“Applying Participatory Design and Collaboration in Digital Public Services for discovering and re-designing e-Government services”

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Abstract

E-Government projects are currently service-oriented, focusing on the implementation and diffusion of digital public services, through one-stop points of access for citizens. E-Government strategic plans are political, directed at cost and time minimization during the execution of public services, and they do not analyze citizen needs, nor public Administration’s internal operating peculiarities. Although those plans have led to the development of projects, which have succeeded in cost and time savings for both citizens and public Administration, surveys conducted around the world show that users evaluate digital public services. The same surveys show that citizens don’t hesitate to return to traditional methods rather than using digital channels to transact with the public Administration again; neither would they recommend their use to others. In this article collaborative and participating tools and methods for use by public servants are presented, in order for their knowledge and experience to be offered for the execution of custom and non-automated public services. Collaborative tools can succeed in the development of real one-stop shops for e-Government, while on the other hand they can encourage both citizens and civil servants to participate in the e-Government era.

Keywords: e-Government, collaboration, CSCW, participatory design, digital services, knowledge collection, virtual teams
1. Introduction

E-Government development is currently based on strategic plans designed under the responsibility of Governments, which all specify similar targets for Public Administration modernization: cost and time minimization during public service execution and the development of an improved, citizen-centered Public Administration.

In general, the development of e-Government strategic plans is a “top-down” procedure, meaning that central Governments have the supervision of the design and execution of national e-Government initiatives. The “top-down” procedure is defined in detail with means of educational methods [17], where an instructor has to present the general concept of a system and proceed to its subsystems. In e-Government initiatives, the instructor is the Government –usually with the support and knowledge of special consultants, invited from the private sector– who plan and monitor multiple projects. “Top-down” developed e-Government plans contain policies and targets, but not methods and principals. Information and Telecommunication Technology (ICT) vendors have provided solutions for e-Government and for digital service execution, which are mainly eCommerce-based applications, transformed and parameterized to Public Administration methodologies [20].

Surveys conducted around the world show that although current e-Government initiatives have succeeded in time and cost savings for both citizens and public Administration [8], current designation procedure of Government plans causes serious problems to e-Government acceptance by both citizens and Public Administration. Skepticism is expressed to Governments regarding the success and diffusion of e-Government.

The fact that citizens evaluate e-Government solutions and digital services, together with the results of surveys conducted in Greece, which show the reluctance of civil servants to participate in e-Government evolution, lead to multiple considerations, which are
presented in this article. Considerations refer to the expectations of both citizens and civil servants from the modernization of public Administration. The involvement of civil servants in e-Government design appears as necessary and can lead to the “bottom-up” design of e-Government. The “bottom-up” design can be considered as the procedure, where different participants (end-users, public seniors, politicians, academics) participate, share knowledge and support Administration’s modernization. The “bottom-up” design is defined in detail by means of educational methods too [17], where participants consider e-Government as a hierarchical system –consisting of multiple elements (sub-systems)–, which are needed to be identified, combined and analyzed, according to multiple perspectives, in order for the whole system to be realized. The initial elements that participants face are their expectations from e-Government systems, the digital public services and their simplification, together with the smooth migration from traditional to ICT-based procedures.

A tool that can be used for establishing public servants’ involvement in the design and implementation of digital services and of e-Government in general consecutively, is the eGG (from the initials e-Government Groupware, which has a metaphorical meaning of the re-birth of public Administration). The eGG is a cross-border collaboration application, from where civil servants can offer and execute all possible digital public services. The concept of the system has been presented in WCIT 2004 [2] and in EEE05 [3].

In this article the benefits for e-Government of the application of the “bottom-up” design, executed with the participation and knowledge sharing of public servants via such an application are presented, while the incorporation of Participatory Design methods is proposed, as a means to support the discovery and essential improvement of digital public services and to achieve their social acceptance.

In section 2 of this article, current e-Government designation is analyzed, according to strategic plans from leader countries in e-Government. Both public Administration’s and
citizen perspective on e-Government are presented in sections 3 and 4, which lead to the necessity of the “bottom-up” design of e-Government. In section 5 the involvement of civil servants in the execution of digital services via the eGG system, is described. In section 6 this involvement is extended to the participatory design of digital public services and to the collection of distributed knowledge that can support service improvement. In section 7, information is given about how easily this involvement can be established, according to data collected from the digital city of Trikala, Greece. Finally, in section 8 it is presented the infection of the eGG system and civil servants’ participation in e-Government evolution.

2. e-Government strategic plans

Four major Strategic Plans were investigated in order for the top-down method of e-Government development to be analyzed. The aims of the investigation were a) the identification of the procedure that was followed before and during e-Government implementation, b) the discovery of targets which were set for e-Government in different countries/regions, c) the resulted ICT platforms and applications which have been developed under those plans, d) current results and future estimated achievements. The strategic plans, which were investigated, were the U.S. Federal Government’s e-Government action plan [10][32][33], the UK’s Modernizing Government plan [31][30], the European Committee’s eEurope 2005 Action Plan [7] and German BundOnline 2005 [13]. Furthermore, a few one-stop Government portals were analyzed with means by which, both the policies that have been applied over their development and the policies that direct portal operation to be identified: the French (www.service-public.fr), the Austrian (www.help.gv.at), the Canadian (http://www.canada.gc.ca)[14] and Singapore’s (www.gov.sg). Finally, useful conclusions of the methodology followed during the development of digital public services, together with the identification of a common e-Government architecture, were discovered under the
investigation of two major e-Government projects: eGov [9] and SmartGov [26]. Some of the key findings are presented in (Table 1) and (Table 2).

**TABLE 1 ABOUT HERE**

**TABLE 2 ABOUT HERE**

The investigation showed that all of those plans have been designed according to the top-down procedure, while the same procedure has been used for the implementation of all supervised projects. All Governments defined an Agency who –with the support of senior consultants from the private sector– supervised the necessary steps of e-Government development (design, implement, evaluate, improve, manage change) and of all relative projects.

Additionally, all of those plans have set common primary targets for Public Administration’s transformation: the development of a citizen-centred, results-oriented and market-based public Administration, where corruption and bureaucratic phenomena will be eliminated.

The achievement of those targets – in all investigated plans– is based on the implementation of multiple projects, which conclude to the development of a one-stop e-Government portal, from where simple public services are executed via software applications, while a directory of public services offered is interconnected with Agencies responsible for their execution. In order for many public services to be offered online, simplification of their execution procedure has occurred.

Moreover, in all of the above strategic plans, e-procuring platforms were set as the means for corruption treatment in the public Administration, while it is known that corruption
can occur in all public transactions. Some major problems that have been identified for the development of e-Government, refer to citizen authentication, to interoperability between new and legacy systems, to the establishment of secure transactions and to the training of both civil servants and citizens on basic ICT skills.

ICT solutions that have been installed during all plans either were developed according to mature e-Commerce technologies and systems, which were transformed and parameterized to Government’s needs. This approach has high risks for Governments [23], [25], because they become dependant on specific Information and Communication Technology (ICT) solutions.

Furthermore, some literature has been written, displaying the principals and the axes of improvement of e-Government portals, in order for optimally operating as public points of access [11]: openness, usability, customization and transparency. All of the investigated one-stop e-Government portals follow those principals. Moreover, portals present online digital public services offered, grouped mainly in life-event logic. On the other hand, only a few public services are offered in fully automated format. All other services, which are presented online, either are offered as downloadable digital forms, or are directed to the back-office Agencies for further execution. In this case, work-flow systems have been proposed [24] to execute and improve public transactions. These systems establish vertical and horizontal integration among different agencies, but they retain the Weberian hierarchical structure of Public Administration [27]. In many cases this structure places various restrictions on information flow and it does not result in service simplification, which is one of the primary e-Government targets.

The implementation of all investigated strategic plans has not considered the special needs and peculiarities of Public Administration, some of which are:
− Civil servants mostly work and execute public services according to their personal experience.
− Knowledge is distributed to different public organizations [28] and its allocation is unknown.
− Each public servant feels him/herself to be a unique entity with special abilities.
− Proper Legal framework is a pre-requisite for every attempt at transformation inside Public Administration, even for internal procedures of an organization or for the cooperation of different Agencies.
− Public Administration reacts and conforms to changes very slowly, in contrast the Private Sector.
− Most Public Organizations are non-profit and many of the public services – such as social care services – establish Government’s social view. So, Governments’ modernization cannot mainly focus on cost savings, but on citizen satisfaction.

3. Public Administration’s perspective

“Top-down” followed design, combined with the particularities of Public Administration presented above, lead to the following problems:
− Strategic plans are general and they present policies and targets and no solutions, resulting in the non-treatment of each special need for Public Administration, without each solution installed being combined with the pre-installed ones, in order to result in a global digital environment.
− There is not an association between different e-Government actions. Different organizations develop different projects (such as e-procurement, e-auctions etc.), which don’t lead to a global environment. For this reason, new projects –such as FirstGov in U.S.– are developed to interconnect previous ones.
− The Public Sector is supplied with tools and methods coming from related e-Commerce products. Those tools can be parameterized to Government needs only to a limited extent. The Public Sector has to adapt and follow the characteristics of those tools and transform internal procedures according to them. In some cases Public Administration depends on those tools.
− Public Administration is supplied by infrastructures of high costs (Table 3), without having viability studies for maintenance and extension.
− Current e-Government solutions offer less than ten digital public services (Table 3) while they can offer a limited number of public services. Furthermore, it is estimated that less than 45 percent of available public services can be made digital in the EU [6], due to their complication and customization.
− Current e-Government infrastructures have not yet been incorporated into Organizations’ procedures and they operate as discrete and independently operated virtual organizations.
− Public executives appear reluctant concerning e-Government [4], due to possible job losses and to possible downgrading of their role.

All above results show that current e-Government design and development threatens Public Administration: software and hardware infrastructures collapse is possible, due to technological evolution and to high-cost operation and maintenance. Furthermore, current e-Government projects do not succeed in the essential modernization of Public Administration, but a new “virtual Administration” is installed, operating synchronously with the traditional one.

Additionally, a partial success for e-Government is possible, but only in the areas of commercial and financial interest for Governments, such as the electronic submission of tax forms [8]. Generally, discrimination between e-Government and e-Administration is
demanded, in order for all possible public services – such as care services – to be offered electronically.

4. Citizen consideration

Top-down design does not consider how citizens experience public transactions: citizens visit Public Organizations without knowing the service to apply for, or the methodology they must follow. Citizens act according to special life events or their personal demands. Most e-Government projects group public services according to life events. If real life’s simulation “suffers” in e-Government projects or citizens fail to access and execute the proper service due to usability errors, social dissatisfaction occurs. Citizens consider accessibility, usability, efficiency and simplification characteristics of digital points of access. Furthermore, citizens do not return to Government portals if they fail in service execution, nor they propose their use to others [2].

Usually, e-Government projects focus on the technical characteristics of one-stop Government portals [29] [34], together with the provision of a customized digital environment for the citizens. However, what really matters is whether citizens get served and satisfied. Surveys conducted in U.S. show that citizens evaluate both digital public points of access and digital public services [1]. Citizens who used digital means to access Government seem to prefer returning to traditional methods to using electronic methods again [15]. Additionally, the increment rate of use of the digital services has fallen [2] during the first months of 2005.

5. Participation of public servants in e-Government

All above results lead to thoughts on the re-designation of e-Government platforms offering public services. Some useful data can support this re-designation: citizens feel more
confident and familiar transacting with local town-hall agencies [21]. Moreover, a survey was conducted with the use of questionnaires in the Digital City of Trikala, Greece (Anthopoulos, 2005), where 1000 citizens, the heads of all 40 local Agencies and 200 public servants were questioned about digital transactions. The survey was conducted in order for the local Administration to assess the expectations of the local community with regard to e-Government and make the optimal choices for digital transformation.

**TABLE 4 ABOUT HERE**

The survey showed (Table 4) that only 10 percent of citizens are certain about digital public services. Additionally, almost all (98.2 percent) prefer executives’ involvement during public transactions. On the other hand, in Government-to-Government services, most of the public agencies (87 percent) agree to the use of ICT systems to automate their routine transactions.

The surveys’ results lead to thoughts about the essential involvement of civil servants in the execution of digital public services, so that while citizens feel satisfied, civil servants feel they are active members in e-Government. A collaborating environment – such as a groupware application – was the result of those considerations [3]. The environment would gather public executives to create teams and cooperate in service execution. The application is called eGG [4].

The eGG system was designed on behalf of the Municipality of Trikala –the first Digital City in Greece– [5] according to the following principles, which can guide policy makers in similar situations:

a) *e-Government targets to be achieved*: the treatment of both bureaucracy and corruption among public transactions and time and cost savings for citizens and the Public
Administration. The collaborating environment should impose rules of participation in order for current administrating problems not to be incorporated into it.

b) Synchronization between the collaboration environment and current or future e-Government projects is to be established.

c) The new environment should be economical in development, maintenance and extensibility, while it should demand only basic ICT skills from the participants.

d) Support the improvement of e-Government projects in: offering non-automated public services, the treatment of every custom citizen need through one-stop points of access.

e) The installation of ICT tools in Public Administration, which support self-maturation of civil servants on e-Government issues.

f) The essential transformation of the Public Administration, so that ICT tools can succeed in:

i) the horizontal interconnection of separate Agencies, ii) the motivation of civil servants, iii) the evaluation of performance in the Public Sector and iv) the establishment of transparent public transactions.

g) The collection and mapping of distributed knowledge in the Public Administration.

h) The encouraging of both citizens and civil servants to participate in e-Government initiatives.

6. Presentation of the eGG system

The technical implementation of the components of the eGG system is beyond the purposes of this article. The eGG considers the Public Administration as a unit. Civil servants are grouped according to some specific roles that they will have to “play” during cooperation procedures, and not according to their title and the Agency to which they belong. This consideration leads to the “suppression of physical borders” among different public Agencies, and the elimination of the hierarchical, Weberian [27] structure of the Public Administration.
The system demands all civil servants be recorded in a unique Directory System. The created catalogue would be interconnected and synchronized to distribute Directory Systems, managed by different Agencies [16]. Each Agency will be responsible for the data of its own Directory.

Citizens will apply for public services through a four-generation Government portal [12], by filling in an application form via an XForm (http://www.w3.org/MarkUp/Forms/) application, offered on the e-Government portals. The application will offer pre-constructed and flexible forms in order for the citizen to describe his affair. Citizen applications, which will refer to fully automated public services, will be directed to components and applications already installed in investigated strategic plans, which follow similar architectures to those presented in e-Gov and SmartGov projects. Meanwhile, applications for custom or non-automated public services will be mapped on XML documents (Code 1) and will be treated by groups of civil servants (Figure 1).

**FIGURE 1 ABOUT HERE**

The group team of civil servants is inspired by the Straus model for public document creations [19]. The team consists of four specific roles: the Dispatcher (D), the Legal Expert (L), the Financial Expert (F) and the Signer (H). For this reason, all civil servants will be grouped in the Directory System according to the role they can play, in the groups for service execution.

When citizens apply for a service through a Government portal, LDAP based queries will construct a collaborating team to execute the service. Queries will consider the Directory as a database, where they will seek for executives to “play” all necessary roles. Queries will also have as credentials i) the number of cases an executive has participated in and ii) no
executive “appearing busy” will be selected for the group. Queries will consider all executives as “equal” for selection.

Query results will be a RecordSet containing: IDs, e-mail addresses, ID of the Agency. A mail server will submit automatically created messages, calling all selected members to participate in service execution.

Executives will collaborate with the use of a web browser via the Government portal. The service execution will result to a XML document, called target XML document, as a certificate with the same value of traditional official certificates. Members will collaborate asynchronously, under discrete phases, according to the following explicit scenario of participation (Figure 2):

1. Dispatcher (D) will enter the system, will study citizen application form, and document attached, and will seek relevant data kept in other Government legacy systems. The Dispatcher will try to figure out citizen need and describe it in the target XML document, with the proper schema (Code 2). Dispatcher will then call the Legal Expert (L) to follow up the service execution.

2. Legal Expert (L) will enter the collaborating environment and will study the target XML document described above. He will seek a legal framework store – built in LexML or LegalXML format and containing official rules – to discover rules that relate to the citizen affair. Results will be attached to the target XML document, as happens with official certificates. Legal Expert will consider attached rules to Dispatcher’s findings, described on the target XML document. Legal Expert will conclude whether citizen application will be accepted or not and the new version of the target XML document will be as presented in (Code 2).

The Legal Expert will notify the Dispatcher to follow up the procedure. If Legal Expert considers citizen application as “valid”, the Dispatcher will call the Financial Expert (F) to
follow up the procedure. *Otherwise* he will call the Signer (H) to finalize the execution of the service.

3. If the citizen application is “valid”, the Financial Expert (F) will enter the collaboration environment and consider the target XML document. Financial Expert will verify whether service execution requires payment made by the citizen. In this case the citizen will be invited to proceed to payment via a proper e-payment system. After payment is submitted by the citizen, Financial Expert will be notified and will insert into the target XML document information about the payment and a time stamp of the payment that has been made. The target XML document will have the structure presented in (Code 2). Then, Financial Expert will notify the Dispatcher to proceed.

4. Dispatcher will call the Signer (H) to finalize the procedure. Signer will add his “signature” to the target XML document, and he will store it in order to lock it from any further alterations. Additionally, an automatically created message will be submitted to the citizen informing him of the content of the target XML document. The content of the document will have the form of (Code 2).

The eGG system, with the incorporation of functions based on web service architecture, will automatically submit SOAP message(s) to the Public Authority(s) which is (are) responsible for the executed public service, and make the proper record updates.

The scenario presented above will be executed asynchronously according to the availability of each participant and to the tasks he has to undertake during his traditional, daily work. However, the eGG system will have limits of «tolerance», according to empirically estimated values, describing the duration of delays for each member. With the exceeding of those limits, automatically created electronic messages will be submitted to the headquarters of the Public Administration, in order to proceed to investigations.
All participants will cooperate over the target XML document, with the use of a web-based interface and XForm application, which can access XML DOM and add or alter fields and values of the document. The eGG operates far beyond the collaborating e-writing tools [20].

None of the participants will be aware of the identities of the other members, or of any kind of identification data (such as e-mail etc.), so that the service can be executed transparently and corruption can be avoided. Furthermore, each member will have the authority to access only the relevant field of the target XML document. Additionally, citizens will be able to monitor the execution of the service and to enter claims for unjustifiable delays. This characteristic of the eGG system will strengthen citizen belief in the transformation of the Public Administration to a modern and citizen-centered organization.

FIGURE 2 ABOUT HERE

7. Participatory Design of public services over the eGG system

According to the eEurope 2005 action plan [7], 15 services for citizens and 10 services for enterprises must be made digital by the end of 2005 in all EU member countries. During the last three years, offices – called KEP (www.kep.gov.gr) – which operate as points of access for citizens have been installed in Greece. These offices work as agents who discover and execute public services within the Greek Public Administration. According to KEP data, in Trikala alone [5] citizens applied for 84 different services during 2004, which shows the significant divergence between the action plan’s target and reality.

The eGG system can support the execution of non-automated public services and motivate public executives’ work [4]. The operation of the collaborative environment will gather useful meta-data regarding all public services applied for and executed in Public Administration; the knowledge used for the service execution; and the participation of the
group members. Beginning and ending time-stamps of all participants can be used for the evaluation of civil servants performance [4]. More accurate and objective methods can be applied for civil servant evaluation if the time-stamps are recorded in data-warehouses, which will be treated as time-series. Methods used for mining those series can be used to discover similarities and rules.

However, there could be cases of participants who will not be able to execute a service, because they will probably not be aware of the proper procedure, or because the legal framework will not be accurate to cover a specific service execution.

A pre-execution session is proposed in order to handle such events. This session will be requested by the Dispatcher, applied by the Signer, and all members will be obliged to participate. During pre-execution session, participants will do brain-storming and will negotiate the execution procedure. In cases where the team cannot conclude to the procedure, the Signer will request support from the Public Agency officially responsible for service execution. The duration of the pre-execution session will be limited by the eGG system. The procedure discovered in the session will be mapped on a XML document and it will have the power of contract among participants. Pre-execution phase will be optional, and will cover cases where the teams are unable to execute a public service.

The pre-execution session will be handled by a separate component of the eGG system, the development of which is beyond the purposes of the article. The component will be accessed via a web-based interface and will have the form of a discussion forum environment. Team members will participate asynchronously and the Signer will be the moderator of the negotiation and will have the power to impose administrative sanctions on those that do not participate.
The Dispatcher will compose *the supplementary XML document* in which the execution procedure is described. This document will be stored in the back-office and can be retrieved as a guide for future similar cases.

The pre-execution process has many similarities to a Participatory Design of a system. This proposed novel procedure refers not to the participatory design of a system, but to the design of a public service, for which the execution process is unknown or un-mapped. This method can incorporate “democratizing development” [22] and moreover “democratizing simplification” of public services, which can lead to their optimal approval by the citizens. The contribution of a large number of users is necessary in e-Government [22], since it extracts multiple ways of view from different users, of actions which refer to citizens.

Such participatory design processes can be applied to the entire public Administration, involving an extended number of participants. This fact can lead to secure results on the discovery, simplification and improvement of digital public transactions, succeeding in benefits for the public sector. Different *supplementary XML documents*, which describe the execution process of the same service, can be evaluated by Administration seniors, who can conclude on the optimal form of the process.

7.1 A presentation of a real incident handled via the eGG system

Consider a citizen who requests a certificate, which authorizes him to teach the German language in Greece. The citizen must visit the responsible Agency of the Ministry of Education or one of the Agencies of Primary or Secondary Education. According to the traditional procedure, the citizen has to fill in an application form and to attach a number of official documents. Consider that the applicant is a Greek, born in Germany, has studied in a Greek school and graduated from the Psychology Department of a German University. The
Greek legal framework provides certificates for teaching a foreign language in the following conditions:

a) To Greeks who have graduated from a Greek Academic Department of relevant Foreign Language Literature.

b) To Greeks who have graduated from a relevant Academic Literature Department in an EU member country.

c) To European citizens born in the country where the relevant language is spoken and who have graduated from a Literature Department.

d) To European citizens who have graduated from a relevant Literature Department in an EU member country.

In the current case, the citizen cannot understand whether the legal framework authorizes him to get a certificate for teaching German and he could apply to the eGG system. The execution procedure would be as follows:


2. Citizen fills in a flexible XML form describing his situation, giving the following information:
   a. Citizen ID -- provided automatically by the eGG’s authentication system
   b. Service description (Code 3).

3. Citizen submits the application form to the eGG and he is provided with an automatically generated service ID.

4. Citizen visits one of the KEP offices and submits all relevant certificates: Certificate of Birth – certifies that he was born in Germany – Citizenship Certificate, and University Degree.

5. The eGG system composes the team to execute the service and invites selected members to participate.
The Dispatcher studies the application form, compares applicant’s data with that described in attached documents and composes a draft version of the target XML document. However, he cannot understand what he has to do or what the Certificate of a Foreign Language is. In such a case he requests from the Signer the pre-execution session.

**FIGURE 3 ABOUT HERE**

Signer invites all participants to discuss the specific affair. The Legal Expert notifies all, concerning the Legal Framework that covers the specific issue. However, they cannot conclude whether the citizen can get the certificate or not. In this case the Signer has to contact the relevant Agency to request assistance. The Public Agency responds that “the citizen is not authorized for the certificate” and Signer records the response (Figure 3).

The Signer notifies the other participants through the Discussion Forum and requests that the Dispatcher compose the supplementary XML document with the below information: citizen is a European born in Germany, who has not graduated from an Academic Literature Department. He is not authorized for the teaching certificate for German language. Participants consider the supplementary XML document and discuss any further observations. Dispatcher stores the supplementary document at the end of the discussion and the execution procedure begins as described in Section 4. Citizen is provided with both XML documents (supplementary and target) at the end of the execution procedure.

It is estimated that after a short operating period, a satisfied inventory of supplementary XML documents will be developed for use by civil servants during multiple public services. Furthermore, public experts can apply statistical analysis on both supplementary and target XML documents, study extracted results and conclude specific methodologies for public servants or to transform custom to fully automated public services.
The procedure described above was a participatory design phase of a custom and non-automated public service. The result can be a guide to citizens who request for the same public service, in the form: Europeans who have not graduated from an Academic Literature Department cannot be certified to teach their maternal language. This phrase can be a new rule of the service Certificate of teaching a foreign language. Relevant conclusions, which will be generated by other teams of civil servants, can be studied in order for the legal framework to be “decoded” to the citizens and for the public services to be simplified. Furthermore, civil servants will become mature and feel themselves as the “owners of their knowledge”, while on the other hand they will feel active participants in the transformation process of the Public Administration and e-Government.

8. Future Steps

The eGG system has been designed in order for real one-stop e-Government shops to be developed and Administration’s modernization to be achieved. However, the collaboration scenario and the execution procedure relate to some critical issues:

a) Executives from different Agencies – Y, Z, W, K – will probably participate in the execution of a public service for which Agency X is responsible. This issue requires proper legislation.

b) Information generated, stored and belonging to Agency X until recently, will be produced and stored in the eGG’s components. In this case, every target XML document must be marked with the responsible Agency, which will be the only Authority able to access and use it. It becomes obvious that the eGG system will be a “trusted third party” for the global Public Administration.

c) Sensitive personal data known only to Agency X will now be known to all Y, Z, W and K Authorities. In order for this issue to be overcome, the eGG has been designed keep hidden
from all participants –except the Dispatcher– citizen personal data. Furthermore, the citizen will be informed of the procedure and his consent will be requested.

However, the predisposition of Public Agencies to be involved in such a collaborating environment has to be investigated. The eGG system will be initially implemented and installed in Trikala, the first Digital City in Greece [5]. The system will involve five (5) local Public Agencies in service execution collaboration: the Municipality, the Tax Agency, the Prefecture Agency, the Forestry Authority and the Local Financial Delegate. The eGG will be developed under a project funded by the Greek Information Society Framework Program (www.infosoc.gr).

The acceptance of the eGG system has been investigated in the area of Trikala. The headmasters of all forty (40) local public Agencies participated in a survey carried out with questionnaires, consisting of questions in two categories: a) general questions posed to discover participant’s ICT skills, together with their knowledge of e-Government and of digital public services. b) Specific questions, where participants had to confirm whether 1) they would permit their executives to participate in public services of other Agencies and 2) whether they would authorize other Agencies executives to participate in the execution of internal public services.

Results are hopeful (Table 5). Of the forty (40) Public Agencies all (100 percent) appear informed on e-Government and digital public services, while 57 percent of them have already executed a digital service. Moreover, 85 percent of the Agencies would offer their executives to participate in other agencies’ services. However, only 42.86 percent of them would authorize other agencies’ executives to participate in internal public services.

The results presented above show that the Public Administration’s headmasters are interested in modernization and they welcome radical changed. However, they appear reluctant concerning the involvement of third participants in internal issues, fact that shows
the lack of trust in cross-border transactions. However, it is estimated that the pilot project of the eGG will encourage all local Agencies to participate in the collaboration environment.

After a period of operational time from the installation of the eGG, policymakers will have a useful inventory of service data, which they can evaluate with statistical analysis methods in order to: realize most requested services, de-codification and simplification of complex services and of the allocation of distributed knowledge in the public sector. All this data will be helpful for the optimal further design of e-Government initiatives. Policymakers will make potential of the existing resources in the public sector and succeed in the optimal incorporation of e-Government tools and methods in Administration.

**TABLE 5 ABOUT HERE**

7. The contribution of the eGG to e-Government

The eGG system has been designed as a supplementary component of the global e-Government architecture. It can work either standalone—in cases/countries where no e-Government architectures have been installed— or in cooperation with other e-Government platforms as presented in this article, without infecting other e-Government initiatives. eGG’s benefits can be summarized in the following:

a. It delivers all possible public services online, via a one-stop Government portal.

b. It encourages civil servants to participate and become self-maturated in e-Government initiatives, by offering their experience for service discovery and simplification and by participating in digital service execution.

c. It encourages citizens to apply for public services online and prefer digital than traditional methods, when transacting with public Administration. Moreover, citizens
will feel confident for their affair’s treatment, since civil servants will handle their needs.

d. It supports the migration of the public Administration to e-Government era, since civil servants will not feel their role to be degraded in digital transactions.

e. It offers methods for the treatment of corruption in all public transactions.

f. It establishes the incorporation of e-Government practices and tools in Administration’s procedures, avoiding the development of a new “virtual Administration” working in parallel to traditional one.

g. It can collect useful information from the participatory design of public services, in order to civil experts to apply statistical analysis on the service inventory, to codify and simplify them.

h. It demands low funding for development and maintenance –compared to other ICT solutions for e-Government– and it can be easily installed and accessed. Moreover, it uses open standards, in order for its operation to be accurate and trustworthy.

On the other hand, the installation of the eGG in the public Administration demands the proper legal framework to be settled. The eGG will eliminate physical borders between different Agencies and make potential of the available human resource.

Policymakers have to consider the eGG as an area of trust for all involved parties, where all knowledge will be collected and assessed, in order for Administration’s modernization to be established optimally. The eGG can succeed in the participation of all interesting parties in e-Government, in the simplification of public transactions and social satisfaction.

Collaboration among various Agencies will enter Administration to the e-Government era, where traditional stiffnesses will be overcome and real modernization will be established.
Additionally, it will encourage the public sector to make use of the e-Government systems, already installed in the public Administration.

8. Conclusions

The route to e-Government is currently based on general and political plans, which do not include citizen or Public Administration expectations. As a result what appears is the partial offering of digital public services and the definition of financial and commercial targets.

Furthermore, ICT infrastructures installed for e-Government are based on e-Commerce solutions, parameterized on Public Administration characteristics. E-Government infrastructures focus on time and cost savings for both citizens and the Public Administration, but they are not accompanied by business plans for maintenance and extension.

In this article, the characteristics and an investigation of the possible acceptance of the eGG collaboration environment were presented. The eGG system can succeed in the involvement of civil servants in e-Government era, can cooperate with current or future e-Government systems and it can be used in the participatory design of public services, in order for their discovery and improvement. The eGG can lead to the implementation of real one-stop e-Government portals, achieving citizen satisfaction and Public Administration modernization.

References


LIST OF FIGURES

Figure 1. The incorporation of the eGG system in e-Government platforms.

Figure 2: A sequence diagram describing the eGG collaboration scenario and the time stamps for the discrete phases of each member's participation.
**Figure 3:** A sequence diagram describing Participatory Design of the Public Service.

Negotiation phase contains steps 7, 8, 9 which can be executed more than once.
<table>
<thead>
<tr>
<th>Strategic plan</th>
<th>Supervisor</th>
<th>Method followed</th>
<th>One-stop shop</th>
<th>Primary targets</th>
<th>Achievements</th>
</tr>
</thead>
<tbody>
<tr>
<td>BundOnline 2005 (Germany)</td>
<td>Federal Ministry of the Interior</td>
<td>Top-Down</td>
<td>Bund.de</td>
<td>1. Define and deliver online Federal Public services. 2. Client-orientation services. 3. Transparency and faster processing for federal services. 4. Quality and security of public services.</td>
<td>1. Bund.de one-stop portal. 2. Life-event driven public services. 3. Download-able digital forms for most of the public services.</td>
</tr>
<tr>
<td>eEurope 2005 (European Committee)</td>
<td>Information Society Directorate General</td>
<td>Top-Down</td>
<td>Europa.eu.int</td>
<td>1. Citizen-centred public Administration. 2. Encourage participation. 3. 25 primary digital public services for all European member countries. 4. Multilingual one-stop shop. 5. Telecommunication’s costs reduction. 6. Pan-European network of public Administrations (IDA) of member-countries.</td>
<td>1. Europa multi-lingual portal containing documents and information from the European Committee 2. Most European countries have under implementation, relative strategic plans, directed to primary targets. 3. Many e-Government projects have been funded by the IST program, while major directions have been set under the IDA program.</td>
</tr>
<tr>
<td>One-stop shop</td>
<td>Services to</td>
<td>Services presented</td>
<td>Targets</td>
<td>Applied Policy</td>
<td></td>
</tr>
<tr>
<td>---------------</td>
<td>-------------</td>
<td>--------------------</td>
<td>---------</td>
<td>----------------</td>
<td></td>
</tr>
</tbody>
</table>
| French        | Citizens    | Life-event oriented | 1. Present public information  
2. Offer online forms  
3. Present relative legislation | 1. Accessible  
2. Life-event oriented services  
3. Define key services  
4. Present services interconnected with Agencies |
|               | Enterprises |                     |         |                |
|               | Civil Servants |                 |         |                |
|               | French Citizens |             |         |                |
|               | Enterprises |                     |         |                |
|               | Civil Servants |                 |         |                |
| Austrian      | Citizens    | Categories         | 1. Present public information  
2. Direct applications to responsible Agencies | 1. Accessible  
2. Multi-lingual  
3. Grouped key services and interconnected with Agencies |
|               | Enterprises |                     |         |                |
|               | Individuals |                  |         |                |
|               | Austrian Citizens |          |         |                |
|               | Enterprises |                     |         |                |
|               | Individuals |                  |         |                |
| Canadian      | Citizens    | Organized primarily by:  
1. Subject or cluster  
2. Audience group  
3. Life events | 1. Offer improved Services (according to SII initiative)  
2. Continuous improvement of user-friendliness  
3. Agency discovery according to metadata criteria  
4. Current, accurate, understandable and trustworthy content | 1. Government online initiative  
2. Accessible  
3. Usable  
4. Horizontal integration of Agencies  
5. Bilingual information  
6. Security and privacy principals |
|               | Enterprises |                     |         |                |
|               | Civil Servants |                 |         |                |
|               | Canadian Citizens |           |         |                |
|               | Enterprises |                     |         |                |
|               | Civil Servants |                 |         |                |
| Singapore     | Government  | “Island” oriented | 1. Present public information  
2. Offer online forms  
3. Present legislation relative to services | 1. Accessible  
2. Define key services  
3. Provide guides for all key services |
|               | Resident citizens |             |         |                |
|               | Enterprises |                     |         |                |
|               | Non-resident citizens |            |         |                |

Table 2: Summary of key findings referring to policies followed and applied on investigated e-Government one-stop portals.

<table>
<thead>
<tr>
<th>Country</th>
<th>Government Investments in ICT ($ millions by 2001)</th>
<th>Public services offered online (% by 2002)</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>812,635</td>
<td>5,4</td>
</tr>
<tr>
<td>Canada</td>
<td>80,896</td>
<td>5,1</td>
</tr>
<tr>
<td>UK</td>
<td>137,726</td>
<td>5,1</td>
</tr>
<tr>
<td>Germany</td>
<td>154,845</td>
<td>5,1</td>
</tr>
<tr>
<td>France</td>
<td>120,569</td>
<td>5,1</td>
</tr>
<tr>
<td>Italy</td>
<td>64,555</td>
<td>5,1</td>
</tr>
<tr>
<td>EU (average, including new member countries)</td>
<td>38,732</td>
<td>4,3</td>
</tr>
<tr>
<td>Japan</td>
<td>431,772</td>
<td>5,1</td>
</tr>
<tr>
<td>Hong Kong, China</td>
<td>26,810</td>
<td>5,1</td>
</tr>
<tr>
<td>Singapore</td>
<td>9,592</td>
<td>5,2</td>
</tr>
</tbody>
</table>

Table 3. ICT investments compared to number of offered Digital Services in leader e-Government countries according to World Bank’s 2003 survey [18].

<table>
<thead>
<tr>
<th>Subject</th>
<th>82%</th>
<th>90,5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citizens interested in digital public services.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Citizens skeptical about existing e-Government systems.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Consider digital services appropriate for their needs. 40.5%
Certain about ICT systems in official transactions 7.4%
Citizens who consider training in ICT skills would make them feel more confident about e-Government systems. 15%
Would use e-Government systems only to access public information and documents. 34%
Would apply for digital services if 100% secure. 69%
Consider necessary the existence of public executives to supervise digital public services. 98.2%
Expect job losses for civil servants as necessary for cost minimization and for the modernization of Public Administration 1.1%
Agencies that use digital Government-to-Government services. 87%
Agencies which have difficulties during Government-to-Government digital transactions 24%

**Table 4:** The results of the survey carried out in the area of the Digital City of Trikala, Central Greece, in order for citizen and civil servants’ opinion of e-Government to be investigated.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Trained on basic IT skills</td>
<td>100</td>
</tr>
<tr>
<td>2. Informed of the concept of the digital public services</td>
<td>100</td>
</tr>
<tr>
<td>3. Have executed a digital public service once</td>
<td>57.14</td>
</tr>
<tr>
<td>4. Would prefer to personally supervise the execution of a public service treating his/her affair</td>
<td>57.14</td>
</tr>
<tr>
<td>5. Would encourage the existence of digital public services</td>
<td>100</td>
</tr>
<tr>
<td>6. Would offer staff of the organization where he is Headmaster, to execute public services of other public Agencies</td>
<td>85.71</td>
</tr>
<tr>
<td>7. Would accept other’s Agencies staff to participate in the execution of public services, where the organisation I am a headmaster is responsible.</td>
<td>42.86</td>
</tr>
</tbody>
</table>

**Table 5:** Results of the survey carried out in e-Trikala digital city, in order for the ease of installation and acceptance of the eGG to be investigated.
APPENDIX
CODE LISTS

<?xml version="1.0"?>
<application_form>
  <CitizenIdentity>
    <ID>id</ID>
    <surname>surname</surname>
    <fname>fname</fname>
    <address>address</address>
  </CitizenIdentity>
  <ServiceApplication>
    <date>datetime</date>
    <service_category>category</service_category> //eg. Health, job, financial
    <application_type>type</application_type> //eg. Complain, Application
  </ServiceApplication>
  <Service_description>
    <title>title</title>
    <content>content</content>
  </Service_description>
</application_form>

Code 1: XML document presenting the structure of the application form

<service_document>
  <legalExpert_part>
    <legalExpert_ID>value</legalExpert_ID>
    <date_of_creation>value</date_of_creation>
    According to the following legislation:
    <legalExpert_field>
      <legislation>
        <rules>
          <rule>
            <rule_ID>value</rule_ID>
            <rule_title>value</rule_title>
          </rule>
          ...
          <rule>
            <rule_ID>value</rule_ID>
            <rule_title>value</rule_title>
          </rule>
        </rules>
      </legislation>
    </legalExpert_field>
  </legalExpert_part>
  <dispatcher_field>
    <citizen_ID>value</citizen_ID>
    <service_description>
      <sdata>Request for a certificate</sdata>
      <sdata>Kind of certificate</sdata>
      <sdata>Use purpose</sdata>
    </service_description>
    <citizen_data>
      <cdata>Information certified from attached document</cdata>
    </citizen_data>
  </dispatcher_field>
</service_document>
Code 2: The structure of the target XML document

<service_description>
  <servicedata>Request for a teaching certificate</servicedata>
  <servicedata>German Language</servicedata>
  <servicedata>Secondary Education</servicedata>
</service_description>

<citizen_information>
  <citizendata>Greek</citizendata>
  <citizendata>Born in German</citizendata>
  <citizendata>Psychology Degree</citizendata>
</citizen_information>

Code 3: An instance of the XML document, which contains necessary metadata for the real incident.