digital literacy and for innovation. All the above European strategies have specified similar primary targets for e-Government, and they have associated public sector's transformation with the quality of life in Europe. Moreover, these strategies have defined the necessary key-enablers for e-Government establishment, they have given specific timeframes for the implementation of the pre-defined targets by national Governments, and they have secured the appropriate funding for e-Government actions. The Directorate General for the Information Society of the European Committee has the responsibility to coordinate and manage both the central European activities, and the National framework programs implemented by the European States. European authorities defined the directives and some frameworks to coordinate Member States in their missions: telecommunication directives and the European interoperability frameworks for instance, are only some of the standards that were delivered to the State Governments.

The Digital Agenda does not determine the reasons that its previous European strategies did not succeed in their expected outcomes, but it recognizes similar and emerging challenges with its previous ones, and it defines an internal coordination mechanism and an annual Governance cycle, which can secure missions' establishment. It also defines indicators that will measure all key actions' progress by the Member States on an annual basis. Moreover, it contains a separate pillar for interoperability and standards, and a Communication document is expected in 2011, which will provide guidance on the link between ICT standardization and public procurement and help public authorities to use standards in order to promote efficiency and reduce lock-in.

Although the Member States have central directions and management, they do not perform the same on e-Government [8]: some countries succeeded in strategic objectives in time, while others requested extra time to implement them; e-Government penetration is high in some countries, while others are still in the beginning of digital public service deployment. Additionally, some European countries such as the United Kingdom (UK) and Germany implemented their own EAs to support further their national strategies.

In this paper we seek for outcomes in e-Strategic progress and management due to the lack in standardization. We examine the Greek national e-Strategy -which was aligned to the European ones- as a representative European case where no EA was applied in strategic implementation. We use data extracted from the analysis of various tenders, in order to present the lack of standardization, which can cause in projects' success and sustainability.

In the following section 2, we make an overview on the EAs applied in major e-Government strategies. In section 3 we present the Greek case, while in section 4 we present the findings from the investigation over various tenders of Greek e-Strategy. We estimate that the differentiation on cost and time specifications and on deliverables' determination is the result of the EA's absence. A centrally defined architecture could guide Greek authorities and support their efforts for digital public service implementation.

2. Literature Review

Literature [9,10,11] demonstrates the application of an EA in e-Government strategies. The importance of an EA existence could be associated with standardization's demand due to the variety of the mission of e-Government projects: many projects concern infrastructures, others software and e-service development, while some focus on digital skills and on diffusion initiatives etc. Major international cases have developed and applied an EA in their strategies, as we present later in this section.

However, today, EM's market penetration is about 8 percent in US and 7 percent in Europe according to Gartner Group [4]. EM markets are still perceived and they are measured separately from the operational enterprise systems and solutions. Most EM projects are performed disjoint from the operational environment and various solutions are being modeled. In this context it is obvious that the purpose of EM is mostly used for human sense-making about the enterprise's mission and structure, delivering common understandings across disciplines and processes. EA on the other hand, arises as the dominant market, rapidly in US and rather slowly in Europe. Today the EA market offers tools to get overviews of IT systems and operational solutions of the enterprise, aligning new IT initiatives and strategic investments, and to maximize outcomes from these investments.

The United States (US) Federal Government's e-Government strategies [12] aim at the transformation of public administration into a citizen-centered, results-oriented and market-based e-Government. The first was entitled "Expanding Government" and it was launched on 2002. Expanding Government was updated to the "Open Government Initiative" by 2009, in which emphasizes on openness, on accountability and on transparency [13]. Today, specific directives are being produced and delivered to the American public agencies so that they will become accountable. Extensive funding of more than \$70 billion is being invested annually on IT and on e-Government projects. All distributed websites from State Governments and local authorities are accessible from a one-stop e-Government portal

called the USA.gov, while the e-Authentication platform provides secure services and preserves privacy during public transactions. On the other hand, the SmartBUY portal for public procurement has decreased annual public spending, while the Open Government Dashboard measures progress and visualizes statistics concerning agencies' performance on accountability and on transparency.

A major American key initiative is the Federal Enterprise Architecture (FEA) [14, 15], which was inspired from Zachman's framework [16] and supports the implementation of US strategy. FEA adopted the National Institute of Standards and Technology (NIST) model [14, 15], and it contains the business, information, information systems, and data and delivery architectures. Moreover, FEA is a *Foundation Architecture* type [1], meaning that it supports the administration to identify and understand its public procedures, while it defines the proper standards for IT systems' design. Foundation is the first among the three potential architectures, and it focuses on well-architected, well-designed IT systems with enterprise-level alignment, interoperability, and efficiency.

European countries on the other hand, as presented before, have followed e-Europe [17] and i2010 strategies and agreed to achieve ambitious targets by 2005 and by 2010 respectively [7]. European central Agencies have not defined a specific EA for e-Government and the implementation of their strategic missions is basically controlled by directives that are formulated by the European Parliament and the European Council. European countries are obliged to compromise their national strategies to the European ones and the overall coordination is performed by the Information Society Directorate General. Centrally implemented initiatives have been launched by the European Committee, such as the Europa.eu and YourEurope.eu web portals that offer cross-country public information and services. Cross-border data and service deployment is based on a common interoperability framework, called the Interchange of Data between Administrations (IDABC) e-GIF or European Interoperability Framework (EIF). This framework contains an IT standards catalogue, policies, guidelines and best practices for integrated service provision. Some European countries such as UK (UK e-GIF framework), Denmark (Danish Interoperability Framework (DIF)) and France (Le Cadre Commun d'Intéropérabilité (CCI)) have developed their own interoperability frameworks, and aligned them to the European one. It must be mentioned that the interoperability frameworks serve the purpose of the standards profile in an EA, which is missing in European strategies. In this context, an important "gap" between European vision and the appropriate standards for e-Government can be

observed and it is expected to be handled by the Digital Agenda.

The British strategic plan [18] is one of the most successful in Europe. It is called "Modernizing Government" and it runs under the coordination of the Office of the e-Envoy. The Direct.gov portal has been implemented under UK's strategy, from where public services are offered centrally, while the Government Gateway is a central platform and the Government Secure Intranet (GSI) interconnects systems with different architectures and data structures, and establish user authentication for all public agencies and civil servants. The e-GIF (e-Government Interoperability Framework) [19] provides a range of standards for data formats and protocols, in order to establish interoperability between different systems. British Government designed and approved its EA on 2005 [20] called the "cross-Government Enterprise Architecture (xGEA)", describing the common "business-led vision" and procedures for UK's Administration. The xGEA defines various architectures, which are called "domains". Specific exemplars are used to define the content for each of the domains, and they are distinguished in "Agreed" and "Possible". The xGEA extends the FEA with the incorporation of the Strategy, Integration, and Security domains.

Moreover, Germany has built the BundOnline 2005 strategic plan [21] for its Information Society framework program, which contained specific targets for e-government. The web portal Bund.de offers more than 450 different public services from more than 100 agencies. German Federal Government wants to make the Bund portal the main information platform for its public Administration, and a citizen-centered and open environment. German EA is called the SAGA Framework [22] and contains - centrally selected- common solutions and standards for ICT projects in German Administration. Furthermore, the framework presents different perspectives that the ICT architecture designers in public Administration must follow for e-Government projects. The SAGA consists of several architectures, which are called "Viewpoints". Only the enterprise viewpoint defines operational standards and deals with business processes' and internal roles' determination and standardization. The others define technological standards for e-Government projects: the Information viewpoint provides data and data modeling standards; the Computational refers to modules and interfaces; the Technology viewpoint defines standards and techniques; finally the Engineering viewpoint provides hardware and infrastructure solutions.

On the other hand, the Federal Government of Canada designed its e-Government strategy by 1999 entitled the "Government on-Line (GOL)" [23], which targeted the deployment of all digital public services until 2004. By 2001 the Canadian one-stop

e-Government portal (canada.gc.ca) became available online. GOL strategy has evolved to the Service Oriented Architecture (SOA) Strategy [23]. Service orientation is defined as “the planning and delivery of all services by formally componentizing each of the services and their subordinate services such that the overall collection of services work as a whole and supports a high level master-plans”. The Canadian SOA can be considered as its EA since it contains the vision, the rules and the methods for e-Government to be complied by all public agencies. The Canadian SOA is an *Extended Architecture* type [1], succeeding in the simplification of the internal procedures in the public administration.

One of the most rapidly evolved international cases has been observed in Australia. The Australian Government launched its first e-Government strategy by 2000 called “Government Online” [24] in order to improve administration’s efficiency and to deliver more than 400 services online. The Australian case succeeded in its clear targets by 2002, when the updated strategy was initiated called “Better Services – Better Government” [25]. This strategy targeted service integration and responsiveness by 2006, when its new version was composed entitled “Responsive Government: A New Service Agenda” [26]. This final version prioritized service transformation and personalization in order to meet users’ needs and public online engagement with Government, and to achieve value for money. Value for money has been supported by the Gateway™ project management assurance methodology, while all strategic visions were asserted by Australian “Government Architecture” (AGA) framework [27]. The Australian EA was based on the US FEA, but it has to be mentioned that compared to the previously presented cases, AGA incorporated the Performance Architecture in order to standardize outcomes’ measurement against the strategic requirements. Moreover, the development of AGA envisioned the cost-effective delivery of consistent and cohesive public services.

The above literature review displays the consequences of standardization in some of the most significant e-Government strategies. With the exception of the European case, all others -and more others that have not presented in this paper such as the Korean and the Japanese cases- formulated and followed specific EAs in order to achieve their missions. In spite of differentiations in maturity level, in structure and in priorities, all EAs try to align vision and methods, and to standardize administration’s transformation.

3. The Greek e-Strategy

Greek e-Strategy can be considered as another European representative case, where lack in standardization has caused considerably in e-

Government development. The Greek Government has adopted all the European strategic plans and developed its first national Information Society Framework Programme by 1998. The Greek first strategy was aligned to the European objectives and directives, and its implementation was assigned to a committee that belonged to the national Ministry of Finance. The committee was called the Special Secretariat for the Information Society and its particular position at the low level of an economic Agency displays the national IT priority and proves that it paid attention mostly to the economic obligations and objectives defined in the European e-strategies. The Greek e-Strategy approached all European priorities for broadband telecommunications market, interoperability, transportation etc.

E-Government was one axe of precedence in this first strategic plan, where the e-Government political objectives concerning a responsive and transparent public administration were aligned to the European ones. E-Government axe of precedence was analyzed in nine (9) special segments, which funded projects whose scope varied from physical citizen service offices (called the KEP), to digital public service deployment, and to digital skills’ enhancement in public administration. Digital public services concerned the twenty (20) pre-defined ones in the e-Europe strategies for citizens and businesses, other usual administrative procedures, tax-declarations, and tele-care and e-health transactions.

The supervision of the Greek e-Government strategy was distributed to multiple agencies, a fact that complicated the entire management procedure: the General Secretariat for e-Government (Ministry of Interior), the General Secretariat for Information Systems (Ministry of Finance), the Special Secretariat for Information Society presented above (Ministry of Finance), the General Secretariat for Telecommunications (Ministry of Transportation and Telecommunications), the Hellenic Data Protection Authority (the independent national authority that studies and arranges privacy issues), the Informatics Development Agency (Ministry of Interior) and Information Society S.A. were the major stakeholders in e-Government development. However, many projects of the Greek strategy were developed by local agencies and municipalities too. The General Secretariat for e-Government was responsible for Greek administration’s modernization. It implemented the KEP offices, the Greek interoperability framework (Greek e-GIF) and the one-stop portal for public administration called the Ermis (www.ermis.gov.gr). Additionally, this General Secretariat guided all projects that were implemented by municipalities and local agencies.

Furthermore, the Greek Observatory for the Information Society (www.observatory.gr) was founded on 2005 and its purpose was to carry out

investigations regarding the IT implementation progress in Greece. This Observatory cooperates with all stakeholders and local agencies, performs measurements for all European indexes, and delivers its results to the Special Secretariat for the Information Society. Measurements are obliged by and delivered to the European Committee, while they are the basis for the future Greek strategic reforms.

The Greek Information Society Framework Program was updated on 2007 to the Digital Convergence Framework Program, which contained the Greek strategic vision for 2013. This updated strategy was aligned to the European i2010 one. The main objectives of this recent Greek program concern the establishment of social cohesion and of social participation, while on the other hand it seeks for solutions that will support national IT industry's and e-business's growth. The Digital Convergence does not contain a separate action plan for e-Government, but it incorporates e-Government in all its different priorities. The Information Society Framework Program and the Digital Convergence strategies resulted in an extensive number of separate projects, funded by more than €5.5 billion until 2010.

The initial Information Society strategic plan prioritized the development of large-scale and horizontally implemented projects such as: a) the Greek Public Administration's Intranet called the SYZEFXIS interconnecting more than 1,300 distributed public agencies across Greece with a cost of more than €75 million; the Police Online system for citizen identities with a cost of more than €10 million; the Digital Urban Service interconnecting more than 100 Urban Service agencies with a cost of more than €20 million etc. On the other hand, the Digital Convergence strategy performed a vertical distribution of projects, giving local agencies the opportunity to perform their internal modernization, to install broadband infrastructures and information systems, and to deploy digital public services.

It is important to analyze the outcomes of the Greek strategic progress with data that are basically obtained from the official documents that are being published periodically by the Special Secretariat for the Information Society [28]: more than 6.000 separate projects were implemented all over the country by 2010; 1.600 of them referred to e-Government axe of precedence, they were implemented between 1998 and 2010, and they have cost €666 million. These projects have deployed nine (9) of the (20) digital public services, which was the primary of the European e-Government strategic objectives. However, only five (5) from the above services interoperate and they are fully available from the Ermis one-stop portal. Additionally, all public agencies were interconnected on the common public SYZEFXIS broadband network, offering the necessary infrastructure for further modernization and cost savings in the public sector. A 37 percent of

the civil servants have participated in IT relative courses and successfully updated their digital skills, in order to improve internal efficiency in Greek administration. The Greek interoperability framework has been defined while one e-Government portal has been developed. Public services are structured in life-event groups, while all future projects have to interoperate with the Ermis portal according to the Greek e-GIF model. All of the above projects did not follow common standards or an EA, suggesting high risks for interoperability failures and for sustainability of the project deliverables.

By the end of 2010, the Greek Digital Convergence strategy has been updated and re-considered its structure and priorities for its remaining period 2010-2013. According to the strategy's official website (www.digitalplan.gov.gr), the updated strategy consists of the following five (5) axes of precedence: a) *open data* that concerns transparency and public information available to citizens; b) *interoperability* in terms of a common Service Registry and cross country services; c) *cloud computing and data centers* that aim in the development of cloud services by both the public and the private sectors; d) *open standards* that refers to standardization for Greek IT projects; e) *multi-channel* information and service provision, which aim in the deployment of high quality data and services via different channels, and in means that support the close of the digital divide. However, only a few projects have been implemented according to updated strategic targets. On the other hand, significant effort has been given to openness in terms of accountability and transparency, as inspired by the US Open Government strategy: a central public consultation web portal has been installed (www.opengov.gr), while all public agencies are obliged to "open" their documents and their information to citizens, by publishing them to their portals and to the Opengov.gr portal.

4. Analysis of Findings

The investigation of the Greek e-Strategy presented in the previous section, documents significant complexity in supervision and management, due to the extended distribution of responsibilities to various authorities. On the other hand the alignment of the Greek strategy to the European one is obvious. Moreover, a lack in standardization is proved, and all effort is given to interoperability between information systems and the Ermis portal. The absence of an EA could complicate further the progress of the Greek e-Strategy, since various agencies are involved in projects' design, procurement and implementation.

The results of this lack in standardization and of the absence of an EA can be proven by the fact that

same projects follow different standards in their definition, and management. Our concept has been confirmed by the analysis of a significant amount of projects' tenders of two project categories: a) the installation of ultra-high speed Metropolitan Area Networks (MAN) in Greek cities. In this context, we investigated twenty two (22) similar cases. b) The deployment of digital public services by Municipalities. In this context we analyzed three (3) similar cases. All of the examined tenders are publicly available on the website of the Greek Special Secretariat for the Information Society.

4.1 Metropolitan Area Networks

The Metropolitan Area Network (MAN) is a fiber-optic ultra-high speed broadband network that interconnects all public agencies in a municipal urban space. This physical network is interconnected with the SYZEFXIS intranet and with the Internet, in order to offer data and voice services to all local public agencies in Greece. The distant objective of the MAN is to create the basis for the deployment of cross-border and cross-agency digital public services. Moreover, another objective concerned the development of the main fiber-optic rings in all Greek cities, on which FTTH connections will be installed and offer ultra-high speed services to citizens and businesses.

According to the Greek policies, each city with a population of over 5,000 civilians, could apply and install a MAN. Cities with less population could apply and install metro-WiFi networks, which are beyond the purposes of this paper. The implementation of MAN all over Greece was one of the biggest initiatives of the Digital Convergence strategy until 2009. Projects' design and procurement were assigned to the Greek Municipalities, who were obliged to participate in this priority. These projects were distributed in seven geographic Regions, whose supervision was assigned to Regional Administrations. The overall supervision was performed by the Special Secretariat for the Greek Information Society.

We investigated 22 tenders of the total 72 MAN projects that have been implemented in Greece, in terms of projects' definition, of technical standardization and of the evaluation criteria for contractor selection. All tenders were composed by local authorities in cooperation with Regional Administrations. Local universities and research centers were obliged to provide technical consultancy to the procedure for the determination of the network's plan and architecture. General technical standards for the network planning and for the network equipment were defined horizontally and incorporated in tender documents by the Greek Special Secretariat.

Our investigation shows that all tenders followed the same technical standards for MAN and the same evaluation criteria, but different evaluation models. Moreover, our findings (Table 1) show that projects vary significantly in their duration (from 8 to 16 months), and in their cost definition per network's Km (from €29.711 to €142.282), without special reasons (e.g. network's route and size). These results question standardization's efficiency in projects' definition and hereupon in deliverables' sustainability.

It is also important to be mentioned that most of the above networks had the opportunity to be extended, in cases where the municipality could document the necessary convenience and prove MAN's sustainability. These extensions are being implemented under similar tendering procedures, and projects' definition and cost are varied too. Two important questions rise, concerning the sustainability of these projects: a) networks' operation is assigned to the municipalities, who are normally unable to offer telecommunication services. In this context, these projects under-perform and their sustainability suffers. These networks do not offer incomes to the municipalities, while on the other hand their maintenance demands a significant amount of a 4 percent of their initial cost. The above horizontally declared tender documents do not contain operational norms or details, but only recently the Special Secretariat for the Information Society has published tender document that seeks for a MAN's operator in the form of a Service Level Agreement (SLA). b) MANs are defined as public networks and they legitimately allow only public data to be exchanged, meaning that no enterprise or civilian can use these networks personally. In this context, it is doubtful how FTTH connections will be installed on the MANs.

4.2 Digital Public Service implementation

Beyond the MANs that are infrastructure-oriented projects, we also investigated projects whose scope is in the area of digital public service deployment. Three projects that have been implemented by municipalities in Greece were analyzed. All of them aimed in the development of a Municipal portal that could offer specific digital services. No central coordination for project design and procurement was applied on the examined cases. Our findings (Table 2) display an extended differentiation among these cases. More specifically, in Trikala case a groupware system was determined for service execution, while the Kavala case requested a step-by-step workflow system, and the Thessaloniki (Sykies) case offers digital form-filling and submission for municipal services. Furthermore, different subsystems and architectures were identified for the projects deliverables. Extended differentiation concerned the

duration and cost estimation for these projects. Concerning the procurement procedure, contractors' profile was different; the evaluation criteria were the same, but different weights were assigned in the examined tenders.

All of the above findings confirm once again the lack in standardization, and the complexity of the e-Government implementation in Greece, facts which it is expected that could be avoided with the existence of a common national EA. This common framework would oblige common architectures, standards and interoperability for similar projects [11].

Table 1. Findings from MAN projects' tenders

City	Budget (€)	Duration (months)	Km	No-des	Cost / Km (€)
Chalkida	719.000	12	24,2	44	29.711
Grevena	340.538	12	10,7	23	31.826
Florina	718.550	16	19,5	40	36.849
Amfissa	640.000	12	15,8	38	40.506
Farsala	360.000	12	8,3	25	43.373
Vathi (Samos)	379.832	12	8,3	38	45.763
Karditsa	819.000	12	16,3	66	50.245
Thebes	850.000	12	12,4	47	68.548
Drama	926.413	12	12,1	37	76.563
Lefkada	216.000	8	2,8	26	77.143
Trikala	1.120.000	12	14	43	80.000
Preveza	770.000	12	9,5	48	81.053
Komotini	1.088.820	8	13,4	55	81.255
Corfu	938.239	12	11,3	53	83.030
Livadia	600.000	12	6,3	42	95.238
Edessa	682.437	12	7,1	34	96.118
Thassos	363.944	12	3,6	33	101.095
Orchomenos	230.000	12	2,2	16	104.545
Ioannina	2.000.000	16	18,9	80	105.820
Ptolemai da	820.600	12	7,6	55	107.974
Atalanti	183.567	12	1,4	20	131.119
Ksanthi	1.010.202	12	7,1	37	142.282

Table 2. Findings from e-Government projects' tenders

Title	Kavala city	Trikala city	Sikies (Thessaloniki)
Budget	€312.558,95	€283.855,34	€85.323,00
Duration	8 months	10 months	2 months
Targets	- IS of 2 servers - portal - 7 G2C municipal services - Workflow system for service	- IS of 4 servers - portal - 3 G2G services and 4 G2C services - Groupware system for	- IS of 2 servers and IVR - Digital forms for all municipal public services

	execution - Document management and Content management systems. - Online payment method	service execution - ERP, Document management and Human Resource management system - Online payment method	
Connected agencies	The Town Hall	- Six agencies	The Town Hall

5. Conclusions

In this paper we focused on the impact that the absence of an Enterprise Architecture might have on an e-Government strategy. We began our approach with the examination of some significant e-Strategies around the world, all of which have defined, and implemented an EA that guide the implementation of the e-Strategy. EAs have conformed to national particular needs, but they all approach public administrations in means of standardization, segment identification and gaps' elimination. Europe is the only of the presented cases that has not applied an EA for Member States' strategies, and obliges countries to install systems that offer interoperable cross-European public services aligned to a common interoperability framework. Moreover, it provides Directives for European strategic control, which request Member States to conform to common principles and requirements. However, some European countries have moved beyond European Directives and implemented their national EAs for strategic standardization, while the interoperability frameworks serve the purpose of the standards profiles in EAs.

Greece is a representative European case, where no EA was determined and applied. We investigated the e-Government implementation methodology in order to extract useful findings due to this lack in standardization. For the purposes of our investigation we analyzed various tenders of similar projects. Our findings confirm that the absence of an EA influences projects' determination in means of scope, cost and time definition and management. Moreover, it impacts deliverables identification and contractor's selection methods. We strongly believe that an existence of common standards could lead to the avoidance of these differentiations, and could strengthen the sustainability of projects' deliverables.

In this context and at a European level, a common EA for European States would support all countries which do not use centrally defined standards. Additionally, it is expected that it would initiate internal re-organization of both the European Commission and the State Governments for public

service further deployment and improvement; it is also necessary for the development of pan-European services and for the management of complexity of European administrations. The experiences from the FEA, the AGA, and from the Canadian SOA will be useful for such a change. Coherency management [1] can be a significant tool for European Governments.

The alignment of the European policy and market to such a change will be difficult, but it is also necessary since the complexity of the enterprises and the public sector raise further, and both the European and international environments become more demanding [29]. Consumers demand more and better products and services, suppliers have less available resources, and the challenges for Europe of 2050 concerning ageing societies and the raise of Asia are even clearer than before.

The European Commission could design and suggest a common EA for its mechanisms and for Member States, which will guide significant organizational changes for the European public sector, in order to align to the common EA. Fully customizable EA tools and methods will be required and designed by the European market, and significant outcomes can be produced (models and software applications), able to compete in international era. These tools and methods are expected to deliver important technological change in both the European market and in existing management methods in the European public sectors.

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