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A Trust-Enhanced Approach to the eParticipation Life Cycle

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Abstract. eParticipation provides a means to involve citizens in eGovernment decisions. The ease of access to eParticipation processes has raised the issue of the trustworthiness of both the institutions promoting processes and the citizens participating in these processes. Our research aims at obtaining a generic eParticipation framework enriched with trust management techniques like the ones used in e-Commerce and social networks. Our work plan includes the following steps: making a systematic review for extract the knowledge base, designing an eParticipation framework definition and incorporating trust techniques, developing support software, implementing several case studies in Spain and Ecuador, and providing results and evaluation.

Keywords. Public participation, eParticipation, method, framework, trust

1. Introduction

The use of the information and communication technologies (ICT) in the public participation process (leading to what is known as e-participation) [1] represents a big step towards the involvement of citizens in contexts traditionally reserved to governments. ICT innovation allowed achieving effective interaction, breaking barriers such as distance, time, communications, and this way reducing implementation costs and improving spaces for democracy.

Many research efforts have been developed with the aim of obtaining theoretical frameworks for public participation, which were complemented with an implementation in few cases. However, the public participation processes implemented are not managed according to the knowledge acquired after years of definition and implementation of classical (that is, non-ICT-based) participation processes. Several agencies have used different types of web applications like survey support systems (eg. SurveyMonkey¹, Google forms²), social networks (especially, those with high usage rate among citizens) and, in other cases, projects tailored to meet specific needs. In all of the above cases, one can find a common weakness: the management of all stages of the life cycle of a project of public participation is not supported (only partial coverage is provided).

A global solution for the management of eParticipation processes is still to come. Specifically, such a solution requires methods, techniques and tools allowing the planning, definition, design, implementation, enactment and analysis of these

¹ https://www.surveymonkey.com/

² https://www.google.es/intl/es/forms/about/

processes, using the knowledge developed along of experience in public participation processes. This is the main focus of our work, which is in its early stages. At this moment, we want to achieve the following research goals:

- To design a framework to manage eParticipation processes. The framework will include models and methods supporting the definition of the different types and stages of public participation processes.
- To develop a prototype implementation of the framework proposed, for the management of the public participation processes.

When planning new public participation processes, especially with large numbers of potential participants, the problem of trust arises naturally. Trust management techniques have been widely studied in the domains of e-commerce and social networks, and currently being incorporated into the eParticipation domain [2], where it is particularly relevant in helping citizens to decide whether to join public participation processes or not. Roughly speaking, modern eParticipation environments should support trust on technology, trust in the process, trust in the use of information and trust in the results of the process. With the addition of these techniques, originate the following research goals:

- To identify the critical points of "trust" in eParticipation.
- To incorporate trust techniques in the aforementioned eParticipation framework domain.
- To apply the support software in study cases in different countries like Spain and Ecuador, among others.

This paper is structured as follows. In the next section, we present background knowledge about eParticipation and trust management. In section 3 we describe a proposal for the generic framework. Section 4 describes the methodology to be used to achieve the goals. Finally, section 5 presents the preliminary and future results.

2. Background

2.1. Public participation and eParticipation

There is no single definition for public participation. In [3] we can read that "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". Another suitable definition is one that s public participation "to the participation of various stakeholders in a collaborative process; they can be individuals, citizens' initiatives or common interest groups also known as organized public. Any participatory process should be open to all interested parties, like a wide audience" [4]. The Federal Austrian Chancellery defines: "Public participation means the chance of all those concerned and/or interested to preset and/or stand up for their interests or concerns in the development of plans, programs, policies, or legal instruments" [5]. From the above definitions, we can draw several common aspects:

the various stakeholders (decision-makers and citizens or participants), the importance of citizen participation in a decision-making collaborative environment, and the bidirectionality of the process.

The use of ICT tools within the public participation context led to the term "eParticipation (electronic participation)". In Macintosh's words, e-Participation means "ICT-supported participation in processes involved in government and governance. Processes may concern administration, service delivery, decision-making, and policy making" [1]. In this paper, we use both terms interchangeably.

2.1.1. eParticipation levels

Traditionally, public participation processes have been defined in terms of the so-called levels of participation. A level relates to a specific characteristic of the process, which must be managed and enforced. Table 1 summarizes the levels of the most relevant public participation and eParticipation proposals, Arnstein [6] proposed eight levels to define the influence of citizens over policy as early as in 1969; such levels were the basis for subsequent proposals developed years later. The Organization for Economic Cooperation and Development (OECD) presented a three level view of eParticipation designed to improve representative democracy [7], from these models, Macintosh and Whyte [8] incorporate ICT into their proposal. Later, Lukensmeyer and Torres [9] created a set of guidelines for public deliberation, and defined four levels to participation, including collaboration as a relevant level. One of the most referenced is the framework of Tamborius et al. [10], which defined five levels adapted to the recommendations of The International Association for Public Participation (IAP2) [11].

The Standards of Public Participation published by Austrian Federal Chancellery [5] return to a vision with three basic levels. Teran and Drobnjak also present an approach based on the five levels of eParticipation proposed by the model of Tamborius et al. [10] and incorporate web 2.0 concepts in order to include community-building processes, and discussion between citizens and authorities [12]. Proposals for most authors are similar, in some cases it is named differently or new shares are included from others. As a base level has "information", "consultation" and "collaboration" in addition to various characteristics of empowering.

Author(s)	Year	Participation Levels		
Arnstein	1969	Citizen control, delegated power, partnership, placation, consultation, informing, therapy, manipulation.		
OECD	2001	Active Participation, consultation, information.		
Macintosh	2004	eEmpowering, eEngaging, eEnabling.		
Lukensmeyer & Torres	2006	Collaboration, engagement, consultation, communication.		
IAP2	2007	Empower, collaborate, involve, consult, inform.		
Tambouris et al.	2007	eEmpowerment, eCollaborating, eInvolving, eConsulting, eInforming.		
Austrian Federal Chancellery	2011	Cooperative, consultative, informative.		
Teran & Drobnjak	2014	eInforming, eConsulting, eDiscussion, eParticipation,		
-		eEmpowerment.		

Table 1. Participation Levels

2.1.2. eParticipation Frameworks

Between 2000 and 2014, several works have conducted research on the creation of methods and frameworks that create, define, implement and evaluate eParticipation process. Encompassing features such as levels, areas, techniques, methodologies, tools, social factors and technologies embedded within this domain. Table 2 shows a chronological classification with several of the most referenced works, synthesizing their coverage or phases.

Nº	Author (s)	Year	Title	Scope or phases
1	Rowe & Frewer [13]	2000	Framework for evaluation public participation	Evaluations of methods.
2	Macintosh [14]	2004	Characterization framework for eParticipation.	Characterizes: the level of participation, the technology used, the stage in the policy-making process.
3	Tambouris et al. [10]	2007	Framework for assessing eParticipation projects and tools	Process, areas, participatory techniques, tools, technologies.
4	Kalampolis et al. [15]	2008	Model domain of eParticipation	Define domain model to: stakeholder, participation process, ICT tools.
5	Islam [16]	2008	Sustainable eParticipation implementation model	This model describes seven consecutive phases: policy and capacity building, planning and goal setting, programs and contents development, process & tools, promotion, participation, and post implementation analysis.
6	Phang & Kankanhall [17]	2008	A Framework of ICT Exploitation for E- Participation Initiatives	Presents a three step procedure for eParticipation initiative implementation. 1) Identify objectives, 2) Select techniques and 3) Select ICT tools.
7	Aichholzer & Westholm [18]	2009	Evaluating eParticipation Projects: Evaluation Framework	Evaluation Perspectives: Democratic, Project, Socio- Technical.
8	Smith et al. [19]	2011	Framework for evaluating eParticipation	Model based on 3 levels: Operational outputs, outcomes and impacts.
9	Scherer & Wimmer [20]	2011	Reference Framework for eParticipation Projects	Model with: dimensions that build the scope of an e-participation project, a domain meta model, a procedural reference model, and a library with requirements, reference models and building blocks for eParticipation.
10	Terán & Drobnjak [12]	2013	Evaluation Framework for eParticipation: VAAs	Define levels: eInforming, eConsulting, eDiscussion, eParticipation, and eEmpowerment. Stages: 1) ICT tools are identified and filtered into each of the five participation levels and 2) evaluating by quantitative method.
11	Porwol et al. [21]	2013	Social Software Infrastructure for eParticipation	Define an integrated model for eParticipation for social software Infrastructure (SSI): design, information flow, requirements.
12	Yusuf et al. [22]	2014	Novel Framework of eParticipation	The framework includes factors: politics, economics, social, cultural, education and technology. Using Actor Network Theory (ANT).

Table 2. eParticipation frameworks

2.2. Trust

Trust is a subject that has long been of interest in a variety of fields of human endeavor, like psychology, sociology, computer science; it has led to a diversity of conceptualizations, "a simple definition of trust is that it is the willingness of a party to expose itself to the possibility of being exploited by another party" [23]. The involvement of trust in ICT applications, such as eCommerce and social media networks have been widely studied. In the domain of eGovernment it is also has a keen interest, as demonstrated by researchers [23] [24]; since it is necessary to create an technological confidence environment so that citizens first, choose to participate in a process and, secondly provide clear and effective data through the various tools that are created for that purpose. Scherer & Wimmer [2] present a research on trust in eGovernment, eCommerce and eParticipation to define a trust model for eParticipation with two roles (trustor and trustee), besides proposing several emerging needs.

3. Proposal: A trust-enhanced approach to the eParticipation life cycle

Based on theory investigated and the several cases of study implemented until now, it can be determined that there is no global vision of a public participation architecture independent to application domain. The literature focuses on the development of theories and frameworks with little implementation and testing; the revised application cases provide solutions to specific problems focusing on gathering information from "citizens" or "participants" for a subsequent "analysis" of data oriented decisionmaking, leaving aside the work of "expert" in the public participation process or the institutions they represent; without a computer tool to manage their work.

In order to achieve the research goals, it has designed a generic method consisting of three main threads or sub-process: preparation, implementation, and evaluation (see Figure 1). The *preparation* subprocess aims to generate a planning process eParticipation made up of the following: definition of objectives, identification of participants, establishing the level of participation by next levels: informational and consultative or collaborative, choice of tool or method, define criteria evaluation, setting times for each activity. The *implementation* subprocess allows that the "expert" user notifies to participants and provide information related to the process by allowing the latter to choose whether to accept or not their participation. At this particular point, the proposed trust method incorporates techniques that ensure a higher rate of acceptance of denial. Finally, the *evaluation* subprocess allows you to generate reports and statistical data to support decision making. In method are includes trust management.



Figure 1. Trust in eParticipation life cycle

4. Methodology

We use the "Design Science Research Methodology methodology (DSRM)" [25] which specifies the following steps: identify problem & motivate, define objectives of a solution, design & development, demonstration, evaluation and communication. Performing an adaptation to the particular context of this study, it is planned as depicted in Figure 2.



Figure 2. Research methodology

4.1. Identify problem & motivate and define objectives of a solution

To perform the first task of the methodology was necessary to conduct a study of the state of the art through a systematic review method [26]. Using the search string created by [27] and adding the terms "trust; eParticipation and trust; trust management"; as primary sources of information to digital libraries: Springerlink, ACM Digital Library, IEEE Xplore Digital Library, Scopus and Web of Science; academic journals: Government Information Quarterly and Information Polity and various research questions, the following main research objectives were defined:

- Define a framework to support the definition of the different types of public participation processes, and the corresponding guidance to the users along the definition and implementation of the processes.
- Design and implement a support environment, incorporating trust techniques, that automates the steps defined in the proposed method.

4.2. Design & development

The modeling of the overall public participation process is performed, covering the entire life cycle; three actors are defined: public participation expert, technology expert and participant.

The development phase provides a web tool featured with "responsive design, that can be performed on any portable device, and a mobile application oriented the expert user. The main module is the "process manager" responsible for automating the threads or sub-process of "preparation and implementation", which allows the creation of the process, these can be published (visible to participants), completed process (logs). Furthermore, this module offers a catalog of methods or tools to be used. The processes can be published in public or private environment, with a previous authentication to participate. The software managers also have methods, groups, users, shares, results, and adaptation to social networks.

4.3. Demonstration and evaluation & communication.

The application of this methodology is designed to perform with the implementation of several case studies in collaboration with government and educational institutions from Spain and Ecuador. At this point is important to make a comparison between entities of Europe and South America; that allows the analysis of the results obtained from the data related to the real living conditions among participants in these continents, due to these scenarios have not been studied yet.

5. Preliminary Results

As preliminary results we have got the design of eParticipation framework (modeled in BPMN³), which is adaptable to any application domain. Also, we have stated the elicitation process with the specification of requirements represented with use cases methodology (diagrams and description) and, the preliminary design has been created of graphical interfaces of the application, through the use of mockups.

Additionally, we will acquire results about the realization of a meta-modeling technique that allows make instances in any application domain to be established as the basis for future development of software, this will integrate techniques in trust management eParticipation framework, this will be aimed to a future implementation and evaluation of the software through the use of case studies in institutions of Spain and Ecuador.

As a result of this research work, the public sector will have a tool that will allow to the experts users to build and perform any process of eParticipation, covering demographics aspects, integrating leaders and citizens, making decisions in a collaborative environment that favor to the construction of a better society based on transparency and public confidence generation. In the case of educational institutions, these are provided of a collaborative tool that would allow then act as government open, to allow the university community to participate in decisions that affect them.

Finally, this research work will provide to the scientific community a vision, that has never has been studied, taking into account comparative data between two countries in different continents with different problems, ideologies, and living conditions. In addition, it will give a basis for standardization of processes eParticipation, based on a framework, and the development of software that will incorporate techniques confidence between the civil society and the institutions.

³ http://www.bpmn.org/

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