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Towards a Reference Model and a Web-Based Framework for eParticipation Services Design

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ABSTRACT

eParticipation involves the use of Information and Communication Technologies (ICTs) for facilitating the two-way communication between governments and citizens. Designing eParticipation activities is a complex task. Challenges include the need for interdisciplinary expertise and knowledge (e.g., in political, sociology, usability and technology domains) and the lack of widely accepted models and technological standards. This paper paves the way for the definition of a basic reference model for eParticipation, providing guidelines for the design, implementation and management of eParticipation web applications. This model was put into practice for the design of an eParticipation Framework helping users in designing, customizing and deploying web-based services for a given eParticipation process. The authors also report on the experimental use of the Framework in a group of Tuscany municipalities for carrying out participatory budget activities.

Keywords: eDemocracy, eGovernment, eParticipation, Information and Communication Technologies, Participatory Budget, Policymaking, Web Application, Web Science

INTRODUCTION

Many governments around the world are promoting initiatives in the e-Government domain, with the objective of rationalizing internal processes and improving services delivered to citizens, while containing costs (Hassan, Shebab & Peppard, 2011; Heeks & Bailur, 2007; Steyaert, 2002).

Among several e-Government application domains, eParticipation involves the use of Information and Communication Technologies (ICT) for facilitating the two-way communication between governments and citizens. According to the definition provided by Creighton (2005), “public participation is the process by which public concerns, needs, and values are incorporated into governmental and corporate decision making. It is two-way communication and interaction, with the overall goal of better decisions that are supported by the public”.

Typically, public participation processes include actions for informing, involving and
consulting citizens within one or more specific stages of the democratic process.

Designing eParticipation activities is a complex task. Challenges include the need for interdisciplinary expertise and knowledge in different domains (e.g., political, sociology, usability and technology domains), as well as the lack of widely accepted models and technological standards.

Despite the widespread adoption of ICT tools for the carrying out of participatory processes, low support is provided to designers in the overall design of the participation process, from high-level requirements specifications to technical implementation and deployment of web-based services.

Public bodies (typically municipalities) can define different policies for participation, by asking for citizens’ involvement for different purposes and within different stages of the policy making process. In this context, the main objective of this work consists in devising a configurable and extensible Framework that designers can use to put such high-level participation guidelines and rules into practice. Configurability and extensibility requirements have to be taken into account in order to promote the re-use and the evolution of the framework by public bodies.

In order to cope with these issues, the intended contribution of this work can be distinguished into:

- A general-purpose model for e-Participation defined as the intertwining of a policy-making process and participation activities.
- A set of guidelines helping eparticipation designers in choosing most appropriate information and communication services for each type of on-line participation activity.
- An eparticipation framework helping users in designing, customizing and deploying web-based services for a given eparticipation process.

These activities were carried out in the framework of “Telep@b”, a two-year project funded by the Italian Minister for Innovation in Public Administration. Within Telep@b, the eParticipation Framework was exploited to implement participatory budget processes in a group of municipalities in Tuscany (a region in Italy). This reference scenario was especially challenging, since each municipality was administratively and operationally autonomous in defining and implementing its own participatory process. Lessons learnt from this experience are driving re-design and experimentation activities in a follow-on project, named PAAS-Telep@b.

RELATED WORK

The discussion on the exploitation of ICTs to improve quality and effectiveness of governance processes and citizens’ participation into the democracy process is not novel. Some of the earliest contributions have been provided by Arterton (1987), Becker (1993) and McLean (1989), who investigated the potential role of interactive television and telephone/conferencing systems. In the last decade and half, the focus has been shifted on internet and web technologies, starting from some seminal contributions, including the ones provided by Bellamy and Taylor (1998), Kamarck and Nye (1999), and Gattiker (2001).

Information and Communication technologies can be exploited in democratic processes for three main purposes: to provide and disseminate information, to facilitate communication and interaction, and to make transactions such as televoting or payments possible (Anttiroiko, 2003, p.125).

This is also a direct consequence of the great success of the Web, since its conception in the 1990s. The Web cannot be characterized merely in terms of technological factors (e.g. architectures and protocols). Its inventor, Tim Berners Lee, argues the need for adopting a systems approach to model the Web and its impact on the social sphere (Hendler, Shadbolt, Hall, Berners-Lee & Weitzner, 2008). This is required to properly study the evolution of the Web and to prevent possible unanticipated social effects.
In the last decade several research and innovation projects have been promoted by governments in order to put eParticipation principles into practice. Several eParticipation projects and experimentation activities have been promoted at local, national and international level. Hereafter we mention some relevant examples in Europe, while more exhaustive lists are presented in the works by Tambouris, Kalampokis and Taranbanis (2008), Chrysos, Kercic, Porquier and Todorovski (2009), Phang and Kankanhalli (2008). The European Citizens’ Consultations initiative uses web tools to create a pan-European discussion space for debating about the future of the European Union, while “Your Voice in Europe” is the European Commission’s portal providing tools for consultation and discussion targeted to civil society representatives.

Among the huge amount of studies related to eParticipation, we selected the ones that are relevant to our work in the areas of:

- ICT tools for eParticipation;
- Conceptual models and guidelines for eParticipation process design.

**ICT Tools for eParticipation**

Many existing works focus on specific technologies and/or services for eParticipation. Bouras, Katris and Triantafillou (2003) propose a web-based, database-oriented electronic voting service and highlight relevant issues concerning security and safety. Butka, Mach, Furdik and Genci (2011) propose an ICT toolkit capable of supporting policy modeling processes through model-based simulations, knowledge sharing and building from inputs provided by relevant stakeholders, as well as collaboration and discussion among citizens. The work by Benn and Macintosh (2011) investigates the use of computer-supported argument visualization techniques for eParticipation. The argument visualization tool aims at supporting the work of relevant eParticipation actors by enabling them to navigate through arguments contained in consultation and policy documents.

Few works aim at providing extensible and configurable frameworks for eParticipation. Kalikakis, Gouscos and Georgiadis (2008) propose a unified eParticipation scheme modeling the entire lifecycle of public fund collection and spending, and identify proper tools and workflows for implementing the proposed scheme. Gov2DemOSS (Koulolias, Karamagioli, & Xenakis, 2006) is proposed as an open source, generic and customizable e-participation platform. It has been designed and implemented by leveraging the open source Mambo Content Management System (CMS) and offers services for delivering information to citizens, collecting their opinion, and promoting their involvement in the decision making process. Slaviero, Maciel, Alencar, Santana and Souza (2010) describe preliminary research results towards the specification of a component-based architecture for easing the fast deployment of virtual environments for eParticipation.

To the state of our knowledge, among the above mentioned works, only Gov2DemOSS has been developed and experimented in some municipalities in Europe. The remaining works (Kalikakis, Gouscos and Georgiadis, 2008; Koulolias, Karamagioli, & Xenakis, 2006) describe preliminary results of modeling and design activities. All above mentioned works aim at providing a reusable and extensible platform of on-line services for supporting eParticipation process. While offering a wide set of services (e.g. forums, blogs, polls), they do not offer tools for modeling and handling a participation process and configuring participation services in relation with the stages of the policy making process.
Conceptual Models and Guidelines for eParticipation Process Design

In this paragraph we analyze works in the area of conceptual models for eParticipation and guidelines for the design of eParticipation process and elicitation of proper ICT tools.

The work by Sanford and Rose (2007) contributes to the shaping of the eParticipation research area, by analyzing and organizing relevant articles selected from the amount of available literature. This study also presents a list of technologies which have a direct relevance to eParticipation. As highlighted by Sanford and Rose (2007), none of selected technologies is exclusively an eParticipation technology; rather, they are a customization of previously developed technologies.

It has been recognized that the success of innovative e-participation solutions depends heavily on the careful planning of citizen participation and the incorporation of such participation initiatives into the policy-making process (Albrecht et al., 2008; Bicking, Triantafillou, Koussouris & Wimmer, 2011). Moving from these considerations, Scherer and Wimmer (2011) argue that Enterprise Application Frameworks (e.g. Zachman Framework and TOGAF) could ease the successful carrying out of e-participation projects by supporting the sustainable implementation of e-participation projects and the integration of e-participation in organizational settings by using also (but not only) Information and Communication Technologies.

Phang and Kankanhalli (2008) propose a framework to support eParticipation designers in choosing appropriate ICT tools. More specifically, they discuss how existing ICT tools can help in achieving citizen participation objectives.

Kalampokis, Tambouris and Tarabanis (2008) propose a conceptual model of the eParticipation domain by formalizing the relationships among organizational and social aspects of the participation process with ICT tools. The study includes the specification of three sub-domains and related interrelationships. These sub-domains are: main stakeholders and related roles, participation levels (e-informing, e-consulting, e-involving, e-collaborating and e-empowerment) and related ICT tools.

While the framework proposed by Phang and Kankanhalli (2008) aims at supporting the implementation of novel eParticipation initiatives, the contribution by Kalampokis et al. (2008) models more granular aspects of an eParticipation projects (such as stakeholders and their roles in the participatory process) but it seems targeted at analyzing existing eParticipation projects rather than providing guidelines for designing new eParticipation solutions.

Several studies on the classification of ICT tools for eDemocracy have been performed. The DEMO-net project has provided a non-exhaustive framework for classifying eParticipation tools and projects (Tambouris et al., 2008). These categories include ePetitions, eVoting, eConsultation systems, ePolling, community systems, GIS and map-based tools. At present, most eParticipation service platforms are designed on top of existing web-based Content Management Systems. Consequently, they provide an ad-hoc solution that supports a specific participation model but they can be hardly reconfigured to support new participation processes.

The above mentioned works provide a valuable contribution in the elicitation of ICT services for eParticipation and their proper use in different stages of an eParticipation process. As described in the following section, results of these works helped us in defining a proper correlation between participation activities and ICT services. Nonetheless, these results mainly consist in high-level guidelines and do not provide designers with tools helping in the design and deployment of the selected ICT services.

Based on this state of the art analysis, we highlight the lack of ICT tools that can be properly configured according to the requirements of the eParticipation project to be carried out and its specific relation with the policy making stages in the given public body. As pointed out by Macintosh, Coleman and Schneeberger (2009), the design and use of technology are
typically influenced by a limited understanding of the needs of the actors and are dependent on the skills of people involved in research and design activities. We believe that the availability of some reference guidelines and customizable ICT tools would help a fast design, deployment and re-use of eParticipation environments, while minimizing the level of technology expertise required for their configuration.

**TOWARDS A MODEL FOR ePARTICIPATION SERVICES**

The design of ICT services for carrying out of eParticipation processes is a complex and interdisciplinary activity. Indeed, an eParticipation process can be modelled as the interweaving of two processes, the policy process and the participation process, including off-line as well as on-line participation activities. On-line participation activities are those carried out through information and communication services.

The design of an eParticipation process thus requires different expertise. The focus of our work is to provide guidelines and tools to ease the translation of high-level eParticipation process specifications into specifications of technological artefacts.

More specifically, the intended contribution of this work consists in:

- A general-purpose model for eParticipation defined as the intertwining of a policy-making process and participation activities.
- A set of guidelines helping eParticipation designers in choosing most appropriate information and communication services for each type of on-line participation activity.
- A web-based framework helping users in designing, customizing and deploying web-based services for an eParticipation process, according to the above-mentioned guidelines.

A participation model defines the relationships between policy-making process stages and participation activities to be carried out during such stages. At present, several participation models have been studied and experimented in municipal, national and international eParticipation initiatives.

Päivärinta and Øystein (2006) analyse several contributions in theories and implementation of eParticipation and propose a framework made of four basic “idealised” models of eDemocracy: the Liberal, the Deliberative, the Partisan, and the Direct. The framework defines two main dimensions for characterizing any democratic process: agenda setting (i.e. “citizens set the agenda”, “government sets the agenda”, and inclusion in decision making projects (i.e., “Citizens are mainly implicitly included in decision making”, “Citizens have an explicitly defined role in decision making”).

The four models are obtained by combining these two dimensions. Päivärinta and Øystein (2006) argue that any technological implementation of eDemocracy should be adapted to the specific democracy model(s) pursued by a particular initiative. However, this classification is too coarse grained for providing requirements for effectively driving the design of ICT services for participatory processes support.

As a consequence, we chose to adopt a more granular classification. More specifically, we adopted the classification proposed by Anderson (2006). This conceptual framework, conceived for easing the analysis of the policy process, distinguishes a sequential pattern of activities:

1. **Problem Identification and Agenda Setting:** This stage focuses on how the problems that may become the targets of public policies are identified and specified.
2. **Policy Formulation:** This encompasses the identification of one or more alternative courses of action that can solve or ameliorate identified public problems.
3. **Policy Adoption:** This step consists in deciding which actions will be adopted to address a problem. Possible options may include also the decision of “taking no action”.
4. **Policy Implementation:** This step focuses on actions that have to be performed to apply adopted policies. This could also imply the development of further policies.
5. **Policy Evaluation**: This step aims at evaluating to which extent the implemented policy has achieved its intended original goals.

Based on this basic framework for policy making process analysis, we can specify a participation process as a set of participation activities, properly interrelated with the policy-making process stages.

As depicted in Figure 1, we distinguish the following types of participation activities:

- **Information/Education Activities**: Institutional communication and education/training activities needed to inform citizens about the topics of participation process.

- **Discussion Activities**: Citizens debate and exchange opinions on the subjects of the participation process or share ideas and concerns on open themes.

- **Consultation Activities**: Citizens are asked to express their opinions on one or more topics.

- **Monitoring and Memory-Building Activities**: Citizens are made aware of how participation process results have been taken into account in the policy-making process, and they are made capable of monitoring decisions and actions made by local governments. This implies that memory of completed participation processes should be preserved.

![Figure 1. Building blocks for Participation Process](image-url)
While information, discussion and consultation activities are widely recognized as activities to be considered for building a participation process, we added a novel activity type, i.e. Monitoring and Memory-building. As explained above, this type of activity aims at building and maintaining citizens’ memory and awareness of completed participatory processes. For instance, a report documenting the most relevant intermediary and final results of completed participation processes might be produced and made available to citizens for later access. We argue that such memory-making activities could contribute to guaranteeing transparency of political processes, while promoting citizens’ sense of responsibility and encouraging their involvement in future participation initiatives, as argued also by Elliman, Macintosh and Irani (2006).

As depicted in Figure 1, an eParticipation process can be defined as a sequence of one or more policy making stages. Every stage is a macro-phase of a cooperative decision-making process, in which every actor has a proper role (according to his functions and activities) and weight (according to his relevance for the process objectives). More specifically, every actor has his/her role and weight assigned according to existing rules (i.e. legal and administrative rules) and exerts them through specific activities and related tools. Hence, it’s crucial avoiding that a bad system configuration reduces the impact of an actor’s decision-making power.

Participation activities can thus be assigned to each policy making stage, to the overall process, or to a subset of stages. This model provides a flexible way to define participation processes properly customized to target scenarios, requirements and available resources. For instance, a participation process could be defined as a sequence of information and consultation activities for identifying a target problem (i.e. Problem identification and agenda setting); another example is a process implementing information and discussion activities to specify possible actions for addressing a target problem (Policy Formulation) and consultation activities to gather citizens’ preferences of alternative actions for Policy Adoption.

Participatory budgeting represents a relevant example of participatory decision making processes that are typically carried out at the municipal level. Its main objective consists in allocating available resources in the municipal budget to various public projects based on the priorities determined through citizen participation (Kim, 2008). As an example, a participatory budgeting process can thus be specified as follows: citizens discuss community needs and determine priorities through forum discussion (agenda setting phase); the policy formulation is executed with discussion with citizens or associations representing citizens; budget resources allocation are decided through citizens’ vote.

According to the representation of eParticipation processes depicted in Figure 1 we have identified the following basic stages for designing eParticipation applications:

1. Identifying the objective and stages of a policy-making process that should be the target of the participation process;
2. Associating the participation activities to the policy stages in order to define the participation model;
3. Choosing the information and communication services to be used to support the participation activities.

The first stage refers to circumstantial political-administrative choices and to the persons who at any given time play a role of political-administrative leadership. The second one is the stage in which these choices are properly shaped and specified according to constraints and guidelines expressed in general rules accounted by the Community for every participation process (i.e. the Participation Act). The third stage refers to the implementation of the previous stage results by using ICT tools. Therefore the third stage assumes a crucial importance in the success of the participation process, as a non-correct system configuration could lead to a distorted cooperative decision-making, invalidating the participation policy and breaking the rules that the community has given to itself.
These steps can be assigned to different actors. The first step is usually performed by political and administrative representatives. Also the second one can be performed by these representatives, supported by domain experts, e.g. persons with expertise in the participation domain and/or persons who will tutor the participation process by mediating the citizens’ access to the participation process. The third step could be performed by an ICT designer, eventually supported by domain experts.

Therefore, as previously discussed, several existing technologies can be exploited to implement and deliver web-based services for participation processes. Nonetheless, we pointed out the lack of methodologies and frameworks helping ICT designers in speeding up design and development activities, while taking also into account requirements from the policy making process and translating them into technological artefacts.

In order to address these issues, an eParticipation Framework has been designed and developed within the Telep@b project, as described in the following sections. The Framework aims at supporting a Designer in configuring (and re-configuring) ICT services to address changing requirements of different participation processes and their evolution over time.

ePARTICIPATION FRAMEWORK

The eParticipation Framework provides configurable services for designing and activating eParticipation processes according to the eParticipation model and guidelines described above. The Framework has been designed and developed within the Telep@b project.

Telep@b Objectives

Telep@b (Electronic Technologies for the Participatory Budget) is a two-year project funded by the Italian Minister for Innovation in Public Administration. The main objective of the project, successfully completed in July 2008, was the development and experimentation of a web-based technological platform supporting the design and carrying out of participatory budgeting processes.

The project consortium comprised 29 municipalities in different mountain areas of Tuscany, Italy, for approximately 200,000 inhabitants. The project activities have been coordinated by one of the involved municipalities (Fabbriche di Vallico), with the support of the Tuscany Section of the National Union of Mountain Municipalities (UNCEM Toscana, http://www.uncemtoscanaita.it) and the Tuscany Section of the National Association of Italian Municipalities (ANCI Toscana http://www.ancitoscana.it/).

Design activities have been performed by an interdisciplinary group composed by different research organizations: the Dept. of Electronics and Telecommunications of the University of Florence and the Florence Research Unit of the National Interuniversity Consortium for Telecommunications, involved in the design of the overall Telep@b portal and services for e-participation; the Institute of Legal Information Theory and Techniques (ITTIG, http://www.ittig.cnr.it/IndexEng.htm), involved in the requirements analysis and design of tools for managing budgetary documents (Mercatali, Romano, Fabrizi, & Becchi, 2007). These design activities have been driven by results of the requirement analysis performed by the Dept. of Political Science and Sociology of the University of Florence (Italy).

eParticipation Framework Details

The eParticipation Framework has been designed in order to support ICT designers in the specification, configuration and deployment of on-line participation services.

As discussed in the previous section, different participation processes can be specified to cope with requirements of different scenarios. Since it is not feasible to define a “one-size fits all” approach for eParticipation process specification, we argue that a framework for eParticipation services should provide users with services easing the configuration, implementation and deployment of different process instances, while containing costs by maximiz-
ing the re-use of existing services and existing process templates.

The Framework is thus applicable to any type of participative process and any administrative context, regardless of the type of available resources - the use of which is defined by the participative processes itself -, as well as regardless of the timing constraints that are imposed by the legislation (e.g., the municipal budget lifecycle), the type of actors involved in the participative process and their relevance within the process, the type of budgeting documents, the presence of an information system for financial management and accounting, and the sequence of phases of the cooperative decision-making.

The eParticipation Framework provides different views: the Participation Process, the Administration View and the Design View.

The Participation Process View is the web-based application that exposes the services enabling citizens and public administration representatives to take part in the participatory process.

Users that are directly involved in the participation process, called “front-end users”, can be distinguished into the following roles:

- Citizens, acting as individuals or members/representatives of associations;
- Representatives of the Public Administration, including both politicians and administration officers;
- Tutor of the participation process, who has the responsibility of managing and animating on-line participation services and off-line initiatives. Typically, one or more administration officers play this role.

Besides actors who directly participate to the participative process, back end users are the operators who administer and configure the web-based services for supporting one or more processes. We defined two main roles:

- The Participation Process Designer, who has to translate high-level specifications of a participatory process into a specific configuration of the web-based services to be deployed.
- The Administrator, who is responsible for the technical administration of the deployed web-based services.

These actors have to configure the system according to rules and operational guidelines decided by others before. To do this, they are supported by two different Views: the Administration View and the Design View.

The Administration View deploys basic administration services for configuring the web-based services, including user profile and role-based access management. Each participating actor has proper functions and weights assigned - in accordance with the Community Participation Rules - and participate with corresponding rights and duties. These rights and duties can change across the subsequent phases of the decision-making process.

The Design View is a graphical interface for specifying the participation process and related web-based services. It offers the most interesting features, since it helps designers in putting into practice the proposed participation model and guidelines. The configuration process is characterized by a decision-making workflow. This view offers a drag&drop menu that eases the design of the participatory process and front-end application (i.e. the Participation Process View), through the following steps:

- First, the designer selects the policy-making stages that are the target of the participation process;
- For each selected stage, the designer assigns the participation activities to be performed (i.e. information, discussion, consultation and memory);
- For each identified combination of policy-making stage and participation activity, the designer selects the on-line services to be activated (e.g. agenda, news, forum, online polls) and possible information resources to be made available to citizens.
Moreover, in each tutored workflow step, the system guides the Designer through the specification of some configuration parameters by posing a sequence of questions. Examples of these configuration parameters are: the type of resources that are the target of the participation process, the scheduling of process phases and sub-phases, credentials assigned to each type of actors and their decisional relevance, methodological resources.

The types of resources and actors credentials must necessarily be defined in the configuration phase, for reasons of institutional organization (phases and resources) and technological constraints (credentials). During the participation process, the system may also submit questions regarding the timing of planned phases and sub-phases, the decision-making weight of local technicians and the availability of some methodological resources offered by default by the system. Thus, the Framework offers flexible configuration support not only for every kind of process, but also in the context of a given participation process.

Elicitation of services and their correlation with participation activities are based on the literature analysis (Phang & Kankanhalli, 2008; Kalampokis, Tambouris, & Tarabanis, 2008; Kanstrup, Rose, & Torpe, 2006) and on the requirements analysis carried out within the Telep@b project.

The output of this design step is a set of specifications that automatically configure the Participation Process View with the selected phases and related web-based services. At the end of the design step, the Participation Process View is generated as the instantiation of the flow of activities specified in the design phase (some activities could be “inactive”). The participatory process is thus handled as a lightweight workflow process (Paganelli, Pettenati, & Giuli, 2006). The transition from an active state to the following one can be automatically triggered by a pre-defined event (e.g. a date, the upload of a specific document type or the automatic creation of a document from Forum posts) or can be manually triggered by the Tutor of the participation process. Moreover, participation process’ operative phases are visualized in the Participation Process View through a timeline specifying existing milestones according to the scheduled activities and phases.

Table 1 shows the list of the services that are currently managed by the eParticipation Framework. In Table 1 we show also a correlation between participation activities and most appropriate services. Services taken into consideration are:

- Web content publishing and management;
- News;
- Calendar for shared events and timelines set for any process, phase and workgroup;
- Newsletter;
- Document Management (document versioning, editing collaborative, automatic creation of document from Forum threads and posts, document indexing and repository);
- Knowledge Management;
- Communication to local administration representatives (via e-mail);
- Forum;
- On-line polls and surveys;
- Report generation tool (statistics);
- Integration with existing social networks.

The eParticipation Framework has been implemented by an ICT Italian company within the Telep@b project.

Figure 2 shows the architecture of the Framework. The Presentation Layer includes the components that handle the web-based interaction with end-users (styles documents, graphic components, code specifying the interaction flow). The Core Modules layer hosts the back-end modules. It includes: the Process Design Manager, which embeds the logic for building and validating participatory process specifications; the Process Execution Manager, which is the component that controls the execution of a participatory process instance; a set of modules implementing the information and communication services needed for supporting the execution of a participatory process (e.g.
Forum Manager, Document Manager, Poll Manager, Search Engine, etc.). The Data layer is the infrastructure for persistent storage, secure access and handling of information resources (e.g., process specifications, user profiles, user-generated content, etc.).

In order to adopt a modular design approach and exploit available open-source components, the framework has been implemented on top of the Joomla! open source Content Management Systems (Joomla, 2009) and integrates/extends several Joomla! Components, such as Events for the events publication and handling (Event Manager), Fireboard for forum management (Forum Manager) and PollXT for on-line poll management (Poll Manager). The Process Design Manager and Process Execution Manager have been developed from scratch.

**EXPERIMENTATION**

The first release of the eParticipation Framework has been completed and the use of the Framework has been experimented within the Telep@b project for the specification and carrying out of a 6-month participatory process for municipal budget formulation.

The experimentation activities have been organized by the municipality coordinating the project and performed by a group of municipalities in the project consortium. More specifically, this group consisted of 24 municipalities. These municipalities are small towns with less than 15,000 inhabitants, and they are located in mountain areas of Tuscany. For each of them an instance of the eParticipation Framework has been properly configured and deployed.
In each municipality the participation process management was regulated by a participation policy (“the Participation Act”). The policy is a document defining scope and thematic areas of the participation and subjects allowed to participate. It also defines the stages of the participation process, resources to be spent for the activation and management of the process, initiatives and channels for dissemination and involvement of the population. In each municipality, a reference person has been selected and trained in order to play the roles of “Participation Process Designer” and “Tutor”.

Information Resources for the Budgetary Process

In order to support communication and information activities related to the budgetary process, the Telep@b Framework was extended with specific services for budgetary document presentation, indexing, and retrieval.

Information resources that are considered relevant for the budget formulation process, according to the Italian legislation and practice, have been analysed by the project partners. For sake of completeness, we provide here a brief introduction of the work on budgetary document management, which has been detailed by Mercatali et al. (2007).

Budgetary information resources include:

- Documents for strategic planning (e.g. general plan, triennial budget, provisional and programmatic report, public works triennial plan).
- Documents for operational planning (e.g. provisional and programmatic report for the 1st year, upcoming annual budget, annual public works list).
- Documents for executive planning (e.g. executive management plan).
Telep@b services for budgetary document management are based on the XML schema specifications defined and published by Regione Toscana (SIFAL Project Web Site). These schemas define elements representing most relevant functional entries (e.g., “incomes” and “expenditures”) and related areas of intervention (e.g., functions and services for expenditures). XML Elements representing functions and services (such as “sport infrastructures”, “schools”, etc.) contain content that help citizens understand the domain of investment actions and strategies in their municipality. Therefore, these elements were used as first-level entities (i.e., keywords) for structuring and characterizing the participatory budget process.

Based on the above-mentioned XML models for budgetary documents, the eParticipation Framework has been enhanced with a set of features for the management of budgetary documents, such as: navigation across budgetary documents based on semantic similarities and syntactic links across structured content; full-text search; automatic generation of reports aggregating information extracted from a set of budgetary documents.

More details on the budgetary document management services developed within the Telep@b project and on the overall eParticipation Framework can be found in the work by Mercatali et al. (2007).

**Experimentation Results and Current Adoption Status**

Two towns have carried out and completed a participatory process by using Telep@b services. In the first phase of experimentation, the users who accessed the services were approximately 1.7% of the overall municipality population. The percentage of population that actively used the web site for discussion activities was less than 0.5% of population in one town, while in the second municipality the discussion has moved into an external online community already used by citizens.

The Tutors accessed the Design View to configure the participation area, according to the model in Figure 1. They found the Design View useful but they complained about the lack of pre-defined configuration patterns to be used and easily customized in order to speed-up the configuration process and minimize possible mistakes.

Moreover, the Telep@b Framework successfully passed a certification project promoted by Regione Toscana and it was inserted into the Catalog of Reusable Software Products in 2008. Tuscany Region has included software reuse among the key principles for regional innovation policies. In this context, it has promoted the creation of a Catalogue of Reusable Software Products, which is a repository of software products available for reuse (Tuscany Region, 2004). More precisely, the term reuse refers to the large scale adoption of ICT systems that have been autonomously developed by initiative either of a single public body or of a small group of public bodies. ICT systems are then made available to other public bodies for reuse. Reuse can imply adoption for use, but also for further development and evolution of the system itself (Ambriola & Cignoni, 2010). Expected advantages include cost savings as well as exchange of knowledge and good practices across public bodies.

Based on these results, a follow-on project, called PAAS-Telep@b project, has been promoted by the Tuscany Region with the aim of reusing and extending the existing Framework in order to take into account the results of the above-mentioned experimentation activities. More specifically, the objectives of the PAAS_Telep@b are:

- To activate the Telep@b areas in further 36 Tuscan municipalities in order to extend the geographical coverage and the population involved in the experimentation activities.
- To improve existing features of the eParticipation Framework. More specifically, in order to cope with remarks emerged during the use of the system, one specific aim is to make the design of the participation process more intuitive. This will be done by improving the presentation of the Design...
View and by offering a set of predefined process templates which could represent some relevant examples of participation.

- To promote the involvement of a larger percentage of population, especially young and elder people.

The latter point is the most critical one. It has been widely recognized that government bodies find it difficult to make citizens access and discuss on political issues in their web sites (Meijer, Burger & Ebbers, 2009). More in general, participation to civic and politic activities in local communities is perceived as declining, due also to recent social and economic transformations (i.e. many people work and live in different places) (Komito, 2007). Even if ICT technologies have proved to encourage and increase the amount of communication between people separated by physical distances, it is not yet clear how ICT and social network tools can increase citizens’ involvement in the participation process.

Calenda and Meier (2009) argue that citizens tend to discuss issues in digital places that they are familiar with. Moving from this consideration, the PAAS-Telep@b project aims at adopting two complementary strategies to facilitate the involvement of citizens with different profiles (e.g., age and attitude towards ICT tools) in the participation process.

First, the activation of the Telep@b web-based services in new municipalities goes with the activation of access nodes, named “Assisted Access Point to Services and Internet” (PAAS), across the territory of interested municipalities. PAAS is a community service initiative promoted and funded by Regione Toscana to facilitate the use of on-line government services (Tavazzi, Brugi & Saliaj, 2011). A PAAS is a sort of enhanced Internet Point that is free of charge and is run by qualified personnel assisting users in accessing e-services.

Second, the project is investigating the use of social networking tools. The aim is to leverage existing communities and/or ICT tools for community building in order to disseminate participation activities by sharing events notification and links to resources published on the Telep@b web sites. The aim is thus to develop an application for integrating Telep@b web-based services with Facebook via Facebook API (Facebook, 2012). Motivation for this choice is twofold: exploiting municipality’s Facebook accounts in order to disseminate participation events and activities across municipality’s network members; allowing Facebook users to receive and personalize notifications for participation events as well as to post and share comments on these events by accessing external social network services. We chose Facebook since it is a general-purpose social network that is widely known and used in Italy. In this context, an aspect to be carefully evaluated consists in finding the appropriate compromise between activities to be performed in external social networks and those to be performed in the Telep@b web site. The objective is thus to exploit existing social network communities for boosting involvement in participation, but without compromising the role of the Telep@b site (or in any case, the institutional site) as the digital place for participation processes. Otherwise, the integration with external social networks might have the undesired effect of scattering citizens’ participation efforts across different digital places.

Since 2009, participation activities have been carried out in 36 municipalities within the PAAS-Telep@b project. As reported by Tavazzi et al. (2011), each municipality activated the Telep@b web services and autonomously promoted participation projects. Each municipality could independently decide on when and how to carry out such processes. Six municipalities completed a first cycle of participation activities in 2011. Most participation projects were focused on urban redevelopment (e.g., the renewal of squares, neighbourhoods and public areas). For example, in a small municipality close to Siena, citizens chose to spend the available amount on a “Cartoon Village Project”, an expo with laboratories and screenings of cartoons and comics. In a municipality close to Lucca, the council asked the citizens’ opinion about the use and restyling of a mineral spring.
The process was carried out through meetings, forum discussions and on-line consultations. In a municipality close to Pisa the participation process was specifically targeted to young people aged 18-30 years with the aim of deciding the requalification and use of a public area. Within this project, the Telep@b services were successfully integrated with discussions carried out on social networks.

CONCLUSION

In this paper we presented results achieved in the Telep@b Project to support public bodies in the conception, design and carrying out of participation processes by means of web-based information and communication services.

To this purpose, we introduced a general-purpose model for e-Participation. The proposed model allows designers to specify participatory processes in terms of relationships among policy-making process stages and participation activities. This model inspired the design of the eParticipation Framework. This Framework helps eParticipation designers in configuring and deploying web-based services to support the activities planned in the participatory process. It allows back-end users (Participation Process Designers and Administrators) to specify a participatory process lifecycle and configure required web-based services, by hiding low-level implementation and configuration details of the underlying web-based Content Management System. We also provided a set of guidelines helping eParticipation designers in choosing most appropriate information and communication services for each participation activity.

The Framework was conceived with configurability and extensibility principles in mind. The eParticipation Framework is based on an open source Content Management System and, thanks to its modular design, can be extended with novel capabilities by adding pluggable components. Most notably, the Framework offers a Design View that help designers in configuring the participation process by selecting the target policy making stages, assigning the participation activities to be carried out and, finally, selecting and activating proper on-line services.

The Framework was developed within the Telep@b Project and its use was experimented in a group of Tuscan municipalities. We reported on the results of experimentation activities carried out in the domain of municipal budgeting process. The main objective of the evaluation was to assess the overall process design methodology and capabilities provided by the Framework.

The overall approach was positively evaluated by the Tutors. Some remarks were raised about the ease-of-use of the Design View. To cope with this limitation, activities are running within the PAAS_Telep@b project to improve the Design View by allowing the specification of simplified participation process templates. Future work will also be devoted to investigate the use of the OpenSocial APIs to improve the degree of interoperability with external social networks (Häsel, 2011).

Since 2008 the Framework has been adopted by 8 Municipalities to carry out participation processes. Each municipality defined its own policy and objectives for participation and exploited the capabilities of the Framework to configure and customize its own participation services. Moreover, the Framework was positively evaluated and inserted into the Catalogue of Reusable Software Products of the Tuscany Region.

Based on the results of the experiences carried out in Telep@b and in the ongoing PAAS-Telep@b project, the successful carrying out of participatory processes has been favored by the integration of Telep@b services with traditional offline initiatives (e.g. meetings) and assistance to citizens in accessing on-line services (i.e. PAAS nodes).

Nonetheless, we are aware of the fact that only a subset of Municipalities involved in the Telep@b and PAAS-Telep@b projects activated and completed at least one participation process cycle up to 2011. Many factors may be considered as potential barriers, as reported in the literature (Eynon & Dutton, 2007): resistance
among political actors, cultural barriers to change, lack of political support and of strong directives for eGovernment and eParticipation. We argue that a major obstacle in the project was the choice of the contexts where the Participation Framework was tested. The project objective was to enhance both e-technologies and participation processes in small Tuscany Municipalities in mountainous areas. In these specific contexts, low population density is often an obstacle for the interaction between Administration and citizens. In small communities, use of face-to-face relationships resists more than in large metropolitan communities and yet a substitution of this anthropological feature is difficult. Indeed, we acknowledge that technologies for eParticipation could be more easily deployed and better exploited by a larger Municipality, where typically costs for learning and training initiatives for Administrative staff members can be afforded and a larger percentage of citizens is proficient in the use of at least some of the e-participation tools (e.g., e-mail, forums, and social networks).

In particular we recommend carrying out well-focused and long-term training activities on participation policy and processes, before adopting and using the Framework, to favour the understanding and proper exploitation of its capabilities. In fact, a major obstacle is the inadequate qualification of human resources in managing cooperative decision-making processes, which has a cultural origin, rather than a motivation in the learning curve of web-based tools.

Finally, the evolution of the Telep@b Framework should take into account recent technological and organizational advances in the area of “Open Data”. The term “Open Data” refers to models for data publication and reuse promoting open information exchange and reuse across data producers and consumers. While the notion of “Open Data” is quite recent and not yet mature, a satisfactory definition is provided in the Open Definition web site (http://opendefinition.org/) “A piece of content or data is open if anyone is free to use, reuse, and redistribute it — subject only, at most, to the requirement to attribute and share-alike.” Open Data principles have been applied in several application domains (science, bibliographic data, and government). National governments and local administrations are publishing data sets on the web (e.g. data on education, health, safety, and transport, just to mention a few). The presumably increasing availability of open government data that can be accessed via web pages and programming APIs could increase citizens’ awareness, strengthen the participation process and encourage novel forms of participations, such as participatory sensing (Estrin, 2010; Zappia, Paganelli, & Parlanti, 2012) and user-centric software development and service composition (Paganelli, Parlanti, & Giuli, 2010). We thus recommend future designers of eParticipation platforms to adopt best practices and standards for publishing and accessing Open Data (Bizer, Heath, & Berners-Lee, 2009).

REFERENCES


**ENDNOTES**


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