
eParticipation Research Projects in the European Union: A Survey

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Abstract: The introduction of Information and Communication Technologies (ICTs) in the field of public participation has led to the emergence of electronic Participation (eParticipation). The field of eParticipation is currently rapidly evolving and is characterized by an increasing number of related projects and tools. This paper surveys projects that have been and are financially supported by the European Commission in the area of eParticipation. More specifically, we identify projects that are funded within and after the 5th Framework Programme, which was the first program to explicitly address electronic Government (eGovernment) and electronic Democracy (eDemocracy). We found 36 projects that were and are in progress from 1999 to 2010 with a total budget of 126 M € and a total EC funding of 65 M €. Our analysis of these projects identified the priorities the EC considered important in terms of eParticipation areas of research as well as the ICT technologies used and tools utilized or developed within these projects.

Keywords: eParticipation, research projects, areas, tools, technologies.

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1. Introduction

Governments across Europe are confronted with a growing public indifference and lack of inertia towards formal political processes. A decrease in voting activity and factions of decision-making power are common concerns for all European countries (Matilla, 2003). Modern western democracies suffer from a decline of trust by its citizens and the model of representative democracy is being disputed (Kampen and Snijkers, 2003; Nye, Zelikow and King, 1997). In this context, governments seek to encourage participation in order to improve the efficiency, acceptance, and legitimacy of political processes (Sanford and Rose, 2007).

According to Smith and Nell (1997), public participation encompasses a group of procedures designed to consult, involve, and inform the public in order to allow those affected by a decision to have an input into that decision. As technological developments mature and are diffused widely, Information and Communication Technologies (ICTs) can play an important role in helping to address new challenges in the involvement of citizens in decisions-making. eParticipation has thus emerged as a field of study in order to address these challenges.

The European Commission's Communication "i2010 electronic Government (eGovernment) Action Plan: Accelerating eGovernment in Europe for the Benefit of All" incorporates an action on "Strengthening citizen participation and democratic decision-making in Europe" (European Commission, 2006a). The European Commission thus started to systematically fund eParticipation research within the Information Society Technologies (IST) programme of the 5th Framework Programme (1998-2002). This trend continued in the IST programme of the 6th Framework Programme (2003-2006). In both cases, research on eParticipation was primarily conducted within research on eGovernment. Thus, from an administrative point of view, research projects on eParticipation were managed by the eGovernment Unit of the European Commission.

The main objective of this paper is to identify and analyze the eParticipation projects that the European Commission has funded in the last ten years since 1998. This is expected to provide insights into the European Commission's interests in specific areas of eParticipation. We also elaborate on the choices of the consortia that implemented these projects in terms of ICT tools and technologies employed and/or developed.

We thus address the following research questions:

- RQ1: Which were the high-level priorities of the European Commission in terms of eParticipation areas? The analysis will indicate the number of projects that are (were) active in each year, as well as the investments made.
- RQ2: In which areas of participation have European eParticipation research projects been active? This allows us to determine the active and overlooked areas of research.
- RQ3: Which ICT tools have been used and/or developed? The analysis identifies emerging ICT tools.
- RQ4: Which technologies have been used? The analysis identifies emerging technologies.

The remainder of this paper is organized as follows. In the following section we present our research methodology, which is followed by a listing and discussion of the data that was collected. The remaining two sections present and discuss the main results and draw conclusions from our findings.

2. Research Methodology

The accumulation of knowledge in a particular field can be achieved by efforts that conceptualize research areas and survey and synthesize prior research (Webster and Watson, 2002). However, it is essential that these efforts are being conducted according to a specific methodology. Webster and Watson (2002) discuss the broad structure of a literature review and suggest how to conduct a review. More specifically, they suggested that these efforts should include a structured approach to determine the source material and a framework that is based on concepts that organize the review. They also indicated that boundaries should be set on the work and elaborate definitions of the key variables should be provided during the early stages of the research. The survey that is presented in this paper has been conducted in this context.

2.1. eParticipation definition

Efforts to engage people in the political process have led to 'public participation' which can be defined as the process by which public concerns, needs, and values are incorporated into governmental and corporate decision making (Creighton, 2005). The

value of public participation is that “*administration can learn from the citizen and vice versa in an environment of mutual enrichment*” (Hall, 2007). The field of public participation has recently been facilitated with ICT, thus leading to the field of eParticipation. Associated concerns exist as to the extent which such activities widen representative participation, or amplify existing participation (Hall, 2007).

Therefore, our working definition of eParticipation is: “eParticipation describes efforts to broaden and deepen political participation by enabling citizens to connect with one another and with their elected representatives and governments by using Information and Communication Technologies (ICT).” (DEMO-net Consortium, 2006b). The emphasis of this paper is on the technological rather than the political side of eParticipation. Therefore, programs that fund technological projects are included in our survey.

2.2. Source material determination

The survey identified two major databases that provide information about projects that were financed wholly or partly from the budget of the European Communities. The first is the Information Society Technologies (IST) Projects Database (<http://cordis.europa.eu/ist/projects/projects.htm>) which contains information about research projects funded under the Fifth Framework Programme (FP5) and the Sixth Framework Programme (FP6) by the IST Programme. The second is the eTen Project Database (http://ec.europa.eu/information_society/activities/eten/cf/opdb/cf/project/index.cfm) which has projects funded under the European Community eTen programme.

The first database was searched by using the following keywords and phrases:

- Participation, including e-Participation and electronic participation;
- Democracy, including e-Democracy and electronic democracy;
- Voting, including e-Voting and electronic voting;
- Consultation, including e-Consultation and electronic consultation.

The search resulted in a database of 68 projects. The project summaries were examined in order to identify the projects that are within the concept of eParticipation as outlined in the previous section. The outcome of this process was a list containing 17 projects.

The eTen Database provides a structured way to search by using predefined keywords. In this case, ‘e-government’ was chosen as a theme keyword and ‘e-Democracy’ as a sub-area keyword. This search resulted in 4 projects.

In addition, the official eGovernment-related EU Web site (<http://ec.europa.eu/egovernment>) was searched in the eParticipation section. The search discovered a summary report of IST eParticipation research projects (European Commission, 2006b) which contains 19 projects and a report on projects funded by the eParticipation Preparatory Action 2006 (European Commission, 2006c). This report contains 6 projects. Finally, the Web sites that contained EU initiatives were searched (e.g., INTERREG III at <http://www.interreg3c.net>). One project was found during this search.

There were a total of 36 projects that addressed eParticipation and were funded by the European Commission. Table 1 lists the projects and their sources. Some of the projects emerged from two or more of the sources.

Table 1: Research Projects and Related Sources

<i>Projects *</i>	<i>Acronyms</i>	<i>Sources</i>
Evaluating Practices And Validating Technologies In E-democracy And E-voting	EVE	IST database
Western Balkans democratic participation	WEB.DEP	IST database
Web Technologies Supporting Direct Participation in Democratic Processes	WEBOCRACY	IST database, "IST eParticipation projects" report
An Innovative Cyber Voting System For Internet Terminals And Mobile Phones	CYBERVOTE	IST database, "IST eParticipation projects" report
Electronic Democracy European Network	EDEN	IST database, "IST eParticipation projects" report
EUROpean CITies platform for on-line transaction services	EURO-CITI	IST database, "IST eParticipation projects" report
Organizational Consequences Of E-mail Introduction, Adoption And Diffusion	COMMORG	IST database
Democracy Network	DEMO-NET	IST database, "IST eParticipation projects" report
Electronic Polling System for Remote operation	E-POLL	IST database, eTen database, "IST eParticipation projects" report
An Internet Based Electronic Voting System	E-VOTE	IST database
Virtual Desktop for the Mobile Elected Representative	EREPRESENTATIVE	IST database, "IST eParticipation projects" report
A Secure and Trustable Internet Voting System based on PKI	TRUE-VOTE	IST database
Delphi Mediation Online System	DEMOS	IST database, "IST eParticipation projects" report
IST for Parliamentarians	EPRI KNOWLEDGE	IST database, "IST eParticipation projects" report
Innovative IST Platforms and Services to Support a Democratic Regional/Urban	AGORA 2000	IST database, "IST eParticipation

Planning Process		projects” report
Community Empowerment Network Through Universal Regional Integration for the 21st Century	CENTURI21	IST database
E-Forum for European Government	E-FORUM	IST database
The eParticipation Trans-European Network for Democratic Renewal & Citizen Engagement	E-PARTICIPATE	eTen database
TransEuropean Living Labs for an iMproved E-participation	TELL-ME	eTen database
EUROVOXBOX services for Improving Citizens' Participation in Democratic Life	EUROVOXBOX	eTen database
Automated Legal Intelligent System	ALIS	“IST eParticipation projects” report
Innovative Cities for the Next Generation	ICING	“IST eParticipation projects” report
E-Government for Low Socio-economic status groups	E-LOST	“IST eParticipation projects” report
The European project for Standardized Transparent Representations in order to Extend Legal Accessibility	ESTRELLA	“IST eParticipation projects” report
Quality of Service and Legitimacy in eGovernment	QUALEG	“IST eParticipation projects” report
Intelligent Cities	INTELCITIES	“IST eParticipation projects” report
Electronic Court: judicial IT-based management	E-COURT	“IST eParticipation projects” report
European Programme for an Ontology based Work Environment for Regulations and legislation	E-POWER	“IST eParticipation projects” report
Voluntary organisations and Social Inclusion in the Information Society	VSIS	“IST eParticipation projects” report
Drafting Legislation with Ontology-based Support	DALOS	“Preparatory Action 2006” report
Environment for Assisting the drafting and debating of Legislation	SEAL	“Preparatory Action 2006” report
Enabling Participation of the Youth in the Public Debate of Legislation among Parliaments, Citizens and Businesses in the European Union	LEXIS	“Preparatory Action 2006” report

Easing Participation in Legislative Processes	LEGESE	“Preparatory Action 2006” report
An advanced ICT Tool for enhancing Citizen’s Participation in the Legislative Process	LEXIPATION	“Preparatory Action 2006” report
Enabling citizen’s initiative to eParticipation	TID+	“Preparatory Action 2006” report
Promoting eGovernment Actions in European Cities	E-CITIZEN	INTERREG IIIC Web Site

* The Web addresses are listed in the Appendix

2.3. Framework

The results of a survey need to add value by categorizing the results according to a scheme that helps to define the topic area (Webster and Watson, 2002). The research field of eParticipation is multidisciplinary whose definition is still under development. Therefore, there are a number of different perspectives and approaches that are often difficult to relate to a common framework. Several frameworks have recently been developed in order to conceptualize the domain of eParticipation.

One of these efforts is a characterization framework for eParticipation that aims to compare and contrast initiatives (Macintosh, 2004). This framework has ten dimensions of analysis: level of participation, stages in decision-making, actors, technologies used, rules of engagement, duration and sustainability, accessibility, resources and promotion, evaluation and outcomes, and critical success factors.

Another eParticipation-related framework was developed by Anttiroiko (2003) in order to assess the contextual role of ICTs as a part of electronic democratic practices. This framework incorporates the following:

- Contextual pressures and challenges to democracy. This means that changes in social structures, institutions, and mentalities must be identified and taken into account when assessing the processes and outcomes of the democratic system.
- Institutional mediation mechanisms of a democratic system. This element determines how and to what degree citizens influence and control collective decisions.
- Technological mediation tools that are causing a transformation in the field.
- Varieties and levels of political issues. The nature of the issues to be dealt with and the scale of issues directly affect the appropriateness of mechanisms of citizen influence.
- Different phases of democratic processes. This is based on a process view of democracy.

A layered eParticipation framework (Tambouris et al., 2007) begins with the democratic process, which includes participation areas where citizens can interact with their representatives or between themselves. This is followed by: participatory techniques which include the methods used to engage and involve citizens in the democratic process, ICT tools that can be used to enhance and support techniques, and the technological tools that are used.

Finally, the framework that was adopted in this study is a concept-centric grid that was developed by Tambouris et al. (2007). This simple framework (Figure 1) suggests that eParticipation consists of three main domains of interest: participation areas, tools, and technologies. The participation areas define the context of the participatory process and are supported by ICT tools that enable some form of automation of the relevant processes.

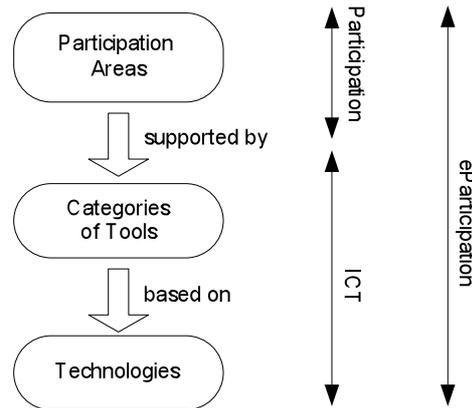


Figure 1. The framework to investigate eParticipation research in the EU

Participation areas are the specific area or areas of citizen engagement and involvement in the democratic process. Earlier studies about citizen participation and the new opportunities that ICT provides focused on three main aspects (Gross, 2000): access to public life information, public discussions about political themes, and support for electronic voting (e-voting). New aspects have been included in this approach and new areas of public participation have emerged. The DEMO-net project lists eleven areas (DEMO-net Consortium, 2006a):

- *Information Provision*: to structure, represent, and manage information in participation contexts.
- *Community building/Collaborative Environments*: to support individuals who come together to form communities, to progress shared agendas, and to shape and empower such communities.
- *Consultation*: official initiatives by public or private agencies to allow stakeholders to contribute their opinion, either privately or publicly, on specific issues.
- *Campaigning*: protest, lobbying, petitioning and other forms of collective action (except during election campaigns).
- *Electioneering*: to support politicians, political parties, and lobbyists in the context of election campaigns.
- *Deliberation*: to support virtual, small, and large-group discussions, allowing reflection and consideration of issues.
- *Discourse*: to support analysis and representation of discourse.
- *Mediation*: to resolve disputes or conflicts in an online context.
- *Spatial Planning*: urban planning and environmental assessment.
- *Polling*: to measure public opinion and sentiment.
- *Voting*: public voting in elections, referenda, or local plebiscites

The participation areas are all supported by one or more tools. They include Web logs and Web portals to the more sophisticated consultation platforms, e-Petitioning

systems, and virtual communities (Macintosh et al., 2005; Tambouris et al., 2007). According to the DEMO-net project the tools that are used in eParticipation can be grouped in the following categories (DEMO-net Consortium, 2006b):

- *ePetition systems*: Systems which host petitions using interactive media. Users can sign the petition online and a list of signatories is usually available. The systems may be aligned with the processes of a specific governing body (e.g. a Parliament or Local Authority) and be “owned” by this body. They may include information about the petition’s subject, a discussion forum, and/or feedback about responses to the petition.
- *eVoting and eReferenda*: Online voting that may be used to elect people or vote on a specific issue. They may be used as part of a statutory process or other decision-making processes.
- *eConsultation systems*: Tools that may use a blog-like format, and are used to gather public opinion on a specific issue, usually via a discussion forum, online surveys, or a combination of the two. ePanels are a subset including a group of people chosen for specific reasons. eConsultation systems usually include background information.
- *ePolling*: Online polling systems that are used to measure opinion. They use selected samples to get representative opinions. Quick polls use self-selecting samples to get a “snapshot” of opinion. e-preferenda are e-polls that use preferential voting methods.
- *Community Systems*: Systems which enable groups of people with a common interest (issue or locality-based) to work together to influence change. They usually involve content management systems and discussion forums and often include quick polls.
- *GIS and Map-based tools*: Systems which center on geographic information (usually in the form of an interactive map) and may use satellite data. They are used for participation in planning and in environmental consultations. They are also used by citizens to inform local authorities of specific problems.
- *Online surgeries and chat rooms*: A virtual space for people to meet with representatives. They may use real-time chat, asynchronous technology, or web-casting.
- *Combined collaborative systems*: Combinations of tools to support a group in order to complete tasks together.

There is a strong dependency between eParticipation tools and ICT technologies. Some of the technologies that underpin typical eParticipation applications and tools are the following (Tambouris et al., 2007; Kanstrup et al., 2006):

- File Sharing
- RSS Syndication
- Streaming Media Technologies
- Computer Supported Collaborative Work (CSCW) / Groupware
- Web Services
- Data Mining
- Ontological Engineering and Semantic Web
- Natural Language Processing (NLP)
- Mobile Technologies (e.g. WAP)
- Web Content Management System (UMS)
- Security and Cryptography (e.g. SSL, PKI)
- Unified Messaging Systems (UMS)
- Smart Cards
- Biometrics
- Artificial Intelligence

3. Data Analysis

3.1. High level priorities of the European Commission

The frequency of the number of projects since the year 2000 is depicted in Figure 2. The data indicates that a surge in the number of eParticipation projects at the beginning of the decade was followed by a decline that has since increased. All of these projects have a cumulative budget of 126 M€ and an EU funding of 65 M€.

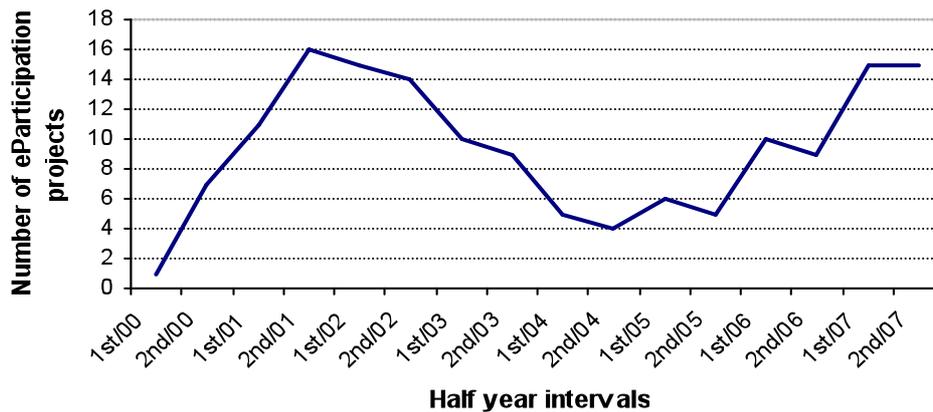


Figure 2. Number of eParticipation Projects from 2000 to 2007

In Table 2, the projects are grouped according to their funding programs. There were four projects funded by eTen, one by Interreg, sixteen by FP5, ten by FP6, and six current projects by the eParticipation preparatory action 2006 with eight more projects that will be funded in 2007.

Table 2: Funding Programs and Projects Acronyms

<i>Funding Programs</i>	<i>Project Acronyms</i>
eTen	E-PARTICIPATE, EUROVOXBOX, E-POLL, TELL-ME
Interreg IIC	E-CITIZEN
FP5-IST-1999- 1.1.2.-1.4.2 On-line support to democratic processes	WEBOCRACY, CYBERVOTE, EDEN, EURO-CITI, E-POLL, AGORA 2000, DEMOS
FP5-IST-2000-8.1.1 Project Clusters	EVE
FP5-IST-2000-5.1.7 CPA7: Socio-Economic Analysis for the Information Society	COMMORG, VSIIS
FP5-IST-2000-1.3.1 Smart Government 2005-2010	E-POWER, E-FORUM, E-COURT
FP5-IST-2000-2.4.2 Large scale trust and confidence	E-VOTE, TRUE-VOTE

FP5-IST- 1.1.2.-5.1.1 CPA1: Integrated applications platforms and services	CENTURI21
FP6-IST-2002-2.3.1.9 Networked businesses and governments	INTELCITIES, QUALEG
FP6-IST-2004-2.4.9 ICT Research for Innovative Government	ALIS, ICING, E-LOST, DEMO-NET, ESTRELLA
FP6-IST-2004-2.4.13 Strengthening the Integration of the ICT research effort in an Enlarged Europe	E-REPRESENTATIVE
FP6-IST-2002-2.3.2.6 Applications and services for the mobile user and worker	EPRI-KNOWLEDGE
FP6-IST-2005-2.6.5.1.d eGovernment eParticipation Preparatory Action 2006	WEB.DEP DALOS, SEAL, LEX-IS, LEGESE, LEXIPATION, TID+

Most of the projects were funded under “1.4.2 On-line support to democratic processes” of FP5/IST. Others were funded under “eParticipation Preparatory Actions” which was launched during 2006 and 2007. Most of the eParticipation related projects under FP6/IST were funded under action line “2.4.9 ICT Research for Innovative Government”. Although this was not strictly an eParticipation action, a specific focus on eParticipation was incorporated in it. In all other occasions, eParticipation-related projects were funded under generic eGovernment calls in which there were not any obvious reference to eParticipation. Consequently, the three aforementioned calls must be studied in order to identify the high-level priorities of the European Commission in the field of eParticipation.

The objectives of the action line “1.4.2 On-line support to democratic processes” as delineated in the 1999 IST Work Programme are linked with the processes and activities that are associated with the representative form of democracy. More specifically, this action line was designed to promote the development and demonstration of voting systems which incorporate adequate safeguards for privacy and authentication and the management of votes. In addition, it was designed to study the relationship of citizens with elected representatives and an understanding of democratic procedures. The first eParticipation specific call promoted information provision, voting, and consultation and emphasized voting systems, consultation systems, and chat rooms.

The action line “2.4.9 ICT Research for Innovative Government” also had a focus on eParticipation, where the European Commission was interested in exploring innovative tools and methods (e.g., agent technologies and intelligent information technologies) that could be used to encourage interactivity in democratic processes. In addition, there was an emphasis on policy development and democratic decision making processes. Finally, the eParticipation Preparatory Actions Call for 2006 was targeted towards harnessing the benefits of the use of ICTs for better legislative processes and enhanced public participation that focused on information provision and consultation.

In the year 2000, the European Commission felt that eParticipation-related research should be conducted in the areas of voting, information provision, and consultation, with most of the emphasis on the development of voting systems. Their

interest was on the enhancement of traditional participation processes (with ICT tools) which are related to the representative form of democracy (such as voting). During the succeeding years, there was no direct reference to a specific participation area. More recently, legislative processes have been the subject of most of their calls, which are not part of the participation areas that are discussed in this article. In this respect, the six projects that were funded within the Preparatory Action call for 2006 are grouped according to specific participation activities, such as policy development, decision making, and legislation.

3.2. Participation areas

eParticipation-related research projects that are and were funded by the European Commission are grouped in Table 3 according to public participation areas. All possible areas are listed, even if they do not have a project associated with them. An additional area is included in order to list those projects that did not develop or use a specific eParticipation tool or application but instead studied and disseminated findings (knowledge) in the eParticipation process.

Table 3: Research Projects grouped per Area

<i>Participation Areas</i>	<i>Project Acronyms</i>	<i># of Projects</i>
Information Provision	WEBOCRACY, E-PARTICIPATE, INTELCITIES, E-POWER, E-COURT, E-CITIZEN, ALIS, EPRI KNOWLEDGE, DALOS, LEGESE, LEXIS, ESTRELLA	12
Community building / Collaborative Environment	DEMOS, CENTURI21, ICING, TID+	4
Consultation	WEBOCRACY, EURO-CITI, E-PARTICIPATE, EUROVOXBOX, INTELCITIES, TRUE VOTE, E-CITIZEN, QUALEG, LEXIS, LEGESE, SEAL, LEXIPATION	12
Campaigning	TID+	1
Electioneering		0
Deliberation	WEBOCRACY, DEMOS, LEXIPATION	3
Discourse	WEBOCRACY, EDEN, EPRI KNOWLEDGE, TID+	4
Mediation	ALIS	1
Spatial planning	EDEN, AGORA 2000, INTELCITIES	3
Polling	WEBOCRACY, EURO-CITI, EUROVOXBOX, TRUE VOTE	4
Voting	CYBERVOTE, E-POLL, E-VOTE, TRUE VOTE	4
Dissemination of Knowledge	EVE, E-FORUM, VSIIS, E-LOST, DEMO-NET, COMMORG	6

The Information Provision and Consultation areas were the most popular. They are followed by the Voting, Polling, Discourse, and Community Building areas. Campaigning and Mediation include only one project each.

3.3. Categories of tools

Table 4 lists the most popular categories of eParticipation tools that were used and/or developed within the projects. The majority of the tools are part of the eConsultation systems category. This result was expected since the consultation participation area includes most of the research projects. The second most common category of tools is Combined Collaborative Systems, followed by Community Systems, and e-Polls. Although attention was paid to all tool categories, ePetition systems, online surgeries, and chat rooms are included in a small number of research projects.

Table 4: Research Projects grouped per Tool Category

<i>Tool Categories</i>	<i>Project Acronyms</i>	<i># of Projects</i>
ePetition systems	INTELCITIES, TID+	2
eVoting systems (and e-Referenda)	CYBERVOTE, E-POLL, E-VOTE, TRUE VOTE	4
eConsultation systems (includes e-Panels and e-Surveys)	WEBOCRACY, E-PARTICIPATE, EURO-CITI, EUROVOXBOX, INTELCITIES, TRUE VOTE, E-CITIZEN, QUALEG, LEXIPATION	9
e-Polls	WEBOCRACY, EDEN, EURO-CITI, EUROVOXBOX, TRUE VOTE	5
Community Systems	EDEN, E-FORUM, CENTURI21, EPRI KNOWLEDGE, TID+	5
GIS and Map-based tools	EDEN, AGORA 2000, INTELCITIES	3
Online surgeries and chat rooms	WEBOCRACY	1
Combined collaborative systems	DEMOS, ALIS, ICING, SEAL, LEXIS, E-REPRESENTATIVE, LEXIPATION	7

3.4. Technologies

The main technologies that were used by the projects are listed in Table 5. Mobile technologies, ontologies, and semantic web related technologies are the most popular technologies.

Table 5: Research Projects grouped per Technology

<i>Technologies</i>	<i>Project Acronyms</i>	<i># of Projects</i>
File Sharing	WEBOCRACY, E-FORUM	2

RSS Syndication	TELL-ME	1
Streaming Media Technologies	E-PARTICIPATE	1
Computer Supported Collaborative Work (CSCW) / Groupware	SEAL, EDEN	2
Web Services	E-PARTICIPATE, QUALEG, ICING	3
Data Mining	WEBOCRACY	1
Ontological Engineering and Semantic Web	WEBOCRACY, DALOS, SEAL, LEXIS, LEGESE, E-POWER, E-COURT, ALIS, QUALEG, INTELCTITIES, ESTRELLA	11
Natural Language Processing (NLP)	EDEN, E-POWER	2
Mobile Technologies (e.g. WAP)	CYBERVOTE, EDEN, EURO-CITI, E-VOTE, E-POLL, E-CITIZEN, ICING, CENTURi21, TELL-ME, AGORA 2000, INTELCTITIES, E-REPRESENTATIVE	12
Web Content Management Systems	WEBOCRACY	1
Security and Cryptography (e.g. SSL, PKI)	CYBERVOTE, EURO-CITI, TRUE VOTE, E-VOTE, E-REPRESENTATIVE	5
Unified Messaging Systems (UMS)	EDEN	1
Smart Card	E-POLL, TRUE VOTE, E-CITIZEN, E-VOTE, EURO-CITI	5
Biometrics	E-POLL, E-REPRESENTATIVE	2
Artificial Intelligence	ALIS	1

4. Results and Discussion

The public participation areas of information provision and consultation are characterized by an exceptionally large number of projects. It is often argued that although information provision by itself does not constitute public participation, it remains an essential component of an effective public participation process (Creighton, 2005). Citizens cannot participate unless they receive complete and objective information on which to base their judgements. Therefore, the popularity of information provision is due to its inclusion in most of the participation processes.

Arnstein (1969) asserts that the involvement of public in decision-making represents a redistribution of power from authorities to citizens. She described public participation as an analytical scheme that is metaphorically represented by a ladder with eight rungs, each representing a level of citizen participation. More recently, other classifications have been developed in order to describe the various levels of

participation. OECD (2001) adopted a three level scheme which are: *information*, where governments disseminate information, *consultation*, where government asks for and receive citizens' feedback, and *active participation*, where citizens engage in decision-making and policy-making. Lukensmeyer and Torres (2006) adapted the scheme in the OECD report to a four level model of public involvement. Their levels are: information, consultation, engagement, and collaboration. Finally, Tambouris et al. (2007) proposed a five level framework: e-Informing, e-Consulting, e-Involving, e-Collaborating, and e-Empowerment. All of these schemes list information provision and consultation as their first two levels, which are also the most popular areas that have been addressed in the research projects listed in this study.

The most frequently used technologies in the 36 projects are the mobile technologies, such as WAP. However, it can be argued that this type of technology is not linked directly to the functionality of the eParticipation tool. These types of technologies provide a more diverse set of interfaces for the users to select from, and thus increase the potential of the adoption of a tool. The accessibility of services through a range of communication channels is crucial to enable eParticipation for all. Therefore, an understanding of different technological attributes that offer citizens a degree of latitude in selecting the application that is more pertinent to their situation is important. A proper understanding of what drives citizen choices for technologies designed to support eParticipation will help the deployment of specific applications and devices to intended target groups.

The results of our survey also indicate that ontological engineering and the semantic web have attracted the most attention among the technologies used within the research projects. According to the DEMO-net Consortium (2007), ontologies can help to structure the complex area of eParticipation, thereby creating the natural links between the application of ICT and the context of citizen engagement in their discourse with politicians and governments. In more advanced eParticipation implementations, ontologies represent the basic underlying concept of structuring domains and lines of argumentation where intelligent reasoning and knowledge extraction may be facilitated. Recent technologies that support digital ontology descriptions enable the exploitation of reasoning and inference mechanisms, thus providing innovative means for knowledge management and personalized and customized tools and services that support a wide range of eParticipation areas.

5. Conclusion and Further Work

This survey of European Union funded projects over the last decade identified 36 projects in the domain of eParticipation that had a total budget of 126 M € and a total EU-funding of 65 M €. Most of the projects were funded under two main streams. The first was action line 1.4.2 on "online support for democratic processes" within FP5 that funded seven projects while the second is the eParticipation Participatory Actions that is currently funding six projects and will fund eight more in 2007.

The European Union has been flexible with regards to the areas and technologies that are researched by their sponsored projects. A notable exception is voting, which was funded under specific action lines in order to address large scale trust and confidence. The remaining EU projects indicate a preference for Consultation and Information Provision, with some emphasis on legislative processes.

A database of implemented eParticipation projects and initiatives makes it possible to relate specific areas of participation with ICT tools and technologies. This will help to sharpen the focus on the potential of specific areas of eParticipation. Undiscovered relationships between different areas and untapped and unrealized avenues for research will help to further identify future avenues of research. For example, the differences between discourse, deliberation, deliberative discourse, and consultations need to be firmly understood and agreed upon by involved actors. Since eParticipation involves researchers from technological domains as well as those from the political sciences, cross disciplinary practical and theoretical perspectives need to be merged in order to gain a more holistic view of eParticipation.

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Appendix

Web addresses of the EU projects that address eParticipation

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- 10 E-POWER (2007), <http://www.lri.jur.uva.nl/~epower>.

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