A Cross Border Collaboration Environment, as a means for offering online public services and for evaluating the performance of Public Executives

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Abstract

Current e-Government systems offer only a few digital public services. Additionally, studies carried out around the world show that citizens who have used digital means to access the Public Administration prefer the traditional methods for their transactions with Government agencies. Two surveys carried out in Greece show that citizens feel more confident when civil servants handle their affairs. These results could lead to the re-designation of e-Government platforms, so that public executives could be involved in the execution of digital public services. In this paper a concept of a collaboration system is presented, as the proper environment that unifies distributed agencies, maps all available human resource in the Public Administration, shares processes equally to equivalent agencies and evaluates the performance of public executives.

1. Introduction

According to the eGov project [6], a formal definition of public services suggests that “independent public services are legally grounded business of public organizations in an economical sense”. They represent the development and delivery of products and services of an organized unit to the public. Public services consist of numbers of steps that are followed, according to a legal framework, in order for a citizen or business affair to be handled. Different e-Government projects around the world consider public services as procedures oriented to specific life events and business situations. These procedures can be simple or composite and fully- or non-automated.

Current e-Government platforms offer only fully automated public services. In WCIT 2004 a concept of a groupware system was presented for offering custom and non-automated public services online [1]. In this paper this system is extended to a cross border collaboration environment for public executives, which will be called the eGG (e-Government Groupware). Furthermore, methods that can be applied to the eGG are proposed for evaluating the performance of civil servants and generally of the Public Administration.

2. Involving public executives in the execution of digital public services

A study carried out by the World Bank [9], shows that less than 10 digital public services are offered by major e-Government projects, while only 16 percent of government websites worldwide offer public services. Another study carried out in Europe shows that only 45 percent of the public services [3] are expected to be transformed to digital. Furthermore, although the use of e-Government in USA [7] has increased by 50 percent last year, citizens that contact government said “they are more likely to turn to traditional means, rather than use the web or e-mail to interact with government”.

Two surveys have been carried out in two Greek public authorities (Municipality of Trikala, Administration of Secondary education of Trikala) about e-Government. The first survey [1] questioned 1200 citizens and showed that only 10 percent of citizens who transact with the public administration feel confident about e-Government. Additionally, almost all (97 percent) consider, as necessary, the
involvement of civil servants in the execution of digital public services.

The second survey (Table 1) questioned 220 civil servants and showed that only 10.4 percent of the civil servants are informed about e-Government plans, when 67 percent of them have participated in Information Technology (IT) training courses to improve their skills. From those that are well informed about e-Government only 4.9 percent consider possible the transformation of public services to digital by the end of the current decade. The most important result is that due to possible job losses, almost all (98.6 percent) appear reluctant to support the installation and diffusion of e-Government systems.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Percent rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informed about national e-Government strategy.</td>
<td>10.4</td>
</tr>
<tr>
<td>Informed about e-Government innovations.</td>
<td>8.5</td>
</tr>
<tr>
<td>Use of ICT systems in daily transactions.</td>
<td>65</td>
</tr>
<tr>
<td>Participated in IT training courses.</td>
<td>67</td>
</tr>
<tr>
<td>Expect the digitization of public services until 2010.</td>
<td>0.45</td>
</tr>
<tr>
<td>Consider training on IT skills make them more confident on e-Government.</td>
<td>5</td>
</tr>
<tr>
<td>Would use e-Government systems only to transact with other agencies.</td>
<td>85</td>
</tr>
<tr>
<td>Would transact with government agencies if 100% secure.</td>
<td>85</td>
</tr>
<tr>
<td>Consider the involvement of civil servants in digital public services as necessary.</td>
<td>97</td>
</tr>
<tr>
<td>Cost minimization in Public Administration should lead to job losses.</td>
<td>1.2</td>
</tr>
<tr>
<td>Expect job losses due to e-Government investments.</td>
<td>100</td>
</tr>
<tr>
<td>Will support the installation, use and diffusion of e-Government systems.</td>
<td>1.4</td>
</tr>
</tbody>
</table>

Table 1. “How civil servants in Greece consider e-Government”

All above results show that due to the complexity of most of the public services, only a few of them can be transformed to digital. Furthermore, citizens prefer the involvement of civil servants to handle their affairs.

The involvement of civil servants in digital services could be achieved with the incorporation of groupware applications [2],[4],[5] in common e-Government systems. When a citizen applies for a fully automated public service his request would be directed to proper software modules (such as those proposed by the e-Gov [6] and the SmartGov [12] projects). Otherwise, the execution would be handled by groups of executives, who cooperate via groupware applications, according to specific scenarios (Figure 1).

The implementation of the groupware application is beyond the purposes of this paper. However, it must follow e-Government principals, such as the improvement of public services and the treatment of corruption in public administration. From a technical point of view, the groupware system must establish interoperability with other e-Government modules and follow open IT standards. It should also require only basic IT skills from the participants and contain versioning options in order to achieve transparency during the execution of the public services.

Figure 1. The incorporation of groupware systems in e-Government platforms.

3. Cross-border collaboration

The groupware application will succeed in the following objectives: a) consider human resource of the public administration as a unit, b) allocate work to proper executives and c) consider all executives as equal for the allocation. Additionally it must optimize the service execution by allocating the work to members that are not busy or unavailable to cooperate and to executives that have relative experience on the task they have to undertake.

Public Administration is a network of distributed knowledge hosted by public executives [13]. The execution of a public service by traditional means is undertaken by civil servants who are experienced in the specific affair or who are aware of the legal framework.

An initial approach for the allocating procedure would consider executives’ roles in public agencies, as described in organization hierarchical flowcharts. Each member would be retrieved according to his position in the flowchart. Although these charts describe roles and the work flow in a public authority clearly, they become insufficient to describe work flow between different organizations. On the other hand, due to the
fact that equivalent agencies do not handle the same number of tasks at the same time, due to geographical or regional characteristics, the exploitation of available human resource is necessary for the improvement of public administration efficiency.

The proposed groupware system, called the eGG, considers a horizontal interconnection of the public agencies, by categorizing civil servants into four specific stages, independently of the organization they belong. Categorization makes borders between different authorities invisible and simplifies the allocation procedure. The four stages of the categorization describe the different roles that civil servants have to play in the collaborative environment.

Inspired from the Straus model [9], where four civil servants cooperate to produce an official digital document, the proposed groupware system requires four necessary participants that could execute all public services:

- **A Dispatcher (D)**, who is responsible for the service’s dispatch.
- **A Financial Expert (F)**, who monitors possible payment obligations.
- **A Legal Expert (L)**, who considers and applies legal restrictions.
- **A Supervisor (H)**, who signs the service.

Figure 2. The structure of the 4-level Government directory and the development of the work team.

The team could be described as a directed graph (Figure 2), where nodes represent the cooperating members and arrows the work flow direction. In order to develop work teams with the above participants, public executives must be categorized into four layers independently of the Agency they belong, the role they have in routine transactions or their personal skills. A directory system [8],[11] could be used to manage the four layer distribution. Distributed directories will hold the human resource of local Agencies and a global Government meta-directory will collect distributed information with peer-to-peer and Gateway replication methods [8] (Figure 3). Both distributed directories and the meta-directory will have the same structure. LDAP based search queries will create the necessary groups to execute public services.

4. The collaboration scenario

The work team will cooperate via the eGG system asynchronously, while software modules and RDBMSs will support information exchange and storage. The team will produce an XML document, called target XML document, which will describe the service, the decision made by the members according to the legal framework and the necessary payments made by the citizen. Each member can add information to a specific part of the target XML document (Figure 3), which will be reviewed by the other participants.

Figure 3. The concept of the eGG: a group collaboration for the development of the target XML document

A citizen can apply for a non-automated public service via a Government portal, by filling in a flexible digital form [14] to describe his affair. Service guides will support citizens to fill in the forms and to submit necessary official documents to the system. After the submission of the application form, the work team will be created and members will be retrieved automatically from the Government Directory System to execute the service. Their identities will be kept hidden amongst each other during service execution, in order for
corruption phenomena to be avoided. The collaboration scenario involves the participants in discrete phases of the service execution, as follows (Figure 4):

1. The Dispatcher will be the first who enters the groupware system, studies the application form, together with the attached documents and creates an XML target document containing: information about the service, the citizen’s identity and relative information included in attached documents.

2. The Legal Expert will receive a notification from the Dispatcher about further evaluation. He will study the XML document and match requirements to legal issues retrieved from a legal information store, containing rules in LegalXML, LexML or SGML format. Information about legal issues will be added to the document together with a mark of “permission to execute” or “not allowed” description. Then he’ll submit a notification to the Dispatcher.

3. The Dispatcher will retrieve the target document and follow Legal Expert’s marks. If legal issues are followed he will submit a notification to the Financial Expert for further evaluation. Otherwise, he will notify the Signer to finalize the execution.

4. The Financial Expert will retrieve the target document and will verify financial obligations to accomplish the execution of the service. Requirements about payments will be posted to the citizen. When necessary payments are made, the Financial Expert will mark the XML document and submit a message to the Dispatcher. Finally, the Dispatcher will post a notification to the Signer who will sign the document and mark the end of the execution.

The target XML document will be stored for future use, locked from further alteration and a printed copy, together with other official documents, will be posted to the citizen.

5. IT specifications for the proposed system

The proposed groupware system (the eGG) will be based on open standards following e-Government technical perspectives, while it will enhance scalability and interoperability with the other components of an e-Government platform. LDAP based directory systems can hold human resource information, collected from all distributed public agencies. Directory systems will also contain information for member authentication, together with their permissions on the RDBMS systems and on discrete execution phases. Software modules, developed in Java, C or Visual Basic, will be used to implement the collaborative environment. Software modules will be used to create work teams, execute service steps and deliver information created by the participants, to specific RDBMS systems. Citizens will use e-Government portals to fill in digital forms, submit documents to the back-office and monitor the service execution.

Work team members will access the eGG system via a web based interface. Web based architecture will simplify member involvement and minimize the costs for development and maintenance of the groupware system.

6. Evaluating public services and civil servants

6.1 Evaluating a public service

Monitoring the execution of a public service offers the ability to apply metrics that could evaluate the quality and the efficiency of the service. Some metrics have been defined for the evaluation of a fully automated service [12]. In the proposed collaborative environment, the execution of the public services is analyzed in two phases: a) the application phase where a citizen fills in a digital form that describes the service and submits it to the back-office together with the relative documents, b) the execution phase, where
group members cooperate to execute the service. Some proposed metrics that evaluate the quality of a service executed in the proposed system could be the following:

- The time that it takes for a citizen to fill in a digital form describing a public service and to submit the necessary documents to the back-office.
- The average number of errors made by the citizen.
- The average number of citizens that abandon the procedure, compared to the number of citizens that succeed in finishing the procedure.

On the other hand, metrics could be applied to evaluate the efficiency of a service executed by the proposed system. These metrics will evaluate the performance of the system, together with the performance of all sub-components of the system:

- **Reliability** will describe the average technical errors that occur during the execution of a service. Due to the fact that the proposed system executes all services similarly, service reliability will have the same value for all services.

- **Response** will describe the duration between the end of the application phase and the beginning of the execution phase. The value of this metric will be analyzed to the system response and the team response. The first value will describe delays occurred by the software and/or hardware components, while the second value will describe delays occurred due to the non-existence of available executives to cover some of the group roles.

- **Acceptability** will describe the number of the successful applications submitted for a specific service.

### 6.2 Evaluating the performance of the public executives

The eGG system offers a means for the public administration to monitor its human resource. The distributed local directories will be updated by distributed agencies and deliver “a clear view” of the available civil servants, the tasks they undertake, their skills and other useful information to the central administration.

On the other hand, the proposed system can measure public executives’ response to an allocated public service. Time stamps (Figure 4) that will mark the beginning and the end of the involvement of each member will be used for the evaluation:

1. Dispatcher’s involvement:
   \[ td = (td1-td0) + (td3-td2) + [(td5-td4)] \]

   The last parentheses will not exist when service execution is not allowed by the Legal Expert.

2. Legal Expert’s involvement:
   \[ tl = tl1 - tl0 \]

3. Financial Expert’s involvement:
   \[ tf = tf1 - tf0 \]

   A case of \( tf=0 \) is possible when the service has no payment obligations.

4. Signer’s involvement:
   \[ th = th1 – th0 \text{ or } th = th1’ – th0’ \]

   Other metrics will evaluate each member’s efficiency as follows:

   - Dispatcher’s: \( dd = td / tdes \)
   - Legal Expert’s: \( dl = tl / tles \)
   - Financial Expert’s: \( df = tf / tfes \)
   - Signer’s: \( dh = th / thes \)

   Where \( tdes, tles, tfes, thes \) are estimated values for each member’s involvement collected empirically in the public administration.

   The duration of the execution phase will be measured using the values presented above, as follows:

   \[ ts = td + tl + tf + th \]

   The duration of the service execution phase, together with the value of the response metric can be compared to empirical values, collected in the public administration. This comparison will show whether service execution is sufficient. Big divergences will be submitted to the headmasters of the responsible public agency, for further investigation.

   Evaluation results will be available to the public as an inventory that presents the efficiency of the public administration.

### 7. Considerations

The eGG system follows e-Government perspectives such as the modernization of the Public Administration, by giving digital means to map and maximize human resource potential, while it offers a cross-border collaboration environment for knowledge exchange. Members will supervise each other during service execution, without being aware of their identities, offering transparent transactions. Each member will have access to edit only the specific information that relates to the role they play in the groupware. Versioning mechanisms will mark the identity of each member on the target XML document, giving the opportunity for complaints made by
citizens, to be investigated. Citizens will be able to monitor the execution process, which will make them feel confident about e-Government procedures.

Additionally, public executives will be involved in digital transactions and will be encouraged to improve their skills and support the diffusion of e-Government.

Methods for public administration evaluation could be applied, while civil servants will be aware of the evaluation procedure and will be motivated to improve their efficiency. Furthermore, public administration will improve its “public face” by upholding citizen needs and keeping civil servants’ jobs.

8. Future plans - Conclusions

Existing e-Government systems offer only a small number of fully automated digital public services and they have not gained public confidence about their operation. The involvement of the civil servants in digital services would support the diffusion of e-Government and could deliver all public services online.

The eGG, a groupware system incorporated in common e-Government systems, was proposed as a means to develop a cross border collaboration environment in the public administration. The eGG system follows e-Government perspectives and offers means to map and evaluate the performance of the human resource in public administration.

The eGG system has been planned to be implemented under a pilot program for the municipality of Trikala, Greece, funded by the Greek Information Society Framework Program (www.infosoc.gr).

10. References


