Efthimios Tambouris
Ann Macintosh
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Electronic Participation

Third IFIP WG 8.5 International Conference, ePart 2011
Delft, The Netherlands, August/September 2011
Proceedings

ifip

Springer

Lecture Notes in Computer Science 6847

Commenced Publication in 1973
Founding and Former Series Editors:
Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

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Preface

The International Conference on eParticipation fosters an integrated interdisciplinary research culture by providing a meeting place where eParticipation researchers can disseminate methods, tools and data and plan future cooperation. Organized annually, ePart is supported by IFIP WG 8.5 (International Federation for Information Processing Working Group 8.5 on Information Systems in Public Administration), and is the scientific hub for research and practice in the field of eParticipation. This year again, ePart brought together researchers from a wide range of academic disciplines working at the interface of technology and society. At the heart of ePart philosophy lies the idea that understanding the phenomenon of eParticipation requires contributions from different disciplines, even though these disciplines may offer divergent or even conflicting perspectives on eParticipation. The collaboration between researchers from these different disciplines gives us an insight into the complex world of participation. We can learn from the social sciences that eParticipation has many positive effects which we also find in normal participation processes. It can result in more active citizens, better policies and closer ties between society and governments. As the research papers in this conference series have demonstrated, eParticipation can result in positive outcomes but can also result in public frustration (much participation, limited impact) or in a greater influence of subjective knowledge over objective knowledge — experts and laymen are often equals on the Internet. The engineering disciplines provide us with the technology for eParticipation (such as argument visualization tools), but the potential field of application is much wider than merely enabling participation. Technology can also lead to a game change. eCampaigning, for example, has changed the course of many political campaigns. Technology re-structures the way people communicate and even reflect and learn. What makes this even more challenging is the fact that the impacts of technology often belong to the category of the unknown unknowns. Who could have predicted the Twitter revolutions a few years ago? In fact, in this publication, we see a number of research studies into the impact of social media, and in particular Twitter, on citizen participation in political decision making. At the same time the field is gradually maturing. Indeed, this publication presents papers enabling both a better theoretical understanding of eParticipation and also learning from initiatives and country studies.

We have brought all these exciting developments together in this year's ePart 2011 proceedings. The volume comprises six parts:

 – Appreciation of Social Media
 – Visualizing Arguments
 – Understanding eParticipation
 – eParticipation Initiatives and Country Studies

- Participation and eServices
- Innovative Technologies

This volume brings together 26 papers representing the comprehensive research of over 60 authors from countries worldwide. This is an amazing achievement for such a young conference which saw 19 full research papers published by Springer in 2010 and 16 papers in 2009.

All ePart papers were blind peer reviewed by at least three reviewers from the ePart 2011 Program Committee with the assistance of additional reviewers. We would like to acknowledge their professionalism and rigor, which resulted in this series of high-quality papers. ePart 2011 was hosted by the Faculty of Technology, Policy and Management (TPM) of Delft University of Technology, The Netherlands. The faculty has five research programmes which are at the interface of engineering and public administration. Earlier this year, these programmes were reviewed by an International Review Committee under the Dutch system of quality assurance and received very high scores. The faculty also offers several degree programmes aimed at students who are interested in connecting the worlds of engineering and policy making. Given its international orientation, the faculty is a natural environment for eParticipation research.

As in past years, Trauner Druck, Linz/Austria, published accepted work-in-progress papers and workshop and panel abstracts in a complementary proceedings volume. This year, that volume covers approx. 50 paper contributions, workshop abstracts, and panel summaries from both the IFIP EGOV and IFIP ePart conferences. Edited by the Chairs of both conferences, the volume once again illustrates the close links ePart has with EGOV, our sister conference focusing on eGovernment research.

Finally, we would like to thank Marijn Janssen and his team at TPM for organizing the conference, including all the crucial details pertaining to an international conference.

August/September 2011   Efthimios Tambouris
                                                                      Ann Macintosh
                                                                      Hans de Bruijn

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Understanding Twitter™ Use among Parliament Representatives: A Genre Analysis

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Abstract. This article examines parliament representatives' Twitter- contributions (tweets). First, the genre of communication approach is introduced to identify common characteristics and communication patterns. Second, the findings are analysed using various eDemocracy models and deliberative standards to identify to what extent these tweets could be characterized as part of a deliberative discussion. The tweets are mainly dominated by five communication purposes; providing links to information sources for other Twitter users, to inform about the representative's ongoing activities, to express views on topical issues, introducing non-political (private) content and participating in online discussions with other parliament representatives. Other less frequent communication patterns include tweets attracting attention to the representative's own blogs, requests for input from readers and finally discussions with citizens. The analysed tweets generally did not meet deliberative standards and are dominated by politicians disseminating information and discussing with other parliament representatives. We conclude by arguing that the parliament representatives´ Twitter use is linked to the Liberal Democracy model, where the main purpose is to disseminate information to electors, and provide information on ongoing activities to the audience.

Keywords: Twitter, eParticipation, Parliament representatives, genre of communication, Democracy models.

1 Introduction

Throughout the last years, social networking services, such as Facebook and Twitter, have proliferated in political debate and communication, significantly influencing how various stakeholders communicate. Such services offer the potential to deliver conventional forms of discourse to a wider audience and offer new opportunities for political participation [1]. A growing body of research has begun to examine the influence of social networking services on political communication [1], since interpersonal discussion plays a distinct role in creating the dialogue necessary for sound political deliberation [2].

This study contributes to this research by exploring how a social networking service, Twitter™, was adopted and used by parliament representatives. Conceptually, we use this empirical study to weave together two strands of research. The first strand argues that electronic communication, like the use of Twitter, can be classified into

recognizable genres [3]. Research on online political communication often exposes "the Internet" as one-dimensional [4], discussing "the Internet" as a single entity [1]. Genre refers to "a recognizable communicative event" [5] with socially identifiable motives and tasks, which give a rational reason for communicative utterances to exist [6]. Genres have been used to study the communication structure within organizations [3], determining requirements for systems in general [7], and specifically in e-Participation projects [6, 8]. A genre-based analysis may help to explore characteristics of politicians' Twitter postings to better understand the role of using such services for political purposes, and addresses the call for a more in-depth understanding of online political communication [9].

The second strand of research argues that the use of electronic media for political purposes is influenced by the ideals regarding how democracy should take place [10-12]. Current research on Internet and political engagement often focus on citizen's engagement [9] and deliberation [13-15]. The conclusions are often somewhat disappointing, illustrated by the conclusions drawn by Strandberg [16]:

> *"on-line discussions are not, at least for the time being, truly deliberative. The debates analysed generally did not meet deliberative standards in terms of quality and only politically very active and interested citizens seemed to take part in them. The question thus still remains if, and how, on-line citizens' discussions can ever become truly deliberative"(*p. 71)

Rose and Sæbø [17], by analysing a political discussion forum, found conflicts of interest between citizens and politicians:

> *"Politicians set out to demonstrate their specialist/elite abilities through rational argumentation and to broadcast their policies to a broad range of voters in order to be (re)elected. Citizens engaged politicians in discourse in order to set agendas and influence political decision making"*(p.160)

To fully understand the influence of social networking services on political communication, we need to broaden the perspective by including other democratic context than only the deliberative approach, and to include various stakeholders' perspectives. The eDemocracy models represent means for seeing technologies and development of the society as a mutually dependent and dynamically emergent phenomenon [18]. Discussing the identified genres in relation to various eDemocracy models explore how politicians' use of Twitter contributes to various democracy ideals.

In this paper, we integrate these two research strands by investigating the use of Twitter among Norwegian parliament representatives. We conduct content analysis to analyse 473 tweets based on the genre of communication perspective to identify common patterns of communication. These patterns were then analysed in regards to the eDemocracy models.

2   Theoretical Premises

2.1   Genres of Communication

The term genre originally describes a distinctive type or category of literary composition [19]. The genre perspective was introduced to Information System (IS) research by Yates and Orlikowski [3, 20] who used it to investigate organizational

communication by applying it to "recognized type of communications, e.g. letters, memoranda or meetings. In the eParticipation area, the theory of genres has been used to analyse the purpose and nature of communication in government-initiated discussion forums [6, 8, 17], and provided the basis for guidelines to develop eParticipation systems that combined eDemocracy models and genres [6]. Genres are complex, as they integrate many different facets into an identifiable but intricate whole, and the boundaries are difficult to specify [21]. Yates and Orlikowski [3] defined a genre of organizational communication as a typified and recurrent communicative action such as memos, meetings and training seminars, enacted to realize a particular social purpose. The recurrent situation includes the history and nature of established practices, social relations, and communication media within organizations, and involve expectations relating to communities and roles [3].

Even though no common consensus exists on the exact definition of genre, most classifications include considerations of the form, expected content, and intended communicative purpose [21]. The purpose of a genre refers to the socially identifiable and enacted motives and tasks, which give a rational reason for communicative utterances to exist. Purpose is constructed and recognized by the organizational community [22]. Form refers to observable aspects of the communication [22], such as the preferred media for the typified utterances (e.g., pen and paper, telephone or Skype), linguistic characteristics of how information and communication content is organized and stylistic expectations for the language and other semantically meaningful expressions used [6]. An established genre within a community serves as a template for social interaction, shaping the communicative actions of members within the community [20].

By employing various computing devices and the Internet, the genre research agenda has broadened not only to organizational, but also digital genres [19]. As documents migrate to the web, their identity also evolves [21]. Many technologies are converging – voice, image, text, databases, computing – creating opportunities for combining and recombining many various forms of genres in inventive ways and for unexpected purposes. Digital genres are thus not only characterized by traditional indicators, such as specific content and form, but also new and different cues for both identifying and then analysing and conceptualizing them.

In order to analyse genres, we adhere to the six dimensions of communicative interactions, introduced by Yates and Orlikowski [20]: purposes (why), contents (what), participants (who/m), forms (how), time (when) and place (where), also known as the "5W1H" framework (See Table 1).

Table 1. 5W1H framework (adapted from [20]

Why	Expectations about socially recognized purpose.
What	The content of the genre, including expectations about which genres typically appear and potential sequences.
Who/m	The participants involved in the communicative interaction and their roles, e.g. who initiates and who is addressed by the genres involved.
How	Expectations regarding the form, including expectations on media, structuring devices and linguistic elements.
When	Temporal expectations, such as deadlines or expectations (explicitly or implicitly stated) on timelines for performing the communicative actions.
Where	Location and time expectations, physical or virtual.

2.2   Models of eDemocracy

Ideas and ideals of democracy may vary significantly between societies, communities, and even the stakeholders of one community. Literature on democracy models [10-12] uses varying characteristics in order to clarify differences among democracy ideas, making a detailed comparison of the competing models difficult. A review of this literature [18] suggests an overarching but simplified comparison of various eDemocracy models based on two fundamental dimensions: inclusion in decisions and control of the agenda [23]. Inclusion refers to the idea of whether all members of a society are able to participate in current debates and decision-making processes. Control of the agenda is related to the issue of who decides what issues should be addressed in the first place. The resulting stereotypical models allow for analytical comparison on different theories, empirical situations and stakeholder perceptions between the models [18]. Since this paper focuses on twitter use among parliament representatives, only the models where politicians are the initiators are relevant; that is, the Liberal and the Deliberative democracy models.

In Liberal eDemocracy, governmental agencies and the political elite set agendas for decision-making processes. Citizens participate only implicitly, if at all, in most of the decision-making processes, except for voting in elections. Meanwhile, the citizens are mostly regarded as consumers of services and subjects to the public governance. Liberal eDemocracy is based on a representative government, where citizens form the electorate, participate in public debate and provide mandates to representatives at the local level [10]. The purpose of politics is to reconcile conflicting individual interests using politicians to mediate these conflicts through negotiations [24].

The concept of Deliberative eDemocracy connects citizens more explicitly and directly to the decision-making processes [10, 25] emphasizes the role of open discussions in a properly functioning public sphere [26]. Politicians and citizens share ideas via dialogue and discourse, which then leads to the formation of public political opinion. This is a form of representative democracy where the input and cooperation between citizens, politicians, and administration constitute the legalisation of power. Graham [14] introduces four components for deliberative democracy. First, the discussion should take the form of rational-critical discussion, with reasoned claims. Second, to achieve such rationality, reciprocity is needed, where the participants listen and respond to others. Third, reflexivity is required where the arguments of others are reflected against one's own. Finally, empathy might be necessary, where you are able to put yourself in another's position in order to achieve mutual understanding [14].

3   Research Method

Twitter is a micro-blogging service where users may post 'tweets' (brief text updates that are a maximum of 140 characters) to describe their current status. Twitter allows a user to register as "followers" to receive updates (tweets) added by others [27].

Tweets are exclusively textual and in principle form a document that can be analysed by any recognized form of textual analysis. In addition, the postings demonstrate many of the characteristics of conversation, such as question and answer periods, thematic groupings, ordering, and obvious conversational devices, such as

references to previous postings and the opportunity to change the subject. The text is therefore suited to qualitative analysis, within a philosophical framework of hermeneutics, and genre analysis. Content analysis [28, 29] is chosen as the analysis method. Content analysis provides a relatively systematic and comprehensive summary or overview of the dataset as a whole [30]. It operates by observing repeated themes and categorizes them using a coding system.

The thematic analysis took a grounded approach. Tweets were examined in detail, first for more specific textual evidence of adherence to the political models and second for repeated types of postings and interactions. Communication patterns were derived in a grounded manner from the text (rather than from a theoretical source), giving the opportunity for a more qualitative style of detailed analysis designed to display the important features of the interaction. The resulting communication patterns were then iteratively used as thematic categories and the text recoded so that their frequency could be counted. Since the genres themselves can also be related to the democracy models, this analysis both triangulates the earlier theoretical analysis and exposes some increasingly detailed ways in which the interactions operate. The principle purpose of the theoretical analysis was to discover which models of democracy underpin the tweets posted.

A total of 102 (out of 165) parliament representatives posted approximately 4000 messages in the time period studied (January to June 2010). We randomly selected 473 of these tweets to be included in the conducted analysis. In the genre analysis, the tweets are studied in detail. Questions of structure, tone, style, intended audience, and relation to context were investigated, based on a genre approach to identify purpose and forms. These common patterns are then sorted according to the democracy models that they best relate to (each of the squares in the theoretical table is allotted a code). Some tweets are classified into more than one category. Thus, the number of tweets allocated into the various categories (527) exceeds the number of tweets analysed (473).

The content analyses are conducted to identify communication patterns and to explore the characteristics of the tweets posted, and do not allow for generalization towards the samples identified. The communication patterns should be seen as examples and potential archetypes, which may or may not be supported by quantitative studies. The number of occurrences should, therefore, not be seen as an attempt to generalize, but are instead conducted to support the textual descriptions of the identified communication patterns.

4 Results

The genre analysis identified eight typical communication patterns, which are introduced as follows.

Representatives posted **links to information** sources, which is the most common communication pattern identified (114 occurrences). This is a one-way communication pattern, where the representatives are providing some information for everyone to read, without any expectations to receive input or initiate a discussion with others. In general, the representative provide links to information supporting their own views, from sources sharing their political point of views, e.g. their own party's web-pages

or mass-media from their own political "sphere". Furthermore, it is interesting to observe that links to online content from sources other than the dominating and established information providers (mass-media, political parties, organizations from the two sides of industry) are indeed rare. It seems as though the representatives, even when using social media like Twitter, are continuing to rely upon established sources for information.

Informing everyone about the representative's ongoing activities is the second most common communication pattern (98 occurrences). These tweets also represent a one-way communication pattern, with few (if any) attempts to get into dialogue with the reader (receiver) of the tweet posted. Such tweets are often posted when the representative is on external visits, or when the representative is participating in a debate in the parliament. Oftentimes, he/she is expressing his/her viewpoints while informing about what he/she is doing, e.g. by telling how impressed he/she is by what he/she explores when visiting an external project. There are no negative comments from visits outside the parliament; everyone seems to be pleased and impressed by the external visits.

Many tweets posted (87) express the representative's **political statements**. These tweets share some similarities with those providing links to information; they are topical (part of the ongoing parliament discussions or referring to issues discussed by the mass media) and represent one-way information dissemination, without encouraging the readers to respond. These tweets focus on the representative's own views of the issue being discussed. A very limited amount of these tweets (seven out of 87) include questions as a part of their statements, but some of these questions appear rhetoric.

It is quite common to tweet about **non-political content** (83 occurrences). On one hand, such tweets are not an important part of the political discussion. On the other hand, however, these tweets might be partly considered an attempt to allow citizens to get to know their representatives. It is interesting to look at what kind of private message that are posted. These tweets are heavily dominated by discussions about sports-related topics. Football and cross-country skiing are often introduced, which are both very popular sports in Norway. Talking about football, the representatives supports their local teams from the region they are elected representatives. Other popular tweets are about daily life, e.g. discussing family life in general or private plans for what to do in their spare time. There are very few tweets in this category that could be considered controversial.

Discussions with other parliament representatives are quite common (77 occurrences). Unlike the communication patterns introduced above, the dialog is important here. References to other Twitter users and ongoing discussions are common, and the statements often include arguments posted by other parliament representatives. There are few, if any, non-politicians participating in these discussions. As such, the discussions appear internally oriented, without any clear invitations for others to participate. These tweets are generally posted during discussions taking part in the parliament, where several parliament representatives are present in the same room listening to the same debate.

More seldom (28 occurrences), the representatives are **linking to their own blog postings**, or their own postings at e.g. their party's web page. These tweets are generally the only communication pattern referring to information not being posted by the

established information providers (e.g. mass-media or the parliament). These tweets might be seen as "teasers" to attract more readers to the blogs. They share characteristics with the "linking to information" category introduced above, and represent in general one-way information dissemination, even though it should be mentioned that the blogs might encourage readers to add comments and take part in a dialogue.

Requests for input from other Twitter users represent the first of the final two communication patterns where non-politicians are included as active participants, posting their own tweets (in the discussions) or being requested to respond (requests for input). These communication patterns are quite rare, with eight occurrences for requests and only two occurrences where the representatives have posted tweets being a part of an on-going discussion dominated by non-politicians. The requests for input from citizens are often connected to an early phase of a decision-making process, where the representative or his/her party is in a clarifying phase. Readers are then asked to reply on some specific issues, expressing their argument to further guide the representative. No information is given on how this information will be a part of the further process, or how the representative plans to comment on the (potential) input made by citizens.

Finally, there are two tweets representing **discussions with citizens (non-politicians)**. Here, non-politicians are dominating, both context-wise by initiating what topics to discuss, and content-wise by dominating the debate concerning number of occurrences. It makes no sense to introduce general communication patterns based on only two tweets. Thus, they are not summarized as the communication patterns above. These tweets follow a similar pattern to the discussion within parliament representatives, except from the fact that citizens are dominating the discussions.

The communication patterns are summarized towards the 5W1H framework in table 2 below.

Table 2. The genre analysis of the Twitter postings

1	Why	**Provide link to information sources for the readers**
	What	Often the representative introduces his/her own view on a topical issue and provides hyperlinks to relevant information sources. The information provided is in general supporting his/her own views, e.g. by linking to his/her party or to online newspapers sharing his/her own political point of views.
	Who/m	The only one involved is the one posting the tweet. There are no specific expectations expressed on who is the receiver.
	How	The candidate often expresses his/her own views in the first sentence. The second part is the hyperlink to the information source.
	When	Topicality seems important. The more common explanations why it is topical is that that something is discussed in mass-media, the representative is travelling, visiting e.g. a project, a municipality or a business, or the Parliament is currently discussing the topic being introduced.
	Where	Online 24/7
2	Why	**To inform about the representatives on-going activities**
	What	The representative informs about what he/she is (or has been) doing. Often, he/she is also expressing his/her own point of view. If it is an external visit, his/her views are always positive, being impressed or very supportive towards what he/she is experiencing.
	Who/m	The representative is the only one being directly involved and there are no expectations to get the reader involved in a dialogue.
	How	In general, these tweets consist of one sentence in first person singular introducing the on-going activities.
	When	These tweets are posted in connection to external activities or parliament' discussions.
	Where	24/7, more often than other tweets posted from mobile devices.
3	Why	**To express his/her own views on topical issues**

Table 2. (*Continued*)

	What	The representative introduces the topic by referring to a source (a debate, mass-media, opinions expressed by other representatives). Then he/she adds her statements on the issue introduced.
	Who/m	The first part refers to a third-party. The second part refers to his/her own points of view. There is no invitations or expectations to the reader to comment, although other Twitter users often do.
	How	The first part of the tweet often refer to other Twitter users or debates by introducing "@" (reference to other users) or # (hash tag, referring to on-going Twitter debates). It is quite common to post ironic comments.
	When	In relation to topical issues. The number increases during parliament debates. If one or two of the representatives post such tweets, a spillover effect seems to appear, where more representatives add similar tweets.
	Where	Online 24*7
4	**Why**	**Introducing non-political content**
	What	All kind of (non-controversial) private issues, dominated by messages in relation to sports, always supporting Norwegian athletes or teams from their own region. One-way information dissemination about on-going activities.
	Who/m	The representative comments on some third-party stakeholder (athletes, musician or others), or his/her own family (anonymously).
	How	Generally only one short sentence about on-going activities, which may include exclamation or question marks, the latter representing mainly rhetoric questions.
	When	In connection to sport- or cultural arrangements, more often before or after the weekend or in relation to holidays.
	Where	Online 24/7
5	**Why**	**Participating in online discussions with other parliament representatives**
	What	The first part often relates to arguments introduced by others, or a link to users or topics being discussed. The second part is either a statement or a question. The question is either for other representatives to comment on or it appears rhetoric. Irony is quite common, e.g. when characterising other party's or representative's views.
	Who/m	There is a clear connection between the tweet and other tweets and users who are encouraged to respond. The audience (the readers) are not explicitly addressed, and are as such a "non-present" part of the debates.
	How	These tweets consist of two parts. First, the reference to the on-going discussions and then the representative's contribution to the discussions. Linguistic elements related to Twitter are commonly used, such as reference to users (identified by "@") and references to ongoing Twitter debates (identified by "#").
	When	Related to offline activities, in general to parliament debates where several parliament representatives are participating and listening to the same offline content. Thus, the tweets are quite often posted during office hours.
	Where	More often than other tweets posted from mobile devices.
6	**Why**	**Attract readers to her own blog postings**
	What	The representative often introduces his/her own view on a topical issue, argues why this is topical and why more information is needed, before providing a hyperlink to his/her own blog.
	Who/m	The only one being involved is the one posting the tweet: There are no expectations on who is the receiver.
	How	First part is the view and the reason for discussing the topic. The second part is the link to the blog.
	When	Topicality seems important. A common explanation for topicality is that something is discussed in mass media, the parliament is currently discussing the topic, or his/her own party is expressing an opinion about the topics discussed.
	Where	Online 24/7
7	**Why**	**Requests for input from Twitter users**
	What	The representative introduces a topic and asks for some input from readers. No further information is given on how the information is to be used or will be commented upon by the representative.
	Who/m	The representative is initiating the dialogue and invites other (unnamed) Twitter users to participate by posting their view on the issue being discussed.
	How	The first part introduces the topic and tries to motivate readers to respond by arguing why the topic as well as the response is important. The second part is the request for input, most often conducted by posting a question.
	When	These tweets appear to be posted in an early part of a decision-making process, when the representative or the party is considering various alternative solutions to the issue being discussed.
	Where	Online 24/7

By analysing the tweets towards the various eDemocracy models, we found that an overwhelming amount of tweets represent one-way communication patterns, where the parliament representatives are focusing on information dissemination to an un-named audience. In general, there are very few examples where the representatives participate in debates where non-politicians are dominating, or add requests to the readers to participate. Tweets of this nature are only present in the categories "Re-

quest for input" and "discussions with non-politicians", with ten occurrences altogether, representing less than 2% of the tweets analysed.

The majority of the tweets posted do not support the Deliberative democracy model. As introduced above, the Deliberative model emphasizes the role of open discussion between citizens and politicians, sharing ideas via dialogue and discourse. None of the requirements for the deliberative discourse (rationality, including reciprocity, reflexivity and empathy) are met by more than only a few of the postings.

It could be argued that the ideas and ideals of the Liberal democracy model are dominating, where the citizens are regarded as subjects to the public governance, not as active participants in an ongoing dialogue. Thus, it is important for the parliament representative to inform citizens about the daily work, to disseminate their political points of view, and to get closer to potential voters by inviting them to learn more about their daily (private) life. Interestingly, these private messages are extremely non-controversial and dominated by content "everyone" agrees with, e.g. by supporting national skiing athletes or regional football teams.

5   Discussion

The main purpose in this paper has been to explore how parliament representatives use Twitter, by identifying and describing common communication patterns. Thus, the main contribution is the descriptive analyses of the various communication patterns introduced above. The tweets are dominated by one-way information dissemination from the representatives to an unnamed audience. These tweets do not represent the ideas and ideals in a deliberative democracy and do not encourage anyone to reply or participate in an ongoing discussion. Further research is needed to fully understand the rationale and motivation for why these communication patterns are dominating, e.g. by interviewing the representatives themselves.

The parliament representatives' Twitter messages do not appear to be posted mainly to address the general public. The comments received from others often have personal references, e.g. by referring to earlier meetings. Furthermore, to truly understand the content and the context of the tweets posted, the reader needs to follow the chain of messages posted, not only to read one tweet. That might be one explanation why these tweets are not very deliberative; the candidates may not consider Twitter an important arena for conducting discussions with citizens, but instead as an arena to discuss with their friends, supporters and colleagues. More research is needed to further explore the representatives' views on these issues.

The representatives appear conscious on the regions they are representing. Most of the messages in the "informing about ongoing activities" category are messages from the representatives' home regions. An explanation might be that the representatives are more often visiting projects in their home region. But it might also be more important for the representatives to tell potential electors that they are very active in their own regions. If the latter argument is true, this might be considered as a part of a Liberal democracy way of thinking, where it is important to inform (and not discuss with) the potential electors of how active and enthusiastic the representative is about projects in his/her own region. The regional perspective is also present in the private messages discussing sports. For instance, the candidates are, without any exceptions,

in support of their local football team. Perhaps none of the representatives are supporting teams from other parts of the country, or maybe those who are do not find it sensible to communicate such support?

The analyses conducted ultimately yield the conclusion that we have seen several times in the eParticipation area; new technology does not extensively alter traditional communication patterns. The parliament representatives continue to focus on information dissemination, where the readers (citizens) are mainly considered as being the receivers of information, not active participants. This is, as such, not meant to be critical towards the politicians; they are most likely just doing what they have always done: utilizing available communication opportunities to inform potential electors about their ongoing activities and political point of view in order to achieve support and be re-elected as parliament representatives. New communication channels, like Twitter, do not change these needs in the short run.

What, then, is the use and usefulness of parliament representatives' Twitter messages? Firstly, what we have not investigated here is the consequence of shortening the distance between the representatives and citizens. Although dialogue between representatives and non-politicians is very rare, the *opportunity* to communicate is being presented. That is, every Twitter user has the opportunity to comment upon tweets posted by the representatives. More research is needed to investigate the perceived value of the *potential* to communicate.

Secondly, it is interesting to investigate who the users are among the 165 parliament representatives. That is, are there any characteristics among the active Twitter users that may tell us anything about the use and usefulness of twittering? A striking perspective is the lack of representatives from central government. Moreover, the most prominent representatives are not being very active. For instance, none of the party-leaders have posted more than two tweets in our selection. The more active contributors are the younger representatives in the parliament. The explanation might be that these representatives know how to use the technology. But maybe they are also in a bigger need than the more established representatives to utilize new arenas to communicate? The young representatives have less experience and are perhaps more seldom appointed to important positions within their party or the parliament? This might explain why they are more actively using Twitter to communicate.

Finally, it appears as though representatives from the opposition parties are more active Twitter users than representatives from the government parties. Maybe the opposition party representatives have more needs to communicate and express their views since they are not equally influential on the decisions being made in comparison to their colleagues from the government parties?

6 Conclusion

In this paper we have explored how the parliament representatives are using Twitter by identifying common communication patterns and discussed them in light of both the Liberal and the Deliberative democracy model. The tweets analysed generally did not meet deliberative standards and are dominated by politicians distributing information about political issues and themselves and discussions between various politicians. We conclude by arguing that the parliament representatives' Twitter use is linked to

the Liberal democracy model, where the main purpose is to communicate information to electors and market the representatives' activities to the audience.

Our contribution represents a means for seeing social networking services and development of democratic discourses as mutually dependent and as a dynamically emergent phenomenon. We subscribe to an established line of theorizing that, in general, warns against viewing any application of information technology as a deterministic tool, orientating instead towards analysis of structural processes in which technologies and organization contexts (and, in this case, societies) develop in an interwoven [31, 32]. Our analysis of Twitter use in light of the genre of communication perspective and eDemocracy models addresses this issues: the need to discuss societal values and ambitions in connection with the development and use of a particular technology in a particular democratic context instead of seeing technology – let alone democracy – as a generic "black box" [18].

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Left and Right in the Blogosphere:
Ideological Differences in Online Campaigning

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Abstract. This article investigates the usage of blogs in electoral campaigns in Sweden, a country characterized by strong political parties and a party centered form of representative democracy. The central argument is that blogs are utilized in different ways by different parties. The empirical analysis based on a survey among over 600 blogging politicians indicates a vast difference in uptake and usage of blogs between the right- and left wing politicians. The results indicate that ideological positions towards individualism and collectivism matters for the practice of blogging.

Keywords: Blogging, political parties, election campaigns, political individualism.

1 Introduction

There is little doubt that the internet is capable of transforming the mode and content of mass communication, perhaps most notably in election campaigning. Political aspirants in the United States, such as Bob Dole, Howard Dean and, most recently, Barack Obama, have all made headlines for their creative use of the internet to mobilize voters and generate support. Blogging, as a form of e-participation, is particularly recognized as a practice that allows candidates to engage in campaigns more directly and bypass parties to articulate individual opinions, thoughts, feelings, experiences and identities [1, 2]. However, not all countries have nurtured the blogosphere in the same way. Recent research has found that the adoption and use of political blogs, to a large extent, is shaped by institutional setting, i.e. the different roles given to political parties [3, 4]. In political systems where major party endorsement is still crucial to winning a seat, there is little incentive for candidates to openly champion divergent positions.

This article aims to investigate the usage of blogs in electoral campaigns in Sweden, a country characterized by strong political parties and a party centered form of representative democracy. This is where the shadow of party hierarchies is among the darkest in Europe. At the same time, internet use is more developed here than in almost any other country. It is a country of partisans as well as pirates. And, perhaps, it is therefore a country in which interesting intra-national differences can be found. The central argument of this article is that blogs are utilized in different ways by different

parties. Just as blogging is shaped by how institutions support persons or parties, we propose that political blogging is also shaped by attitudes towards preferential voting, candidate-centered campaigning and, at a more basic level, ideological positions towards individualism and collectivism.

According to Benkler and Shaw [5], prior studies have argued that the left and the right are relatively symmetrical and embody uniform practices. However, few investigations have been conducted on the attitudes of political bloggers, and those that have are focused on small samples of elite bloggers [1, 6, 5]. Since this article draws upon a survey questionnaire of 600 blogging candidates in the run-up to the 2010 Swedish election, it has the potential to uncover new perspectives and knowledge.

2   The Internet and Political Campaigning

According to most academic observers, the history of political campaigning creates three distinct phases [7]. The first "premodern", era [7], was characterized by decentralized and staff intensive campaign activities and high levels of party loyalty among voters. In the wake of changes in the media landscape, campaigning evolved towards a second "modern era" characterized by stronger centralization of campaign activities and a stronger focus on party leaders. In recent decades, a new era of campaigning has arisen. The so-called "post-modern era" of political campaigning refers to a mixture of developments with uncertain outcomes. On the one hand, there are signs that campaigns continue to professionalize, with power increasingly centralized in the hands of party elites. On the other hand, local campaign organizations seem to be experiencing a second spring [7], and local candidates have started to employ ICTs to run election campaigns, independent of their parties and the traditional media. This ambiguity is highlighted by Zittel [8], who offers two competing hypotheses regarding the internet's impact on the structure of election campaigns – one "orthodox", one "revisionist". The former perceives the internet as reinforcing the trend toward professionalized and centralized campaigns, allowing parties to target and mobilize groups of voters in more efficient and direct ways. Content is primarily about party program and party image, even though information on these topics may often be distributed "with a personal face" [8]. According to the revisionist view, it is not all that certain that parties are in the driver's seat. Instead, it is argued that the internet is a means for individual candidates to run candidate-centered campaigns, independent of their own parties, attracting as much attention as possible to themselves, rather than to their parties.

Blogs are touted as having the potential to reinvigorate political communication by facilitating decentralization, individualization and interactivity, in line with Zittel's revisionist view. At the same time, an unmistakable tension has arisen between orthodox and revisionist tendencies. According to Wright [1], "a battle is being fought". On one side are candidates trying to make use of the individualistic blog platform. On the other side are parties, trying to carry out professionalized campaigns, controlling their messages and presenting uniform fronts. Blogging candidates are, thus, implicated in a tug of war between two different cultures.

Politicians live in a world of certainty and tribal loyalty which is at odds with the blogging ethos of open-mindedness and knowledge-sharing. As long as politicians are

expected to be never in doubt and ever faithful to catechismic party messages, their blogging efforts are always likely to look more like simulation than authentic self-expression [2].

In explanations of how blogging candidates handle this intricate situation, factors related to institutional setting have been most prominent [3, 4]. Much less attention has been directed to the fact that a candidate-versus-party emphasis within parties may affect the extent to which candidates distance themselves from their parties and loosen central party control over their campaigns. This is somewhat surprising, considering that previous research emphasizes party affiliation as one of the most important explanations for members´ support of different principles of representation [10, 11] and that this is often explained with reference to ideological differences. Holmberg [12], for instance, points to the tradition of collectivism within socialism. For leftist parties, the guiding principle has been party solidarity, while right-wing parties have been influenced by more liberal and individualistic traditions of representation. The left-right axis has also been important when explaining different approaches towards reform proposals that support more candidate-centered electoral systems [13, 14]. Again, parties´ positions and arguments have been proven to reflect their ideological views on collectivism and individualism. Nonetheless, theoretical arguments or empirical evidence to support the view that the left and right blogospheres should vary remains in short supply. Instead, prior studies have argued that the left and the right are relatively symmetrical and embody uniform practices [5].

The central argument of this article is that blogs are utilized in different ways by different parties. Just as blogging is shaped by how institutions support persons or parties, we propose that political blogging is shaped by party affiliation and ideological positions on individualism and collectivism. We will also consider that blogging candidates are situated within the blogosphere, as well as the party-sphere, and that the depth of their involvement in these spheres might influence their attitudes and strategies. Along the lines of cultural theory, less party-involvement and more blog-involvement could be expected to increase the probability of individualized campaigning – and vice versa. Another assumption we will test is that innovations such as blogs spread to an increasingly large group only after a period of time. When a phenomenon is new, it is limited to a relatively small group. From a diffusion perspective, we would, therefore, expect that some groups – including young, highly-educated candidates – are particularly likely to use blogs to individualize their campaigns.

3   The Swedish Political Context

Sweden is characterized by strong political parties with a central position in the representative democratic system. Parties have traditionally taken a central role in organizing political representation and electoral campaigns; all candidates are nominated by the political parties, and all representatives are organized in party groups. Thus, local and national party organizations are traditionally most influential in the organization of electoral campaigns in Sweden. Although political parties in Sweden, as in most western democracies, have experienced a weakening public support few signs are apparent that the power of political parties in political assemblies is weakening.

During the last 40 years, Swedish parties have lost the lion's share of their members, voters have become increasingly mobile between elections and party identification among citizens has strongly decayed [15]. Still, the level of party loyalty among elected representatives has steadily increased during the same period. Almost half of representatives say that they would choose to adhere to party views in a conflict between the (known) views of voters, their own views and the views of their party [11]. At the same time, only 15 percent of voters now say that they identify with a party [15]. The current political climate, thus, resembles the picture painted by Katz and Mair in the middle of the nineties: "The parties are at once stronger, but also more remote; at once more in control, but also less powerful; at once more privileged, but also less legitimate" [16].

In an attempt to revitalize Swedish democracy by strengthening candidates' incentives for seeking personal mandates, a preferential vote was introduced through constitutional reform in the mid-nineties [17]. The reform was a compromise between the Liberals and Moderates, who supported a stronger individual vote, on the one hand, and the Social Democrats and Left Party, who strongly opposed individual voting, on the other [13]. The result was an optional preferential vote, allowing voters to make a preferential choice for one candidate on their party's list. If a candidate on the list received enough votes from his or her constituency to reach a pre-set limit (8% for the national parliament and 5% for local and regional assemblies), he or she was put at the top of the party list and got the first mandate won by the party in that constituency. The Swedish system for individual votes has been characterized as a weak system of preferential voting that gives candidates increased, but still limited, incentives to conduct personal campaigns and does not challenge the central position of political parties in Swedish democracy [13].

The political parties' opinions regarding the preferential vote are strongly polarized. While political representatives from the Left Party and the Social Democrats resist a strengthened preferential voting system and the Greens are only moderately in favor of it, all the parties in the right bloc are strongly in favor of such a reform [18]. Among skeptical politicians on the left, several arguments for limiting the influence of preferential voting have been made; it was thought to Americanize Swedish democracy, threaten the existence of political parties, give campaign financing a decisive role in elections and undermine intra-party democracy, as well as party cohesion [25, 29]. Increased opportunities for public control and accountability, as well as greater opportunity to strengthen the relationship between voters and representatives and increase activity among both voters and candidates in election campaigns, were arguments put forward by proponents of a strong preferential vote, especially politicians from the conservative Moderates and the Liberals [14]

Taking the description above as a point of departure, the likelihood of finding individualized campaigning in Sweden should be fairly low. Online campaigning in Sweden would be likely to be collectivistic and party-centered. However, the diffusion of the internet has been shown to have some significance when it comes to campaign strategies [7, 19]. Sweden is one country where internet access is most widely diffused. In 2010, over 85% of the Swedish population had access to the internet [20]. Hence, Sweden is a country where conflicting forces surround political campaigns. On the one hand, it is a country characterized by a strong party-centered tradition and weak institutional incentives to conduct individualized campaigns. On the other hand,

it is a country much evolved, in terms of the social and technological developments that encourage individualization. The subject of political blogging appears to be an important arena in which to study these two forces. Blogging politicians are socialized into collectivistic parties and are dependent on party-centered electoral institutions but are also employing individually-oriented technologies.

4   Methods and Measurements

This study is based on a web survey sent to the authors of all blogs listed on the political blog-ranking site "Politometern" (www.politometern.se) for which e-mail addresses could be found. The survey was answered by 730 political bloggers. The 604 who were politicians from the seven parties represented in the Swedish national parliament during the parliamentary term 2006-2010 were included in the study. Included respondents were either holding political office at the time of the survey (the study includes Members of the European Parliament, members of the national parliament, local councillors and local board members) or candidates in the 2010 elections. The survey was answered during the two months following the 2010 Swedish election. The empirical material accumulated gives a broad overview of the Swedish political blogosphere and makes it possible to analyze bloggers' background, strategies and behavior, in connection to their blogging. This study is primarily based on quantitative analyses of bloggers' survey responses and positions in the network centrality index. The variables used are presented in the following sections. As dependent variables a set of measurements of individualization among political bloggers are analyzed. The independent variables analyzed in this study can be divided into three categories that correspond with the three areas discussed in the theoretical section: party bond, blog-related variables and social characteristics.

4.1   Individualism – Collectivism

First, we investigate bloggers' attitudes to preferential voting and separate supporters of a stronger preferential voting system (Support stronger preferential vote) from other respondents. Second, respondents' motives for using blogging as an instrument in personal election campaigns are investigated by dividing respondents into two categories: those who report that using blogging as an instrument in a personal campaign was a strong motive for blogging during the 2010 election campaign (Strong personal campaign motif) and other bloggers. The third dimension of individualism – collectivism – is measured by separating bloggers with an individual focus (Blog focusing on person) from bloggers with a party focus (Blog focusing on party).

4.2   Party Bond

Bloggers' party affiliation is divided into two party blocs: left-oriented (the Left Party, the Social Democrats and the Greens) and right-oriented (the Centre Party, the Liberals, the Christian Democrats and the conservative Moderates). Level of party activity is operationally defined as the number of party meetings respondents reported having attended during the year preceding the survey (10 party meetings or more/less than 10 party meetings). We also analyze bloggers' positions within their parties by

separating incumbents, who held a political position in the last parliamentary term, from challengers, who were candidates in the 2010 election and had not held a political position during the last term.

4.3   Blog-Related Variables

Level of experience and activity in the blogosphere are investigated using three variables. First, how long respondents have blogged is studied using a variable that separates bloggers with at least two years of experience (Long-time bloggers) from other bloggers (Short-time bloggers). Second, we operationalize level of blogging activity with a variable that reflects the frequency with which bloggers write blog posts, dividing bloggers into two categories: those that update their blogs at least three to five times a week (Frequent bloggers) and those who write posts less frequently. We also investigate level of activity in the blogosphere by creating two categories for respondents who read others' blogs: those who follow ten blogs or more (Heavy blog readers), and those who follow fewer than ten blogs.

4.4   Social Characteristics

Several social characteristics are analyzed: gender (Man/Woman); education – specifically, whether or not respondents have a post-secondary school education (High education/Low education); age – specifically, whether respondents are born before or after 1970 (Under 40 years old / 40 years or older).

5   Empirical Analysis

5.1   Who Are Swedish Political Bloggers?

The distribution of political, social and blogging variables reveals many similarities between the left and right blogosphere in the run-up to the 2010 Swedish election, but there are some interesting differences, as well. Perhaps most important, there seems to be an ideological bias towards the right. First, the data show that bloggers from the right are somewhat overrepresented among respondents (352, against 252). Second, a general right orientation of the Swedish political blogosphere becomes evident when comparing left-right self-positioned blogging politicians[1] to other Swedish politicians. A majority of bloggers are in harmony with their parties, in the sense that they position themselves at the mean self-positioning value among political representatives from their parties [33][2]. However, while only 11% of bloggers position themselves to the left of their parties, a quarter of bloggers position themselves to the right – a tendency which is greatest for bloggers on the left (Table 1). Moreover, the mean self-

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[1] We investigate self positioning on an eleven-point scale, reaching from 0 (most left-oriented) to 10 (most right-oriented), that is included in several earlier studies of Swedish politicians and voters (see [33] for an overview).

[2] The results of the blog survey are compared with a survey among political representatives in Sweden. The party mean values from the general survey presented are rounded to the closest whole number, Left=1, Social democrats=3, Greens=4, Centre party=6, Liberals=6, Christian democrats=7, Conservative moderates=8.

position on the left-right scale among all bloggers is 6,3 when individual positions are weighted against their respective parties' share of seats in national, regional and local assemblies. In comparison to surveys of Swedish representatives, the political bloggers in this study are, in general, remarkably more right-oriented. Surveys among Swedish politicians in general shows that representatives at both the local and regional levels had a mean left-right position of 4,8, while national representatives positioned themselves more to the right and had a mean value of 5,2 [18]. Thus, the blogosphere during the 2010 Swedish election cycle shows an ideological bias towards the right. Blogging more often attracts candidates to the right of the ideological spectrum, both between and within parties.

Table 1, furthermore, shows that candidates from both the left and the right are highly involved in the party-sphere, as well as the blogosphere. More than 80% of respondents' have participated in ten or more party meetings during the last year, and a third of blogging politicians hold incumbent positions. The remaining two-thirds were candidates in the 2010 elections. A large share of respondents is also comprised of highly active and experienced bloggers. The majority had blogged for more than two years before the 2010 Swedish elections, and almost a third wrote daily blog posts during the election campaigns. Respondents are also active as readers of political blogs: about a fifth follows ten or more political blogs, and over 40 percent follow between four and ten. No major differences are visible between left- and right-oriented bloggers when it comes to frequency of writing or reading blog posts. However, a significantly higher number of bloggers from leftist parties have been blogging for two years or more.

When it comes to social characteristics, we find that blogging candidates are predominantly male, representing six out of ten respondents. This difference roughly reflects the gender difference among local and regional Swedish politicians, in general (42% women) but is somewhat higher than the gender differences among national parliamentarians (47% women) [19]. The share of female political bloggers is slightly higher among the left-oriented than the right-oriented parties. As we would expect, the age structure among bloggers is different from that of politicians, in general. Young politicians are overrepresented among bloggers, but there is, nonetheless, a fairly high number of bloggers over the age of 40. There is a significant difference in age structure between the two party groups, as left-oriented bloggers are more often under forty. No similar difference is apparent among left and right politicians, in general [19].

5.2 Political Blogging, Collectivism and Individualism

Let us turn from the backgrounds of blogging candidates to the question of how and why they blog. A key finding in our survey (Table 2) is that blogging politicians on the right are much more individualized than those on the left, who are more strongly tied to the collective identities of their parties. While more than two-thirds of bloggers from parties on the right support a "stronger personal vote" in the Swedish election system, only a quarter of bloggers on the left do the same. Almost two-thirds of right-oriented bloggers display a strong personal campaign motive for blogging, compared to only a fifth of bloggers on the left. Additionally, 43% of blogging politicians on the right report that they focus more on themselves than on their parties in their blogs.

Table 1. The Swedish candidate blogger; left and right (percentages)

	All	Left	Right	Difference
Incumbent position (elected)	32	29	33	4
Challenger position (not elected)	68	71	67	-4
Visited 10 or more party meetings	81	81	81	0
Visited less than 10 party meetings	19	19	19	0
Ideologically left of party	11	12	9	-3
Ideologically same as party	64	57	69	12[***]
Ideologically right of party	24	29	22	-7[**]
Long time blogger > two years	55	66	46	-20[***]
Short time blogger < two years	45	34	54	20[***]
Blogged daily	29	28	30	2
Blogged weekly	45	44	46	2
Blogged less often	26	28	24	-4
Follows more than 10 blogs	18	19	18	-1
Follows 4-10 blogs	43	41	45	4
Follows 0-3 blogs	39	40	38	-2
Men	61	58	63	5
Women	39	42	38	-5
Younger than 40 years	46	55	44	-11[**]
40 years or older	54	45	56	11[**]
High education	72	71	72	1
Low education	29	29	28	-1
N	604	252	352	100

Notes: Chi-square test, significance levels are displayed as follows, [***]: p<,01, [**]: p<,05, [*]:p<,1.

The comparable figure for bloggers on the left is 20%. This pattern remains strong, even when bloggers are categorized according to political, social and blogging variables. With few exceptions,[3] significant differences are apparent between left- and right-oriented bloggers, at all levels of individualization in all categories of bloggers. Thus, our findings strongly suggest that the blogosphere plays different roles for the left and right. The right appears to embrace an individualized form of candidate-centered blogging, while the left gives the impression of having a more collective agenda.

Besides ideology, do less party-involvement and more blog-involvement increase the probability of individualized campaigns? Sometimes the evidence points in such a direction, but the results are rather complex. Left and right bloggers with challenger positions and relatively low party activity tend to be more supportive of a stronger personal vote, especially challengers. They also tend to focus somewhat more on

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[3] Significant differences between bloggers on the left and right are not found regarding the level of focus on person (in comparison to focus on party) for bloggers that attend few party meetings, among female bloggers.

person, rather than party, in their blogs, especially within the left bloc. However, incumbents do, just as often, have personal campaign motives for blogging as challengers, and high party activity is positively correlated with such motives. Thus, even though ideology is important, it looks as if there is a degree of pragmatism involved in blogging, as well. Furthermore, when it comes to involvement in the blogosphere, there are some significant relationships. The data roughly indicate that actively reading and/or writing blogs is positively associated with support for a stronger personal

Table 2. Blogging and individualism; left and right (percentages)

	Support "a stronger personal vote"			Personal campaign motif for blogging			Blog focusing on person		
	Left	Right	Diff.	Left	Right	Diff.	Left	Right	Diff.
All	24	69	45***	21	63	42***	20	42	22***
10 party meetings	21	67	46***	26	73	47***	18	42	24***
Less	28	75	37***	10	44	34***	39	44	5
Difference	7	8		-16*	-29***		21**	2	
Incumbent	18	64	46***	24	70	46***	19	42	23***
Challenger	31	79	48***	25	71	46***	23	43	20***
Difference	23*	15**		1	1		4	1	
Left of party	17	63	46***	19	69	49***	54	52	-2
Same as party	28	51	23***	13	64	51***	37	41	4
Right of party	22	74	52***	25	62	37***	40	52	12**
Difference	6	11		6	-7		-14	0	
Short time blogger	23	63	40***	36	70	34***	19	38	19**
Long time blogger	20	74	54***	19	70	46***	21	48	27***
Difference	-3	13*		-23***	0		2	10	
Frequent blogger	24	71	47***	20	63	43***	21	44	23***
Infrequent blogger	18	67	49***	30	77	47***	18	40	22***
Difference	-6	-4		-10	-14**		-3	-4	
Reading few blogs	18	66	48***	15	62	40***	23	48	21**
Reading many	41	77	46***	25	72	46***	19	41	23***
Difference	23***	11		10	-10		-4	-7	
>40 years old	24	59	35***	25	67	42***	24	40	16***
<40 years old	24	79	55***	17	58	41***	19	47	28***
Difference	0	20**		-8	-9		-5	7	
Men	24	75	51***	21	67	46***	19	47	28***
Women	18	57	39***	30	75	45***	23	35	12
Difference	-4	-18***		9	8	***	4	-12**	
High education	22	63	41***	26	72	46***	20	41	21***
Low education	19	80	61***	21	64	43***	19	43	24***
Difference	-3	14***		-5	-6		-1	2	
N	221	311		247	342		220	308	

Notes: Chi-square test, significance levels are displayed as follows, ***: p<,01, **: p<,05, *:p<,1.

vote and a campaign motive for blogging, on both the left and the right. No significant relationships are found in relation to blog focus. However, it is interesting to note that long-time blogging means different things to the left and right. On the right, long-time bloggers are significantly more individualized (in their support for a stronger personal vote). On the left, long time-bloggers are significantly less individualized (in terms of their motives for blogging). It is, therefore, far from certain that the cumulative effect of blogging will push the leftist blogosphere towards a more individualized approach over time.

How about social characteristics? Are some groups – such as young, highly-educated candidates – particularly likely to use blogs to individualize their campaigns? In general, the results show moderate differences between groups, indicating that the threshold for using blogs to conduct individualized campaigns is relatively low. Within the right, there are significant differences in relation to age, education and gender. Young and highly-educated bloggers are more supportive of a stronger personal vote than are older and less educated bloggers. Men are both more individually focused and motivated by personal campaign aspirations than are women. The fact that no age differences are found within the left-oriented group is interesting and suggests – in line with the argument above – a continuing divergence, rather than convergence, of the left and right blogospheres. There does not seem to be a younger generation of political bloggers on the left coming to age with more individualized attitudes to blogging and politics. Rather, young bloggers on the left appear to resemble their older colleagues, while individualism is amplified among young bloggers on the right.

6   Conclusions

In the popular debate on online campaigning, deterministic perspectives are at the center. The new opportunity structure of the internet is assumed to change everything or nothing at all. Institutional contexts make all the difference – or none. According to Wright [21], this deterministic framework often distorts how researchers make sense of their empirical findings by creating undue expectations. In the face of all the hyping of technology, there is danger of an implicit pessimistic mindset being adopted. Considering the institutional context in Sweden, with parties of unparalleled strength and an election system with limited incentives for candidate-centered campaigns, we should, thus, be careful not to set too-high expectations. It is important to note that a pretty large number of candidates blogged during the 2010 electoral campaign and that the blogging uptake has been quite broad. More than the usual number of pioneers have been blogging, and their blogs have often been used in candidate-centered campaigns. Furthermore, many bloggers perceive their blogs as having given them more influence, and the more they have been involved in the blogosphere, the more influence they report. Hence, the medium appears to be important.

The main conclusion to be drawn from this study is, nonetheless, that the uptake and usage of blogging, to a considerable degree, is mediated by ideology and party affiliation. First, blogs seem to be more attractive to politicians who stand to the right, both among and within parties. A possible explanation for this ideological asymmetry within the Swedish blogosphere lies in common understandings of blogging as an

individualistic practice and, therefore, more attractive to politicians with liberal ideological convictions [5]. Second, we find that right-oriented bloggers are widely embracing political individualization, while bloggers on the left are more hesitant. As left-oriented politicians are socialized into collectivistic party organizations that have traditionally opposed reforms for a stronger preferential voting system and traditionally been characterized by stronger party loyalty, this duality is quite logical [10, 11, 12, 14]. Within these parties, a wide support for a stronger preferential vote, as well as an increase in the number of blogs used for personal election campaigns and individually-focused blogs, would be nothing less than a landslide. Instead, we see the prevailing influence of preexisting party cultures that mediate the uptake, and use of political blogs. The available evidence does not suggest that further blog experience or the younger generation will automatically change this. The results therefore underline the importance for researchers to consider ideological frameworks as well as institutional contexts, in order to fully understand the differentiated impact of e-participation.

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Social Media and Political Participation: Are Facebook, Twitter and YouTube Democratizing Our Political Systems?

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Abstract. This paper presents the results of a literature review in regard to Social Media and participation. Besides that, to understand the meaning and impact of Social Media on elections, we show field results from the 2010 and 2011 elections in the Netherlands. There are several challenges when it comes to engaging people in party politics. The current findings in literature show us that previous efforts to shape public participation with prior Internet tools did not meet expectations. With Social Media this could change, because participation seems to be the key concept that explains the difference between 'old' web and 'new' Social Media. In the Netherlands, Social Media did not significantly influence voting behaviour during the local elections (2010/2011). But, during the national elections (2010), politicians with higher Social Media engagement got relatively more votes within most political parties. In conclusion, we propose a future research agenda to study how political parties could benefit from Social Media to reinvent and improve the way they work with their members and volunteers.

Keywords: Social Media, Internet, Participation, Politics, Elections.

1 Introduction

Recent years have seen a decline in non-profit community participation such as political party membership. Also, there are several challenges when it comes to engaging people in party politics [1,2]. Contrary to popular expectations, the rise of the Internet did not result in increased levels of public participation [3,4]. On top of that, many political parties are afraid to lose control over their message when they delegate power and authority to the public [3,5].

At the same time, Internet use by citizens is becoming more social and participatory. Today, social websites such as Facebook, Twitter, LinkedIn, MySpace, Wikipedia, Flickr and YouTube are the number one activity on the web. As of April 2011, Facebook has approximately 600 million registered users and according to market researcher ComScore [7], people are spending more time on Facebook than on

Google. The use of mobile Internet gave an additional boost to the use of Social Media. Organizations such as political parties are trying to keep up with this changing environment. Most of them are struggling to implement Social Media to their benefit. It seems that political parties are just riding the wave of Social Media without any strategy. Organizations tend to underestimate the implementation of Social Media because they do not understand them.

The opposite was true in the case of Obama's election campaign; it was, for a large part, systematically based on Social Media [6,10,11,12,13,14,53]. Next to his own website, Obama used fifteen Social Media sites to run his campaign. He understood the power of complementing offline work with an online campaign. He systematically linked the online community to offline activities such as fundraising [15]. Obama's use of Social Media was an important aspect of his overall campaign strategy. Another positive case was the campaign of Ségolène Royal during the French elections in 2007. She managed to connect with a massive online crowd [5]. Due to her online campaign, party membership increased from 120,000 to 200,000 members [16]. 90% of increase had not been a member of a political party before. With examples of mass mobilizations such as civilian protests in Iran and other Middle-Eastern countries, it is safe to argue that Social Media are changing the game of politics.

While Social Media have the potential to dramatically change the relationships of individuals to society [17], we have to discover what Social Media mean and how to implement them for maximum benefits. There is no clear definition of Social Media, as we will indicate in a next section. Political parties often have traditional community structures. Organizations with such structures can probably benefit from Social Media since they depend on active member participation. Hence, we decided to perform a systematic literature review.

This paper aims to show the results of a literature review in regard to Social Media and participation. As one of the results of the literature review, we will further define Social Media and participation. We will also introduce some field results and a research agenda.

2   Literature Review

A systematic literature review was conducted to deliver a broad overview of disciplines, authors and journals related to Social Media and participation. We used the electronic scientific databases ISI Web of Science, Picarta, Scopus, EBSCO INSPEC and EBSCO Business Source Elite. Various keywords were used to search those databases. The first keyword is "Social Media". The second keyword is "participation". We also used the following related terms for the concept of Social Media: "Social Internet", "Social Web", "Social Network Site(s)", "User Generated Content", "Web 2.0" and "Crowdsourcing". During the research, one search query was added because many retrieved articles included the keyword: "e-participation". Related terms of participation such as "engagement", "involvement" and "commitment" did not deliver additional results, and were left out. The next step was selecting relevant papers from the search results by analysing abstracts from retrieved records. We used a-priori selection criteria; for example, articles about user participation in system design were excluded.

Some research disciplines were more frequently selected than others. Especially, social sciences are ahead of Social Media research. Table one shows the articles by topic.

Table 1. Articles by topic

Topic category	Number of articles	Percentage of total
Citizen participation	40	35 %
Use and social behaviour	23	20 %
Online community design	14	12 %
Politics and democracy	13	12 %
Other	23	20 %

Some areas of interest are more frequently studied than others. Most of the publications relate to the topic of citizen participation, especially in local government. Several studies were carried out on local electronic participation [18,19]. Only 12 percent of all articles are about politics and democracy.

Based on the analysis of the articles from a political and public participation perspective, the following insights emerge.

Previous efforts to shape public participation with Internet tools did not meet expectations. There has been very little success with prior Social Media tools such as online discussion forums, chat and online surveys [20,21,22].

Many authors [23,...,34] address the issue of defining and measuring e-participation. From the literature selection, no less than 13 different participation ladders are available and no consensus exists about them [26,32,35]. In general, the participation ladders define a certain degree of user participation, from informing to empowerment. Because of the inconsistent ways of defining and measuring participation in the literature, it is difficult to measure and compare e-participation. In the next section, we use the frequently cited participation ladder from Macintosh [26,30,31]. In our opinion, Macintosh's model is most suitable for describing Social Media participation levels.

With the changing Internet environment, there are opportunities to involve and empower citizens in campaigns and work of representatives and government. This so called Crowdsourcing, is a major challenge, which needs a different perspective on citizens. It is necessary to change the perspective from content consumers to content producers (prosumers) [36,37,38,39]. In most cases, this change is difficult. It requires additional trust in the community. And, it turns out that only a minor group of users is responsible for almost all the contributions. So called super contributors [39]. Hence, this may result in creating a new political 'web' elite instead of an equal representation of citizens.

Another relevant topic, indicated in literature, is the concept of digital divide. Online political participation is not equally represented. Certain people are more interested. According to various authors [5,40,41,42], the political active on the web are well-educated males with relatively high income and even relatively high age. But, the younger they are, the more they post and participate [36]. In many cases the politically interested people online, are the same as the politically interested people offline.

Secondly, next to political and citizen participation, studies are available related to societal use and social behaviour. In the latter, for instance, findings support the idea that the use of Social Media increases social capital [43,44,45,46,47,48] that is related to political participation [53].

As the participation research field is much broader than citizen participation, more research should be carried out in regard to political parties, their members and elections. With the insights of the literature review, we are able to define Social Media and participation.

3   Social Media and Participation Defined

One of the first definitions of Social Media, published in scientific literature, comes from Kaplan and Haenlein [49]: "Social Media is a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of User Generated Content." This definition makes clear that Social Media is not a completely new generation of Internet tools. Social Media rely heavily on the concept of Web 2.0. "Web 2.0 is a term that was first used in 2004 to describe a new way in which software developers and end-users started to utilize the World Wide Web; that is, as a platform whereby content and applications are no longer created and published by individuals, but instead are continuously modified by all users in a participatory and collaborative fashion" [49].

Hence, it can be argued that the term Social Media is mainly a new label for existing technology. Tim Berners-Lee, the founder of the World Wide Web, already expected this social use of the Internet from the start: "The Web is more a social creation than a technical one. It was designed for a social effect to help people work together" [50]. Kaplan and Haenlein emphasize, in their definition, that users can participate more actively in processes of organizations by using web technology.

Participation seems to be the key concept that explains the difference between 'old' web and 'new' Social Media, although basic tools for interaction such as chat and forum were available in the early days of the World Wide Web. The problem with the definition of Kaplan and Haenlein is that they do not include the power of underlying social networks with personal profiles, as pointed out by Boyd and Ellison [51]. The media hype around the term Web 2.0 is decreasing. The trend is downhill. Today, people are talking about Social Media. The Google trend comparison in figure one illustrates this.

Fig. 1. Google trends: "Web 2.0" against "Social Media"

A key factor of Web 2.0 and Social Media is participation. Therefore, let us define participation more precisely. Grönlund [26] defines participation as "the specific activity of doing things together". Xie, Bo and Jaeger define political participation as "behaviours aimed at shaping governmental policy, either by influencing the selection of government personnel or by affecting their choices".

Macintosh [26,30,31] created a participation ladder with three stages of online participation, which is useful for explaining the Social Media phenomenon. First, there is e-Enabling. This is mainly about giving access and information to members, citizens or users. The second stage is e-Engaging. During this stage, people can interact with the organization and start a dialogue. People are being consulted for certain projects, decisions or activities for instance with forums and polls. The third stage is e-Empowering. This stage is about working together with users, members or citizens. Empowering them with responsibilities, tasks and options to collaborate with the organization.

Take the Lego Factory website for example: Lego fans can design, share and order their own virtually designed products. Or, Obama's followers making and sharing their own Obama related campaign video clips on YouTube [15].
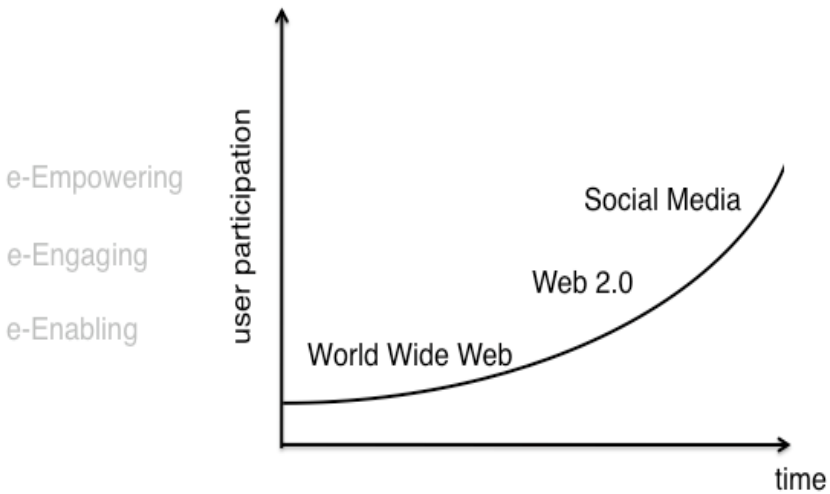
Fig. 2. Social Media evolution model

Figure two presents the model for understanding Social Media as an evolution out of previous web constructs. The vertical axis represents the level of user participation by indicating the typical degree of participation from e-Enabling, e-Engaging to e-Empowering. The horizontal axis is time. When time passes, new labels and definitions are created to understand how the Internet develops. Boundaries in this model are not precisely defined, but gradual. It shows the evolution from World Wide Web, to Web 2.0, to Social Media. Web 2.0 is a new stage where the user participation increases. The emphasis is more on e-Engaging tools.

This model makes clear that Web 2.0 is not a completely new kind of the web, but a new stage reached with higher user participation. With the current increasing use of Social Media, the user participation level can increase dramatically. This does not mean that e-Empowering was not possible during the beginning of the World Wide

Web. Social Media is a new stage of development where users are more actively participating than ever.

With the rise of Social Media, politicians and government could create opportunities for political participation: enabling, engaging and empowering followers for various benefits.

4   Field Study Dutch Elections

To understand the meaning and impact of Social Media on political elections, we conducted a series of empirical research projects during the 2010 and 2011 elections in the Netherlands. Firstly, we were interested if there were empirical signs that Social Media usage by politicians has an effect on voting behaviour. By comparing Social Media engagement of political candidates on the one hand and the individual votes on the other hand we are able to calculate if there is a relationship between them.

As an accepted framework for measuring Social Media engagement is lacking and the participation ladder from Macintosh is too abstract for measuring, we decided to develop our own evaluation framework for Dutch elections, the: "Social Media Indicator" (SMI). This framework consists of a standardized way of measuring the Social Media participation of politicians and their interactivity with the public.

This Social Media Indicator is a helpful tool in indicating the level of engagement of politicians in social media and the degree in which they interact with their followers on these media. The indicating questions from the Social Media Indicator are presented in table 2.

Table 2. Social Media Indicator

Social Media Indicator (SMI)
Does the politician maintain a personal Blog?
In case of a Blog, how many replies?
In case of a Blog, how many Blog Posts?
Does the politician have a profile at Hyves?
In case of personal Hyves, what is the total number of scraps?
In case of personal Hyves, what is the view count?
In case of personal Hyves, how many friends?
Does the politician have a profile at Twitter?
Based on latest 200 tweets, how many retweets?
In case of personal Twitter account, how many tweets?
Based on latest 200 tweets, how many replies?
In case of personal Twitter account, how many following?
In case of personal Twitter account, how many followers?
Does the politician have a profile at Facebook?
In case of personal Facebook account, how many friends?
In case of personal Facebook account, how many likes?
Does the politician have a YouTube channel?
How many videos are posted on this personal channel?
Based on all videos, how many times are they watched?
Based on all videos, how many comments?
Based on this channel, how many subscribers?

Because of the large number of different Social Media, we did not try to cover all social media in our analysis. We thought it was more important to include the social media with the highest reach in the Netherlands. Hence, we included Hyves, Twitter, Facebook and YouTube. Hyves is still the largest social network site in the Netherlands. On top of that, we added personal blogs to the Social Media Indicator. Personal blogs from politicians are often used to connect to citizens and have a large reach.

By focusing on the measurement of contribution levels of the politician and counting interaction with others, we include all levels of participation (e-enabling, e-engaging and e-empowerment). This current measurement system does not differentiate between these different levels of participation yet.

By observing the set of predefined standardized indicators, we can calculate a total SMI score for each politician in the Netherlands. This score is compared to the personal votes this politician got during elections. With this comparison, we are able to see if Social Media usage makes a difference within the party. Do party candidates engaged in Social Media get more votes than colleagues who do not? Statistically, we compare two variables, on the one hand the SMI score of a candidate, on the other hand the votes this particular candidate received. We use scatterplot diagrams and Spearman's rank correlation coefficient to find dependencies.

After applying the above method to three different elections in the Netherlands, the results are as follows. Social Media does not play a big role yet in the local state (2011) and municipality (council) elections (2010) in the Netherlands. The engagement levels of politicians were very low. Because of this low participation, it was very difficult to calculate correlations. When only two or three people of a party engage actively in social media, it does not make sense to compare them to a much larger group of inactive users.

During the national elections of the House of Representatives (Tweede Kamer der Staten-Generaal) of June 9, 2010 we got clear results because participation levels in Social Media were much higher. We calculated the SMI for all candidates (n = 676) and compared it to the votes. We excluded the first five candidates from every candidate list, because we assumed that politicians with high list positions have easy access to mass media such as television, radio and print media. In those cases, it is very difficult to isolate the effect of Social Media from other, more traditional media.

Within nine parties, out of sixteen, we found a positive significant correlation. Politicians with higher Social Media engagement got relatively more votes within most parties, as illustrated in table 3.

Table 3. SMI correlation with votes at Dutch national political parties

Positive correlation > 0.5	Positive correlation > 0.3	No correlation <0.3
Partij van de Dieren	CDA	PVV
Piratenpartij	PVDA	SGP
	Christenunie	TON
	SP	Nieuw NL
	TON	MenS
	Lijst17	Partij één
	D66	

The differences between parties could be a result of differences in target audience, content strategy and other factors, but these factors are not yet thoroughly explored.

Additionally, the higher scores for certain candidates could reflect that a party candidate has an already large social network in the real world. Nevertheless, there seems to be a powerful influence from Social Media on reaching and influencing voters.

To increase the value of our findings, we conducted a few qualitative, open face-to-face interviews with party members and board members of political parties. Interviews held with the parties PvdD and CDA helped us to improve our understanding of the relationship between social media participation and votes. Measuring points that were exceptions could be explained by other influence factors. And, it seems that it makes a difference if politicians use Social Media with or without strategy.

Use of Social Media does not always result in a more effective political campaign. It heavily depends on how its use is designed, which emphasizes the need for further research.

5 Future Research Agenda

Political parties and similar non-profit organizations could benefit from Social Media to improve the way they work with their members and volunteers. However, the various ways to use Social Media and their effects on member participation are not well understood. Therefore, two research questions for further research are articulated.

> RQ1: How can non-profit organizations - with community structures – such as political parties increase member participation by implementing Social Media?
> RQ2: What are the design principles for optimal implementation of Social Media, as a participation instrument, at non-profit organizations with traditional communities?

To answer these questions, we plan to conduct multiple longitudinal case studies. According to Waters et al [8], "longitudinal studies could offer insights into how organizations change their social networking strategies over time, and case studies should be conducted to help offer insights for other organizations based on efforts that have both succeeded and failed". In the near future, we will study the changing dynamics of the city council of a large Dutch municipality influenced by the participatory use of Social Media.

We will do a longitudinal study, comparing two variables: Social Media Participation (SMCP), and Offline Community Participation (OCP). The evaluation of both offline and online participation is a new and emerging area, which needs further research [52].

Our next goal is to design an evaluation framework for Social Media and community participation. Besides measuring of actual participation, it is important to look at social aspects of community participation as well, such as beliefs, attitudes and sense of community.

Our broader goal is to make clear to which extent Social Media can be used as a community-strengthening tool in non-profit organizations with community structures such as church, trade-unions and political parties. Therefore, in June 2011, we started a longitudinal case study at the Dutch parish H. Plechelmus from the Roman Catholic Church.

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Combining Social and Government Open Data for Participatory Decision-Making

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Abstract. In the last years, several research endeavors were launched aiming at involving popular social media platforms in electronic participation. These early endeavors seem to present some essential limitations related mainly to scalability and uptake. In order to avoid these limitations, we introduce a two-phased approach for supporting participatory decision-making based on the integration and analysis of social and government open data. The proposed approach is based on the literature related to the analysis of massive amounts of social data for future events prediction. In this paper we also present a Web data driven architecture for the implementation of the proposed approach. The architecture is based on the use of linked data paradigm as a layer that will enable integration of data from different sources. We anticipate that the proposed approach will (i) allow decision makers to understand and predict public opinion and reaction about specific decisions; and (ii) enable citizens to inadvertently contribute in decision-making.

Keywords: eParticipation, Open government data, Social data, Linked data, Data driven architecture.

1 Introduction

In modern western democracies the power of decision-making have been assigned to people who have been elected through legitimate processes to represent the public. However, this does not go without responsibilities as *"representing means acting in the interest of the represented, in a manner responsive to them"* [1]. The representatives must act in such a way that there is no conflict, or that if it occurs an explanation is called for. To this end, public participation was introduced as a group of procedures designed to consult, involve and inform the public to allow those affected by a decision to have an input into that decision [2], [3].

Information and communication technologies have made it possible to enhance traditional participation procedures by electronic means, introducing in this way the concept of electronic participation *(eParticipation)*. As a result, the last years a number of eParticipation initiatives launched throughout the globe [4], [5].

However, the efficiency of these initiatives has been put to the question mainly because they proved rather unsuccessful to attract large numbers of participants, which

would constitute a representative sample of the affected population [6], [7]. In order to overcome this issue, governments and academia started to consider using popular social media platforms such as Facebook, Twitter and WordPress and exploiting *social data* in eParticipation [8]. Social data refers to data that is created and voluntarily shared by citizens through social media platforms. This sort of data can be characterized as subjective because it communicates personal opinions, thoughts and preferences.

In this context, a number of research endeavors were recently launched aiming at involving popular social media platforms in eParticipation [9-11]. However, these approaches seem to present scalability limitations considering the fact that social data is streamed in large quantities every second (e.g. as of early 2011 Twitter users send more than 140 million tweets per day[1]). For example, the approach suggested in [9] could face scalability problems as it aims at enabling policy-makers to identify, monitor and get involved in debates of interest carried out in social media platforms. They also seem to inherit the essential uptake limitations of traditional eParticipation platforms as they try to transfer the same techniques in the reality of social media. The approach described in [10] is related to this as it is based on the publishing of specific policy applications called Padgets to social media platforms as embedded petitions, poll or social tagging applications in the sidebar of a popular blog, wiki or forum.

Recently, a number of works have been published on the analysis of massive amounts of social data in order to understand real world phenomena and predict relevant trends in various domains such as elections [12], box-office revenues [13] and stock market [14]. The approach that these works follow is based on the use of independent variables related to both social data and real world objective facts in order to predict dependent variables i.e. election results, box-office revenues and stock market indices.

At the same time, a large number of governments worldwide started to massively make their data available on the Web through Open Government Data (OGD) portals. The *government data* provided through these portals includes statistics, reports, geospatial information and every day incidents reports [15]. This sort of data can be differentiated from social data as it is objective i.e. unbiased and not influenced by personal prejudices.

The aim of this paper is to introduce a *two-phased approach* for supporting participatory decision-making and *a Web data oriented architecture* that will enable the implementation of the proposed approach. Our approach is based on the integration of social and government data as well as on the results of the works that analyze massive amounts of social data to predict future events. The architecture is based on the use of *linked data* paradigm as a layer that will enable integration of data from different sources. The central idea of linked data is to extend the Web with a data commons by creating typed links between data from different sources [16], [17]. We anticipate that the proposed approach will *(i)* allow decision makers to understand public opinion and predict public reactions about specific decisions; and *(ii)* enable citizens to inadvertently contribute in the decision-making process.

The remaining of this paper is organized as follows. In section 2 we describe related work as regards the use of social data for future events prediction in various domains as well as the use and characteristics of government data. In section 3 the

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[1] http://blog.twitter.com/2011/03/happy-birthday-twitter.html

proposed approach is described while in section 4 the architecture that will enable the implementation of our approach is presented. Finally conclusions are drawn and future work is discussed in section 5.

2   Related Work

In this section we present a review of the literature on *(a)* the use of social data for understanding real world phenomena and predicting relevant trends, and *(b)* the characteristics and use of government data.

2.1   Social Data to Understand and Predict Real Word Phenomena

In the last years, a number of works have been published in the literature as regards the use of social data for understanding real world phenomena and predicting relevant trends. In particular, social data (mainly data from Twitter) have been successfully used to: forecast box office revenues for movies [13]; spatiotemporally detect earthquakes and typhoons in real-time [18]; predict election results [12]; predict stock markets [14]; analyze consumers reactions to specific brands [19]; analyze and predict the belief about the possibility that swine flu virus will become a pandemic [20]; predict Oscar award winners [21]; predict changes in topics and identify key players and topics of discussion in live media events [22].

Although these studies are carried out following different approaches, we identified that they all use a *two-phased process*:

  (i)   Data collection and filtering
  (ii) Data analysis

As regards the collection of social data different approaches are followed in the existing literature. The most common approach involves the use of the Twitter Search API[2], which is usually queried over frequent intervals in order to provide close to real-time data. However, the growing rate of new social data and the amount of data that is poor in information creates a need for finding an approach to overcome this issue. The majority of the works includes a filtering mechanism in order to enable the analysis of only data of interest. The simplest approach involves the use of keywords that describe the topic of interest. For example, Asur & Huberman in [13] used keywords present in the title of a movie as a search argument in order to identify tweets that refer to a specific movie while Tumasjan et al. in [12] used the names of German political parties or selected politicians to identify tweets that refer to them. In the same context, Diakopoulos & Shamma [22] looked for specific *hashtags* relevant to the topic of interest. *Hashtags* are short strings that start with the # symbol and denote that a tweet is related to a specific topic. The keyword and hashtag filtering is mainly performed through the Twitter API functionality. However, some works use more advanced methods such as machine-learning algorithms. For example, Sakaki et al. in [18] employed a support vector machine to clarify that a tweet is truly referring to an actual earthquake occurrence and not e.g. to a movie containing the word "earthquake" in its title.

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[2] http://search.twitter.com/api/

Table 1. Social data to understand and predict real world phenomena

	Domain	Collection and Filtering	Analysis
Asur & Hubersman [13]	Box-office revenue prediction	Twitter search API with keyword search	Linear regression (quantity, sentiment, distribution)
Bollen et al. [14]	Stock market prediction	All tweets	Time series analysis with Granger Causality (sentiment)
Bothos et al. [21]	Oscar awards prediction	Google and keyword search	Agents realizing prediction markets paradigm (sentiment)
Cullota [23]	Forecast influenza rates	Twitter search API and a dataset from Gardenhose with keyword search	Linear regression (quantity)
Diakopoulos & Shamma [22]	Reactions in live media events	Twitter search API and hashtags filtering	Observation and comparison to timing information of the event (quantity, sentiment)
Jansen et al. [19]	Consumer opinion	Summize and keyword filtering	(sentiment)
Ritterman et al. [20]	Public opinion about swine flu	Time dimension and keyword search	Support vector machine (quantity)
Sakaki et al. [18]	Real-time events (earthquakes) detection	Twitter search API and filtering based on keywords and support vector machine algorithm	Time series analysis with kalman and particle filters (quantity, location)
Tumasjan et al. [12]	Election results prediction	Keyword search	Observation and evaluation with mean absolute error (quantity)

The existing works analyze the data and create prediction models that use different independent variables to predict the dependent ones. The literature suggests that the majority of the works use independent variables that are related to social data characteristics such as the rate at which social data on a specific topic is created, the sentiment of the data, the location of the user who creates the data. In the simplest cases one variable is used for the development of the prediction model. For example, Tumasjan et al. in [12] used only the number of tweets mentioning a political party prior to the German national elections while Bollen et al. [14] and Diakopoulos & Shamma [22] only the public mood derived from tweets sentiment. In addition, in some cases more than one variables were used. Sakaki et al. [18] used the number of tweets describing earthquakes or typhoons in real-time and the location of the users who posted the tweet.

Interestingly however, Asur & Hubersman [13] aiming at predicting box-office revenues created a linear regression model using not only independent variables related to social data but also variables about *objective real-world facts*. In particular, they used the number of tweets about a movie on certain period before and after its

release, the sentiment of those tweets and the number of theatres a particular movie is released in. They also showed that the use of objective data adds to the accuracy of the prediction.

Finally, as regards the analysis models different approaches are considered in the literature. Some use linear regression model using least squares [13] while other probabilistic spatio-temporal algorithm based on Kalman and Particle filtering [18]. Ritterman et al. [20] used the Support Vector Machine algorithm to carry out regression. Finally, Bothos et al. [21] utilized computational agents.

Table 1 summarizes the review of the existing approaches for exploiting social data to understand and predict real world phenomena. Again, the review reveals that these approaches follow a two-phased process: *(i)* data collection and filtering and *(ii)* data analysis. As regards the filtering, we identified a deficit in the existing approaches as the majority of them use keyword and hashtag search. As regards the analysis, the review identified that the majority of the studies use only independent variables related to social data characteristics such as *quantity* and *sentiment*. Interestingly however, the review revealed also indications that the use of objective facts can improve the accuracy of the analysis and prediction models.

2.2   Open Government Data

In the last couple of years, a large number of governments worldwide started to massively make non-personal government data available on the Web. This Open Government Data (OGD) movement follows the open data philosophy suggesting making data freely available to everyone, without limiting restrictions. It is based on the publication of data in open formats and ways that make it accessible and readily available to the public and allow reuse [24].

Recently, Kalampokis et al. [15] analyzed 24 OGD initiatives around the globe in order to propose an OGD classification scheme that could describe all relevant initiatives. This study revealed some interesting characteristics of government data with regards to the employed technological approaches as well as the content.

In particular, current OGD initiatives use the following main technological approaches for publishing their data:

- Making data available of the Web as downloadable files in well-known formats such as PDF, Excel, CSV, KML, XML etc.
- Making data available of the Web as *linked data* through RESTful APIs and/or SPARQL search interfaces.

The majority of the existing initiatives fall into the first category while three of them provide linked data, namely *Data.gov.uk*[3], *Data.gov*[4] and *Catálogo de Datos de Asturias*[5]. In addition, Data.gov.uk and Data.gov are the biggest and most advanced initiatives and the ones concentrating the most interesting characteristics.

Their analysis also suggested that government data included in the identified initiatives contribute towards most of the declared objectives of OGD i.e. enhance

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[3] http://data.gov.uk

[4] http://data.gov

[5] http://risp.asturias.es

transparency, enable economic growth, improve citizens' every day life and support public administration's function. More specifically, data related to governmental spends, financial statements and statistics and building permits can enhance transparency. This type of data is provided by some of the initiatives such as Data.gov.uk. The liberation of geo-spatial data and/or census statistics data can contribute towards economic growth. Data describing the location of schools, bus stops, hospitals etc., street crime levels, available social workers and meals programs for homeless can provide social value to citizens. This sort of data is the most common one and appears in the majority of the initiatives. Finally, the function of public administration can be supported by government data related to legislation and the organizational structure of public sector.

Finally, although current OGD initiatives provide data regarding a wide range of topics, there are no evidences in the literature on how government data could be used in decision-making.

3   The Two-Phased Approach

As already mentioned, the proposed approach aims at supporting participatory decision-making and enabling decision makers to understand public opinion and predict public reactions about a decision. This ability will allow decision makers to timely implement corrective actions, e.g. better information provision, in order to alleviate foreseen reactions. The proposed approach aims also at enabling citizens to inadvertently participate in democratic decision-making, as they will continue to express their opinion in their favorite social media platforms without being aware of the fact that these opinions could have an impact on the decision-making process.

Our approach is based on the integration of subjective social and objective government data and on the two-phased process emerged from the review on future events prediction using massive amounts of social data. In Fig. 1, the proposed approach is conceptually depicted where social data is transferred through the two phases, i.e. *Data Collection and Filtering* and *Data Analysis,* while government data is used to improve both of these phases. The aim of the former phase is to narrow
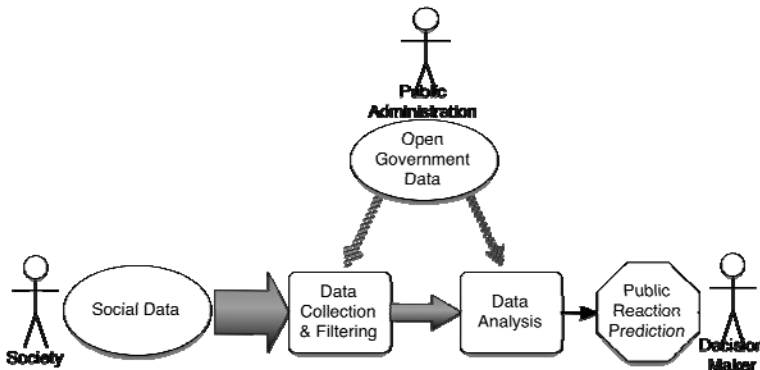

Fig. 1. The two-phased approach for participatory decision-making

social data based on criteria such as the topic of the decision and the target group that is affected by the decision. The aim of the latter phase is to predict public opinion and reactions using independent variables related to both subjective social and objective government data.

In the rest of this section we describe each of the two phases. In order to enhance clarity in the proposed approach's presentation, we introduce real-life scenarios in which we deploy datasets from existing data sources. In particular, we use Twitter as a source of social data and Data.gov.uk as a source of government data.

3.1   Data Collection and Filtering

Social data is streamed in large quantities every second, creating significant information overload for the users interested in making sense of the information related to a specific context. This is particularly true in decision-making where decision makers want to listen to people that are expressed about a specific topic of interest or/and are affected by a particular decision, and not to the whole population. So, after its collection, social data should go through a filtering stage in order to be narrowed based on some criteria.

Existing approaches in the literature use keyword search or hashtag search in order to alleviate the problem of information overload. However, this type of search can only support the selection of social data related to a specific topic of interest, e.g. immigration, or to a specific event, e.g. publication of a new draft law. In our approach, we want to enhance such solutions with capabilities that will enable the filtering of social data based on the *target group* i.e. people affected by a particular decision. This could include for example, the identification of data created by female users above the age of 18 or the identification of data created by citizens that live in areas characterized by high crime levels.

To this end, we propose that we should enrich social data with government data. Characteristics of target groups such as age group, gender and area of residence could be linked to variables included in government datasets that provide objective facts related to these characteristics.

In order to make our point clear we now describe a real-world scenario. According to this scenario the government of the United Kingdom announces to citizens a draft law on public budget cutting in police forces. Before the enactment of the particular draft law the government wants to know what citizens think about the specific action. Moreover, the government is particularly interested in the opinion of the residents of areas presenting crime level above average.

According to our approach, social data will be collected from Twitter before and after the announcement of the draft law. In order to identify only those tweets that are posted by residents of areas with crime level above average we will aggregate data from Data.gov.uk that provides crime levels and statistics in neighborhood areas in the 43 English and Wales's police forces through a RESTful API[6] and data from Twitter. By linking the "location" attribute of tweets to the "crime area" attribute of the Data.gov.uk dataset we can filter the collected tweets and identify tweets posted by residents of areas with high crime level. Fig. 2 depicts the linking of the two datasets using as a "joint point" the particular location i.e. Leicestershire.

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[6] http://data.gov.uk/apps/police-api
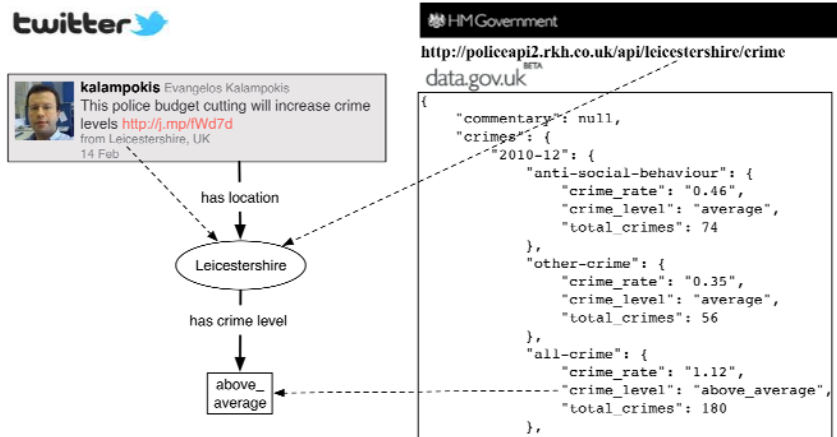
Fig. 2. Filtering tweets based on the crime level of the location

3.2   Data Analysis

The aim of the data analysis phase is to enable decision makers to understand public opinion and predict public reactions on specific decisions. In this sub-section we describe how integrated social and government data can be exploited towards this direction. In order to make our proposition clear we proceed with the same example about public budget cutting in police forces.

Understand public opinion: It refers to the ability of decision makers to understand what is the current opinion of citizens towards a specific decision. This can be achieved by estimating several variables such as the quantity of social data related to a decision, the sentiment of this data and users influence on topics related to a decision. The quantity of the posts can be an indicator of peoples' attention that a specific decision attracts. The sentiment of the posts can reflect the public mood towards the decision. Moreover, the strength of the sentiment can differentiate between mild and strong emotions. Finally, the measure of users influence can reveal opinion leaders who have noteworthy impact on the formation of public opinion.

   In our example, after the identification of posts that are related to the specific draft law and created by residents of areas with high crime levels, the quantity and sentiment of the posts from each area is calculated. These two figures will provide an indication of public opinion to decision makers that will support them in the decision-making process.

Predict public reactions: This refers to the ability of decision makers to predict what will be the public reaction on a decision. In the literature, the analysis of social data quantity and sentiment is mainly used for future events prediction. In addition, real world objective facts are used to enhance the accuracy of the prediction models. So, it is important to integrate social and objective government data in order to improve the data analysis phase. In particular, this integration aims at linking specific characteristics of target groups such as location, age, gender etc to social data related variables

such as quantity and sentiment as well as to variables related to real word objective facts coming from government data.

In order to make our point clear we will employ a general linear regression prediction model proposed in [13]. This has been used to predict future values of a dependent variable based on the values of a number of independent variables such as the quantity and sentiment of social data as well on objective facts related data. In particular the model is described by the following equation:

$$y = \beta_q*Q + \beta_s*S + \beta_f*F + \varepsilon \qquad (1)$$

In our case, y denotes the quantification of public reactions on a decision, ε the error and β values the regression coefficients. The parameters of the model represent social data quantity (Q), social data sentiment (S) and real world objective figures (F).

According to the previous example, after the announcement of the decision on police budge cutting the decision-makers collect the relevant tweets for each area using the appropriate filtering mechanism. Thereafter, the quantity and sentiment of the collected tweets is measured and also government datasets that could provide relevant objective facts are identified. In our case the same dataset from Data.gov.uk provides also data about the number of crime incidents in each area. By combining these three different values for every area and by observing the level of reaction a regression model is created which will provide an estimation of public reaction in each area.

4   The Web Data Oriented Architecture

In this section we present a Web data oriented architecture that will enable the implementation of the proposed two-phased approach. In Fig. 3 the architecture is depicted where social and government data are collected and integrated in order to provide the result to decision makers. We should note that the architecture is based on linked data, as this seems to be the most promising paradigm for creating a layer of data interoperability on the Web. In addition, as the review of sub-section 2.2 revealed, several OGD initiatives provide their data as linked data at the moment. As a result, we consider that the architecture will be consuming linked government data and thus in Fig. 3 we use the Linking Open Data cloud diagram (created by Cyganiak and Jentzsch, http://lod-cloud.net/) to depict OGD.
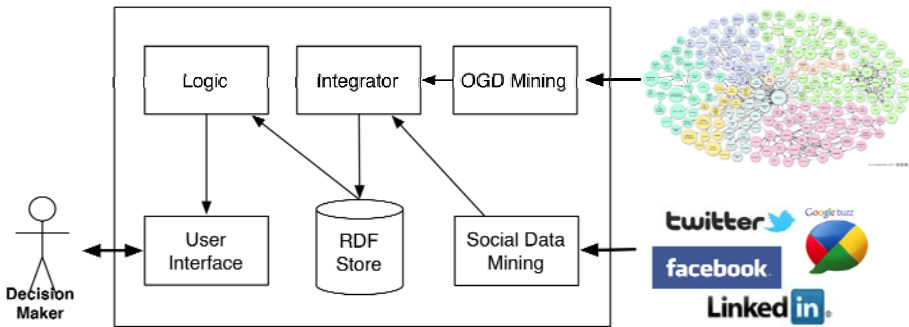

Fig. 3. The Web data oriented architecture

The components of the architecture and their role in supporting the two phases of our approach can be described as follows:

- *User Interface*: It will enable the decision maker to provide input in order to describe the problem related to a decision as well as the target group. It will also enable decision maker to select different variables and analysis models in order to receive the final output.
- *Logic*: It has two distinct roles in order to support the two-phased approach. As regards the filtering phase it will support mining components in the identification of relevant social and government data. As regards the analysis phase it will enable the analysis of the integrated data following different approaches e.g. regression analysis using several variables such as quantity and sentiment that will previously specified.
- *RDF store*: It will support the storing of linked data.
- *Integrator*: It will enable the linking of the different pieces of data coming from the two sources. This component will support both phases and thus will enable the integration of *(a)* social data with objective data related to the specified target group and *(b)* variables related to social data and real world objective facts coming from government data.
- *OGD Mining*: It will enable the collection of OGD that is related to a specific decision and target group's characteristics based on criteria that the decision maker will provide.
- *Social Data Mining*: It will enable the collection of social data related to a decision using APIs of different social media platform such as Twitter, Facebook, FriendFeed and Google Buzz that allow real time access to their data. This component will be also transforming social data to linked data format.

5 Conclusions and Future Work

The eParticipation initiatives launched during the last years proved rather unsuccessful to attract large numbers of participants, which would constitute a representative sample of the affected population. In order to overcome this issue, governments and academia started to consider using popular social media platforms and exploiting social data in eParticipation. In this context, a number of research endeavors were recently launched aiming at involving popular social media platforms in eParticipation. However, these approaches seem to present some scalability limitations, if we consider the vast amounts of social data made available on the Web. They also seem to inherent traditional eParticipation uptake limitations as they try to transfer the same techniques in the reality of social media.

At the same time, Open Government Data (OGD) initiatives emerged worldwide aiming to unlock government data, aggregate them and make them available through one-stop access points. This kind of data differentiates from social data as it is objective i.e. unbiased and not influenced by personal prejudices.

In this paper we introduce a two-phased approach for supporting participatory decision-making and a Web data driven architecture that will enable the implementation of the proposed approach. The approach is based on the integration of social and

government data as well as on the results of the works that analyze social data to predict future events. The architecture is based on the use of linked data paradigm as a layer that will enable integration of data from different sources.

Future work is envisaged in a number of directions. We aim to study real world data sets and create a conceptual model describing the join points of social and government data realities. We also aim to implement the proposed architecture and identify real world use case scenarios in order to evaluate both the proposed approach and the foreseen system.

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Extracting Semantic Knowledge from Twitter

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Abstract. Twitter is the second largest social network after Facebook and currently 140 millions Tweets are posted on average each day. Tweets are messages with a maximum number of 140 characters and cover all imaginable stories ranging from simple activity updates over news coverage to opinions on arbitrary topics. In this work we argue that Twitter is a valuable data source for e-Participation related projects and describe other domains were Twitter has already been used. We then focus on our own semantic-analysis framework based on our previously introduced *Semantic Patterns* concept. In order to highlight the benefits of semantic knowledge extraction for Twitter related e-Participation projects, we apply the presented technique to Tweets covering the protests in Egypt starting at January 25th and resulting in the ousting of Hosni Mubarak on February 11th 2011. Based on these results and the lessons learned from previous knowledge extraction tasks, we identify key requirements for extracting semantic knowledge from Twitter.

Keywords: Semantic Patterns, Twitter Mining, e-Participation, Semantic Analysis, Trend Analysis, Semantic Search, Machine Learning, Social Network Analysis.

1 Introduction

A blog post from Twitter[1] reveals numbers that give us an impression of this social network that turned five years old in March 2011. Twitter states that at each day during the month before the blog entry an average of 140 million Tweets were posted and that 460.000 user accounts were added daily. While Twitter does not mention the current number of users, their latest statistics were released in June 2010 and stated that there were 190 million[2] users at this time. When comparing this with the 460.000 user accounts added per day, we can assume that Twitter has reached more than 200 million total users. This makes it the second largest social network after Facebook, which had reached the 500 million mark in July 2010.

The messages posted on Twitter are called *Tweets* and are comprised of maximum 140 characters. This is roughly similar to the 160 character limitation of

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[1] http://blog.twitter.com/2011/03/happy-birthday-twitter.html
[2] http://techcrunch.com/2010/06/08/twitter-190-million-users/

the well established text messages (SMS) sent from our cell phones. Although, this limit seems to be rather short, it comes with a significant advantage – a user who posts a Tweet must carefully choose the terms and thereby compress the original information. This compression simplifies the manual and automated analysis of Tweets.

There are some basic concepts that are important for understanding how information is conveyed via the posted Tweets. *Followers* are persons that are interested in the Tweets of a specific user, whereas *friends* are other persons followed by a given user. *Retweeting* is the process of forwarding interesting Tweets to one's followers. Another important concept is the employment of *Hashtags*, which are arbitrary terms chosen by the users and preceded with a #. They are intended for the simple categorization of Tweets and allow the real-time monitoring of specific topics. Current examples are "#Libya", "#Egypt" or "#Syria". Since these hashtags are chosen by the community, they represent a self organizing process that evolves according to principles described by Halpin et al. [6]. In general, the information conveyed by Tweets covers all aspects of our society ranging from simple daily activities, over news coverage to discussions and opinions about arbitrary topics. Due to the facts that most of these Tweets are publicly available, that there is a huge user base and that all information must be compressed to 140 characters, Twitter represents a valuable resource for knowledge-mining. Twitter has already been called *The SMS of the internet*[3], but one could even go further and describe it as *The Online Presence of our Society*.

During the last three years we have focused on the development of a framework for the automated extraction of semantic knowledge. This framework is based on the a new concept called *Semantic Patterns* that we have already successfully deployed in a broad area of domains. Here we apply the framework to data extracted from Twitter.

The remainder of this work is organized as follows: In the next section we cover various Twitter related research projects that highlight the wide range of possible applications. We then give an introduction to the employed *Semantic Patterns* concept and present its key advantages. In the subsequent section, we address how Tweets can be extracted from Twitter, and finally we demonstrate the technique by analyzing the evolution of Tweets relevant to the Egyptian revolution. Due to our broad application of this technique, we are able to present the learned lessons which lead us to several key requirements that are also valid for e-Participation projects.

2   Related Ideas and e-Participation Use Cases

Due to the abundance of data covering a wide range of topics, Twitter is a wealth for knowledge mining. The most obvious source for information is the text (including the hashtags) contained within the Tweets. For the analysis of

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[3] http://www.business-standard.com/india/news/swine-flu%5Cs-tweet-tweet-causes-online-flutter/356604/

this information well-know processes from NLP, machine learning and statistics play an important role. However, in addition to the raw text message, Tweets carry other metadata that enables the extraction of additional knowledge. Apart from the timestamp that allows us to follow trends and detect emerging topics, the retweeting and reply features for Tweets, and the follower information of a user enable us to learn how information is distributed over the whole social network. Since the members of social networks and their interaction represent nodes and links within a graph, well-know graph analyses can be utilized for knowledge extraction [4].

Apart from knowledge mining related tasks, which could play an important role in e-Participation related projects, we must not forget the functionality of the service itself and how it is used around the world. The recent developments in Tunisia, Egypt and Libya show that social networks were extensively used by the population to communicate, spread news, and organize groups and protests. Although the regimes in these countries tried to block and manipulate the information spread via social networks[4], the processes can still be seen as a major self organizing e-Participation initiative. An earlier example is the utilization of Twitter during the 2009 election in Iran [2].

The basic idea of sentiment analysis is to extract data from Twitter and determine the attitudes towards various subjects and their evolution over time. Due to the wide range of data on Twitter these subjects include things such as products or places, public figures such as politicians or actors, or entities such as companies or discussions about recent events. A good example for the latter one is the discussion about nuclear energy in Germany after the recents events in Fukoshima. Specific examples from current literature are the general discussion about Twitter and sentiment analysis by Go et. al [5], the sentiment analysis of popular terms by Bifet et. al [1], and the prediction of election outcomes in the paper by Tumasjan et. al [14].

Another application-field is the analysis of health-related information. While Quincey et al. [10] discuss the possible application of Twitter for early warning and the detection of pandemics, Rittermann et. al focus on a specific one – the Swine flu pandemic [11]. Another paper within the health sector by Scanfeld et al. analyzes the over-use of antibiotics by extracting information from Twitter [12]. Obviously, another research field is related to the detection of breaking news events or following trends on Twitter [8], [9]. Twitter data has also been used in the financial sector where Wolfram et al. discuss the possibility to use Tweets for modeling the stock market [15]. There has also been an application where the information about published and spread Tweets is used for earthquake detection [3].

This broad range of applications highlights that Twitter is a vital source of information for all kind of data and should definitely be considered in e-Participation related projects.

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4 Attacks on regime critics on Facebook by the Tunisian Goverment: http://www.wired.com/threatlevel/2011/01/tunisia/, Blocking the Internet in Egypt: http://www.nytimes.com/2011/02/21/business/media/21link.html

3   Semantic Patterns (SemPs)

The *Semantic Patterns (SemPs)* technique was developed during the last three years and initially applied to data extracted from the Austrian e-Participation project Mitmachen [13]. In order to identify shortcomings and to improve and extend the method, it was then applied to other domains. These domains include the analysis of malicious code, the correlation of events within Intrusion Detection Systems (IDS), the semantic analysis of RDF data, the investigation of privacy issues within WiFi networks and most recently an automated analysis of metadata extracted from 130.000 applications within the Android market. The application in such heterogenous domains helped us to gain a much better understanding which allowed us to improve the initial technique and integrate it into a Java framework that can be used for the analysis of arbitrary data. Since the in-depth description of the complete technique would go beyond this work, we refer the reader to the previously mentioned publications (especially [7]) for further details.

The main idea behind this technique is to transform a raw data vector containing arbitrary symbolic and real valued features into a pattern, which forms the basis for a wide range of subsequent analyses. This transformation process is depicted in Figure 1 and shows several processing steps that

1. extract terms (nouns, adjectives and verbs), hashtags and timestamps from Tweets and store them as nodes within a semantic network,
2. represent relations between terms, hashtags and timestamps, and the strength of these relations (e.g. defined by the number of co-occurences within a Tweet) as weighted links within this network,
3. apply spreading activation techniques to Tweets, which stimulates the network and spreads the activation of selected nodes according to their links to other regions of the network,
4. and finally extract the activation values for each Tweet from the network and store them within a vector that we call the *Semantic Pattern*.

The generated patterns represent the activation values of different regions within the network that are activated due to different input stimuli (e.g. the hashtag *"#Egypt"* and the term *"protest"*). The distance between two patterns and therefore their similarity can be calculated by the cosine-similarity distance measure. This distance is the basis for a wide range of standard machine learning algorithms.

The key advantages of *SemPs* are the employment of a single, easy-to-interpret model that eliminates the need for complex setups in different domains, and the ability to easily add analysis procedures. Another key advantage is that semantic relations between feature values and not the raw values themselves are stored in the patterns. This removes the need for normalization techniques and enables a straight forward combination of symbolic and real valued features[5].

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[5] The data analyzed in this paper only contains symbolic values, but the mixture of symbolic and real values is very typical for other application domains (e.g. the semantic relation between the unemployment rate and an export commodity).
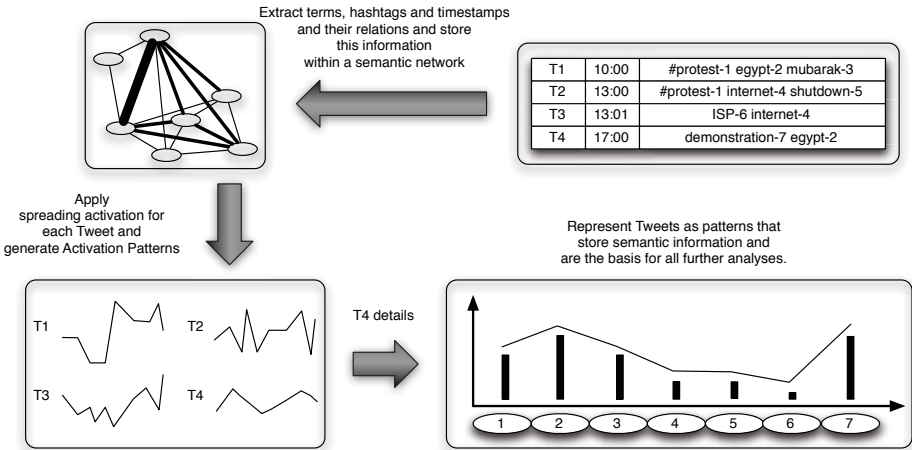
Fig. 1. *SemP* transformation for the Tweets labeled with T1-T4

4   Accessing Twitter

Although Twitter enables users to communicate via private messages, most of the Tweets are posted to public profiles accessible via a web browser. In addition Twitter offers simple and advanced search interfaces for extracting desired information. The results are chronologically sorted and limited to 1500 Tweets. Especially, when Tweets about hot topics are retrieved, this limit is reached within a few minutes. In addition the real-time results of search queries can also be displayed in widgets that can be added to arbitrary websites. This feature is often used by news sites that display further information from Twitter when covering breaking news events. Furthermore, Twitter offers a streaming API that allows access to the continuous stream of Tweets. This API is the only way to retrieve data which spans a larger timeframe, but comes with the disadvantage that information must already be captured during the unfolding of the monitored events. Therefore, there are several third party services that offer various data to paying customers.

There is also a free alternative that allows the retrieval of Tweets six month back – *Google realtime*[6]. It provides real time search results for social network related data. Although it covers various sources such as Facebook or Twitter, an inspection of the results yields that Twitter is the main data source. The service does not offer any APIs which limits its possible applications. However, since it provides a convenient way to access older Tweets, it still is an interesting alternative. An additional advantage comes with the pre-processing Google applies to the retrieved results. Although there are no specific details on these methods, an empirical analysis suggests that only unique and relevant Tweets

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[6] http://www.google.com/realtime

are extracted. This could also be a disadvantage for certain analyses but fitted perfectly for the demonstration presented in this paper.

5   The Revolution in Egypt

In this section we demonstrate how the *SemPs* concept can be applied to data extracted from Twitter. Before going into details, we bring the employed knowledge extraction methods into relation with possible e-Participation related projects based on Twitter data. These projects can be assigned to two main categories: The first one is related to projects that ask users to express their opinion on a given topic on Twitter. The topics could simply be separated from other Twitter data by introducing special hashtags. The second category includes projects that use existing Twitter data in order to extract information about arbitrary topics. Some specific examples for such topics are the attitude towards nuclear energy within the last 6 months, the sentiments about infrastructure projects within given regions or the attitude towards political decisions. For both categories we need to extract that Tweets related to the specific topic and use them as basis for subsequent knowledge extraction methods that allow us to draw conclusions on the expressed opinions. Typically, we cannot assume that a-priori knowledge about the analyzed data is available, therefore the applied knowledge extraction methods must enable us to get a good overview of the data and learn key facts before more in-depth analyses can be applied. The *SemPs* concept helps us to achieve this and to avoid the typical problems of setting up domain-specific knowledge extraction methods by using a generic model for a wide range of analyses techniques.

In order to demonstrate the framework and identify key requirements the remainder of this section covers the analysis of Twitter data related to the Egyptian revolution. The data-set was extracted from Google realtime[7] and covers Tweets from January 24th to February 12th 2011. The Tweets have been pre-processed by applying various NLP techniques such as stop-word removal, phrase chunking, part-of-speech (POS) tagging and inflection. Subsequently, the Tweets were parsed and the following three features and their corresponding feature values were extracted: the timestamp of the Tweet, the tokens within the Tweet (nouns, verbs, adjectives) and finally the hashtags. The extracted features and their feature values for each Tweet are the basis for generating the *SemPs* according to the process described in Section 3.

The analyzed data-set was chosen for two main reasons: First, the Egyptian revolution and similar events were also called the social network revolutions since information exchange was carried out over such networks. Therefore these revolutions could be assigned to a special category of e-Participation projects. This was also recognized by the Egyptian government which shutdown the Internet access in response. Secondly, the Egyptian revolution was covered extensively in the news which gives us detailed background knowledge that allows us to verify the results of the framework. However – as previously assumed – in the general

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[7] One Google realtime search query with the term *"Egypt"*, was executed. The results were parsed via a Java tool and used as input for the *SemPs framework*.

case such a-priori knowledge is not available. Therefore, a knowledge extraction framework must fulfill these three key requirements:

Analyses layers: The employed algorithms should be able to extract knowledge that allows for an overview of the analyzed data and starting from there going into fine details in subsequent analyses. Further requirements are that the algorithms yield significant results by eliminating noise, and allow for an easy interpretation of these results. If these requirements can be fulfilled with a single model, then the further extension and addition of complex analyses is easier than the application of different algorithms for different tasks. In order to gain a *superficial view* on the analyzed data-set, the most important Tweets must be extracted automatically. The exact definition of important depends on factors like the existing a-priori knowledge of the data-set, the processed data or the desired knowledge. In typical scenarios this comes down to a certain compression or categorization of data. One key technological component here is the application of clustering algorithms. When an overview about the underlying data-set was gained, it is necessary that the analysis framework allows the user to use the superficial analyses as a starting point and go into specific details from there.

Representation: Once data has been extracted, it must be represented to the user. This data representation is a key component, since a bad choice in this area leads to a confusion of the user and cancels the benefits of even the best data extraction algorithms. The appropriate representation depends on the analyzed data, which in the Twitter domain could be a combination or a subset of data such as text, timestamps, or geo-locations. In addition the analyzed data could be of a static or dynamic nature (e.g. an event at a certain timestamp vs. a time frame spanning several months). The representation methods range from simple results lists, over visualizations of time series to maps that either show static or dynamic content.

User interface: The conducted analyses and the representations of the extracted data need to be accessed via a convenient user interface, which is the third key component. This interface must allow to make a seamless transition from layer to layer without the need to execute complex operations. The *Analyses layers* component is already covered with the *Semantic Pattern* concept. However, we are still in the progress of integrating meaningful visualizations, especially for dynamic data, and improving the user interface.

5.1   Getting an Overview

For the analyzed Tweets we assume that a-priori knowledge is not available. Therefore, it is crucial that the analysis framework enables the user to gain a quick overview of the data. A common method here is to apply unsupervised learning, or more specific, clustering algorithms that automatically detect categories within the data. Due to the transformation of raw feature values into *SemPs* we are able to directly apply such algorithms. Semantic clustering can be applied to patterns of complete Tweets or to patterns of single feature values

(tokens, hashtags, time-stamps) within the Tweets. While the first case is used to group Tweets covering the same topic into a cluster, the second case can be used to learn more about semantically related feature values (e.g. timestamps for similar events, terms that are used within the same semantic context). In our example this results in the extraction of clusters that cover various topics within the Egyptian revolution such as the protests on Tahrir square, the blocking of the Internet and mobile phone services, the arrest of journalists, or the reported violence during the protests. These clusters help us to gain an overview of the whole data-set and are the basis for further more specific analyses.

The inclusion of the timestamp also enables us to apply clustering algorithms to time series that are generated for Tweets or terms due to semantic changes over a given time frame. When sorting these clusters according to their strongest activity within the time series, we can automatically extract relevant events and arrange them in a timeline. For the analyzed data this includes the following chronologically sorted topics: the accusation of millititants for the bombing of a chruch in December 2010 (2011/01/23), the starting protests (2011/01/25), the following arrests and clashes with the police (2011/01/27), the shutdown of the Internet (2011/01/28), the arresting of journalists, the evacuation of U.S. citizens (2011/02/02), the involvement of the Egyptian army, the final resignation of Hosni Mubarak (2011/02/11), the appointment of an interim military council (2011/02/11) and the international reactions to the revolution.

5.2   Semantic Relations of Terms, Timestamps and Hashtags

One key aspect of any analysis is the consideration of *semantic relations* stored within the raw-dataset. This is highlighted via a Tweet that was extracted via the previously mentioned timeline analysis: *"After access is shut down, some ponder if Internet access is a basic human right. 2011/01/29"*. By searching for semantically related Tweets we are able to find more about the incident and other related events. Examples for retrieved Tweets are *"Apparently switching off Twitter is becoming the standard procedure of every country facing social unrest. 2011/01/25"* and *"RT @sharifkouddous I will eventually lose all communication here. But I will be out in the streets tomorrow. 2011/02/01"*. Although these Tweets do not share common terms they are semantically related – meaning they describe similar topics. These relations are domain-specific and typically cannot be transferred to another domain. However, it is still possible to include other domain-invariant information from other knowledge sources (e.g. details about Egypt extracted from DBpedia[8]) that could be used to augment domain-specific semantic relations.

While the semantic relations between terms, Tweets and topics are the most obvious, the concept can be extended to arbitrary data. For this analysis, we also take hashtags and timestamps of Tweets into consideration and link them to the terms within the Tweets. Another Tweet extracted from the timeline analysis reports the following: *"Live footage shows Egypt's army vehicles deploy among*

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[8] http://dbpedia.org

protesters at scene of violence in Tahrir square - Al Arabiya TV. 2011/02/03". By searching for the associated timestamp *"2011-2-3-0"* we can also retrieve other timestamps that are semantically related due to similar events. An example is highlighted by an event that happened on *"2011-2-5-12"*. Here the following Tweet can be retrieved *"Army removing burnt Police vehicle from Tahrir Sq - dark symbol for protestors. 2011/02/05"*. Since for both events similar terms have been used, the corresponding timestamp features are therefore semantically related. The incorporation of this semantic knowledge is the core idea behind the *SemPs* concept and plays a key role for all analyses.

5.3   Going into Details

The generated semantic network allows us to extract information about the tokens, hashtags and timestamps stored within the analyzed Tweets. The links and their weight represent the strength of the relations between these features. By using one or more feature values as input we can easily find semantically related information. This information also enables search queries that go beyond simple term matching:

The first example retrieves Tweets that are semantically related to the term *"protest"*. Obviously, Tweets like *"Egypt cracks down on mass protests as Mubarak dissolves government. 2011/1/29"* or *"Egypt anti-government protests start for 3rd day. 2011/1/27"* are the best matching results since they contain the term themselves. Such Tweets could also be retrieved with simple term-matching techniques. However, Tweets like *"Egypt unrest enters third day, El Baradei to return. 2011/01/27"* and *"Journalists now have to register with #Egypt's Ministry of Information if they wish to enter Tahrir, not good. 2011/02/07"* can also be retrieved. They do not contain *"protest"* but other semantically related terms – *"Tahrir", "unrest", and "El Baradei"*.

The second example executes a search query by using the timestamp *"2011-1-25-12"*. At this time the mass protests in Egypt have started. The best matching Tweets are those that were written at that time (e.g. *"Huge protest in Egypt right now as thousands in streets trying to topple Gov't like Tunisia. 2011/01/25"*), but there are also tweets that describe a similar event one day after the first mass protests (timestamp *"2011-03-26-0"*): *"Egypt's Mubarak faces unprecedented protests. Thousands march in the Egyptian capital demanding the end of Hosni. 2011/03/26"*.

The inclusion of the timestamps for each Tweet enables us to generate *"semantic time"*-patterns that represent the semantic relevance of each feature and Tweet over the complete timeframe. For this data-set twelve-hour intervals were used, which means that a time pattern has roughly 40 entries. By comparing these patterns, one can find Tweets, terms or hashtags that have a similar development over time. As an example we search for Tweets that are related to the event *"Egypt Internet users report major network disruptions. 2011/01/28"*. The retrieved results have a similar activity over time, but do not need to be otherwise semantically related: *"Wikileaks announces it will soon release numerous*
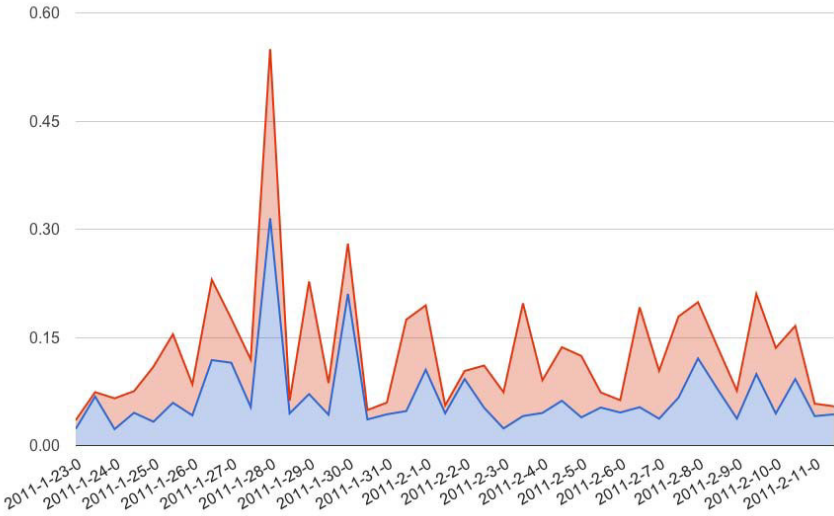
(a) Stacked graph for the semantic evolution over time of the Tweets "*Wikileaks announces it will soon release numerous cables on Egypt. 2011/01/28*" (upper graph) and "*Egypt Internet users report major network disruptions. 2011/01/28*" (lower graph). The peak at "*2011-1-28-0*" represents the initial shutdown of the Internet connections and and the peak at "*2011-2-1-0*" represents the shutdown of the last remaining ISP. The y-axis represents the semantic relevance of the Tweets at a given time stamp.
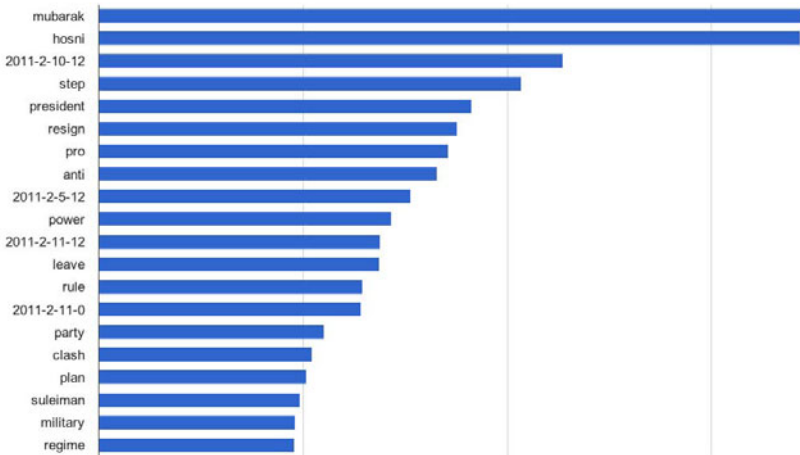
(b) Terms and timestamps that are strongly related with "*Mubarak*" during the revolution. The size of the bars represent the activation values within the semantic network.

Fig. 2. Examples for semantic analyses

cables on Egypt. 2011/01/28" (Figure 2(a)), or "Egypt protesters, police brace for day of rage. 2011/01/28".

The same procedure can be applied to single feature values, which is highlighted by the example "protest": Other terms that have a similar time-pattern are "police", "tunisia", "government", "people", or "video". Although some of these terms are also semantically related, for this example only the time information was utilized.

6 Outlook - Twitter and e-Participation

This paper discusses various application domains for data extracted from Twitter, demonstrates our own knowledge-extraction framework for analyzing Twitter data and based on the learned lessons identifies several key issues that need to be taken into consideration. Based on the findings we strongly argue that Twitter should be used in e-Particpiation related projects and highlight this by drawing the following conclusions: First, due to its huge user base and the continuous coverage of arbitrary topics, we see Twitter as *The Online Presence of our Society* that contains knowledge about arbitrary topics. Second, the automated analysis of Tweets and their carried metadata is vital for the successful extraction of knowledge. Due to the lessons learned from our own analysis framework based on *SemPs* we identify several key requirements for such a knowledge-extraction framework: The semantic knowledge extracted about an arbitrary topic must be presented in several layers that allow the user to make a seamless transition from a superficial overview to fine-grained analyses that extract semantic information. The meaningful representation of the extracted data has a huge impact on the capability of a user to understand important relations and draw further conclusions. Finally, the user interface must allow the user to make smooth transitions between the various analysis layers and address general requirements for intuitive user interfaces. The final conclusion is that Twitter offers the infrastructure for the discussion of topics for free and has a huge user base. Therefore, the future e-Participation projects should consider the possibility to discuss topics directly on the platform. Although there are several disadvantages compared to specific e-Participation related platforms, we argue that the advantages of the huge user base and the ease-of-use outweigh these shortcomings.

Related to our own framework we conclude, that the *SemPs* model represents a well-founded basis that can easily be applied to a wide range of applications and due to its structure can further be extended according to future needs (e.g the inclusion of geo-location based data). Currently, the main target of future improvements are not the analyses layers themselves but the employed data representation layers and the user interface.

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Argument Visualization for eParticipation: Towards a Research Agenda and Prototype Tool

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Abstract. This paper describes research that aims to develop an argument visualization tool and associated method for supporting eParticipation and online deliberation. Based on the state-of-the-art in the field of computer-supported argument visualization, the tool will support the work of relevant eParticipation actors by enabling them to navigate through arguments contained in relevant consultation and policy documents. This tool will form the core of our investigation into the mediating role that large, Web-based argument maps can play in eParticipation scenarios. In particular, we intend to investigate the method and practice of how various eParticipation actors use the tool in the policy-making process. To this end, this paper sets out a clear research agenda for research at the intersection of eParticipation and computer-supported argument visualization.

Keywords: Argument visualization, technologies for eParticipation, online deliberation.

1   Introduction

This paper describes research and development on an argument visualization tool (AVT) for supporting eParticipation and online deliberation. The AVT is part of a larger suite of tools being developed within the EU-funded IMPACT project. The project began January 1, 2010 and will run for three years. The aims of the IMPACT project include addressing the four overarching problems outlined in [1], namely:

1. How can the various actors determine the relationships between contributions to policy development, whether taken from expert papers, consultations or public forum discourse, and appreciate how these contributions are taken through to decisions?
2. How can the unstructured text from the various information sources be analyzed to enable the reconstruction of formal arguments?
3. How can the actors understand better what critical questions to ask in order to determine the validity of the information put forward?
4. Given the large, dynamic nature of the information base, how can the actors identify which issues are of importance to them and how can they be supported to make reasoned contribution to the policy development?

IMPACT does this by combining the two distinct types of argumentation tools described by Bex *et al.*, namely *knowledge-based* tools and *sense-making* tools [2]. The intention is to integrate tools that contain knowledge about the problem domain and can perform reasoning to suggest solutions to the problem with argumentation tools described as sense-making systems [3] which typically do not support reasoning but rather structure the problem, by using visualization techniques. In addition to the AVT tool, IMPACT will develop and integrate three other argumentation-based tools relating to the following.

- *Argument reconstruction*: investigating how and to what extent data resources distributed throughout the Internet can be searched and arguments marked up in such a way as to enable them to be semi- automatically aggregated, analyzed and visualized.
- *Policy modeling and analysis*: using techniques from the field of AI and Law to allow stakeholders to simulate the legal effects of policy proposals.
- *Structured consultation*: extending prior research on using argumentation schemes to generate focused surveys in order to support argumentation schemes needed for policy deliberations and generate surveys.

Importantly, all the tools will be based on the same computational model of argumentation. Further details of IMPACT and the consortium can be found on the project website[1].

The AVT is intended to support the work of relevant actors by enabling them to navigate through arguments contained in relevant consultation and policy documents. To adequately achieve this goal, the AVT will be based on the state-of-the-art methods and tools in the field of computer-supported argument visualization (CSAV). However, the rationale for the AVT is grounded firstly in current eParticipation research priorities, which seek technological support for improvements in the efficiency, inclusiveness, openness and accountability of public services and democratic processes.

Thus, in addition to developing the AVT tool and exploring how best to improve the readability of very large visualizations of arguments (often referred to as 'argument maps'), we will investigate the mediating role that such large, Web-based argument maps can play in eParticipation scenarios. In particular, we intend to investigate the method and practice of how relevant eParticipation actors use the AVT tool in the policy-making process. To this end, the aim of this paper is to set out a clear research agenda for our research at the intersection of eParticipation and CSAV.

Specifically, §2 introduces the specific eParticipation and CSAV challenges that motivate our research and drive the development of the AVT. Next, §3 describes some preliminary design choices made with respect to our AVT development. Finally, §4 and §5 conclude the paper by describing the set of research questions that will guide our research intersecting eParticipation and CSAV.

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[1] IMPACT stands for **I**ntegrated **M**ethod for **P**olicy making using **A**rgument modelling and **C**omputer assisted **T**ext analysis: http://www.policy-impact.eu

2   Drivers of the AVT

This section describes the main drivers of our AVT development. The rationale for the AVT is grounded firstly in current eParticipation research priorities, which seek technological support for improvements in the efficiency, inclusiveness, openness and accountability of public services and democratic processes (§2.1). Secondly, the AVT is grounded in current argument visualization research priorities specifically as they relate to needs for improvement in existing visualization tools for policy consultation (§2.2).

2.1   eParticipation Drivers

There is a wide body of research that recognizes the belief that the Internet and other digital technologies have the potential to broaden and deepen the democratic process, making it more transparent, inclusive and accessible [4][5]. However, other researchers argue that the capacity of information and communication technologies to facilitate online deliberative engagement on policy issues has not been as significant as was originally believed or hoped for [6]. They suggest:

> Demands on knowledge technologies include meeting the need to support rational and justified argumentation, establishing the best balance between a structured format, traceability of contributed information, its accountability in use and transparency about how much information is needed or used to inform policy debate. Additionally, technology design has to consider whether any structuring of information creates boundaries and borders that can limit the access to and understanding of content.

Furthermore, [7] ask the question "How can vast numbers of people engage in collective talk without the voices of individuals being drowned out by the noise of the crowd?" They go on to suggest that a possible radical solution would be for argument visualization research to provide meaningful graphical representations of large-scale discussions, so that the process of accessing and making collective sense of the evolving views of people need not involve reading every word of text produced. The objective of our research and development on the AVT tool is to make possible this 'radical solution'.

2.2   Argument Visualization Drivers

There are an increasing number of researchers reflecting on the use of CSAV methods and tools to support what is referred to as "sense-making" – literally, the task of making sense of some complex discourse in order to understand the structure of the discourse and the main moves being made in the discourse. For an overview of this strand of CSAV research see [3] and [8]. Some researchers (e.g. [9][10][11]) are specifically considering the policy-consultation domain and have experimented with various argument visualization tools for addressing the challenges within this domain.

However, applying CSAV tools in this way also presents its own challenges, as was most recently identified during a specially convened one-day invitational workshop which brought together a cluster of researchers to consider the emerging

argument visualization tools that have the potential to support online deliberation[2]. The specific result of this workshop was a statement of the top ten key adoption challenges of introducing argument visualization tools to support consultative policy-making. These challenges are visualized in Fig. 1.
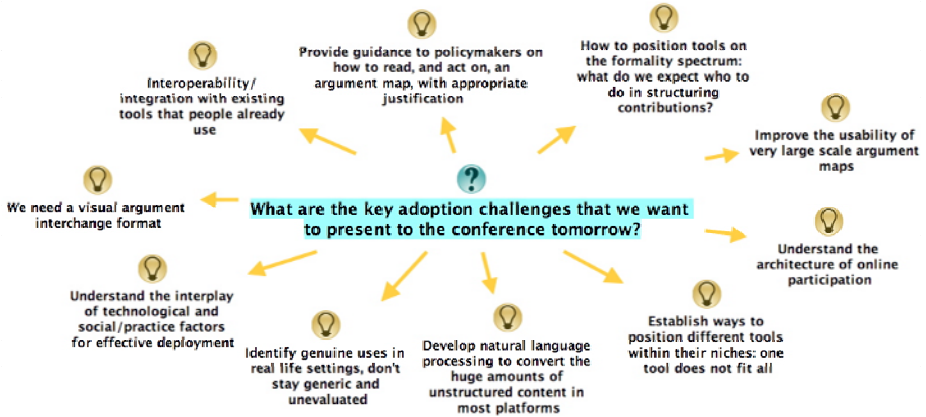
Fig. 1. The top ten adoption challenges faced by argument visualization tools for supporting online deliberation. (Map is courtesy of Simon Buckingham Shum retrieved from http://cloudworks.ac.uk/cloud/view/3667)

Furthermore, underlying these ten challenges, and a repeated theme throughout the workshop was the readability and usability of visual depictions of argumentation. As [12] indicates, reading argumentative structures, whether in text or in graphical form has always been a difficult skill to acquire. This is because making sense of the argumentative structure requires both having a sense of the detail as well as having a sense of the whole (particularly how one detailed area relates to another detailed area). Exploring these particular argument visualization issues will form a key part our research and development on the AVT.

3 Designing the AVT

The objective of the AVT tool is to help users to understand and to make sense of the online policy debate over time, and help the policy analyst to report on the online debate at the end of the consultation period. This section describes how the AVT is designed to meet these objectives. First, we describe the principle of "Document-centricity" which the AVT tool will adopt (§3.1). Second, we describe an early design decision, namely to build on the substantial advances made in CSAV technology (§3.2). In particular, we have decided to reuse the Cohere tool [13] as a platform for our AVT development (§3.3).

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[2] http://olnet.org/odet2010

3.1 Document-Centricity: Anchoring Online Deliberation in Public Documents

The main eParticipation usage scenario envisaged by the IMPACT project involves an organization (typically a government agency) publishing a policy-consultation document (a Green Paper in the case of a government agency) in order to solicit feedback from relevant stakeholders. Thus, the visualization generated by the AVT, i.e. the argument map, is anchored in this policy-consultation document, and all arguments generated by stakeholders are entered into the argument map with links to the original policy-consultation document.

In this way all visualized data in the AVT tool will have a connection to the original consultation document. This document-centricity is important since the policy-consultation document is central to our underlying objectives of achieving transparency and understanding in the argument map. Furthermore, this document-centricity promotes sense-making for users joining at any time during a lengthy consultation period as they can see how their arguments fit within the ongoing policy-deliberation process consultation. Finally, this document-centricity gives confidence to the policy-makers that the contributions provided by stakeholders are on-topic and relevant.

From a technological perspective, in order to support this document-centricity, nodes in the Web-based argument map should contain hyperlinks directly to relevant sections and paragraphs in the original policy-consultation document. This presents a challenge since the process of drafting policy-initiatives within organizations in general is typically performed with standard word-processing software and formats such as PDF are used to exchange documents. Such formats do not easily facilitate online hyperlinks to sections of a document

Specifically meeting this challenge of making policy documents citable down to the level of sections and paragraphs is beyond the scope of our AVT development for IMPACT. However, where appropriate, the AVT tool can make use of results from other areas of research and development that have taken on this challenge. For example, some Open Data enthusiasts have recently embarked on a project called Citability.org[3], which supports making government documents and data available online such that they can be easily referenced for public debate, commentary and analysis. The founders of the Citability.org initiative believe that having the ability to refer to original source documents, down to the level of sections and paragraphs, makes it more difficult to intentionally misrepresent facts and arguments in a debate.

3.2 State of the Art

In order to determine the most appropriate starting platform for the IMPACT AVT tool and to ensure it is based on the state-of-the-art in the field of argument visualization a selection of argumentation visualization systems were reviewed. These were:

- Araucaria and OVA [14,15]
- Argunet [16]
- Carneades [17]

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[3] http://citability.org/

- Cohere [13]
- Compendium [18]
- Cope It! [19]
- Debategraph [20]
- Deliberatorium [21]
- LASAD [22]
- Rationale and bCisive [23]

The reviews were based on the literature about the tools and personal communication with the relevant tool developers. The reviews focused on consideration of the drivers for the AVT tool as described previously and the specific requirements of the IMPACT project.

Araucaria and OVA. Araucaria is an argument-diagramming tool developed by the Argumentation Research Group (ARG) at the University of Dundee, UK. It provides a limited analysis of arguments where the user is supported in reconstructing and diagramming an argument. The software supports several different diagramming methods. For example, the latest version of the tool supports Wigmore diagrams, a technique of presenting legal arguments in a diagrammatic form. Whereas Araucaria is a desktop application, OVA (Online Visualization of Argument) is accessible from a web browser, but otherwise is similar to Araucaria in its support for analyzing and mapping arguments. The web-based access allows for built-in support for analysis of web pages by providing a URL.

Argunet. Argunet is a tool for collaborative argument analysis and reconstruction of complex debates. Argunet consists of two software components: an Argument Editor, with which debates can be reconstructed in varying degrees of detail, and an Argument Navigator, a Web-browser-oriented presentation tool with which the public can browse debates. Argunet adopts an argument mapping approach that is based on classical argument structure. That is, arguments are reconstructed as premise- conclusion structures and visually linked to each other with green and red arrows indicating support and attack relationships between arguments, mapped as a directed graph according to their dialectical relations. Complex argumentations are visualized as color-coded maps in which green and red arrows indicate support and attack relations between arguments. Note, however, that in Argunet debates are not the same as argument maps. Rather, since debates might be too complex to be represented in a single argument map, a debate in Argunet may contain any number of argument maps.

Carneades. Carneades is an open-source argumentation system developed during the European Estrella project (IST-2004-027655), which aims to help both citizens and government officials take part more effectively in dialogues for assessing claims, for example claims for social services such as housing or unemployment benefits. Carneades supports a range of argumentation tasks. Specifically, the tool provides software components for constructing arguments from formal models of legal concepts, rules and cases, for evaluating and comparing arguments, applying proof standards and

respecting the allocation of the burden of proof and argument visualization. One of the strengths of Carneades lies in its ability to inform users about the acceptability of statements without requiring the user to have an expertise in argumentation theory, mathematics or computer science.

Cohere. Cohere is a Web 2.0 system using the familiar standard Issue-Based Information System (IBIS) framework to provide argument analysis and visualization. In the IBIS approach, solving difficult problems involves deliberation. The deliberation process starts with a root issue (expressed as a question), and ideas are offered in response to this issue. Arguments are then brought in that support or object to a particular idea. The elements (i.e. the Issues, Ideas, and Arguments) produced at each stage of the process are then recorded so as to capture the design rationale behind a particular solution to the problem. One of the main features of Cohere with respect to argument visualization is that it provides a platform for collaborative deliberation and mapping of public policy debates over the Internet. In addition, one of the key principles behind Cohere is that any content on the Internet can serve as a node of information in the argument map, any node can be related to any other node and users can specify the properties of the nodes and relationships.

Compendium. Compendium is a hypermedia concept/argument-mapping tool that has been applied in a number of domains including policy deliberation, real-time dialogue mapping of meetings, and scholarly information management. Compendium aims to provide an open mapping environment in the paradigm of the IBIS and argument-based design-rationale approaches. Thus Compendium comes pre-loaded with node and link types derived from IBIS. The system allows for considerable customization of the argument maps by the users and supports outputs in multiple document formats. Elements of a discussion are represented as 'queries' and 'responses', to which qualifying remarks can be attached indicating 'support for', or 'criticism of' that contention. Using hyperlinks, users can associate relevant documents with particular nodes to back-up any references. It is also possible to partition the discussion into a series of linked maps, which has the advantage of breaking down large amounts of data into manageable portions. Finally, users can perform searches upon the information contained in the nodes, which facilitates the extraction of information contained in the maps.

Cope It!. Cope It! is a web-based eParticipation platform designed to support community deliberation, allowing for distributed, synchronous or asynchronous collaboration over the Web. It supports this collaboration through the use of argument mapping and an integrated threaded discussion forum. Argument mapping in Cope It! is based on the IBIS approach. Users can upload various types of "knowledge items" to a collaborative workspace, and these items can be of type Idea, Note, or Comment, or any external multimedia resource that is located on the user's PC or on the Web. Items can be linked and users can choose the color of the link and provide a label describing the intended relationship. Furthermore, Cope It! allows users to cluster related items

into colored rectangular regions in their workspace. It also provides the potential to 'evaluate' informally the strengths of the arguments through a user voting system.

Debategraph. Debategraph is a web-based application that allows users to enter unstructured arguments, for and against a debate, into the evolving argument map. As such it provides an online, public, multi-user forum to develop and present debates. It is called a wiki debate visualization tool in the sense that users can modify the debate maps in the same way that they might be allowed to collaboratively modify a wiki (although most wikis are text based). Furthermore, each node in the map can be regarded as a mini-wiki that can contain textual as well as multimedia content. Thus, arguments in debate maps are continuously open to challenge and improvement by all users. Debates can be started, modified, and reused by the users. The objective is that over time, the debates become definitive so that Debategraph becomes a public library of very well articulated debate graphs on a range of topics. Elements in Debategraph are derived from the IBIS approach. The core elements are Issues, Positions (i.e. responses to Issues), Supportive Arguments, and Opposing Arguments (which are advanced for and against positions and other arguments). Each element on a map has a comments section to allow for open discussion. Also, each element can be rated in terms of the perceived strength of the point it makes. Finally, part of every map has a direct URL associated with it; so readers can be pointed towards the debate as whole or towards a specific argument within the debate.

Deliberatorium. Deliberatorium (formerly Collaboratorium) is a web-based, collaborative deliberation system that supports large (and likely geographically dispersed) user communities in controversial discussions online. Users can browse and create argument maps (or what the authors also refer to as "deliberation maps"). An argument map consists of linked, user-contributed "posts". Users can contribute new posts, edit existing posts, comment on posts, and rate posts (with the idea that rating will allow the system to highlight the best contributions). Each post is a unique contribution to the system, thus users are prevented from replicating a post that has been made elsewhere in the argument map. Deliberatorium is based on the IBIS approach, thus each post represents a single Issue, Idea, or Pro or Con argument.

LASAD. The LASAD (**L**earning to **A**rgue: Generalized **S**upport **A**cross **D**omains) project, funded by the German Research Foundation, is developing a Web-based educational argumentation system. The project is seeking primarily to contribute to the area of Intelligent Tutoring Systems by developing a system specifically aimed at teaching argumentation skills, following in the path of other ITS for teaching argumentation skills such as Belvedere, ARGUNAUT, and LARGO. However, the LASAD project differs from these other research tools in that it aims to produce a generic, flexible, and reusable software architecture, and accompanying methodology, for developing argumentation systems to help students learn argumentation in different domains. As a proof of this concept, the first phase of the LASAD project has demonstrated how this generic software architecture can be used to emulate existing argumentation systems (e.g. Belvedere and LARGO) and existing argumentation

frameworks (e.g. Toulmin and Walton Argumentation Schemes). The user is able to create a new session from a template (example templates include Belvedere, Carneades, and Toulmin), or join an existing active session. A session loads an argument map, which has an underlying model of argument corresponding to the template used to create the session. Each session can be individually configured to include features such as a chat system, where a user is able to view a list of other online users that s/he can interact with. Note that, through the use of sessions and features such as a chat system, LASAD supports collaborative use as well as individual use.

Rationale and bCisive. Rationale is a desktop-based argument-mapping tool developed by Tim van Gelder at the University of Melbourne and marketed by a company called Austhink. Rationale supports the development of simple diagrams of complex reasoning, so that the evolving argument can be visualized. Primarily, the system is intended for educational use to help students develop their critical thinking skills and develop argumentative essays. However, the tool has been used in more professional settings, such as by lawyers to layout legal arguments and by policy analysts to develop and defend policy. Whereas Rationale is meant to be used by the individual user, bCisive, and specifically the recent version bCisive Online provides a common workspace for real-time collaboration. It is marketed as a tool to support group planning and decision-making, and team problem-solving. Though it is not explicitly described as an argument-mapping tool, the drawing elements derive from the IBIS approach (i.e. users can create Issue, Idea, and Pro and Con nodes), thus the tool can be used to support Dialogue Mapping or Issue Mapping.

Table 1 summarizes the main features of each of these CSAV tools and compares them in terms of how suitable each might be as a platform for the IMPACT AVT tool. Based on the comparison of the tools, Cohere appears to be the most suitable of the existing tools to be used as a platform for the AVT tool.

3.3 Reusing Cohere as the AVT Platform

Cohere is an open source, Web2.0 tool for argument analysis and argument visualization. We have decided to use Cohere as a platform for the AVT because it already supports a number of features that we believe the AVT should provide. These features include enabling users to create Web-based argument maps; to add, delete, and edit nodes and relations in an argument map; and to browse and zoom argument maps, making use of hyperlinks embedded in nodes to access further information (e.g. the original source data from which the node is derived).

Furthermore, one of the main principles on which Cohere is built is that when mapping out an argument, users must be able to ground agreement or disagreement in original source documents distributed anywhere on the Web. This document-centric feature of Cohere is important because, as discussed previously, the argument map should be a visualization of arguments anchored in the original policy-consultation document and any other associated documents published during the public consultation process.

Table 1. Comparison of the state of the art CSAV tools from the perspective of IMPACT AVT tool criteria

Systems/ IMPACT Requirements	Araucaria	OVA	Argunet	Cameades	Cohere	Compendium	Cope_It!	Debategraph	Deliberatorium	LASAD	Rationale	bCisive
Open source	GPL	–	GPL	GPL	LGPL	LGPL	–	–	–	–	No	No
Import/export ability	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	No
Web-based	No	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	No	Yes
Collaborative	No	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	No	Yes
Internal representation	AML, AIF (RDF)	AML, AIF (RDF)	–	LKIF XML	XML	XML	–	RDF	–	–	–	–
Argument framework	Walton, Toulmin, Wigmore, Classical	Walton, Toulmin, Wigmore, Classical	Classical	Walton	IBIS	IBIS	IBIS	IBIS	IBIS	Walton, Toulmin, Belvedere, LARGO	Classical	IBIS
Modify argumentation structure	Yes	Yes	Partially	Yes	Partially	Partially	Partially	Partially	Partially	Partially	Partially	Partially
Identification of identical arguments	No	No	No	No	No	No	No	No	No	No	No	No
Visual representation	Partially	Yes	Yes	Partially	Yes	Yes	Yes	Yes	Partially	Yes	Partially	Partially
Manipulate layout	Partially	Partially	–	–	Partially	Partially	–	Partially	–	–	–	–
Edit maps	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Browse maps in Web browser	No	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Close maps	No	No	Yes	Yes	No	Yes	No	No	No	No	No	No
Timeline mode	No	No	No	No	Yes	No	No	No	No	No	No	No

Finally, as an open source tool it can be extended to include the new features as envisaged by our specific IMPACT project usage scenarios. For example, the decision was made within our research project to represent the underlying models of argument in the Legal Knowledge Interchange Format (LKIF) developed during the EU-funded ESTRELLA Project [24]. Using formal semantics, LKIF models can support sense-making tasks such as evaluating arguments to determine which are acceptable. However, the Cohere platform was not originally designed to support LKIF, thus one of the new features it will need to incorporate is a mechanism for input and output of arguments represented in LKIF.

4   Towards a Research Agenda for Argument Visualization in eParticipation

Governments are aware that Web-based approaches to facilitate consultation deliberations on policy issues, and provide access to government and expert reports and the documents discussed, may provide advantages for them and those effected by the policy, in terms of better understanding of policy issues, more effective deliberative communication, and more evidence-based decision-making. With regard to the AVT, the new ways the stakeholders will interact, and therefore the initial evaluation criteria (shown in italic) are summarized in Table 2.

In light of these potential new interactions, in our work we aim to investigate how CSAV can foster more substantive understanding and engagement by various eParticipation stakeholders in consultations on complex public issues. This has led us to devise a set of research questions to guide our work:

Q1. How should one design web-based argument maps for policy consultation on a complex issue that allows various stakeholders to browse, navigate and view the ongoing debate?

Output: Methodology for design of interactive Web-based argument visualization tools

Q2. How should one use CSAV techniques to interpret formal models of arguments and what level of granularity is meaningful to the stakeholders.

Output: Method and associated application to interpret models.

Q3. Can we find evidence of the advantages of argument visualization tools for representing the policy-deliberation process?

Output: Evidence based on real-world scenarios of use

Q4. How can we fill the gap in CSAV research dealing with deriving a visual language for argument mapping?

Output: A set of visual principles that describe the essential visual cues and features that are needed to visually depict argumentation to better support sense-making.

Table 2. New eParticipation-stakeholder interactions enabled by the AVT

	Public	Facilitators	Policy makers
Public	The public will *make more sense of the issues* through being able to: (a) *see the arguments, both for and against different policies*; (b) *navigate a consultation as a map of interconnected issues, ideas and arguments*; (c) *find and link directly to relevant documents*.	When a facilitator publishes a new addition to an argument map, this will show how a given contribution influences the map, and encourage further reflective debate. The public will have a greater sense of *understanding when they see where arguments are positioned* and the shape of the final argument map.	A complex consultation topic can be summarized and structured as an argument map, as can the outputs of commissioned expert reports and feedback from organizations and the public. Any failure to address open questions or provide supporting evidence will be more visible in a map than in a prose document, *making issues more transparent*.
Facilitators		Facilitators will have greater awareness of *where support for deliberation is required* through being able to: (a) *navigate a debate as a map of interconnected issues, ideas and arguments*; (b) *see where specific issues are not being debated sufficiently*; (c) *see how a given contribution influences the debate*; (d) *better report on a policy-consultation back to policy makers using the argument map*.	Facilitators will have a new kind of *reporting tool for presenting a consultation debate on a policy-consultation document back to policy makers*.
Policy makers			Policy makers will have a new support tool to interrogate the policy consultation, aware that their decisions will *be more evidence-based* through being able to: (a) *see where the arguments are greatest for and against policies*; (b) *find and link directly to arguments related to specific issues in the policy-consultation*; (c) *find and link directly to documents related to arguments*.

5   Conclusion

This paper has introduced our work on developing an argument visualization tool (AVT) for supporting eParticipation and online deliberation. It presented particular challenges that drive the research and development on this AVT. Furthermore, the paper presented some preliminary design decisions for the AVT in order to meet the challenges that were highlighted. Finally, the paper put forward a set of research questions that will guide our future work on this topic which is at the intersection of two vibrant research fields, eParticipation and computer-supported argument visualization.

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Evaluation of an Argument Visualisation Platform by Experts and Policy Makers

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Abstract. Argument visualisation (AV) tools enable structured debates around issues, positions and arguments. These tools have the potential to substantially improve transparency e.g. by enabling understanding complex legislation and debating. In this paper we present the results of the evaluation of an AV platform by experts and policy makers. The results suggest the potential of such tools is large particularly for understanding complex legislation and debates. The results indicate an AV tool can be also potentially used for massive deliberations when however usability is further improved. They further suggest an AV tool seems particularly relevant to the analysis and policy formation stages of policy making, where identification, elaboration and presentation of complex topics are needed. In this paper we employed a mature AV tool and concentrate on evaluating general aspects of such platforms hence we believe the results can also apply to other AV platforms.

Keywords: Argument visualisation tools, WAVE project, Debategraph.

1 Introduction

During the past few years there is an increasing interest in open and transparent governance. New policy approaches are needed which "*use the right tools to get the job done*" as well as possible and ensure that "*the voices of those affected are being heard*" [1]. For example, the EU mandate 'Smart regulation' calls for stakeholder consultations and impact assessments as essential parts of the policy making process and argues evidence-based policy making is an essential element for improving the policy making process in today's world [2].

In this context, consultations and deliberations, also supported by modern information and communication technologies and particularly Web technologies, are very common. In Europe, these initiatives mainly aim to inform citizens about relevant policies and consult them with regards to policy alternatives also enabling them to debate online [3]. Online consultations and debates are particularly important in policy decisions regarding complex societal problems (also termed wicked issues [4]) that do not hold optimal solutions for all involved stakeholders.

To facilitate online deliberation a family of tools, termed Argument Visualisation, have been developed (e.g. Debategraph, Cohere [5], AVER [6], Parmenides [7], etc.)

[8]. Unlike e-forums and other media where people debate in an unstructured manner (using posts consisting of plain text), these tools enforce online deliberation in a structured way. The users are therefore required to contribute in terms of issues, positions, positive arguments, counter arguments, etc. and to put their thoughts in the context of others' debates, hence avoiding repetition and enhancing clarity. These tools have gained considerable usage but are still not widely used in online debates. There is therefore a need for a thorough evaluation of such tools in order to gain a better understanding on their strengths and weaknesses. Following electronic participation evaluation methodologies, we believe that evaluation should be conducted not only by end-users but also by experts and policy makers. We feel that experts and policy makers can provide deeper insight particularly in the potential use of such tools in policy making.

The main objective of this paper is to evaluate an argument visualisation platform by experts and policy makers. The argument visualisation platform under evaluation has been developed within WAVE, a project co-funded by the European Commission, and employs Debategraph, one of the most mature and stable argument visualisation tools as also indicated by the large number of organisations that have utilised it including the White House, UK government, CNN etc[1].

The rest of this paper is constructed as follows. In Section 2 we present the main functionality of WAVE platform. In Section 3 we present the evaluation methodology while in Section 4 the evaluation results are presented. Finally, Section 5 presents the main results and future work.

2   Argument Visualisation Platform

WAVE is a Web-based, argument visualisation platform developed to facilitate understanding and debating of European legislation. From a technical point of view, WAVE comprises a customised content management system (based on Drupal) which integrates Debategraph, an argument visualisation tool developed by Thoughtgraph and provided free as a service to everyone to use of embed in a website. In WAVE, the Drupal interface and Debategraph are integrated, thus enabling data flow between the two sub-systems [9].

Since the end of 2009, the platform facilitates debating on climate change at European level[2] but also national level in France[3], Lithuania[4] and the UK[5] (Figures 1 and 2).

The main functionality of the platform is now presented to make more clear what experts and policy makers evaluated.

The platform enables users to perform three main groups of actions.

1. Explore the map, rate and share ideas

The most important functionality of an argument visualisation tool is the ability to explore debates and participate. WAVE platform embeds Debategraph argument

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[1] Source: www.debategraph.org

[2] http://www.wavedebate.eu/

[3] http://www.debatclimat.eu/

[4] http://www.wave-diskusijos.lt/

[5] http://www.jointhewave.org/

visualisation tool [9]. Debategraph is a wiki-based tool featuring both a graphical (flash-based) but also a text interface. Debategraph enables anonymously exploring maps by clicking on an idea which will result in presenting all ideas directly related to the clicked idea. Hence, by clicking the visitor can transverse from idea to idea throughout the whole map.

Fig. 1. WAVE Platform Home Page (EU pilot)
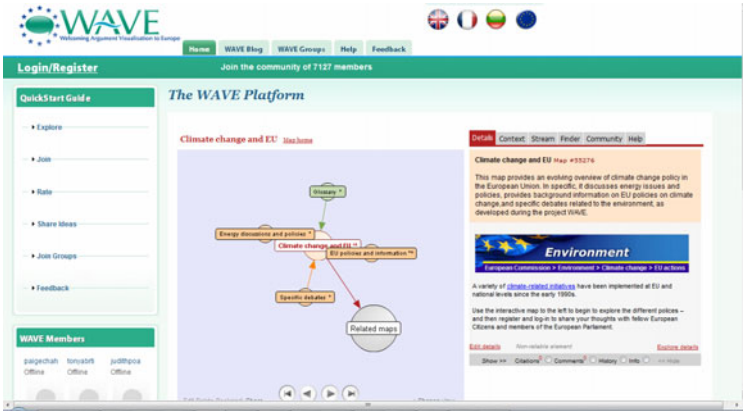
Fig. 2. Exploring a map

Debategraph also enables ranking and managing ideas (for registered users). There is a plethora of idea types available (e.g. issue, position, supporting argument, opposing argument, protagonist, etc.) as well as different link types. Adding a new idea involves typing a short description (70 characters maximum) and, if desired, also provide additional details e.g. a larger description (300 characters maximum), text, photos, video (e.g. from youtube), links etc.

Everyone is able to change any idea on the map. Normally, there is a moderator in each map, who is responsible for editing ideas, deleting irrelevant or offensive contributions etc.

2. Create and join groups/ invite others

WAVE enables registered users to create and manage groups. The website of each group can embed its own home map. The platform also enables writing to blogs, creating events, creating and contributing to a poll, and inviting others to groups and maps.

3. Create account, login and provide feedback

Finally, the platform enables registering by simply requiring a valid email address. It also provides an online form for users to evaluate the platform.

3   Evaluation Methodology

Evaluation methodologies for electronic participation initiatives have recently emerged in the literature, e.g. [10][11][12]. The evaluation methodology presented in this paper is heavily influenced by the methodology created by MOMENTUM project [12], which however is customised to fit the purposes of this paper. According to the selected methodology experts and policy makers would be identified and a questionnaire would be used for evaluation purposes. In cases where email communication was not successful an interview would be scheduled.

Experts should be academics, consultants and/or practitioners having extensive experience with eParticipation and possibly argument visualisation. Policy makers should be from UK, France or Lithuania since pilots were run in these countries having produced rich relevant content. In order to assure objectivity [13] all invited experts and policy makers are external to the WAVE consortium organisations and accepted to offer their assistance without payment or other remuneration of any kind.

The questionnaires have been constructed to assess four different axes as follows:

A. AV Platform. This axis assesses the current state of the platform in terms of usability, potential for further use, and possible enhancements.

B. AV Potential. This axis assesses the areas where an AV tool has the greatest potential in terms of its purpose, suitable policy stage, level of engagement and administration level.

C. AV Utilisation. This axis assesses how an AV tool should be utilised in terms of relevance to eParticipation, realistic use and the role of stakeholders.

D. AV SWOT. This axis assesses AV tools' strengths, weaknesses, opportunities and threats in reaching out widely and maintaining sustainable interest. This axis serves as a means to assess additional issues not directly referred to by the first 3 axes.

A total of 11 metrics have been used to assess the three first axes as provided below. Metrics 1-3 refer to AV platform, metrics 4-7 refer to AV potential, and metrics 8-10 refer to AV utilisation:

1. AV platform usability
2. AV platform potential for continuous use
3. AV platform enhancements
4. AV purpose [choice between "Understand complex legislation", "Contribute to new legislation" and/or "Evaluate legislation (existing/drafted)". Multiple choices possible and a scaling from 1 to 5 is also requested].
5. AV platform suitability for Policy Making Stage [choice between Analysis-Drafting, Policy formation, Policy implementation, Policy evaluation/impact]
6. Level of citizen engagement [choice between Informing, Consulting (discussing for opinion gathering), Engaging (discussing decisions with politicians), Empowering (decision making at citizens' hands)].
7. AV platform suitability at the EU, national or local level.
8. AV tools and technologies appropriateness for eParticipation.
9. Realistic use of AV platform by public bodies (considerations should include which stakeholders should be involved, at what level, for what purpose and through which processes).
10. Role of different types of users (citizens and other stakeholders) within the processes that could be employed by the AV platform.

The policy makers' questionnaire has been intentionally kept shorter than the experts' one in order to engage them easily in the evaluation process. Therefore, metrics 2, 8 and 10 as well as the SWOT axis were assessed only by experts. However, all questions were followed by relevant sections asking for further elaboration if relevant.

We recognise that many scientists are usually in favour of quantitative evaluation methodologies targeting at a high number of responses for assuring representativeness. However, qualitative evaluation methodologies similar to the selected one are common in social sciences; some scholars even argue that qualitative evaluation methodologies may be equally acceptable as quantitative ones [14][15].

4   Evaluation Results

Five experts and seven policy makers participated in the evaluation. Experts were from Denmark, Spain, Slovenia and the UK working in academia, Non-Governmental Organisations (NGOs) and as consultants for policy makers. Their main areas of interest are society related aspects, and government and public administration issues. Policy makers were from France, Lithuania and the UK serving at all levels (municipality, region, national and European). The main evaluation results follow.

A. AV Platform

1. Usability

Experts' opinion with regards to usability seems scattered with three of them finding the platform rather easy to use and the other two finding its use rather difficult. The main positions in favour are that the interface is relatively easy and the structure of the platform is logical with combination of arguments, responses and positions. The addition of ideas, discussion and rating are considered as easily performed while the

guidance provided is viewed as helpful. On the contrary, arguments for finding that the platform is rather difficult to use suggest that the process of learning the AV functionalities can be rather time-consuming and that the registration process creates further confusion. Experts however tend to agree that some time is needed to understand the concepts behind AV and how to use it. In the words of an expert: "*As there are many different options for users to take, it can be somewhat time consuming before getting the whole picture about the various applications offered by the platform.*"

Policy makers also disagree on the platform's ease of use. Two policy makers think that the platform is too complex while the remaining five perceive the platform to be easy to use as regards their basic functionalities, i.e. expression/posting of opinions and participation in polls, which are the main aspects users are interested in. The additional functions and possibilities are considered as more complex requiring a long learning curve.

2. Potential for continuous use

Experts were much more in agreement when asked to estimate whether the platform would attract users to continue using it. The opinions converged the platform is rather attractive for users to continue usage. This relates to the time users need to get accustomed to contributing to debates and to the incentive to continue using the service due to the salience of the topic at hand. It is stated that "*the platform is a new paradigm of collaborative thinking across the web, which makes it attractive to participate in anytime and anywhere with an entire community of interested participants, in a similar way as social networking*". Users can easily identify how the debate about an idea/concept is evolving which makes the platform visually attractive and the debate quite well structured. However, it is also stated that the platform is more attractive to users who already have an interest toward the policy under discussion (in our case climate change).

3. Enhancements

Experts suggested improvement of the user interface to allow intuitive handling and the availability of tools for providing discussion summary reports based on participants' inputs.

Policy makers suggested focusing on easy access and navigation. Additional suggestions included the reflection of polls' results in the discussions and integration of social networks' functionalities on the platform (such as Twittering by users).

B. AV Potential

4. Purpose

Experts and policy makers assessed AV purpose by rating whether WAVE mostly helps to understand complex legislation, contribute to new legislation or evaluate legislation. The quantitative results are shown in Table 1. An interesting observation is that experts suggest the platform can mainly help in contributing to new legislation while policy makers suggest it can mainly help to understand and evaluate existing legislation.

Table 1. Experts' (E1-E2) and policy makers' (P1-P7) rating on usage of AV platform in legislation processes (1: very weak, 5: very strong). Expert E5 did not answer this question.

	E1	E2	E3	E4	E5	P1	P2	P3	P4	P5	P6	P7
Understand	3	4	2	3	-	4	4	4	4	4	1	1
Contribute	4	4	4	3	-	2	2	3	4	2	2	2
Evaluate	4	3	2	3	-	3	5	4	4	5	4	2

5. Policy making stage

Experts and policy makers estimated the kind of legislation processes that can be supported by the platform, i.e. analysis-drafting, policy formulation, policy implementation and policy evaluation. Table 2 presents the quantitative results.

Table 2. Experts' (E1-E2) and policy makers' (P1-P7) view on appropriateness of AV platform in various policy making stages. Expert E4 did not answer this question.

	E1	E2	E3	E4	E5	P1	P2	P3	P4	P5	P6	P7
Analysis-drafting	✓	✓	✓	-	✓	✓		✓	✓	✓		
Formulation	✓	✓		-	✓	✓			✓			
Implementation	✓			-	✓	✓			✓			
Evaluation	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓

Experts indicate that the platform provides more added value to analysis and evaluation processes. An expert pointed out the use of the platform to tackle complex issues; it was suggested: "*The platform can be useful within the legislation processes when identification, elaboration and presentation of complex topics is needed*". The community aspects of the AV platform were considered to be better suited to policy monitoring and evaluation. The context of use however seems also important. As an expert pointed out: "*Answer depends on who your target group is and what the topic is. Personally I doubt that citizens will participate in any of the above four legislative processes unless it is strongly promoted and "localised" to individual citizens' local context*".

Policy makers signified the policy evaluation stage as the most important followed by the analysis-drafting stage. A policy maker suggested "*the ideas reflected on the map might be used for developing draft version of various documents and discussed between experts. […] Also platform can facilitate feedback about outcomes of the policy in particularly finding out the negative sides*". The platform is perceived as less important in the implementation stage, where more specific actions and groups of people are required.

6. Engagement Level

As regards the appropriateness of AV platform for different engagement levels, experts and policy makers provided the quantitative results presented in Table 3.

Table 3. Experts' (E1-E2) and policy makers' (P1-P7) view on appropriateness of AV platform in various engagement levels

	E1	E2	E3	E4	E5	P1	P2	P3	P4	P5	P6	P7
Informing		✓			✓	✓		✓	✓	✓		
Consulting	✓	✓	✓	✓				✓	✓	✓	✓	
Engaging					✓	✓	✓		✓			
Empowering									✓		✓	✓

Almost all experts stated that the AV platform is more suitable for consulting followed by informing. The engaging and empowering levels were not regarded as relevant since experts could not distinguish the level of deliberativeness on the platform. Policy makers indicated the informing and consulting level as most effective, followed by engaging and empowering.

The responses seem to indicate that an AV tool can serve all engagement levels but is particularly relevant to consulting i.e. discussing for opinion gathering. Thus, it seems that the level of citizens' engagement is mostly influenced by the use of AV tools and the political process they are embedded into rather than by merely the tools' offered functionality.

7. Administration Level

Experts suggested that the administration level (EU, national, local) is contingent to the topic and the target group and not the tool. For instance, for the EU level, the language barrier has to be taken into consideration to allow for multi-lingual processes. As the tool is deemed more suitable for stakeholders and interest organisations or even public authorities rather than citizens, the level is not essential. Another aspect which has to be considered is that current challenges of European eParticipation are not related to the lack of eParticipation channels but to non-technological issues such as citizenship, political elitism, accountability and trust. In overall, though, experts tend to deem the national level as more appropriate since the platform cannot handle multi-lingual debates at its present form.

Most policy makers think that the AV platform could support eParticipation at all levels. However, there is again a tendency towards the national level being the most suitable, as policy makers suggested it would be too complex to use at European level and it would be easier to attract many active users at national level than at local level.

C. AV Utilisation

8. Relevance to eParticipation

Concerning the appropriateness of AV tools and technologies for eParticipation, experts rated them as rather appropriate and fully appropriate. As a positive aspect it was noted that the platform encourages continued involvement and genuine deliberation; two very crucial conditions for eParticipation. However, it was also suggested that more background info would be beneficial for eParticipation as well as geo maps

presenting spatial information. Furthermore, the AV platform should also present detailed evidence of impact to the political and decision-making processes.

9. Use of AV

Respondents were required to indicate how the AV platform could be realistically utilised by public bodies and through which processes. Experts' suggestions here vary as it is indicated that an AV tool can be used either by citizens for agenda setting (i.e. ask citizens what should the government do next) or better serve stakeholder and interest organisations to organise debates. It was also suggested that a simplified version of the AV platform should better be used by organisations such as the United Nations (e.g. when setting up Millennium development goals) and the European Union (e.g. when preparing the EU Constitution document in the future) than by national governments to prepare national policy documents. Additionally, public bodies could use the AV platform for "*structured debate during policy formation, expertly and independently facilitated and with considerable resources for processing, analysing and summarising responses for policymakers*".

Policy makers suggest that AV platform could be used for cooperation between governmental intitutions and other public organisations serving as an information exchange tool in various policy areas. Another suggestion is to use it for pan-european debates like the Youth Panel; the AV platform could serve as the debate platform for the youth panels before the conduct of a face-to-face conference. However, policy makers also refer to the importance of a deep understanding of the benefits and possibilities of AV platforms by public bodies and to the need of allocating additional resources for platforms' utilisation. Both experts and policy makers underline the significance of the feedback process as a prerequisite.

10. Role of Stakeholders

Finally, experts were asked what kind of role different types of users (citizens and other stakeholders) could have within the processes employed by the platform. It was suggested here that citizens are more likely to contribute with personal opinion and ideas associated to specific local issues, whereas a more prominent and visible role for government representatives/policy makers is needed in order to assure users about debates' impact. However, the responses received signal also the role of civil society and NGOs as very important. NGOs are likely to contribute with more data and arguments phrased in a language and format suitable for legislation, covering both local and wider issues and perspectives. Civil society organisations can contribute with activities such as promoting, explaining and facilitating use, and providing content. It was finally suggested that an external study could identify additional roles to be undertaken by each stakeholder group, as their strategies to influence policy making vary.

D. AV SWOT

The results of experts' SWOT analyses are presented in tables 4 and 5.

Table 4. Results of the experts' SWOT analysis on reaching out widely

Strengths	Enhancement of inclusiveness and transparency of decision-making processes at the national and European level using Argument Visualisation techniques.
	New and novel way to gather public opinion on any issue.
	Can be sustained and utilised from merely all European institutions to provide information on controversial issues of the internal market.
Weaknesses	Many citizens feel that policy development is a process that they do not understand and have little control over.
	Different ICT skill are required – such as map reading.
	Time-consuming service to learn.
Opportunities	Further use in other countries/languages at other levels (e.g. local, regional) and for other topics (e.g. education) depending on the focus and target group.
	To provide a platform to learn about policy at the EU/national level and find out what particular policies mean to citizens on the national level so they can contribute to policy drafting and impact assessments.
	Easily available over the Internet, requires no special downloads, integration with mobiles and online social networks could enhance participation.
Threats	Stagnating debate and input without moderation.
	Need to focus on one theme targeting one stakeholder at a time.

Table 5. Results of experts' SWOT analysis on sustaining interest

Strengths	Can be used in agenda-setting contexts where users can come back at regular intervals.
Weaknesses	Data need to be authored and dated so that longitudinal approaches can be implemented.
	The engagement rates can be reduced if the topics are not motivating enough for the community.
	Hard to identify concrete benefits that platform can provide to an average internet user unless it poses some interest into the EU climate change policy.
Opportunities	By using this platform with other tools (e.g. emails, users online meetings) citizens will feel more involved. Technologically, there are possibilities for these strategies to take place.
	Creation of a more open space for people to debate on existing legislations and their impact on their daily lives.
	Connection with similar civil society and NGOs projects can heat up debates.
	Possible for stakeholders to take ownership of the process, producing a strong demonstration effect for other groups.
Threats	Clear demonstration of feedback mechanisms to ensure users maintain interest.
	Establishment of a clear democratic policy impact.
	Lack of trust and support from key stakeholders.

5   Conclusions

In this paper we present an evaluation of an Argument Visualisation (AV) platform by experts and policy makers. Although a particular AV platform has been evaluated, we believe that the results can, to some extent, apply to other AV platforms and tools as well. The reason is two-fold. First, the AV tool under investigation (namely

Debategraph) is mature and stable, hence, it constitutes a fair representative sample of AV tools. Second, the evaluation results presented in this paper concentrate on general issues relevant to AV tools as opposed to specific platform and project characteristics. Having said that, we should point out that the results are not directly applicable to all AV tools and to all different contexts these are or can be used.

The evaluation was conducted in four different axes. The first axis assessed the current state of the platform in terms of usability, potential for further use, and possible enhancements.

The evaluation results suggest there is room for improving the usability of the AV tool. However, respondents also agree that easiness of use is substantially improved after a short learning period. This is an important aspect and we feel there is a need to distinguish between difficulties due to the use of argumentation in online debates and difficulties due to a specific interface. Responses seem to indicate that while there is room for improvement in the interface itself, substantial difficulty remains due to the use of structured argumentation. In other words, having to contribute in terms of positions, arguments, etc. is clearly much more difficult than contributing in plain unstructured text and this has to be appreciated.

Policy makers suggested integration of the AV tool with other social media platforms and specifically twitter. This is indeed an interesting suggestion also due to the fact that all map ideas have a very short title (up to 70 characters) which is inline with message length restrictions of twitter and other micro-blobbing tools. Experts additionally suggested the development of tools for providing discussion summary reports based on participants inputs[6].

Experts expect users to keep using AV tools as they provide a new paradigm of collaborative thinking across the web, similar way to social networking. Users' interest for continuous usage is also linked to the saliency of the debate topic(s).

The second axis assessed the areas where an AV tool has the greatest potential in terms of purpose, suitable policy stage, level of engagement and administration level.

The results here suggest it is important to set up an overall participation process and make clear the role of an AV tool in it. It is interesting to note that for experts, AV tools are better suited for contributing to new policies while for policy makers for understanding and evaluating policies which may be due to the difficulties in contributing (some of them inherent in AV). AV tools seem also appropriate for experts' or organisations' consultations and for informing the public. AV tools can be used at all policy making stages however they are deemed particularly relevant to agenda setting and also to policy analysis and evaluation. This is indeed expected as the debating functionalities of AV tools seem particularly suited for these stages.

Finally, AV tools seem relevant to all administration levels (EU, national, local) depending on the topic and the groups targeted in each case. However, there is a tendency towards the national level being the most suitable as, on the one hand, it is wide enough to engage many active users and, on the other hand, limited enough to overcome issues of complexity and multilingualism.

The third axis assessed how an AV tool should be utilised in terms of relevance to eParticipation, realistic use by public bodies and the role of different stakeholders.

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[6] Actually, it should be noted that the AV tool now provides the possibility to create summary reports of discussions.

AV tools were deemed particularly relevant to eParticipation although it was noted that they may not be relevant to all cases and that sometimes dialogue should not necessarily be restricted by the semantics imposed by such tools. In terms of AV platforms' possible utilisation respondents believe that such a tool can be realistically utilised by public organisations for communicating with the public (e.g. for agenda setting and other kinds of debates) but also for inter-institutional cooperation (e.g. expert panels in different policy areas). The latter is an interesting suggestion as in this case many usability issues can be easily overcome by expert users and result in a fruitful utilisation of AV in policy-making. Either way, public bodies still need to appreciate the need for dedicated resources and deep understanding of argumentation processes. Finally, apart from citizens and government organisations/policy-makers, it is noted that NGOs and civil society should play an important role by contributing their specialised knowledge and networks.

The fourth axis consisted of experts' SWOT analysis. Experts' SWOT analysis on the potential of AV tools to reaching out widely suggested AV tools provide a new way of participating with the potential of inclusiveness and transparency that can be also used for learning policy. However, they require some time to learn, have one specific focus at a time and the role of moderator is crucial.

Experts' SWOT analysis on sustaining interest suggested AV tools enable creation of communities, should be integrated with other tools and provide a possibility for contributors to take ownership of the process. On the other hand, data need to be authored and dated, topic should be motivating, and process should be clear including benefits for participants, feedback and impact while trust and support from key stakeholders should be evident.

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ArgVis: Structuring Political Deliberations Using Innovative Visualisation Technologies

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Abstract. Argumentation, having its roots back to ancient years, is used in many aspects of everyday life, such as law, politics, education and decision making. Argument Visualisation Tools serve the need of visualizing natural language's argumentations, targeting in the elimination of the traditional community sites' disadvantages such as the lack of expressiveness. This paper presents ArgVis, an argument visualization tool, which drives the development of structured dialogues in an uncomplicated manner, without demanding from the users to hold any special technical or argumentation skills. ArgVis structures argumentations in interactive graphs that comprise: Issues, Positions, Arguments and Counterarguments. One of ArgVis' innovations relies on the ability to integrate information with relevant, user-generated content from similar tools and sites by exporting data in a machine-readable format using the SIOC ontology.

Keywords: e-democracy, argumentation, deliberation, argument visualization, e-consultation, e-participation, semantics.

1 Introduction

Throughout the centuries numerous efforts have been made in order to generate acceptable frameworks, collections of rules and guidelines that aim to precisely describe the process of real-life argumentation. Argumentation is *"a verbal and social activity of reason aimed at increasing (or decreasing) the acceptability of a controversial standpoint before a rational judge"* [6]. The roots of argumentation trace back to the Greek Antiquity. Ancient Greeks recognized the existence of three main arts of discourse: rhetoric, logic or dialectic, and grammar also known as the "Trivium" [7]. Aristotle was one of the first to refer to the existence of arguments, thus providing the first formal study of logic [2]. Other important milestones in the history of argumentation include Anselm's ontological argument in his *Proslogion* [1], Descartes' ontological argument [4] and Wigmore's *Chart Method* to analyse the large number of evidence that may be conducted in a legal case [24]. A more recent approach is Toulmin's schema with six elements of a persuasive argument: *claim*, *grounds*, *warrant*, *backing*, *qualifier*, and *rebuttal* [20]. Toulmin's work, *"although innovative*

in its day, [...] appears somewhat inflexible in the light of later work on defeasible reasoning and argumentation schemes" [3].

During the last decade the interest in deliberative democracy is steadily growing [11] and notions such as e-Democracy [18] and e-Participation [21] have become very popular. In terms of strengthening the government-citizen relations, OECD [16] has recognized three main relations that frame the processes of e-Government. These relations include: (a) *Information*, (b) *Consultation,* (c) *Active participation*.

There are a large number of online tools and applications designed to enhance e-Democracy activities that range from weblogs and alert mechanisms to more sophisticated consultation platforms [22]. However, the majority of these tools face the problem of being inappropriate for supporting discussions that efficiently contribute to the purposes of their users, such as the design of the argumentations and the interactions among their elements [5]. Moreover, tools such as webcasts, do not support interactivity with the users; users may only review rather than actively participate. Users usually face problems either due to their lack of experience using these kinds of tools or due to the tools' increased complexity. Particularly, in some of the traditional tools, such as discussion forums, the number of posts may vary from hundreds to thousands transforming their exhaustive overview to a real difficult and time consuming process. The high complexity of the discussion also makes it really hard for a viewer to obtain the central points of the discussion or come up with a conclusion. O'Keefe [15] mentions that although argumentation is concerned basically with the "making-arguments" process, the "having-arguments" process shouldn't be ignored. That implies that an argumentation tool should be able not only to support the creation of the discussion's arguments, but to enable the design of the interactions between the specific conversational moves [5].

Argument Visualisation Tools aim to promote near-natural-language presentation of arguments in a simple and clear way. They allow users to participate in structured and consistent argumentations by providing a friendly, intuitive and easy-to-use user interface. They may serve educational needs, (e.g. improvement of critical thinking) or aim to enhance the decision making processes of private companies and governments alike.

This paper presents ArgVis, an Argument Visualisation Tool that eliminates the traditional tools' disadvantages mentioned above. ArgVis serves as a "bridge" to integrate and present the different elements in a "visual" deliberation, in a way that everyone, regardless of their ICT and literacy skills, are able to participate.

The rest of the paper is structured as follows: Section 2 reviews other existing Argument Visualisation Tools and puts them vis a vis ArgVis to identify their common characteristics as well as their differences. Afterwards, section 3 presents ArgVis in detail, describing its architecture and functionalities, providing details regarding its technical implementation. Finally, in section 4 we summarize the paper and discuss the experience we gained by implementing and using ArgVis.

2   Related Work

This section briefly presents the most commonly used Argument Visualisation Tools that have been developed to serve various purposes. Some of them support a graphical

representation of the argumentation, while others use linear, monolithic presentation methods similar to traditional forums.

AcademicTalk supports synchronous online educational argumentation based on the dialogue game theory, a theory that presents models with dialogue practices.

aMap was implemented to prove that it is possible for a web-based Argument Visualisation Tool to support the presentation of complex arguments in a unequivocal format.

Argumed is the descendant of Argue!. It recognizes three types of elements in argumentations: assumption, reason, and attack which are graphically presented.

Argumentations manages online argumentations and supports reusability of arguments to avoid their repetition in different debates.

Argumentative is an open source software to view and manipulate "assumptions", "reasons", "objections" and "helpers" using a tree-formed and easy to navigate view.

Araucaria is a software tool to analyse arguments in a diagrammatic form using a simple interface using. The arguments are saved in XML format.

Athena project was mainly implemented for educational reasons for both argument analysis and production. It includes two separate modules: Athena Standard for the design of argumentation and Athena Negotiator for the argumentation's decision analysis.

Belvedere aims to support the development of argumentation skills to young students. It supports several presentation forms such as hierarchical ones, graphs and tables.

Compendium is a software tool that provides a flexible user interface for managing the connections between visualised information and ideas during argumentation.

ConvinceMe was designed for educational needs to help students "structure, restructure, and assess their knowledge about often controversial situations[1]".

Debategraph is an online tool that allows users to view a discussion's elements in a text or graphic form called "debate map". Users can create argumentations and add new arguments, and also publish, share, reuse and crosslink between their argumentations.

Debatewise supports online, realistic argumentations about several types of subjects such as religion and sports.

Dialaw is a dialogical model of legal justification [10]. It is a two-player game allowing its players to express their views in a tree mode and decide whether they agree or disagree.

Digalo is an educational argument visualisation tool used in classes for collaborative learning.

eDialogos is a project designed to support consultation processes in order to cooperate in *"designing and implementing policies for the City"*. It incorporates three different tools: electronic surveys, e-signatures, and e-deliberation.

Parmenides is a software tool developed to allow structured argument over a proposed course of action. Arguments are stored in a Database for further analysis, with aim to recognise the weaknesses and advantages of the discussions' subjects.

Rationale uses argument maps to help students learn to analyse and think critically.

Reason!Able is a an educational-purposed tool. It supports the implementation of complex dialogues which it transforms in a plainer diagrammatic from.

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[1] http://www.soe.berkeley.edu/~schank/convinceme/index.html

Theseus is used by students to develop their critical thinking skills. It supports a "thought tree" which consists of the questions that need to be answered, their answers, and the questions that arise from the answers and test their strength.

Truthmapping is a conversational tool which presents argumentations as simple conversations. The users' comments are formulated so as to eliminate optical complexity by avoiding repetitive posting of previous arguments. Table 1 provides an overview of the tools' features.

Table 1. Argument Visualisation Tool's overview

AV Tool	Purpose	URL
AcademicTalk	Educational	http://www.londonmet.ac.uk/ltri/research/projects/at.htm
aMap	Educational, Policy Issues	http://www.amap.org.uk/
Argue!, Argumed	General	http://www.ai.rug.nl/~verheij/aaa/index.htm
Argumentations	General	http://www.argumentations.com/
Argumentative	General	http://argumentative.sourceforge.net/
Araucaria	General	http://www.computing.dundee.ac.uk/staff/creed/research/araucaria.html
Athena	Educational	http://www.athenasoft.org/
Belvedere	Educational	http://www.pitt.edu/~suthers/belvedere/
Compedium	General	http://compendium.open.ac.uk/institute/
ConvinceMe	Educational	http://www.soe.berkeley.edu/~schank/convinceme/index.html
Debategraph	General	http://www.debategraph.org
Debatewise	General	http://www.debatewise.com/
Dialaw	Legal justification	http://cli.vu/~lodder/dialaw/
Digalo	Educational	http://dunes.gr/
eDialogos	Policy Making	http://www.samos-dialogos.gr/
Parmenides	Policy Issues	http://cgi.csc.liv.ac.uk/~katie/Parmenides1.html
Rationale	Educational	http://austhink.com/
Reason!Able	Educational	http://www.goreason.com
Theseus	Educational	http://www.skymark.com/Theseus/overview.asp
Truthmapping	General	http://truthmapping.com/index.php

A common problem that traditional tools (e.g. Discussion Boards) face is the lack of expressiveness during the argumentation process. That means that identifying the central opinions or which opinion supports/opposes others through thousands of users' posts may be a really time consuming process. Driving structured dialogues with specific types of elements is ArgVis's solution to this barrier.

Another problem that some tools face is the argumentations' review. For example, the users need to spend a lot of time in order to review all the posts of an extended argumentation. ArgVis overcomes this problem by using visual representation of arguments and their relationships obtaining a highly expressive character.

Structured dialogues and visual representation of dialogues are not innovative techniques in the field of Argument Visualisation. Apart from ArgVis, other Argument Visualisation Tools (e.g. Debategraph) support the construction of argumentations that lean on specific, visualised types of elements as well. However, a problem that may arise from the use of structured dialogues is the one of their complexity. For example, Debategraph identifies 11 different types of elements that constitute a complete argumentation. A user not familiar with Debategraph and argumentation theories may find it difficult to decide which type of elements best corresponds to his opinion. In contrast with Debategraph, ArgVis identifies only five different types of elements in an argumentation: Map, Issue, Position, Argument and Counterargument.

Table 2. Argument Visualisation Tools comparison

AV Tool	Graph	Interactive Graph	Structured Dialogues	Free	Open Source	Group Argumentation	SIOC
AcademicTalk	✓	✓	✓	N/A	✗	✓	✗
aMap	✓	✗	✓	✓	✗	✓	✗
Argue!Argumed	✓	✓	✓	✓	✗	✗	✗
Argumentations	✗	✗	✗	✓	✗	✓	✗
Argumentative	✓	✓	✓	✓	✓	✗	✗
ArgVis	✓	✓	✓	✓	✓	✓	✓
Araucaria	✓	✗	✓	✓	✓	✗	✗
Athena	✓	✓	✗	✓	✓	✗	✗
Belvedere	✓	✓	✓	N/A	N/A	✗	✗
Compendium	✓	✗	✓	✓	✓	✗	✗
ConvinceMe	✓	✗	✓	✓	✓	✗	✗
Debategraph	✓	✓	✓	✓	✗	✓	✗
Debatewise	✗	✗	✗	✓	✗	✓	✗
Dialaw	✓	✗	✓	✗	✗	✓	✗
Digalo	✓	✓	✓	✓	✗	✓	✗
eDialogos	✗	✗	✗	✗	✓	✓	✗
Parmenides	✗	✗	✓	✓	✗	✗	✗
Rationale	✓	✓	✓	✗	✗	✗	✗
Reason!Able	✓	✓	✓	✗	✗	✗	✗
Theseus	✓	✓	✓	✗	✗	✗	✗
Truthmapping	✗	✗	✓	✓	✗	✓	✗

Recent research and development in the Semantic Web call for open platforms that share and interlink data coming from other sources. Towards this direction, ArgVis uses a SIOC[2] exporter to release the content of argumentations in the form of structured, machine-processable RDF data. It though creates a set of RDF documents that describe each of the ArgVis argumentations (maps) and every post (all of the issues, positions and arguments/counterarguments) on them. SIOC is a popular lightweight ontology that facilitates the semantic interlinking of online communities such as blogs, forums, wikis etc. SIOC is aW3C recommendation[3]. Hence, ArgVis argumentation data can be easily reused, linked and mashed with related data that exist in

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[2] http://www.sioc-project.org
[3] http://www.w3.org/2007/02

other community sites. SIOC data export is an innovative characteristic in the filed of Argument Visualisation Tools that none of the rest of the tools support.

Table 2 summarizes the key characteristics of different Argument Visualisation Tools', including ArgVis. The characteristics derived from a list of key criteria that can be used for evaluating Argument Visualisation Tools such as the support of graph-based representation, interactive techniques, structured dialogues etc.

3 ArgVis

ArgVis is an Argument Visualisation Tool designed to systematize the argumentation process by visually representing structured arguments to construct political deliberations. It aims to encourage people, especially the younger generation who are very familiar with new technologies, to express their opinions and contribute ideas to existing argumentations and be actively involved and participate in policy making.

ArgVis' argumentation model capitalizes on the components of a dialogue as defined by IBIS [9]:

(a) Area or topic, *"a task named by a trigger phrase"*.
(b) Issues, which *"are brought up and disputed because different positions are assumed"*.
(c) Arguments, which *"are constructed in defense of or against the different positions until the issue is settled by convincing the opponents or decided by a formal decision procedure"*.

Table 3. Elements of ArgVis tool

ArgVis Element	Description	Stereotype	IBIS Element
Map	The initial point of the argumentation.		Area or Topic
Issue	A statement that arises from the graph of the argumentation. Issues can be connected only with the central topic of the graph.		Issue
Position	A position taken in response to a specific issue.		—
Argument	A premise that supports a position, i.e. in order to strengthen a statement.		Argument
Counterargument	A premise that is posed against a position, i.e. in order to weaken a statement.		Argument

ArgVis' argumentations allow five different types of elements that directly map to IBIS components: Map, Issue, Position, Argument, and Counterargument (see Table 3). The argumentations are organised in interactive graphs which comprise of these interconnected components depicted by representative icons. For example, *Argument* elements are represented by a node which depicts a happy smiley, while *Counterargument* elements are represented by a node that depicts an angry smiley. It is a way to help users recognize the meaning of each element at a glance.

3.1 Users and Functionalities

This section describes the types of users that may participate in Argvis's argumentations, and briefly presents its user interface and functionalities (Table 4).

ArgVis' users range from simple users, for example citizens, who desire to take part in the argumentations' in progress or to collect other people's opinion on particular subjects, to researchers or students who want to advance their techniques in the art of argumentation, and of course to policy and decision makers.

ArgVis supports three different types of users with different access permissions and privileges to the tool's functionalities, namely *unregistered* users, *registered* users, and *administrators*.

Unregistered users constitute the elementary user type and have limited choices. They are only allowed to review the argumentation graphs.

Registered users are the ones that have followed successfully the subscription process. They have the chance to navigate through the interactive argumentation graphs, create their own argumentation graphs, and participate in existing argumentations by adding argumentation elements supported by ArgVis.

Finally, *administrators* have additional privileges as compared to unregistered users, such as editing all kind of elements existing in the argumentations.

Actions concerning editing and deleting elements and graphs may be completed only by administrators or registered users who own these contributions. Actions related to the visual graph's layout and other interaction techniques are allowed to any kind of users.

The main screen (see Figure 1) of ArgVis is partitioned in two main spaces: the *deliberation space* which consists of the visualized graph of the argumentation and the *controls space* on the left, which includes the functionalities supported by ArgVis. The argumentation graph comprises of elements of the five different type visualized as nodes (see Table 3).

Table 4. ArgVis users' and administrators' privileges

Action	Unregistered Users	Registered Users	Administrators
Review Argumentations	✓	✓	✓
Start argumentation	✗	✓	✓
Add Element	✗	✓	✓
Edit Elements	✗	Only his own	✓
Delete Elements	✗	Only his own	✓
Graph Interaction Techniques	✓	✓	✓

3.1.1 The Controls Space

The controls space includes two main components: Users' actions and graph controls (i.e. controls that offer graph interaction techniques). There are two ways to perform users' actions. The first one is to make a selection from the menu on the controls space. The second one is by right-clicking on the appropriate node from the graph.

Fig. 1. ArgVis main screen

The controls space's user actions include:

- *Creating a new argumentation graph* on a desired topic.
- *Navigating through available graphs*, which allows browsing the topics list and reviewing the opinions stated.
- *Adding issues, positions, arguments and counterarguments.*
- *Voting* in order to expressing to what degree a registered user agrees or disagrees with an Argument or a Counterargument. The allowed values are integral numbers between one (disagree) to five (agree). The average values of the submitted votes are displayed on the links that connect the Arguments/Counterarguments with their positions.
- *SIOC data* export so that the contents of the argumentation can be extracted in a machine-understandable format using the SIOC ontology[4].

The graph controls of the controls space enhance ArgVis' functional character. The graph controls include the functionalities that registered or unregistered users may use to alter the layout of the graph or to highlight specific elements of the graph. Specifically, graph controls include:

- *Layout.* Through the Layout control, the presentation scheme of the graph can be altered through a list of options: "SingleCycleCircle", "ConcentricRadial", "Hyperbolic", "Hierarchical", "ForceDirected", and "ISOM". Another option of the Layout control is the "Linklength" that defines the length of the links that connect the elements. The allowed values are from 0.00 to 600.00. Lower values reduce the distance between the nodes of the graph, while higher values increase it. The last option is "Autofit", which resizes the graph to fit exactly on the screen.

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[4] http://www.sioc-project.org/ontology

- *View controls.* They include two basic functionalities, the zoom one, and the scaling one. Zoom supports, in a scale of 0.25 to 2, the zoom in and zoom out actions. Scaling supports, in a scale of 0.5 to 2, the increasing or decreasing of the elements' size.
- *Degrees of separation.* It can be used to define the depth of the argumentation's graph i.e. in what level elements of an argumentation will be represented. The values of the "Degrees of separation" range from 1, where only the main topic and its issues on the graph are presented, to 3, where all elements are presented.

3.2 ArgVis Architecture and Implementation Details

The framework of ArgVis can be separated into three main layers: the User Interface Layer (UI Layer), the Application Layer, and the Database layer (See Figure 2).

The *User Interface Layer* refers to the interaction between the users and the tool. It provides all the functionalities needed in order to transform the communication between the users and the system and the navigation through the tool into a simple and intuitive process.

The *Application Layer* operates as an intermediary between the User Interface Level and the Database Level. It implements all the functionalities supported by ArgVis, which are included in the control space as mentioned in the previous section. The implementation of the Application layer is based on Google's BirdEye RaVis[5]. BirdEye RaVis supports the development of complex data visualization interfaces for the analysis of relational data sets such as social networks. RaVis' library which is extended in ArgVis, is implemented for the Adobe Flex environment using MXML. In addition, ActionScript 3.0 is used to implement the client's logic.
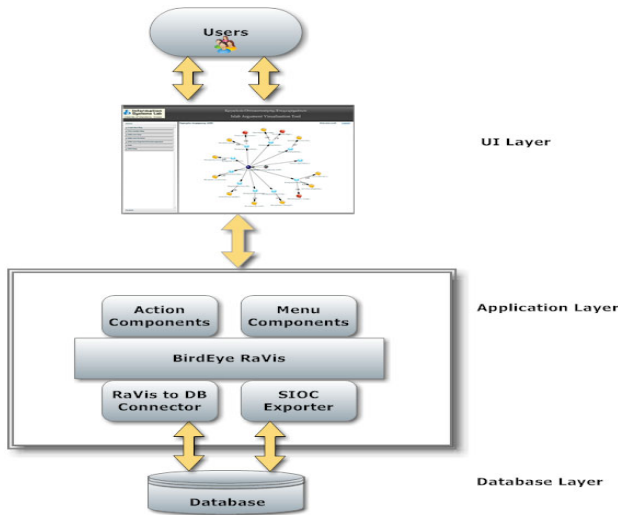

Fig. 2. ArgVis Layers

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[5] code.google.com/p/birdeye

ArgVis has used RaVis library to alter its User Interface, graphical layout and data representation, and the implementation's logic according to the needs of its services. A database (presented in the Database Layer) is embedded to the library in order to serve as a media of storage of visualized data.

Apart from RaVis extended libraries, the Application layer of ArgVis includes a Database Connector in order to interact with an implemented Database, as well as a the SIOC exporters which to convert the argumentations' elements to SIOC data using PHP scripts.

The bottom layer is the *Database Layer*. It implements the database which stores data definitions and data referring to the argumentations' elements, users' personal details etc. The Database is implemented using MySQL 5.1.49 and the access to/from it is developed using PHP scripts that collaborate with the MXML scripts. The whole application is installed on an Apache 2.2.16 Web server.

4   Conclusions

ArgVis is an Argument Visualisation Tool designed to be an easy-to-use, user-friendly and intuitive application that enhances argumentations as dynamic processes and eliminates many of the disadvantages and problems that traditional tools or other Argument Visualisation Tools face.

ArgVis supports an innovative functionality unique among other Argument Visualization Tools, the SIOC data export, which allows the cross-relation and mashing of ArgVis data with related data coming from other online community sites. *None of the traditional or other Argument Visualisation Tools support it.*

It supports well-defined structured dialogues as a way to increase the expressiveness of the argumentation's elements. Moreover, the structure of the argumentation graphs does not suppose that the user needs to have special critical thinking abilities so as novice users can take advantage of it. ArgVis dialogue's structure relies on IBIS well established dialogue theory predominating similar tools with undefined argument structure orientation. Additionally, its dialogue structure includes a limited number of elements (only five) reducing the complexity of the argumentations that tools like Debategraph (which uses 11 elements) face and making its argumentations more approachable to users.

ArgVis represents visually the argumentations that it hosts. Many similar tools, such as Argumentations, may support structured dialogues but not visually presented graphs. ArgVis' visual representation of arguments and their relations on the one hand enhances dialogues' expressiveness and on the other hand facilitates dialogues review by users. Moreover, the interaction techniques that ArgVis offers to the graphs, such as zooming and scaling, help the users to focus on specific parts of the argumentations eliminating the problem of complex, and difficult to read graphs.

Another advantage of ArgVis is the voting process, which offers the opportunity to select a preferred argument and express the agreement or disagreement with it. This may contribute to effectively come up with a general conclusion about the discussed topic by examining the highest and/or the lowest rated elements.

Finally, ArgVis is the only Argument Visualisation Tool up to now that publishes the data of the argumentations that it hosts in an open, machine-processable format based on standardized ontology, i.e. SIOC.

Concluding, ArgVis features many attributes that give advantage to it related to other tools. Some of them can be found separately on other tools but not integrated in a single solution. For example, Truthmapping relies also on structured dialogues but does not support visualization and interactivity techniques. Another example is Debategraph that combines structured dialogues and visual representation but supports a variety of different argumentation elements that increase its complexity.

As part of our future work, in order to develop the next generation of ArgVis some improvements are planned. One is to allow users to search for the argumentation graphs of their interest using keywords, which will save time to users who are interested in specific matters. Moreover, it will be possible to group related topics into categories. Another improvement that will be implemented is to allow a registered user to create "private" graphs which will be accessible only to selected users. The owner will be able to invite other users by sending an invitation e-mail. Finally, an RSS feed will be developed in order to inform users on updates of selected argumentations of interest.

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eParticipation Research: A Longitudinal Overview

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Abstract. This paper provides an update of the existing eParticipation research state of the art, and a longitudinal analysis of the development of the eParticipation field based on a shared framework of analysis. Drawing on a literature search covering the period from April 2006 to March 2011 included, 123 articles are identified, analysed and classified within the categories of eParticipation actors, activities, contextual factors, effects, and evaluation. Findings show that the field has a high level of dynamism, as focuses on eParticipation activities, contextual factors and effects have shifted in time, sometimes in counterintuitive directions. Drawing on the analysis, the conclusion section provides inputs for a research agenda. These include the need to move beyond a technological perspective, and encouraging the ongoing shift of research focus from government to citizens and other stakeholders.

Keywords: eParticipation, eDemocracy, literature review.

1 Introduction

The growing body of knowledge on eParticipation in recent years has increased the complexity of the research field. Contributions focusing on the emergence of new forms of citizen participation in political activity through information and communication technologies (ICT) come from a wide range of disciplines [1]. eParticipation research includes perspectives from political science, sociology, management, psychology, economics, together with contributions that are more technical in nature. Such a varied scenario of disciplinary backgrounds is also accompanied by a variety of methodological stances, and normative perspectives characterizing eParticipation research [2].

As a result of this complexity, a number of attempts at scoping the research field have been carried out so far [1], [3-6]. These contributions aim at providing comprehensive views of the research area, and to enable the research community to share a set of epistemological tools in order to identify gaps and advance the research field. Nevertheless, since eParticipation can be considered a field that is still on its way towards maturity, there is a need to refine the scenario of the state of the art of research available. Existing reviews, being the first ones, still fail to build on top of each other in a systematic way. This can represent a relevant burden as far as understanding the direction that the eParticipation research field is taking in time is concerned.

This paper aims at updating the understanding of the scenario of eParticipation research, while providing a longitudinal analysis of its developments. In particular, this review mainly draws on the approach adopted in Sæbø et al. [5].

The article is structured as follows. The following section will present the method used and the strategy adopted for collecting the literature data on eParticipation research. Section 3 outlines and discusses the limitations of the study. Section 4 will introduce the categories used for the literature analysis. Section 5 will present the findings, distinguishing between five main categories of research focus: eParticipation actors, eParticipation activities, contextual factors, eParticipation effects, and eParticipation evaluation. The conclusion section summarizes the contribution of the paper and provides inputs for an eParticipation research agenda.

2   Method

This paper draws on the analysis of the most recent contributions on eParticipation. The literature search includes all eParticipation-related research contributions published in international journals and conferences in the period from April 2006 to March 2011 included.

The search was conducted via EBSCO, ISI Web of Knowledge, and IEEE Explore databases, in line with the guidelines provided by Webster and Watson [7]. This approach has been adopted in order to capture what are deemed to be all the internationally relevant research contributions, coming from established journals and conferences. The three databases index more than 8,000 journals in the fields of natural sciences, social sciences, and humanities, including important public administration journals, such as *Government Information Quarterly* and *Public Administration Review*, and the top journals in the Information Systems field. Relevant conferences include, among others, the DEXA cluster (including EGOV and ePart conferences), and the Hawaii International Conference on System Sciences (HICSS). A separate search was conducted through the AIS Electronic Library (AISeL), in order to include articles from the proceedings of the European Conference on Information Systems (ECIS) and the International Conference on Information Systems (ICIS).

The literature review carried out in this article draws on the selection strategy adopted in Sæbø et al. [5]. Therefore, in order to retrieve a first comprehensive group of research articles related to eParticipation, the literature databases listed above have been searched using the following sets of keywords in the abstract and the title:

1. eDemocracy, using additional search phrases: eDemocracy, electronic democracy, democracy and Internet, democracy and information system, digital democracy.
2. eParticipation, using additional search phrases: eParticipation, electronic participation, eGovernment and participation, eGovernance and participation, eConsultation, ePetition.
3. eInclusion, using additional search phrase: digital divide and participation (within the results of "digital divide", since "digital divide" only returned more than 450 hits)[1].

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[1] Alternative spellings for some of the keywords were also used to maximize the literature coverage (e.g.: e-democracy; e.participation; e-petition, etc.).

The keywords used are intended to cover the topic area of ICT and democratic participation, including research contributions that do not explicitly use the term eParticipation. A first keyword search was performed in the period between July and October 2008, covering all publications in the period from April 2006, which is the first month not covered by the previous literature review by Sæbø et al. [5], to October 2008 (included). A second keyword search was performed in March 2011, covering the period from November 2008 to March 2011. The approximate 500 bibliographical items retrieved through the keyword search had their titles and abstracts scanned, in order to identify contributions clearly falling under the scope of eParticipation. eParticipation was referred to as the use of IT to support democratic decision-making. This definition of eParticipation draws on the one provided by Macintosh [8], where eParticipation is related to the issues of enabling opportunities for consultation and dialogue between government and citizens by using a range of IT tools. The definition provided by Macintosh [8] has been also extended to include eVoting, that is the use of ICT to support the democratic process of voting. As a result, 123 full text articles were retrieved, analysed and classified by the author, according to the categories described. It was possible for articles to be included in different categories, therefore the total number of category occurrences is higher than the number of articles.

3 Limitations

A number of limitations in this approach have to be taken into account. First, the scope of the literature search includes only contributions written in English, which implies that significant pieces of research on eParticipation that are written in languages other than English have not been taken into account. Such a limitation is significant if we consider that, in theory, a relevant portion of eParticipation research at national and local level can be published in national languages other than English.

Second, while the databases reviewed can be easily argued to be among the most comprehensive ones, the literature scan did not include some academic sources where eParticipation research can appear, such as the proceedings of the *European Conference on E-Government*, and the *International Conference on E-Government*.

Third, the choice of keywords might be considered as incomplete and therefore overlooking research that could be argued to fall within the domain of eParticipation. While the bias introduced by the choice of any limited set of keywords – as the one by Sæbø et al. [5] – is unavoidable, the advantage of using the same set of keywords at different times has to be underlined, as it provides a robust foundation for longitudinal comparison.

Last, the classification process, following the categories presented in the next section, has been carried out by the author only, trying to subjectively replicate the underlying criteria of the distribution of articles between the categories emerging in Sæbø et al. [5], without external aid from other researchers. While this is clearly a limitation that can impact the validity of the findings, there are examples of well-cited reviews in high level outlets that have followed the same approach [9].

4   Classification of the Research Domain

The main categories used to classify and capture the development of the eParticipation field were initially drawn from the model of the field presented by Sæbø et al. [5], to ensure a good degree of continuity and longitudinal comparability in the analysis of the development of the eParticipation research field.

The list of categories in the model, without reference to the relationship between them, is here adopted as a guideline. Each category refers to a focus adopted by the research analysed, namely:

*   eParticipation actors (Citizens; Politicians; Government institutions; Voluntary organizations);
*   eParticipation activities (eVoting; Online political discourse; Online decision making; eActivism; eConsultation; eCampaigning; ePetitioning);
*   Contextual factors (Information availability; Infrastructure; Underlying technologies; Accessibility; Policy and legal issues; Governmental organization);
*   eParticipation effects (Civic engagements effects; Deliberative effects; Democratic effects);
*   eParticipation evaluation (Quantity of eParticipation; Demographic of participants; Tone and style in the online activities)

The range of categories has been expanded when new contributions in the sample analyzed could not fit into the existing categories. This resulted in introducing the actor category of researchers and scholars, as also suggested by [10], and the evaluation category of transparency and openness. Each article has been assigned to one or more categories, depending on the main research contribution(s).

The following section provides a presentation of the findings from the analysis of the literature carried out using the method and the classification categories described.

5   Findings and Discussion

This section outlines the eParticipation field by exploring international eParticipation research contributions related to the following categories: actors, activities, contextual factors, effects, and evaluation.

Table 1 provides an overview of the distribution of all bibliographical items on the categories of analysis. The total number of contributions in each period is higher than the correspondent total N of articles, as each article can include more contributions to different categories.

The research field of eParticipation is growing rapidly, even though it can still be considered to be in its early stages. The previous literature scan, based on all years of available publications until March 2006, has discussed a total of 93 articles in its findings [5]. The period of this study, April 2006-March 2011, features 123 eParticipation-related contributions. In other words, since the last literature overview, an average of almost two new eParticipation studies has been published every month.

Table 1. Overview of eParticipation contributions

Category	Up to Mar 2006 (N=93) [5]	Apr 2006-Mar 2011 (N=123)
Citizens	9	13
Government institutions	8	8
Voluntary organizations	7	6
Politicians	5	5
Researchers and scholars	n/a	1
eParticipation actors (total)	**29**	**33**
eVoting	13	11
Online decision making	18	8
Online political discourse	15	7
eConsultation	8	5
eActivism	9	3
eCampaigning	3	2
ePetitioning	2	1
eParticipation activities (total)	**68**	**37**
Underlying technologies	11	27
Accessibility	8	0
Infrastructure	8	2
Governmental organization	7	12
Information availability	5	0
Policy and legal issues	3	1
Contextual factors (total)	**42**	**42**
Civic engagement effects	8	9
Democratic effects	3	9
Deliberative effects	1	10
Quantity of eParticipation	4	8
Demographic of participants	1	5
Tone and style in the online activities	1	7
Transparency and openness	n/a	11
eParticipation effects & evaluation (total)	**18**	**59**

The picture of the international eParticipation research scenario first provides a number of interesting insights into the current state and future development of the field, when we look at the changes in focus through time.

Overall, research on eParticipation has experienced a big shift in focus away from activities, towards the study of eParticipation effects and evaluation. This has happened within the context of a general redistribution of focuses, resulting in a more balanced picture of contributions focusing respectively on actors, activities, contextual factors, and effects and evaluation. The emergence of a balance between focuses on different aspects of eParticipation can be interpreted as a move towards a higher degree of maturity of the field: different dimensions of the eParticipation phenomenon are covered by a significant number of contributions, with neither side suffering from

exceptional neglect. On the other hand, the impressive growth of contributions focusing on eParticipation effects and evaluation, which has tripled, can be linked to the progress of the many eParticipation initiatives started earlier on. As eParticipation projects move towards completion, research appears to move away from the description of activities and to focus on the evaluation of the impacts of such activities.

5.1   eParticipation Actors

Even though it is now the least focused on aspect in the sample analyzed, the focus on eParticipation actors has remained stable through time, in absolute terms. Moreover, the overall balance between different types of actors (government institutions, politicians, and voluntary organizations) has remained almost identical, with the exception of an increased focus on citizens. Without surprise, citizens and government institutions are the main object of the majority of the contributions focusing on actors. It appears that almost all of the overall slight increase of focus on actors in recent research is due to more studies investigating citizens as the main actors in eParticipation processes. Such a finding is in line with the rise of research interest on citizen-initiated eParticipation that would be expected as a consequence of the diffusion of web 2.0 applications occurred in the last five years. Web 2.0 applications, such as social networking services (SNS), wikis, and blogs, can in fact be argued to have the potential of putting the citizen as user of government services at the centre of ICT-enabled participatory processes [11]. Our analysis can provide some evidence of this shift, even if it is still in its nascent phase. On the other hand, surprisingly few contributions focus specifically on the design, adoption, management, and use of web 2.0 tools in an eParticipation setting. Most of the studies still investigate, for instance, traditional institutional websites and government-run discussion fora. Overall, a large part of the body of research appears to still reflect a top-down approach to eParticipation that has government, and not citizens, as the main focus.

Moreover, it is worth noting that there is a persistent neglect of the role of researchers and scholars in eParticipation activities. The design phase in eParticipation initiatives, as an example, is crucial, and there is little doubt that researchers can play an important part in it [12]. Moreover, the benefits of adopting an engaged scholarship perspective in research [13], by involving practitioners and stakeholders in the research process, especially in research on IT in government [14], should clearly trigger the need to include researchers as a key actor in eParticipation activities.

5.2   eParticipation Activities

Focus on eParticipation activities, overall, has decreased. Within this focus, studies on eActivism, eCampaining and ePetitioning are still at the periphery of the body of research on eParticipation activities. The focus on online political discourse and online decision making has decreased in both absolute and relative terms in recent years.

The sample analyzed shows that the use of ICT for voting purposes is receiving increasing attention. While other "E"-political activities (activism, campaigning, petitioning) further decreased their already weak focus from research, eVoting appears to be the only eParticipation activity that has increased its appeal to researchers through

time. Nevertheless, it is to be noted that the majority of the contributions on eVoting consist of design proposals for voting systems, while only a few are research contributions in a strict sense.

5.3 Contextual Factors

The number of studies focusing on contextual factors affecting eParticipation has remained identical, with 42 contributions focusing on this aspect in the two periods compared. The main change occurred in time has been the concentration of almost all contributions that deal with contextual factors on the role of underlying technologies, and of governmental organization, at the expense of all other factors. In the first period of eParticipation research a number of independent variables was explored in the literature to a more balanced extent. The impact of a wider range of factors was focused on, including policy and legal issues, information availability, infrastructure, and accessibility. Through time, it is striking to see how aspects such as accessibility and information availability have disappeared from the research agenda, leaving room for contributions focusing only on how technologies and governmental organization as independent variables affect eParticipation processes.

This steady strong focus by researchers on the role of government in eParticipation is in line with findings related to research on key actors as outlined above, and highly relevant as far as the discrepancy between these findings and the growing visibility of the web 2.0 discourse is concerned. Again, it seems as the increasingly popular stress on the central role of citizens as users, that many see as brought about by the concept of web 2.0, does not match the actual research focus of eParticipation.

5.4 eParticipation Effects and Evaluation

The most dramatic shift in the overall research focus has occurred in relation to the study of eParticipation effects and to eParticipation evaluation. First, the share of contributions focusing on eParticipation effects and evaluation has grown remarkably in the last five years. Second, the distribution of focuses within this share, which mainly concentrated on civic engagement effects, is now much more evenly balanced, with different types of evaluation studies and different types of eParticipation effects focused on to comparable extents.

As far as effects are concerned, recent research shows a vast increase of the share of contributions focusing on the deliberative effects of eParticipation, which was neglected in previous years. There has been a shift of focus from the sheer amount of participation towards a deeper insight into the impacts of ICT on the quality of democratic discussion. This can also be used as an interpretative key for looking at eParticipation evaluation research. The share of contributions focusing on the evaluation of eParticipation has, overall, almost doubled. Within this share, studies focusing on quantity of eParticipation have decreased and, at the same time, there has been a remarkable growth of contributions assessing the tone and style of online activities. These two phenomena can be interpreted as two sides of a single trend: as the focus on deliberative effects increases, so does the use of methods of evaluation that assess the tone and style of online discourses occurring within deliberation activities. Last, a new category of studies evaluating the degree of transparency and openness of

eParticipation platforms has been introduced, to account for the emergence of this type of focus within the area of eParticipation evaluation studies. A relevant number of contributions focus on evaluating the extent to which eParticipation initiatives result in increased transparency and openness of actors, policies, and processes.

6   Conclusions

This article has provided an overview and a longitudinal analysis of the development of the rapidly growing research field of eParticipation, drawing on previous literature analysis work [5]. The analysis of the most recent literature contributions, based on 123 selected research articles from internationally acknowledged sources, has led to identifying the transformation occurring in the field, regarding research focuses and approaches. The choice of drawing on an existing framework of analysis of the literature provides the eParticipation research community with a first longitudinal analysis of the field, not only to capture the characteristics of this area in a given point in time, but also to enable a characterization of the field development through time.

Findings point out that, overall, the eParticipation research area shows great dynamism. The number of contributions in the field has grown remarkably, and encompasses a wide range of perspectives. The research agenda has changed in time, and it did so radically in some aspects. Some changes, in particular, are of counterintuitive nature, when compared with existing popular assumptions on the impacts of ICT on participation, and the transformation of democratic systems. This is the case, for instance, of studies on eParticipation activities, contextual factors, and effects. Such key areas, which represent the core of a research field, have experienced dramatic shifts. Some of them can be argued to be, to some extent, more predictable or less surprising than others.

The findings summarized in the previous section can be read as a basis for providing inputs to a research agenda, grounded on the gaps, trends and potentials of current eParticipation research.

Focus on a wider range of contextual factors beyond the technological ones

It can be argued that one of the indicators of the maturity of a research field is its internal balance between different focuses on actors, activities, contextual factors, and effects. In the eParticipation research field we are witnessing, overall, a move towards a more balanced distribution of focuses as far as these macro-categories are concerned. Within the domains of actors, activities, contextual factors, and effects, this is also happening as far as eParticipation effects is concerned. On the other hand it is striking to see how, within research on contextual factors affecting eParticipation, the field has moved from featuring a wide range of factors to focus on, to an almost exclusive focus on underlying technology determinants. While contributions often formally highlight the dangers of technological determinism, and call for a deeper, more sophisticated view on contextual factors affecting eParticipation processes, the large majority of studies that should do so have instead focused solely on technological determinants. Future research on eParticipation should revert this trend by including a stronger focus on important factors such as policy and legal issues, accessibility, and information availability. It is difficult to argue that traditional digital divide factors,

such as the role of infrastructure or of information availability, will not play a role in eParticipation in the near future. As eParticipation initiatives spread in different countries, research should make an effort in diversifying the array of contextual factors that can explain the success or failure of IT initiatives aimed at improving citizen democratic participation.

Encourage the shift of research focus from government to citizens and other stakeholders.

The array of actors focused in eParticipation activities is to be extended. With the emergence of Web 2.0 platforms supporting eParticipation, theoretically citizens have the potential of becoming the main actors of eParticipation activities. Collaborative platforms, such as wikis, the horizontal distribution of communication channels in social networking services (SNS), and the emergence of platforms based on user-generated content, ideally make it easier for citizens to coordinate, communicate, produce, and share political power vis-à-vis the traditional government institutions dedicated to decision-making. The amount of research attention on these new types of grassroots participatory experiences has increased in the past years, but it is still largely lagging behind the mushrooming of initiatives that are occurring in the real world, and the exponential boom in popularity of tools that carry this potential, such as in the examples of Twitter, Facebook, and the likes.

Moreover, the shift of focus from top-down, government-led towards bottom-up, citizen-led eParticipation initiatives must be accompanied by an extension of the range of actors to be focused on in research. It can be strongly argued that no longer do only government institutions, politicians, and citizens form the triangle of eParticipation activities, but that there are also voluntary organizations, industry players, and researchers themselves that are an important part of eParticipation processes. The need for digital participatory processes to be as inclusive as possible increases with the increase in complexity of the policy issues to be decided upon, and with the spread of the access to the technological capabilities that enable them.

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Power and Participation in Digital Late Modernity: Towards a Network Logic

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Abstract. Through theories of mediatization it is commonly understood that political institutions and participatory practices adapt to the logics of mass media. Today the overall media and communication landscape is becoming digitalized. Technological processes of digitalization evolve in tandem with socio-cultural processes of reflexivity and individualization in late modernity. Thus politics and participation will be adapting to an increasingly digitalized and individualized media and communication landscape. This is a theoretical paper with an aim to critically analyze how contemporary media and communication landscape will influence practices of participation. Through the concept of network logic it is argued that users are disciplined into responsive and reflexive communication and practices of constant updating. As a result of this political participation will be more expressive and increasingly centered around identity negotiation.

Keywords: Digital Late Modernity, Identity, Network Logic, Political Participation, Power.

1 New Media, New Logics?

It is commonplace to claim the strong links between media and democracy. For example, the idea of media as a fourth estate suggests an understanding of media as an integrated part of democratic institutions and its practices, a component of the political system outside the official administrative realm [1]. Through concepts such as mediatization and media logic(s), it has been argued that media and politics no longer can be understood as two separate domains. Media is not only linked to politics and power, but described as sites out of which power and politics are exercised [2], [3], [4], [5]. This brings attention to a double-sided process in late modernity in which the media emerge as an independent institution with a logic of its own that political institutions have to accommodate to [3]. For example politicians have to adhere to the dramatization style in media discourses, the increasing prominence of short sound bites, visuals and entertainment formats [2], [4]. Hence, political life in its broadest sense has become situated within the domain of media [5]. Media logics thus shape

not only what gets taken up in the media itself, but also in politics, whose voices get represented and in what way [6].[1]

What is happening today is that the media, whose logic political institutions are supposed to adhere to, is changing profoundly. This paper focuses on technological processes of digitalization.[2] There is no doubt that the Internet has changed the media and communication landscape profoundly, both as a phenomenon in itself, and as a locus for established/ traditional mass media to migrate to. The Internet is already established as the main locus for mediated communication and socialization among the young in connected societies [7]. This leads to structural, architectural and social developments with its own significance beyond the technical aspects of digitalization [1], [6]. Not the least digital technology is in a dialectical relationship with socio-cultural processes of individualization and reflexivity in late modernity [8], [9], [10], [11], hence I use the term *digital late modernity* [12]. In other words, digital technology is influencing the way we live, socialize and digital technology is increasingly shaping the way things get done, providing access of information and providing us with new tools for arranging and taking part in all sorts of activities, encounters and social agency [6]. The question then arises what happens with politics and participation when digital technology is starting to claim a dominant position for communication, information and entertainment?

Developments towards a more interactive technology (often described as a web 2.0 or social media) are discussed by some to have far reaching consequences for economy, sociability and not least for politics and participation [13], [14], [15], [16], [17]. The Internet is conceived of as a remedy for all kinds of problem democracy is facing, not least the problem of declining participation in representative democracy [18], [19]. While the Internet no doubt opens up new avenues for engaging in politics, the contribution of this paper to the academic discussion is to put forward a critical perspective of digital technology. The argument is that digital technology disciplines us into certain kinds of behaviors. To conceptualize these relations of power manifested through processes of disciplining, I will outline a concept I claim is emerging in digitalized and late modern societies; *a network logic*. This paper is thus based on deductive reasoning; when the overall media and communication landscape change, media logics will also evolve, and then politics and participation will be adapting to new circumstances bringing about new types of political participation.

This rather deterministic argumentation where media precedes politics and participation is easily falsifiable in its simplistic and causal reasoning. For example it has been argued that the Internet will not change much when it comes to covering, framing and depicting politics, politicians and elections [20]. However media logics is not only about a causal lineage from media and communication platforms to political institutions. Even though political institutions have become increasingly dependent on

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[1] For empirical studies see Asp showed how the political system was influenced and adjusted by the demands of mass media and their coverage [21]. A more recent study of the German Parliament from show that the quantity of information related activities have increased sharply whereas the quantity of decision-making activities has remained fairly constant, indicating that politics are becoming increasingly dependent of media coverage [4].

[2] Digitalization should be understood in tandem with processes of deregulation of media ownership, globalization, an increasing number of channels to navigate, and at the same time a concentration of media corporations, increasingly driven by profit maximization [6].

the media, they continue in some measures to control politics and the power of state bodies is still felt in the various communication channels of the Internet [1], [3]. Hence, instead of establishing a causal lineage from media, communication and culture to politics and participation, it is more accurate to conceive of these as in mutual and dialectic relationships to each other [1], [12]. In this paper I will first have to establish the characteristics of new media and digital communication landscape before I can discuss what a new logic looks like and how this new logic is influencing practices of political participation.

2   Towards a Network Logic

To establish the characteristics of the emerging media and communication landscape I will turn to Leaning [1] and his extensive literature review on the definitions of so-called *new* media. He contends that what is often referred to as the *new* are greater possibilities for convergence, interactivity, continuity, digitization, content that is individually stored and individually produced, greater opportunities for interpersonal communication and more personalized forms of media content. The Internet, digital communication and mobile accesses to the Internet are often referred to when discussing new media. The Internet has now been around for over two decades, but what is often considered as new, is developments awarding greater interactivity, often referred to as web 2.0 or social media. O'Reilly [22] argues that if a website is going to be defined as social, the user must be able to contribute to the content on that site. The user will have the possibility to control his or hers information, and the design is supposed to be interactive. The definition of Social Networking Sites (SNSs from here on) is more elaborate. Ellison & boyd [23] defines them as different from other sites because they allow the user to articulate their social networks and making them visible to other users. SNSs are thus web-based services allowing individuals to create a (semi)public profile, connecting this profile to other users (often self-selected peers), whose contacts in turn will be made accessible by the service [23]. The major difference from older mass media platforms is the amount of activity demanded of the user. Traditional media are often used more passively, as a background channel feeding the user with information, entertainment or just company. SNSs require the user to be more active, actively search for the kinds of information, entertainment, friends and linkages he or she wants. In this way, the user is also taking part in producing information, entertainment and spheres for social interaction [24], leaving digital footprints behind that could be used for all kinds of purposes (such as marketing or surveillance [25]).

Virtualization of sociability is one consequence of contemporary adaptation to the new media and communication landscape, going hand in hand with an increasing domestication of social institutions and a de-territorialization of cultural experience and social interaction [3], [13]. Already Dewey [26] identified a movement away from the principle of territorial organization in favour of to what he called occupational organization. However, geographic location is still important for identification and socialization, even online, but geographically spread niche networks based in interest are made possible because digital technology makes it easier for like-minded to socialize from their home environments but over great distances [27]. This suggests one character of the emerging network logic that has been widely referred to, the

increasing possibilities of socializing with like-minded [13], [14], [16], [17]. The main outcome of increasing socialization along lines of like-mindedness rather than geography is unlimited access to culture and content of all sorts [13]. This in turn implies a different and more complex connectivity, depending to a greater extent on cultural reflexivity [3]. For example, instead of passively receiving news, you may today chose/ tailor what news to be served and on what topics. The era of one fits all is thus proclaimed to have ended, and a market of multitudes emerging, with mass market turning into a market of niches, and mass culture turning into a massively parallel culture, in turn making it hard to tell where professionals leave off and the amateurs take over [13], [24].

However, we need to be given ways to find our niches, find like-minded with similar interests [13]. This is where the network enters the arena as an increasingly important filter through which we take part of information and conceive of the world. Through networks of peers and like-minded we reflexively organize our social life, interact with each other, share and get information. *Inter*activity and *inter*personal communication, which is celebrated as aspects of the newness of the Internet and digital communication, concerns activities and issues going on *between* people. This requires continuous communication. Given the increasing mobility of communication platforms and mobile access to the Internet through smart-phones, expressions and maintenance of network connections are taking place all the time, or at least have the possibility to take place all the time. I would thus argue that an important aspect of the emerging network logic is that it disciplines us to be constantly updated in the double sense of the word – to be updated of the doings in the network as well as update the network of our doings, thoughts and feelings. Livingstone's [27] study of British teenagers use of SNSs underlines updating as a central practice. If someone comments on a profile they are most likely will be commented back and therefore some teenagers spend hours going from one profile to another to leave comments, something Livingstone conceives of as a necessity on order to reaffirm one's place within the peer network. Referring to my students' media diaries, it seems that the mere risk of missing out of something pushes them to have their smart phones with them and turned on wherever they are 24/7. The network logic thus pushes us to be updated in a double sense.

Increasingly important characteristics of the emerging network logic must be *responsiveness* and *connectedness*. This is illustrated in a study of the cell phone where informants claimed that the phone enriched their social life, furthering opportunities for self-expression at the same time as managing and remaking relationships with friends and family [28]. On SNSs more prominence is put on so-called *friends*[3] and links to others than on the text being produced [29]. Less space is allowed for actual text than links to others. What seems to be at stake is the position within the peer network [27]. Hence, on SNSs, the most important list is the list of friends and the point of social networking is to establish and demonstrate linkages and connections, rather than to engage in dialogic communication [29]. The larger the network the more secure the individual. And today large networks are possible because of digital technology such as e-mail, text messaging, SNSs and smart-phones. People are continually in touch because technologies even

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[3] Friend is becoming an increasingly non-sophisticated way of labeling visible contacts online as Livingstone [33] points out.

stand in for us, leading to a kind of connected presence in which we are constantly contactable. Hence Miller [29] proclaims content is not king, but keeping in touch is, further underlining connectivity and responsiveness as important values in the emerging network logic.

The urge to manage lists of friends and linkages to others will lead us to a shift from the narrative as a key form of cultural expression to the database as the prominent cultural form in digital late modernity [30]. Databases are always in progress and thus the management of them can never be finalized [30], and digital technology enable communication among an ever-widening circle of contacts [27]. Hence the emerging network logic disciplines us to build and maintain our networks and possible surfaces of contact. Digital technology enable/disciplines us to codify, map and view relational ties between ourselves and others [27]. The web has thus become an endless and unrestricted collection of texts, images, data records, sound bites, whose purpose it is to efficiently store and retrieve for potential later usage [29]. Foucault [31], when outlining the different characteristics of power in what he labels disciplinary society,[4] refers to the power to extract and make use of knowledge from individuals and about individuals. Today when we freely engage in this surveillance on SNSs, the possibilities of this type of power are multiplied and thus the possibilities for database management also increases.

Intertwined with the increasing importance of managing and sustaining our networks through practices of updating, the network logic underlines processes of identification and reflexivity, resonated in theories of late modernity [8], [9], [10], [11]. A continuous emphasis of the self as something that can be managed, is put upon the individual to such a degree that the self becomes a *reflexive* project [10]. The question *who are we* arises at the end of the 18th century [32]. Supervision in this time of reflexivity is carried out at the level of what one *is* rather than what one *does* [31]. It thus seems that the late modern self, anxiously trying to confirm who she really is, uses digital technology to both monitor her identity as well as reaffirming it in front of selected others/peers. This takes the form of reflexive connectivity and reflexive responsiveness when making links to other users public (as well as causes, organizations, brands) and hence freeloading on their supposed connotations, connotations to which we whish to tie images of our selves [33]. Individuality is then both fostered, and dependent on the network since we most likely will be ignored without network visibility with references to other users.

Through digital technology we negotiate ourselves, and the other is incorporated into this negotiation, underlining a form of networked individualism [34], particularly illuminating for understanding the practice of linking the self to different users and networks in digital late modernity. Social networking online is becoming an integral means of managing one's identity, expressing who you are to others [27]. Hence, being updated (in the double sense) is as much about the self as it is about the other, the collective or rather the network. As Livingstone's [27] study show, British teenagers tend to foreground their links to others, expressing a notion of identity lived through managing authentic relationships. Hence online communication is not so much about narcissism as it is about embedding the self within the peer group [27]. We are thus dealing with identity through connectivity. Digital technology has enabled individuals to act as social

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[4] This refers to a society that emerges n the late 18th century beginning of 19th century.

switchboards, centre points for multiple changing and overlapping networks of interaction. Already Dewey [26] pointed out that the individual could not be understood without considering his associations with others. Similarly Arendt [35] underlined the presence of others to assure us of the reality of the world and ourselves.

We should thus not underestimate the disciplining effects of the new kinds of social practices online. It is almost as digital communication platforms pressure us to engage in continuous reflexive self-presentations, always ready to respond, connect and update. This is one reason to focus on a network logic in order to underline that these practices also carries with it a logic based in other kinds of norms and values to which we have to position ourselves. For example, blog norms and values gets revealed in policing practices of newbies who have to earn the personal respect of others through establishing their presence over time, demonstrating commitment to the community [36]. According to Foucault [31] we are in the midst of a disciplinary society, an age of social control that started at the end of the 18th century. What is constitutive of this society is that power is exercised through disciplining (and not through sovereignty), normalizing power and the knowledge-power formations that support these largely discursive practices. The control of individuals started to be performed by a series of authorities and networks of institutions of surveillance and correction (not only the judiciary) such as the police and the psychological, psychiatric, criminological, medical and pedagogical institutions [31]. Disciplining should thus be understood as increasingly controlled and rationalized processes of adjusting activities, communication networks and power relations [37]. Hence, power is a type of relationship *between* people, influencing others actions rather than acting immediately upon others. In other words, the exercise of power disciplines people to act in certain ways, in turn structuring the field of further possible actions [37]. These power relations are rationalized through different logics operating in different contexts. For example social control was used at the end of the 18th century in relation to the formation of capitalist society as a way to protect economic wealth [31]. The question here is what social control is used for in digital late modernity? How does the network logic discipline the users of digital technology, and into what kinds of behaviors? Preferred behavior online, to be successful on digital communication platforms, you need to master a slightly new form of sociability, through database and friend management and through constant updating, negotiating and maintaining an attractive self on as many stages as possible in order for peers to visit your digital profile, leave comments and reaffirm your identity(ies) [27]. This is a kind of power that reveals it-self in the continuous preoccupation with expressing and negotiating our selves and our positions, as well as interpreting others through the production, maintenance and sustenance of network visibility. Social control today would be the constant monitoring/ supervision of both oneself and others through practices of updating. Foucault's discussions of power can be applied remarkably well on digital communication platforms. He outlines a form of power that makes individuals into subjects, ties them to their identity by conscience and self-knowledge [37]. In other words the late modern reflexive subject is, following Foucault, a result of a form of power exercised upon it through surveillance that individuals willingly submit them selves to through practices of online networking.

Visibility and power has always been connected but in different ways across times [38]. When in antiquity the visibility of the few to the many was connected to power,

in modernity being watched was connected to a subordinate position of being disciplined, a more subtle normalizing power of the gaze (in schools, armies, hospitals, penal institutions et cetera). In digital late modernity we are all visible all the time through a type of connected presence. This resonates with Foucault's [31] well-known discussion of the *panopticon*.[5] We are objects of the constant gaze of others, but what is different today is that we are participating in this disciplining by free will in order to secure a place on the social arena and to negotiate an attractive self. In fact it is not all obvious whether being watched online and being used by others in their identity negotiation is exercising power or being subordinate to power. It all depends how skillfully the user navigates the new social arena and manages his or hers databases of friends and connections, how skillfully the user governs his or hers visibility in the different contexts and front stages digital technology offers. Foucault [31] underlines that the individuals over whom power is exercised are those from whom the knowledge they themselves produce are extracted and used in order to control them. The central question today is thus to decide what shall be public and to whom. This decision is to a large extent put in the hand of the everyday user of digital technology. At the same time the network logic disciplines us to self-revelations online in order to reaffirm ones position in the social arena.

Another way of illustrating power relations in networks is through the metaphor of a filter, a network of peers influencing our decisions. Anderson [13], who has theorized about Internet economy as a long tail of niche markets, summarizes the long tail in two principles, 1) making everything available and 2) helping us finding it. It is especially in the second principle relations of power comes into play. In the increasing buzz of information in digital late modernity, it is impossible to make an informed decision on what to choose. Life choices seem to be multiplying and the responsibility for making the right choices are increasingly put on the individual when modern institutions (family, church, social movements) looses in relevance. We are experiencing an ever-expanding range of elective identities that may be easily embraced or rejected. In other words we need guidance and this is one way our networks are increasingly influential, amplifying certain sites, while sorting out others since it would be impossible for us to process the value of all the different sites on offer [13]. The network thus works as peer power/ pressure, informing us about the variety of choices but also what others before us have done in similar situations.

The network function as a filter, as a group of peers guiding/ influencing us in our choices, and the network disciplines us to share our experiences and making our choices and visible to others (the constant updating), argued by some to lead to a self-endorsed surveillance society [25]. This is where I whish to return to the kind of reflexive expressiveness I have argued is the dominant rationale for our updating practices [12]. Also Anderson [13] discusses expressiveness as a motivator. Down in the tail where distribution and production costs are low, business considerations are often secondary. Instead people create for other reasons such as expression, fun and reputation [13]. Getting noticed is everything. Arendt [35] notices that the public realm in ancient Greece was reserved for individuality and thus permeated by a spirit where everybody had to distinguish him or herself. Hence she points at the inevitability in politics of men

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[5] Following Bentham, Foucault discusses a mechanism of surveillance where one can supervise the many.

disclosing themselves, though speech and action, as subjects, as distinct and unique persons. In my own work I have labelled expressive rationality as *the* motivational force in the digital late modernity [12]. With the increasing possibility of identity, a kind of do it your self-biographies emerges [27], [36]. In other words users of digital technology are becoming more self-expressive.

In conclusion, it is through a network logic of connectedness and responsiveness, users of digital technology are disciplined into behaviours of continuous updating and reflexive self-presentations. Following the analogy with media logics and mediatization presented in the introduction, it is to this though this network logic that politics and participation is supposed to adapt. In the next and concluding section I will situate the above discussion of the network logic more specifically in the realm of politics and participation.

3   Network Logic and E-Participation

When it comes to the de-territorialization of cultural experience and social interaction, digital technology seems to be accompanied with logics where not least placeless communication and mobility challenge the rather geographically bounded character of traditional political participation and sociability [6]. At the same time there seems to be a trend in a seemingly opposite direction, towards the local and neighbourhood. The domestication of social institutions afforded by digital media together with increasing reflexivity and blurring between boundaries of the public/ private dichotomy in late modernity, tend to underline single-issue engagement rooted in the local and everyday life experiences rather than in grand ideologies of modernity. Both these trends turn their back on the nation state as the defining boundary for political participation since participation in digital late modernity to a larger extent is organized around identity and lifestyle as Giddens' [10] concept *life politics* indicates.

The need to feel connected to an issue, evoking some kind of identity, has proven to be an important incentive for communication on websites set up by political institutions for civic deliberation [15]. This I argue will be increasingly the case since the network logic pushes us to share our experiences through processes of updating. Then our choices of arenas and topics for political participation will be carefully and *reflexively* chosen since it will be increasingly likely that we share our doings in different digital networks. Life politics demands a certain kind of self-reflexivity in terms of making conscious choices on what to engage in, since this will be visible online and surveilled by like-minded and peers. Late modern individualisation is thus not only about the liberation of the individual from social regulation in modern institutions (such as the family, church and social movements) but also a demand to supply our life stories, to import our selves into our biographies through our own actions (Beck & Beck-Gernsheim, discussed in Leaning [1]).

It has been claimed that in the market of niches and multitudes afforded by digital technology, it is hard to tell where professionals leave off and the amateurs take over [13], [24]. This points towards both a personalization and de-professionalization of political participation. De-professionalization applies mainly to the lowering of threshold for anyone to launch a life-political campaign digitally, organize an online

petition or engage and inform oneself in a reflexively selected topic.[6] Personalization relates to the salience of individual identity for making participation relevant as discussed previously. Personalization is also a trend in professional politics accompanied by the increasing use of SNSs [39]. The network logic seems to be push politicians to be more personal when appearing in different media and communication platforms. Not least it seems that personality is used as a resource for attracting participation and support, which could be understood in light of the increase of reflexive participation in digital late modernity. When identity management becomes part of political participation, people will more likely tie their engagement to attractive personalities, personalities they whish to connect their selves and their biographies to. Digital communication platforms increases the possibility of identity negotiation and management through displaying links to others and causes and their supposed connotations, further underlining and pushing for reflexive do-it-yourself-biographies as part of participatory practices [33], [36].

The peer-network Livingstone [27] underlines in her study of British teenagers is also at work in political networks. My own study of a politician's use of SNSs indicates that politicians are more likely to comment among each other and within the party community than with outsiders and potential voters, even though this often is the explicit aim when using SNSs [40]. This confirms Millers [29] conclusion that the point of social networking is to establish and demonstrate linkages and connections, rather than to engage in dialogic communication. This also contradicts the utopic visions deliberative democrats have projected on the Internet under web 2.0 with its promise of interactivity [18], [19]. Surely people interact online, but this interaction seems to take place among like-minded to a larger degree than with people of diverging opinion.[7] What we witness online is rather identity through displaying connections with peers than rational communication towards consensus. It thus seems that the late modern self, regardless if it is a politician or a teenager, is anxious to confirm who she really is and thus uses digital media to both monitor her identity as well as reaffirming it in front of selected others. In other words participation in general is becoming more self-expressive.

One implication on political participation of values of connectivity and responsiveness through practices of updating would be that we tend to reveal our political interests to a larger extent in digital late modernity. An American study from the 2008 presidential campaign showed that 20 percent of the survey sample had discovered the political interests of their friends by using SNSs [42]. This seems to counter Eliasoph's [43] well-known ethnographic study of American volunteers, where she contends that people tend to avoid politics. Through a network logic, where updating and sharing practices are highly valued, users are to a less extent shying away from making their political opinions visible to others in the network. Not only will we monitor and classify our connections (friends) online, we are also making ourselves subject to surveillance through displaying our selves, life choices and political preferences. In this way the information we share may be used to target information to us, not only

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[6] When it comes to professional politics the increasing use of spin-doctors and communication advisors rather points towards professionalization of politics.

[7] Sunstein [41] claims this leads to in group polarization rather than consensus.

for commercial purposes, but also for political spin, for professional political campaign strategist to tailor messages to specific target groups.

We use the Internet as a database of texts, images, data records, sound bites, and sometimes store this for later usage [29]. When participation move online, websites are envisioned and designed as resources for its users to access and become informed about the various political perspectives and plans in our surroundings and spheres of interest [15]. In other words governmental, NGO and activist websites are not only used as tools for reflexive identity management, but also often supposed to function as databases for information gathering. Arguably one consequence of subscribing to newsletters, e-mail lists, joining facebook groups and linking our online personas to different reflexively chosen causes and politicians, is that we may potentially become engaged and participate when proposed actions fit with our life stories and can be combined with our every day life.

In this paper I have discussed the emerging network logic and how it intersects and work in tandem with evolving participatory practices online. When media and communication landscape change, participation will also evolve since media, communication and political participation are mutually dependent on each other. Digital technology is no doubt a wonderful thing, connecting people across the globe often lowering the threshold for political participation. However the emerging media and communication landscape is not free from relations of power. Therefore as critical scholars we need to attend to how the network logic disciplines users in different ways, favoring certain behaviors over others. Though we should be somewhat careful with an all-encompassing detached network metaphor. We operate in many different networks at the same time, where somewhat different logics dictate because of different contexts [44]. Participating on an activist group's facebook page differs from participating in the mummy group online, even though the two groups may consist of largely the same persons. Digital networks and online interactions should also not be exaggerated over relative positions and field specific capital in localized offline environment [44]. Hence, network logic cannot be understood without contextualizing in what social fields the network interaction takes place.

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Inform-Consult-Empower:
A Three-Tiered Approach to eParticipation

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Abstract. While most existing eParticipation projects have embraced the need for citizen engagement to achieve effective democracy, as of yet only limited success has been achieved. This lack of success stems from many challenges and barriers: in some cases, it is a lack of interest in policy issues and low levels of trust in politicians; in others, it is a lack of vision or awareness about the benefits of citizens participation inside the policy-modelling process. This paper describes a three-tiered approach to eParticipation based on a multi-stream policy-making model with three levels of participation: Inform, Consult, Empower. This approach focuses on the level of participation by the user: what are the goals of participation at each of these levels and how do each of these levels of participation relate to current policy-modelling practices. The Puzzled by Policy project will adopt and implement the Inform-Consult-Empower approach, which shows how the social complexity barriers, political culture barriers, technological barriers and organizational structure barriers can be reduced in order to provide effective participation. A use case of how this model will be used to engage Spanish citizens with immigration policy is presented.

Keywords: policy-modelling, eParticipation, three-tiered approach, inform, consult, empower.

1 Introduction

In current recessionary times the general public's trust in governments is at an all-time low. Attributes such as transparency, openness and accountability are imperative to rebuilding confidence in policy-makers. However for the average citizen, locating, accessing and using up-to-date information, resources and tools can often be very difficult – leaving many citizens unsure about the key regional, national, European and international policymaking issues or even how to begin to understand them. Over the past decade, many governments have attempted to tackle this democratic deficit

by funding a wide-ranging series of eParticipation projects aiming to broaden and deepen political participation by providing online platforms for citizens to connect with one another and to their elected representatives and governments.

Macintosh [1] characterised three levels of participation that can be used to characterise e-democracy initiates:

- e-enabling (inform) – supporting those who would not typically take advantage of the large amount of public data available,
- e-engaging (consult) – consulting a wider audience to enable deeper contributions and support deliberative debate on policy issues and
- e-empowering (empower) – supporting active participation and facilitating bottom-up ideas to influence the political agenda.

The first wave of eParticipation projects have not been as successful as initially anticipated, with slow uptake from policy actors. This is somewhat surprising, as many studies have investigated and shown that there are many benefits of citizen participation, including tapping into local knowledge and innovation, reducing or avoiding conflict, mobilising new resources including voluntary labour, reducing transaction costs, increasing social inclusion or cohesion and generating trust and social capital [2]. The limitations that have tended to prevent pan-European projects from reaching a mass audience include a lack of interest in policy issues or politics, low levels of trust in politicians, a large and diverse range of policy actors, varying levels of technical skill, a lack of integration of eParticipation strategy into actual government organisation structures, language difficulties and privacy issues [3]. What is evident with many of these barriers is that they are for the most part not technical obstacles, but barriers that apply to participation in the broader sense of the word. The reasons that deter citizens from participating online are common with those that deter citizens from participating offline. This would suggest that there is too much expectation on eParticipation to be the silver bullet of citizen engagement; that there exists a misconception that the use of Information and Communication Technologies (ICT) will alleviate the standard barriers to participation, engage a wide range of citizens and have a direct impact on the policy making-process.

As this has proven not to be the case, the community must reassess eParticipation: what are realistic goals and achievable aims for it? In order to propose how ICT can actually be of benefit to citizens and policy-makers alike, it is important to understand the intricacies of policy modelling itself. In this paper, we revisit the three levels of participation identified by Macintosh and describe how each of them relates to existing policy-modelling processes. In this way, it can be seen that informing, consulting and empowering are each admirable achievements in their own right for an eParticipation platform, in terms of the policy actors involved.

We propose a three-tiered approach, which offers the policy actor all levels of participation in a realistic and achievable setting. The Inform-Consult-Empower approach described in this paper also recognises that citizen engagement is an iterative process; initially policy actors are more likely to want to simply find out information about policies than to discuss them; once informed, policy actors are more likely to want to discuss policy topics than to propose new ideas or drive policy change. At the same time, by providing eParticipation platform designers with a clear outline of the feasible impact each level of participation may potentially have in the policy-making

process, as well as their limitations, the resultant platforms should not confuse or mislead users in any way. On the contrary, the platforms should be built in such a way to address users' expectant level of participation, while guiding them to a higher level of participation if they so wish. A use-case of the Inform-Consult-Empower approach in action is the '*Puzzled by Policy: Helping you to be part of the EU*' project[1] which aims to provide policy actors with an engaging and easy-to-use platform based on the three-tiered approach presented in this paper, so that they can learn about and engage with policy issues. While the project is not yet mature enough to deliver an overall evaluation of the approach, how the approach is being adopted and implemented in the project will be described.

The remainder of this paper is organised as follows. In section 2, evolutionary and existing policy-modelling paradigms are presented, along with how citizen produced content or knowledge can be utilised. Section 3 provides an overview of barriers and benefits of eParticipation.   Section 4 describes the Inform-Consult-Empower approach for eParticipation inline with the multi-stream policy-making paradigm, showing how each of the tiers of this approach relates to a multi-stream paradigm. Section 5 explains how the Inform-Consult-Empower approach will be implemented in the context of Puzzled by Policy. Concluding remarks and future work are provided in Section 6.

2   Policy Modelling

Policy formulation is a complex process involving many factors over a potentially long period of time. In the political and social science domain, many models have been proposed to capture the policy inception, implementation and evaluation process. Lasswell's policy stage model [4], also known as the linear model, breaks down the policy process into distinct, sequential stages and is regarded as the 'traditional textbook approach' to policy modelling [5]. The stages that Lasswell defines are: identification of policy problems, agenda setting, formulation of policy proposals, adoption and legitimisation of policies, implementation of policies, and evaluation of a policy's impact.

The policy stage model has been commended, as it emphasises a process of policy making that cuts across and bridges various institutions of governments, it takes policy outcomes into account and, by reducing the intricacies of policy making to manageable analytic units, it has provided an array of useful stage-focused research, particularly regarding agenda setting and policy implementation [6]. However, it has also received criticism from modern-day social scientists, due to the oversimplification of the model into a series of rational steps. Porter and Hicks [5] claim that in the real world, events seldom unfold in this neat, ordered fashion and policy decision making rarely follows this pattern. Another drawback of the stage model is that it assumes that the only actors involved in the policy modelling process are the 'policy elites' or those individuals who are considered to be 'government officials' [7]. This is a limiting factor as many instances of policy creation or change actually involve actors external to the official policy or government apparatus.

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[1] www.puzzledbypolicy.eu

Kingdon [8] proposes an alternative policy model to the stage model based on the garbage-can model: the agenda-setting or multiple-stream model. The multiple-stream model separates the policy-modelling process into the problem stream, policy stream and political stream, as shown in Fig. 1. Kingdon suggest that it is only when these three streams come together at a given point in time, known as the policy window, that policies appear on a government's agenda and have a chance of being implemented.
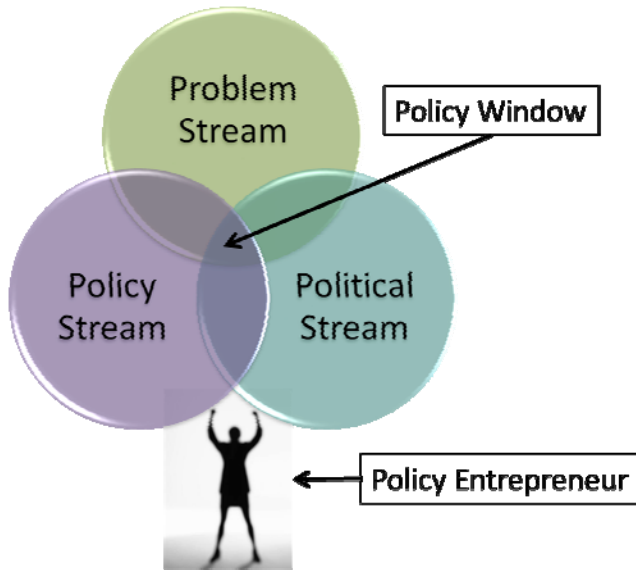
Fig. 1. Multiple Stream Model

The problem stream contains problems, where problems are seen to be social conditions where there is a recognised need for change. Arguments must be made and accepted that a negative social condition is attributable to causes within human control (and not simply a matter of fate or a fact of nature) and amenable to government solution before it can become a problem for public policy [5]. The policy stream (also known as the solution stream) includes potential new ideas that will be tested for feasibility, acceptability and relevance. The multiple-stream model implies the possible existence of policy proposals or solutions, without the existence of a particular problem. In such cases, policy actors may try and identify policy problems to add leverage and support to their proposals, thus pushing these problems onto the agenda. The third component in the multiple stream model is the political stream, which denotes the national mood, organised political interests and the government itself; that is to say the dynamic and often unpredictable elements that will ultimately determine if a problem and a policy alternatives will appear on the government agenda.

According to the multiple stream model, it is only when a problem has been defined, a solution has been identified and the political conditions are right, that the policy window appears, i.e. the time period where the proposed policy is on the

political agenda, i.e. there is the possibility for an actual policy creation or change. However, should any of these components shift, the window of opportunity may close, for example if key actors change, if the event that caused a change in national mood passes, or if no ready alternative solutions are available.

The final factor in the multiple-stream model is that which actually makes the connections between the three streams: the policy entrepreneur. Most case studies of policy formation pinpoint someone or a small set of people who were central in moving a subject up on the agenda. They are advocates who are willing to invest their resources in return for some anticipated future benefits [5]. Successful entrepreneurs may have expertise or political connections, but it is their persistence and tenacity that more often than not results in their policy of interest getting onto the government agenda. They are ready to strike as soon as a policy window opens and may even encourage the opening of a policy window through strategic promotion and campaigning.

The multiple-stream model is more-widely accepted than the linear approach, as it reflects the loose-coupling of real-world policy making and it accounts for the human element of the process. Running parallel to policy models are many questions. For example who defines the problems, finds the solutions and shapes the political arena? What knowledge are these problems and solutions based on? In the following three sections, we will explore these questions.

2.1 Policy Actors and Networks

The human element is at the core of the policy modelling process. While a policy entrepreneur may drive a particular policy change, many individuals, groups and networks contribute to the overall process. Groups that are outspoken and proactive about identifying policy problems, suggesting solutions and attempting to place their views on the agenda table are parties within government, interest groups, researchers, NGOs and the media. These individuals or groups may form networks around particular issues, knowledge-sets or policies.

2.2 Knowledge Generation

Knowledge is what shapes the beliefs and drives the decisions of policy actors and networks. Therefore it is important to investigate where and how is this knowledge produced and how is it used in the policy process. Jones [9] highlights the areas presented as key sources of knowledge for policy: research, process, participation and interdisciplinary. Research refers to the creation of high-quality knowledge by experts in the field, for example universities, research institutes, or consultancies. Secondly, Jones presents the process or experience of project and programme implementation as being in itself a source of knowledge for future policy. What is important in this strategy is to monitor and evaluate progress, so that the causal chain of inputs, outputs, outcomes and impacts can be identified and learned from.

The third source of knowledge put forward by Jones, which is related to the central theme of this paper, is citizen participation. He states that there is a great deal of work which advocates for citizens to either be directly involved in generating knowledge for policy or be invited to participate in policy spaces, hence incorporating evidence which reflects their voices on policy issues. While government accountability is

considered as one of the main grounds for facilitating citizen participation, there are also theories that citizens' experiential knowledge of social issues hold a legitimate and worthwhile perspective and that voicing of that experiential knowledge and personal perspectives bring a new and autonomous discourse to the policy process [10]. On the other hand, the validity of local and indigenous knowledge is often disregarded. Jones also highlights the possibility that engaging citizens may only be tokenistic in nature, or that participatory techniques may serve to reify local culture and reaffirm the agendas of local elites.

Finally Jones presents knowledge generated from multiple and interdisciplinary sources. For complex policy problems, knowledge that is cross-disciplinary and from a variety of sources is required, such as knowledge from those sources mentioned above, combined with values, political judgement, habits and tradition and professional experience and expertise.

2.3   Knowledge Utilisation

There has been much research into how and to what extent knowledge, as described in the previous section, is used in policy modelling. In her work on knowledge utilisation and decision-making, Weiss [11] identifies seven models of research utilisation: knowledge-driven; problem-solving; enlightenment; political, tactical; interactive; and intellectual enterprise.

While the knowledge-driven and problem-solving models of research utilisation may seem like logical approaches for knowledge utilisation, they are somewhat inline with the thinking of the policy-stage model described earlier, in that the identification of a social problem or a need for data will precede knowledge generation. However, we have seen that this is often not the case in real-life scenarios, where policy-modelling is a complicated and political process. The production of high-quality data does not necessarily induce policy or programme change. Therefore it is the enlightenment model of research that has gained considerable attention and agreement within the knowledge utilisation literature.

Weiss' enlightenment model illustrates the idea that knowledge gained through research can enlighten or broaden the existing knowledge base of policy makers which, over time, can create a gradual shift of conceptual thinking and, therefore, the policies which support that conceptual thinking [7]. We would also argue that, not only policy makers, but the citizens themselves could be more enlightened or 'informed' through existing knowledge. This is a more realistic research utilisation model, as it facilitates a trickle-effect influence of knowledge on the policy process, from many sources, on many actors, over a period of time. We are also of the opinion that the enlightenment model is also inline with Kingdon's multiple-stream model, as the build-up of knowledge through the 'enlightenment' process may at some point induce the opening of a particular policy window.

3   Citizen Participation and eParticipation

It is widely accepted that engaging with citizens is not only desired but required for effective democracy and ultimately policy-making. A literature review funded by the Home Office's Civil Renewal Unit [12] found the following sorts of benefits cited for

participation in policy-making: improved governance, greater social cohesion, improved quality of services, projects and programmes and greater capacity building and learning. Despite these benefits, there remains a slow uptake of citizens to participate in the policy-modelling process. As part of the OECD Focus on Citizens report [3], governments were asked to report a number of reasons for people not wanting to participate in policy making, even when they do not face any particular external barriers. The results are shown in Fig. 3. It was claimed that a staggering 78% have a low interest in policy and/or politics and 48% have a low trust in how government uses citizens' input.

(% respondents ranking the option as "important" or "very important".)
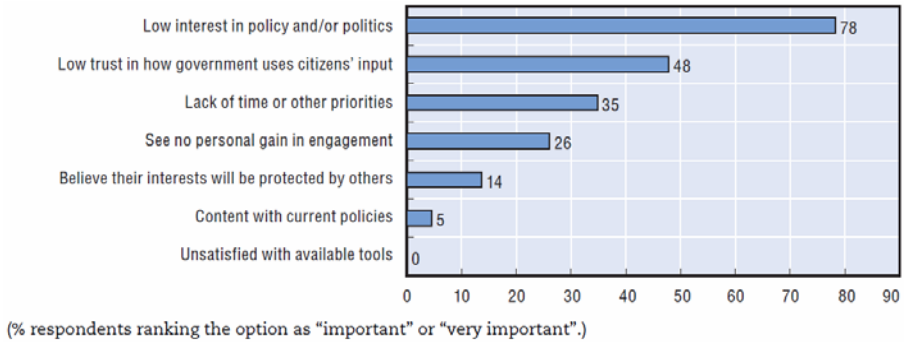
Fig. 3. Why don't people participate? (% respondents, n = 25 countries) [3]

The barriers to citizen participation have also been studied extensively by the eParticipation community. It follows naturally that many of the barriers to offline participation are common with those barriers to online or eParticipation. This is evident from Macintosh's synopsis of the barriers and challenges of eParticipation [13], which are categorised under: social complexity, political culture, organisational structures, technological dependencies, understanding eParticipation.

Social complexity refers to the large and diverse range of policy actors, with varying levels of education, political interest and technical knowledge. There may also exist physical barriers to participation for people, for example physical disabilities, or living in remote, rural areas. Political culture refers to the lack of trust in politicians and governments and a lack of trust that citizens' input will be taken seriously. A lack of commitment from policy-makers in the citizen engagement process helps to fuel this impression of distrust. Organisational structures refers to the lack of integration of eParticipation into routine, government structures and policy processes. Technological dependencies refer to the myth that technologies alone are the silver bullet solution to all citizen participatory problems. In order for eParticipation to be effective, technologies must be integrated into a broader adaptation of government-citizen relationship building. Language difficulties and information management issues are also barriers to adoption. Finally, understanding eParticipation refers to the fact that eParticipation is still a relatively young research area that requires systematic and comprehensive study and evaluation in order to understand its intricacies.

4   The Inform-Consult-Empower Approach

In section 2, an overview of the state-of-the-art of policy modelling and knowledge utilisation in the policy-modelling process was presented. Section 3 provided a brief overview of participation and the main barriers to its adoption. So where does the relatively new discipline of eParticipation fit into the well-established policy-modelling field? For many current eParticipation projects, one of the main goals is usually to influence policy-makers and have an impact on policy [14]. However if we look at Weiss' seven meanings of use and Kingdon's multiple-stream model, we see that in real-world policy-modelling processes, it is not as straightforward as generated knowledge immediately forcing a policy change. It is far more likely that knowledge may exist for a period of time, without being linked to a particular policy problem. According to the enlightenment model, knowledge may feed a policy maker's knowledge base, which may ultimately contribute to a shift in conceptual thinking and potentially a change in policy. We build on this theory by proposing that not only does existing knowledge inform policy makers, but it may also inform any actor, group or network with a stake in the policy process.

Based on these findings, in this paper a three-tiered approach is proposed: the Inform-Consult-Empower approach. This approach is inline with the multi-stream policy-making model and, as such, offers policy actors the opportunity to participate in an appropriate and achievable setting. Table 1 describes how each of the tiers in the Inform-Consult-Empower approach relates to the multi-stream model and hence what impact each level of participation can expect to have on the actual policy-making process. As stated previously, the Inform-Consult-Empower approach is structured iteratively: participating at the Inform level is the most straight-forward and requires the least amount of interaction from the user, participating at the Consult level requires more of a time and deliberative commitment from a user, whereas participating at the Empower level requires continuous contribution and in-depth deliberation.

It can be seen that through participation at the Inform tier (e-enabling) policy actors are enlightened by existing knowledge, thus broadening their own understanding of a domain. At this tier, it is also possible to identify what topics are of most interest to users and thus may require policy change, by analysing how a user interacts with the eParticipation platform. These topics may be considered to be in the problem stream. Through participation at the Consult tier (e-engaging), policy actors discuss and deliberate with each other on existing issues (top-down consultation). Frequently visited issues, or those with many contributions, may give an indication of what topics are important to policy actors and are therefore in the problem stream. Through discourse, policy problems may be refined and potential solutions may be discussed and tailored, adding them to the policy stream. Proposed solutions may also be associated with problems that they were not previously associated with. However in order to participate at this tier, the user is expected to have some knowledge, albeit basic, of the knowledge domain. Through participation at the Empower tier (e-empowering), bottom-up, or citizen-initiated, issues and ideas are facilitated. New issues identified by policy actors may be added to the problem stream and new ideas or solutions may be added to the policy stream. Empowered users are very active and may potentially be

committed to participating in the long-term. This places them in an ideal position to become policy entrepreneurs: those that are central in moving an issue up on the agenda and may even encourage the opening up of a policy window.

Table 1. How the Inform-Consult-Empower approach relates to the multi-stream model

Tier	Relation to multi-stream model	Description
Inform	Knowledge utilisation	Existing knowledge is utilised by stakeholders to broaden their knowledge base.
	Problem Stream	Users' behaviour and preferences may be analysed to highlight popular issues.
Consult	Problem Stream	Popular issues, where there is a potential need for change, are highlighted through deliberative debate between stakeholders
	Policy Stream	Potential solutions for these issues are highlighted through deliberative debate between stakeholders.
Empower	Problem Stream	New discussion topics may be introduced by the user.
	Policy Stream	New solutions or policy-ideas may be introduced by the user.
	Policy Entrepreneur	Stakeholders may become, or be guided on how to become, policy entrepreneurs; those who were central in moving a subject up on the agenda and potentially opening up a policy window.

The Inform-Consult-Empower approach also serves to address many of the eParticipation barriers categorised by Macintosh [13], (see section 3). Social complexity barriers, such as a large and diverse range of policy actors with varying levels of education, political interest and technical knowledge, are diminished, as there are no requirements on who a user is or what they should know before they participate for the Inform-Consult-Empower approach. Political culture barriers such as a lack of trust in politicians and governments and a lack of trust that citizens' input will be taken seriously may be overridden by the fact that at each of the tiers, involvement of policy-makers themselves is not required. The aim of the approach is to inform policy actors and to add issues to the problem stream and solutions to the policy stream. If there is enough interest and deliberation around a certain topic, the topic may be pushed onto the policy agenda and a policy window may open. Organisational structure barriers refers to the lack of integration of eParticipation into routine, government structures and policy processes. The Inform-Consult-Empower approach directly addresses this barrier, as it is designed inline with current policy-modelling processes, with feasible goals. The approach also alleviates the dependency on technology, by

focusing the emphasis of eParticipation on the level of participation by the user, what are the goals of participation at each of these levels and how do each of these levels of participation relate to the policy-modelling practices. Finally we believe that structuring eParticipation according to a common approach enables all policy actors to have a better understanding of the goals and limitations of the eParticipation domain.

5   Implementing the Inform-Consult-Empower Approach: Puzzled by Policy

The Puzzled by Policy project, which was started in 2010 and will run until 2013, aims to bridge the gap between policy makers and citizens by actively engaging citizens in the policy–making process using the Inform-Consult-Empower approach. The following points outline how the approach described in this paper will be implemented in the Puzzled by Policy project:

- **Inform** – The 'test where you stand' personal, profiling approach, which became so popular during the Obama campaign and the UK general election in 2010, will be employed so that users will be able to find out where they stand in relation to a specific policy. Hence, an easy-to-use policy profiling application, comprising of a set of questions and answers related to a specific policy will be made available. This will enable users to assess, understand and position their views against the policy in a fun, easy and engaging manner.
- **Consult –** Puzzled by Policy will facilitate the consultation phase by delivering a visual debating-forum where users can view opinions of other policy actors and, if they wish, contribute to the debate. The online debate will make learning about and debating policy more accessible than ever before.
- **Empower** – Through collaborative debate, specific topics of interest may emerge, communities may form around issues and policy entrepreneurs may be empowered to petition for that cause. If decision makers are involved in the debate, other stakeholders will be able to give feedback, thus establishing a two way communication channel between citizens and policy makers.

Another important accessibility aspect of the Puzzled by Policy platform is that it utilises widget technology to automatically 'push' the platform to popular social media platforms across Europe. Effectively, this means that we bring the platform to the users rather than trying to attract users to the platform.

5.1   Case Study: Immigration Policy in Spain

Designing and preparing a strategic real-life scenario is key to ensuring that the Puzzled by Policy project achieves its goals. In this context, immigration policy in Spain is investigated. The theme of immigration is growing in scope and complexity and is having a serious impact on the European Union and its Member States [15]. Therefore it features prominently on their political agendas. Spain has become a host country ranked tenth in the world in terms of numbers of immigrants and the first source of remittances in Europe, where citizens have already demonstrated their concerns [16].

In the years of expansion, immigration policy had a positive impact on Spanish foreign policy: it revitalised bilateral relations and built an image of an open Spain prepared to share its economic growth with citizens of other countries. However, since the burst of the financial crisis, the Spanish government has progressively transformed its immigration policy in order to decrease the numbers of immigrants. This shift has opened a debate [17], which provides an ideal playground for policy actors to express their views and suggest solutions. On this basis, Puzzled by Policy can provide insights and opportunities to actively engage all policy actors. More specifically, the Inform-Consult-Empower approach, upon which Puzzled by Policy capitalises, can be applied in the case of immigration policy debates in Spain as follows:

- **Inform:** Use Puzzled by Policy's profiling tool to help all policy actors (citizens, policy-makers, researchers, NGOs, immigration associations/observatories and the media) to better understand EU immigration policies and find out what particular policies mean to them on the national level.
- **Consult:** Use Puzzled by Policy's visual debate forum to debate and share opinions on hot immigration policies, such as 'the voluntary return plan', thus giving voice to minority views and drawing out unspoken opinions.
- **Empower:** Use Puzzled by Policy's visual debate forum to connect all policy actors, thus helping decision makers at both the national and EU level to understand the impact of their decisions on society.

6   Conclusions and Future Work

This paper described a three-tiered approach to eParticipation based on a multi-stream policy-making model with three levels of participation: Inform, Consult, Empower. The Inform-Consult-Empower approach focuses on the level of participation by the policy actors. Different types of policy actors have different goals and benefit differently from their engagement in any of the three tiers. The Puzzled by Policy project is implementing the Inform-Consult-Empower approach in order to promote social inclusion and mass civic engagement in policy making through the delivery of the Puzzled by Policy platform. A policy profiling application and visually-enabled debate forum will allow connect policy actors and will enable the average user to be informed (Inform), share knowledge and opinions (Consult) and pursue a particular issue (Empower). The use of widgets will allow users to participate through their favourite social media platforms, thus removing technological barriers and steep learning curves. Concluding, the experience gained during the design and implementation of the Inform-Consult-Empower approach reveals that the main challenges to be faced are not technical, but rather socio-political. In this context, Puzzled by Policy engages the policy actors from a very early stage in the design and the development of the Puzzled by Policy platform to maximise the platform's uptake and ensure its sustainability beyond the scope of the project.

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Design Thinking and Participation: Lessons Learned from Three Case Studies

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Abstract. This paper examines how design thinking and serious games approaches can be used to support participation through the analysis of three case studies. Indeed we will analyze these approaches in three different contexts: (i) a state-owned multi-utilities company; (ii) a political party; (iii) an information system strategic committee. Our analysis framework relies on the concepts of "perceived usefulness" and "perceived ease of use" and we will use it to discuss the lessons learned. Our main finding is that these approaches really contributing in making complex and abstract matters more "tangible" and thus understandable.

Keywords: participation; design thinking, serious games, case study, perceived usefulness.

1 Introduction

In this paper we will examine how design thinking and serious games approaches can be used to support participation through the analysis of three case studies. Section 1.1 addresses the issues of wicked problems, with which most public policies deal, and how innovative techniques can help solving them. Section 1.2 then presents the Think Services approach, a combination of design thinking and serious games. In section 2 we will briefly present the contexts of our three cases studies: (i) a state-owned multi-utilities company; (ii) a political party; (iii) an information system strategic committee. In order to analyze these cases we will use a framework defined in section 3 and we will discuss the lessons learned in section 4.

1.1 Tackling Wicked Problems

According to [1] governments seek to encourage participation in order to improve the efficiency, acceptance, and legitimacy of political processes. They identify the main stakeholders of participation as citizens, non-governmental organizations, lobbyists

and pressure groups, who want to influence the political system, as well as the opinion forming processes. Many political processes are concerned with solving *wicked problems*, defined by [2] as "those that defy conventional approaches to understanding, planning, design, implementation and execution because: (i) The stakeholder interests are so diverse and divisive; (ii) Interdependencies are so complex and so little understood; (iii) Behaviors are so dynamic and chaotic (unpredictable)". One approach to address wicked problem is proposed by [2]: *hybrid thinking* is centered amongst others on *design thinking* and *co-creation*. Similarly the VoiceS research project [3] uses *serious games* to support eParticipation and make "complex EU co-decision procedure accessible to a large audience (especially among younger citizens), thus providing necessary understanding and enabling them to contribute actively to the platform". A game is defined by [3] "as a structured or semi-structured activity, usually undertaken for enjoyment and sometimes also used as an educational tool. Key components of games are goals, rules, challenge, and interactivity." [4] explain that the term *serious game* "came into wide use with the emergence of the Serious Games Initiative in 2002 (seriousgames.org)". The Serious Games Initiative website states that they are "focused on uses for games in exploring management and leadership challenges facing the public sector". [4] also believe that serious games "can be applied to a broad spectrum of application areas, e.g. military, government, educational, corporate, and healthcare."

1.2   The Think Services Approach

The approach used by Think Services is adapted from techniques originating from *design thinking* (for an introduction see [5, 6]) and for more on design science [7]); from the *Innovation Games* of Luke Hohmann [8]; and from participatory focus groups. One of the objectives of Think Services is rely on a *positive lens*. According to [9], this concepts "refers to a perspective in the social sciences that emphasizes the capacity of people, teams, and organizations to construct enriching work environments, create more fulfilling customer experiences and design better socio-technical systems (…)". [9] also explain that design encompasses three organizational practices: (i) actually producing artifacts; (ii) using them; and (iii) communicating about them.

In a world where management and governance processes are focused on decision-making, [9] strongly advises that decision-makers engage in design thinking practices. Indeed it has been assumed since the theory of innovation of Schumpeter in the 1930's that "the most important designs for innovations would originate from producers", even if individuals or other firms also contribute to innovation [10]. Here we allow ourselves to draw a parallel with policy-making and political decision-making: we have a feeling that it is also assumed that innovations come from those who are in charge. However information and communication technology and new models such as open source software and co-creation have been changing this paradigm and leading to what has been coined *open innovation* [10]. This is why the Think Services approach aims at co-designing policies and services. It furthermore has the goal of going *beyond technological applications* and making the *results* of multidisciplinary approaches *tangible*. Indeed prototypes of service innovation should be tangible [6], however tangible does not (necessarily) mean physical. The Think Services approach relies heavily on tangible outputs such as pictures, videos, shared documents and

working spaces, and contextual mapping and presentation tools such as Prezi [11]. However it also goes further in using the leverage of tangibilization: innovation games such as *Design the Service Box* actually do produce a cardboard box describing the designed service. We indeed believe that in order to tackle wicked problems, tangible prototypes should be used.

Several countries and governments are currently exploring a design thinking approach similar to the one fostered through Think Services, see e.g. [12] or [13]. More generally Service Design is itself becoming a more and more developed and structured discipline that addresses a growing demand from the private and public sector see [14], [15] and [16].

1.3 Workshops

To support our tangible service design approach we assembled a toolbox of different workshops. The goal is twofold: first, it allows the elicitation of needs, i.e. exploring the feasibility and the viability of the ideas, and second, it builds energy and momentum with the stakeholders taking part in the workshops.

The toolbox is an evolving set. It uses several practical and academic sources to populate and help finding the right approach for the problem at hand. We do reference the work of the original authors, if they are identified, and encourage the reuse of our own resource. As of this day, several workshops are identified, not all of them are completely developed or tested. Each of them is described in a synthetic document, explaining why it is useful, how to carry it out and what the expected outputs are. The main elements described formally are the objective, the brief, the content, the output and the follow-up of the workshop. To give a brief gist of the current content of the toolbox, this is the list of the titles of selected workshops: "Hunt the stereotypes", "Shape the future trends", "Remember the future", "Create the service box", "Build the business model", "Brainstorming", "Play the service".

Let us explain in briefly two of them that we will describe in more details later in our applied case studies. In "Remember the future", we ask the participants to imagine they live in a distant future. Several scenarios are developed and assigned to different groups (these scenarios are usually taken from the outputs of "Shape the future trends"). The groups are then asked to describe the service and its environment as they would have seen it from that point of view. This forces to observe the future from a more distant future, therefore allowing to literally "Remember the future". The service is then described as if it had already been implemented.

Why is it important? It often is difficult to imagine concretely what the future service should look like. Several studies in cognitive psychology show that by examining the future we lack a frame of reference and get easily lost in the possible paths opening up. By reversing the point of view, the description of tangible elements is clearer, richer and more concrete. It is also easier to describe what steps were taken to reach the desired service. By selecting several scenarios, we allow to test the robustness of the service. This usually uncovers the similarities of the service in radically different settings. On the other hand, by looking at the contrasts, it also underlines peculiarities that might be essential success factors in given situations.

In "Create the service box", the participants are invited to physically design a box that virtually contains the desired imagined service in order to communicate its

characteristics. This not only allows the expression of the tangible benefits and perception of the imagined service, but also lets the groups share more clearly the ideas they have about the service. These ideas will otherwise most of the time remain vague, intangible and difficult to get across. In this workshop, a service is already roughly imagined (this might be the output of a "Brainstorming" workshop combined with a "Remember the future" workshop). The process of "Create the service box" is simple. Give the participants a cardboard box, drawing material, magazines where to cut up pictures, and ask them to literally design the box to sell the service. After building the physical box, we invite them to present the result to the group and strongly encourage a narrative storytelling form. This structures the output, engages the audience and makes it easier to depict a concrete use. The short presentation of the groups is followed by a general discussion and a synthesis.

Why is the workshop useful? It mainly allows describing very vividly the service. By building a physical artifact, people usually come to a point where they stop talking and start doing. In several cases, choosing images, drawing on the box, or developing a story allow to more clearly exchange the ideas than only relying on words, without limiting them in their imagination.

Let us now explain more precisely the experiments we conducted and extract some lessons learned.

2   Case Studies

In this section we describe the design workshops and the three organisations in which they were organised: one state-owned multi-utilities company; one political party; the information system strategic committee of the Canton of Geneva. We will also detail the objectives of these workshops.

2.1   Services Industriels de Genève

The chief information officer (CIO) of the Services Industriels de Genève (SIG, the state-owned, multi-utilities company of Geneva) is in charge of a team of 10 managers responsible for the different information technology (IT) services.

The creative workshop was organized with this team about the future of the IT in the organization [17]. It was based on the *Remember the future* approach [18]. The main goal of the CIO was to make his colleagues stand back about the evolution of their job and of their professional environment over the next 10 to 15 years.

During the first part of the workshop the participants were asked to imagine their workplace in the year 2040 and draw it onto a board. Rather than claiming to correctly describe the reality of 2040, this initial step allowed them to immerse in this far future in a very natural way, making their thoughts tangible through the drawings. It constituted a very good starting point for the rest of the workshop with people envisioning colleagues collaborating from the other side of the planet, convergence of private and professional environments, teleworking using rich interfaces, holographic avatars, ubiquitous sensors, or pervasive virtualization.

Once "projected" in 2040, everybody had to imagine himself as the CIO of SIG celebrating his/her retirement. At this occasion the CIO is asked to tell the story of the

building of his new team 20 years ago (in 2020) and outline why and how this team contributed to the success of the organization in the following years. Two groups were formed and asked to elaborate their scenario in different contexts. One group was supposed to imagine the evolution of the IT team in a context of commoditization: the IT and the information systems were in this case a support to the evolution of SIG. The other group worked on a contrasted scenario where the information systems were supposed to be part of the core business of SIG.

To support their thoughts each group was suggested to elaborate on IT missions of the SIG in the proposed context, on the evolution of the competencies needed to achieve these missions and on the services proposed by their teams.

Even if constructed in two very different contexts, the story proposed by each groups conveyed some common preoccupations. First, data and information was envisioned in each context as a strategic resource for the organization. The workshop helped the team to explicit the value of the information as a primary source of knowledge. Many services were imagined based upon data, information and knowledge, with new activities and competencies (such as "service trader" or "semantician") needed to deal with that.

The CIO of SIG had no peculiar expectations with respect to the outcome of the workshop. But the ideas and reflections generated during the workshop evoked different useful perspectives regarding the evolution of his organization. He mentioned as an intangible result the fact that his team stepped back with respect to their daily activities and a reinforcement of the team spirit.

Table 1. Workshop "Services Industriels de Genève"

Toolbox	Remember The Future
Objectives	Stand back about the evolution of the work of the IT team over the next 10 to 15 years
Brief	Participants are asked to imagine their workplace in the year 2040 and the profile of workers
Outputs	New strategic data and information services; new activities and competencies, such as "service trader" or "semantician"

2.2 Parti Démocrate Chrétien

The Christian Democratic People's Party (Parti Démocrate-Chrétien - PDC) is a center-right wing Swiss political party. Its Geneva section invited ThinkServices to run a creative workshop for the Economic Commission on the theme of *Jobs and Skills of the Future*. Such a prospective issue naturally triggered their interest for co-creativity, design thinking, serious gaming thus leading to their request to experience such methods at first hand.

The roughly 2 hours *Skill Box* workshop was a mix of two techniques: *Persona creation* and *Service Box*. First, the participants were asked to describe the profile (persona) of the future worker. In order to be as open as possible, they were given the following categories of work to address in groups: nursing & health care provider, teacher, bank employee, librarian, blue-collar worker or one of their personal

choosing. They were also given a set of thinking cues in terms of: education and training (initial and lifelong), work load, places, schedules, wages, retirement, tools, recruiting, personal vs. professional life balancing, etc.

Following the persona definition the participants were asked to design the "skill box" (i.e. service box corresponding to that profile) as an actual artifact they could display in a job fair.

Finally, the groups were asked to present two things: first, the persona they imagined followed by the box they co-designed as if they had been in a "skill store". We deliberately looked at the result from the standpoint of observers. This allowed us to witness the following thought process. The participants clearly had in mind the societal drivers and requirements in terms of preparedness level of a political party. Therefore one could easily imagine that their next step could be to conduct a SWOT analysis of some of the salient aspects revealed.

Among these aspects three clearly emerged from the stories. First and foremost was the importance of technology as enabler in the areas of learning, organization and planning of work. The second aspect touched upon the growing changes in social structures and the corresponding work environment thereof. Of particular attention were the increase of working women and the redistribution of traditional family structure. Finally, the fundamental role of the networked life (i.e., social networking, virtual teams, lifelong learning, etc.) in all aspects of both private and professional lives especially considering their blurring boundaries.

Table 2. Workshop "Parti Démocrate Chrétien"

Toolbox	Skill Box
Objectives	Imagine jobs and skills of the future
Brief	Participants are asked sketch the persona of a future worker and to design the skill box corresponding to that profile as a job announcement to be shelved in a JobStore.
Outputs	Technology as enabler for learning, organizing and planning of work; growing changes in social structures; fundamental role of networked life.

2.3 Collège Spécialisé des Systèmes d'Information

The Collège Spécialisé des Systèmes d'Information (CSSI) of the State of Geneva is constituted of 12 managers in charge of information systems of each of the State of Geneva departments. During the year 2009, the members of the CSSI wrote their strategic plan for the years 2009 to 2013 [19]. This document describes the main axes considered to give coherence to the evolution of the different information systems of the State of Geneva. It also presents the key success factors and the strategy adopted to achieve this.

The writing of this strategic plan by a working group of the CSSI allowed to quickly finalise the output. A regular sharing of the reflections with all the members of the committee ensured that everybody related to the content of the document. But the short deadline was not necessarily favourable to an effective ownership of the

final document, at least when considering the values it was meant to convey. Yet this phase of ownership is essential if one expects a coherent and effective communication and implementation of the strategy.

So although the document has been drafted in a rather open and co-creative way, the question remained whether every member of the CSSI had really taken the ownership and appropriated the real sense of the proposed strategy. To test this and/or to make the appropriation process easier, we organized a workshop [20] bringing them together around the *Create the Service Box* [21] creative method.

The workshop was conducted during two hours. The participants were divided into 3 groups. In a co-creation process, each group had 45 minutes to materialize on each of the 6 faces of the box the expected benefits of the service virtually dropped off in the box: namely the strategic plan of the information systems of the State of Geneva. With managers used to mainly talk about "costs" and "quality", we emphasized the importance to also consider other values that their strategic plan can convey, namely its "value of use" and "perception".

The box allows the participants to easily pass from concepts to something more concrete, which helps them to start up again, enriching it with new ideas made tangible through pictures, drawings, carvings, mobiles or any other media supporting their imagination. The six faces of the box also make up a constraint that forces participants to get to the main points and prioritize their messages.

During the creative phase, each group tries to make the key aspects of the strategic plan tangible on the cardboard box by enriching their creative contributions. Participants exchange their standpoint and confront their visions, by using drawings, cut-out or glue.

Once the box is complete, it serves to support the narrative, the storytelling. The group tells its story and "sells" the strategic plan to different possible stakeholders (deputies, business managers, executives) with the help of the box and the symbolism it conveys. This co-construction improves the understanding and the ownership of a service that otherwise remains purely intangible. It also helps to focus on the elements of value rather than only on the expected features.

The exercise was originally intended to facilitate the ownership of the strategic plan of the CSSI by its members. But he eventually demonstrated that this appropriation was already effective: even if the narratives offered by the three groups were different, all agreed on the consistency of the messages heard. The exercise had the merit of revealing that the strategic plan has been understood and internalized by members of the committee. This finding was in itself a remarkable result of the workshop.

All participants recognized the richness of this creative method which helped passing from abstract concepts and common values to various concrete messages. Participants appreciated the fact that this method revealed their strategic plan in the form of various metaphors which, despite their lack of precision, certainly facilitate its communication to different audiences. The *Create the Service Box* method is then an excellent tool to master the complexity and helps to convey simpler and more accessible messages.

Finally everyone recognized the team building dimension of such a co-creative workshop led in a playful spirit.

Table 3. Workshop " Collège Spécialisé des Systèmes d'Information"

Toolbox	Create the Service Box
Objectives	Appropriation of a strategic plan by the members of the IT strategy board
Brief	Participants are asked to materialize the expected benefits of the strategic plan of the information systems of the State of Geneva on each of the 6 faces of a box
Outputs	Different but consistent narratives of the strategy; effectiveness of the symbolism of the box to convey abstract and complex messages; team-building.

3   Analysis Framework

Our analysis framework was built ex post in order to analyze the Think Services approach. As the workshops had been documented through blog posts, pictures, video recordings, etc. it was possible to apply it in a rather coherent way. However we have to mention that no research design was developed before the series of workshops began, and that our analysis has its limitations. Still we believe that interesting lessons can be learned from these selected case studies.

In order to discuss how workshop participants perceived the Think Services approach we focus on the creation of value they support, as well as participants' satisfaction. [22] states that the value creation of a service is most of the time only looked at in terms of cost and quality, possibly of utility, but rarely in terms of perception. This is precisely what we want to look into, rather than investigating the quality or the utility of a tangible workshop's output such as a service box. We will not do a literature review here but we will use [23] as a starting point. They propose "an integrated research model that distinguishes beliefs and attitudes about the system from beliefs and attitudes about using the system". To survey the behaviour of using technology [23] rely on the well-known technology acceptance model (TAM) developed by [24]. This theory suggests that users confronted to a new technology are influenced in their use by the:

- *Perceived usefulness*: Davis defines it as "the degree to which a person believes that using a particular system would enhance his or her job performance";
- *Perceived ease-of-use*: Davis describes this as "the degree to which a person believes that using a particular system would be free from effort".

Although this theory was developed for technological systems we believe it can be applied to serious games and design thinking workshop as well. Other dimensions such as perceived risks, costs, immediacy, or fun, are not formally integrated in our assessment but will be discussed in an ad-hoc manner in the next section.

4   Lessons Learned

We used the above framework as a guideline for assessing the result of this work in terms of the impact of design thinking and serious gaming as significant factors augmenting participation. These findings, although not formally surveyed are however the result of informal debriefing sessions that took place systematically after each workshop. These sessions involved gathering feedback form the participants through discussions; later discussions also took place among the workshop organizers. It is for this reason this paper is presented as "lessons learned" rather than actual formal findings. Future work to validate our hypothesis will require the use of formal quantitative and / or qualitative survey techniques.

Perceived usefulness. Based on informal discussions and debriefing sessions following all workshops, it is clear that the vast majority of workshop participants explicitly stated that both the actual outcome of the workshop and the methods used would significantly contribute to enhancing their performance in their work. Some workshops have actually led to follow up workshops or concrete actions based on the outcome.

Perceived ease-of-use. Again, all feedbacks converged acknowledging the high degree of reusability of the methods and techniques. This is further strengthened by the fact that all our workshops are documented in open workshop briefs available for anyone to take, use and enhance. The briefs describe in detail everything that is needed to run the workshops. As an example, the Create the Service Box brief can be found here [21]. One participant mentioned after a workshop that he would use these techniques in work related problem-solving and mediation meetings. This illustrates the high degree of ease of use of the approach.

Cognitive shielding and *safe house* phenomenon. Interestingly we have found from our participants that as an external not for profit Think Tank we carry a tremendous potential as a "safe place" for experiencing, testing, trying new ideas that would have never surfaced otherwise or would have been difficult to argue in their respective professional environments. We refer to this phenomenon as "cognitive shielding" as it basically offers a protected environment for expressing such ideas and positions with much less risk.

Power of *tangibilizing the intangible*. All our workshops have a strong focus on tangibilization. Whether a Service Box, Stories, etc., they all rely on the production of an artifact. The key point here is that the artifact serves as the focus point allowing a much needed intermediation between people. The attention is therefore transferred on this artifact rather than between people. Moreover, it significantly contributes to reducing the complexity of the issues being discussed. Such tangible artifacts become easier to deal with than concepts. This has also proven to be a major value of the approach. The *serious gaming* approach has a very strong impact on engagement. Participants feel compelled to play in teams thus contributing to team-building addressing together a common challenge. The *story telling* aspect also contributes to tangibilization through its metaphorical side and the fact that people become part of their stories. They therefore collectively endorse the issues they work on, are able to

take some distance and find there is value in the process. This was particularly true for public administrations. The key lesson is definitely the power of tangibilization.

In very rare occasions we have witnessed negative reactions to the approach. The only one we are able to report on was a case where a participant following the workshop commented with a statement: "ok, that was interesting but now we need to get back to work".

Among some of the other aspects let us briefly mention the following. The *perceived risks* appears to be relatively low as participants are immediately put in a "safety" position through a brief introduction stressing the value of creativity, trial and error, collaboration and having fun. In terms of *costs*, the highest cost incurred is most likely the actual time spent for the workshop, and therefore not working as usual. From the point of view of *immediacy*, there is no doubt participants have instant takeaways to inspire their work. Finally having *fun* along the way is a key building block and success factor of the approach leveraging the creative capabilities we have.

Finally, we also learned a few useful things we share as tips and noteworthy moments to lookout for when running the workshops. Success of such techniques is greatly improved when participants are put in the proper mindset. This requires setting the context through well-known techniques like using a short video, playing a game, etc. For example, we have used the "Did you know?" video [25], a simple "yes – no" exercise among two people. Person A states ideas and person B systematically responds No arguing why it's a bad idea. Then they switch roles and person A systematically answers positively enhancing the idea of person B. Another technique is the sound ball where people exchange a virtual ball making a sound. Each person then repeats the set of sounds adding his own at the end.

Another interesting and noteworthy event is when during the workshop you see all the participants in a group get up. We have systematically witnessed this event as being the tipping point moment of success for a group. Often this is unconsciously contagious as all groups end up standing working together.

A last key element is trying to meet the deadline: indeed a good timing of the workshop is a key success factor, as well as having a dedicated timekeeper has proven to be valuable. Using observers from the organizing team can also be useful to capture noteworthy events and / or help answering questions when needed.

5   Conclusion and Future Work

Our experience running co-creation workshops based on design thinking and gaming in intellectually protected settings such as an independent, not for profit Think Tank has led us to witness the value of the approach for participants. This has in turn led us to discuss and consider the role played by design thinking and gaming in stimulating participation. Based on three cases we discussed the lessons learned in terms of perception of usefulness and ease of use. Stimulating and augmenting participation is a source of empowerment for people when addressing and trying to solve wicked problems. Future work involves assessing our hypothesis through formal methodologies. In doing so, we plan to study and define the criteria allowing to not only assess the workshops but also serve as best practice supporting engagement and participation based on design thinking, serious gaming, story telling and tangibilization.

We nevertheless think this contribution already serves as background work for further studies in this area as well as report on field experience that may be helpful to practitioners in services innovation and design.

Finally another aspect we have not addressed in this paper is the organization and structure of the different workshops as a multi-entry point process. These workshops were very briefly mentioned in section 1.3. We plan to further study this issue as we continue to develop and run the workshops.

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Reference Framework for E-participation Projects

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Abstract. Accommodating the various requirements from distinct perspectives in e-participation calls for a holistic engineering approach for e-participation systems analysis and design. This paper presents research results towards a reference framework for e-participation projects. An analysis of procedural models for e-participation and enterprise architectures in the context of e-participation shows that a holistic approach is necessary. A sophisticated and holistic engineering approach for e-participation in the form of a reference framework is seen as a solution to support e-participation projects development and implementation. The reference framework consists of different concepts supporting each other: 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 e-participation.

Keywords: E-participation, Reference Framework, Reference Model.

1 Introduction

Information and Communication Technology (ICT) is to be considered an enabler and facilitator for political participation, but one cannot expect that technology per se impacts political decision making and active citizen participation in political processes. Recent research results in e-participation give ground that possibilities of using ICT for political participation have not yet been sufficiently exploited [12]. Many e-participation projects suffer from planning citizen participation along the whole policy life-cycle of political decision-making [1], i. e. ensuring that the voices raised through e-participation are heard by political decision makers and have an impact on final decisions at political level [4]. The success of innovative e-participation solutions depends – among other challenges – heavily on the organizational planning and the incorporation of such initiatives into the daily routines of political processes along the different stages in the policy life-cycle. Introducing e-participation does not only require the adaptation of given participation processes. It often demands introduction of new participation facilities into traditional political processes, which calls for a holistic engineering approach for e-participation systems analysis and design. Such an approach can

be built upon reference models for e-participation. Reference models are generic conceptual models that formalize recommended practices for a certain domain with three characteristics [5, p. 4]: (1) A reference model provides best practices. (2) A reference model is valid for a class of domains. (3) Reference models can be understood as blueprints for information systems development. Thus a reference model is a conceptual framework that could be reused in a multitude of information systems projects. Reference models serve for several purposes. They can be utilised [13, p. 484f]

- to build a framework for the identification, development, and coordination of related standards and to facilitate communication among the stakeholders.
- to develop more specialized models for support.
- to obtain a so-called reference architecture, so be mapped onto a collection of software components and data flows between those components.
- to enable the use of an architecture-based development process.

The paper at hand presents research results towards a reference framework for e-participation that structures the access to reference models for the domain e-participation.

The paper is structured as follows. In the next section related work is reviewed: procedural models for e-participation, and the application of Enterprise Architecture (EA) frameworks in the context of e-participation is reflected. This research is used as a starting point to develop a reference framework for e-participation. The research approach is presented in section 3. Section 4 sums up the needs for and presents the reference framework for e-participation. Finally conclusions are drawn.

2   Related Work

2.1   Procedural Models and Guidelines for E-participation

Existing procedural models for e-participation, which can provide a framework and guideline for e-participation projects, are focussing on different aspects of e-participation. Based on desktop research for e-participation models, seven procedural models have been selected to be investigated in this section. Table 1 gives an overview of the procedural models. The column *Id, Name and Source* indicates first an identifier for easier handling of the different approaches in the paper. It further shows the name of the procedural model (or English translation) and source reference. The column *Level* specifies if the model focuses on local, regional, national, European, or general level. The column *Strategy* indicates if the model is related to bottom-up or top-down approaches. The column *Area* names the e-participation area which is covered by the corresponding procedural model (e. g. participatory budgeting). The procedural models introduced in table 1 are briefly described subsequently. Figure 1 visualises the different steps and activities described in the procedural models for e-participation.

(a) Phang and Kankanhalli present a framework of ICT exploitation for e-participation initiatives. They examine the suitability of various information

Table 1. Overview of procedural models for e-participation

Id, Name and Source	Level	Strategy	Area
(a) A three-step procedure for e-participation initiative implementation [14]	General	Top-down, bottom-up	General
(b) Implementation model for sustainable e-participation [7]	General	Top-down, bottom-up	General
(c) Guideline for online consultation: practical recommendations for the involvement of citizens over the Internet [10]	General	Top-down	Online consultation
(d) Standards for public participation: practice guide [3]	National	Top-down	General
(e) Procedure of Cologne's participatory budgeting project [23]	Local	Top-down	Participatory Budgeting
(f) Guideline for local e-participation projects [26]	Local	Top-down	General
(g) A collaboration pattern language for e-participation: a strategy for reuse [2]	General	Top-down, bottom-up	General

and communication tools for the achievement of e-participation objectives [14]. Phang and Kankanhalli transmit offline participation techniques analysed by Glass [6] in order to technically support them. Phang and Kankanhalli also present a process for implementing e-participation initiatives consisting of the following three steps [14]: identification of the objective, choosing the best participation techniques, and choosing the electronic tools which support the participation techniques and thereof the achievement of the objectives.

(b) Islam presents a sustainable e-participation implementation model [7]. This iterative procedural 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 [7].

(c) Koop presents an extensive practical guideline for on-line consultations, which aims to give recommendations about how to incorporate citizens with the Internet [10]. This guideline compromises recommendations when online consultations are useful, which actions need to be undertaken by the project team, which formats can be used when and which electronic tools are used. The practical oriented implementation guideline for online citizens consultations published in [10] comprises four phases: identification of the objectives and conditions, design of the procedure, implementation of the consultation, evaluation and conclusion. For each phase questions are defined that need to be answered in order to design an e-participation project.

(d) The guide about standards for public participation published by the Federal Chancellery of the Republic of Austria and Ministry for Live wants to define recommendations for public participation in general. The guide provides a decision help for public participation during the development of policies, plans,
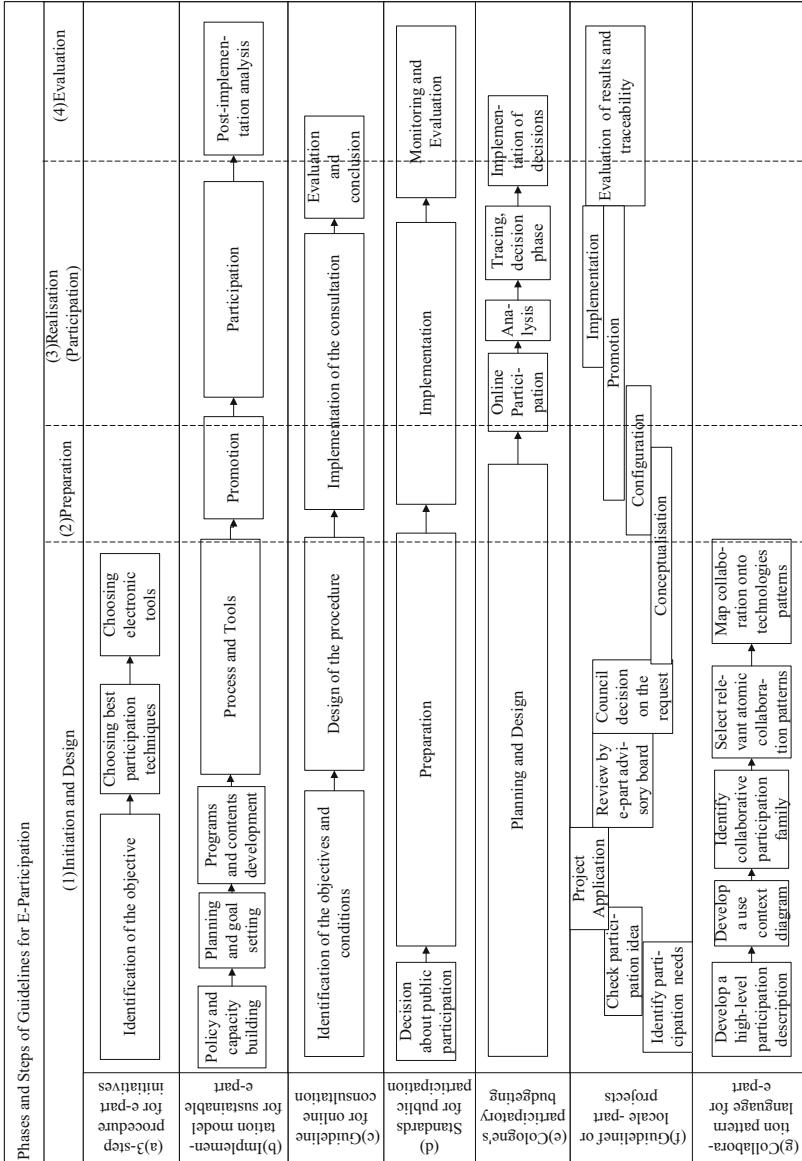
Fig. 1. Main project phases of analysed procedural models for e-participation

programmes and legal acts and differentiates three further phases preparation, implementation and monitoring (in regards to traceability) and evaluation of the participation process. The implementation of participation process gives detailed recommendations regarding the participation areas information, consultation, and cooperation.

(e) The procedural model of the participatory budgeting approach in Cologne is introduced in the evaluation report of the project [23]. It encompasses the following phases: planning and design, online participation, participation analysis, tracing and decision phase, implementation of decisions. This approach takes the monitoring of decision making in regards to impact analysis into consideration. It details participation processes related to participation areas information, consultation and cooperation.

(f) Based on the participatory budgeting approach in Cologne and other German cities, Wehner, Gölz and Märker propose a guideline for local e-participation projects [26]. This approach details a guideline for top-down e-participation projects initiated by local administrations. In contrast to the other approaches, they take the decision for an e-participation project and administrative tendering procedure into account before an e-participation project initiated by administrations can start. Wehner, Gölz and Märker propose an approach with the following phases that partly overlap: identify participation needs, check participation idea, project application, review by e-participation advisory board, council decision on the request, conceptualisation, configuration, promotion, implementation, and evaluation of results and traceability. Wehner, Gölz and Märker model parts of the procedure as business processes using event-driven process chains.

(g) Ali et. al. propose a collaboration pattern language to design architectures for e-participation systems [2]. The aim is to provide a guidance to help the designers of e-participation systems to choose suitable collaborative technologies. The proposed pattern language is based on the work in the areas of collaboration engineering and software engineering. The five phases proposed are focussing on the selection of adequate collaboration patterns: develop a high-level participation description, develop a use context diagram, identify collaborative participation family, select relevant atomic collaboration patterns, and ap collaboration patterns onto technologies patterns. The approach focuses on the design phase of an e-participation project.

The investigated procedural models focus on different tasks necessary to implement an e-participation project; none of them provides a holistic approach. To provide a holistic approach to manage the diversity of tasks in complex system developments, Enterprise Architecture (EA) frameworks are used in commercial areas and e-government (see e. g. [8]) to coordinate and manage relevant development tasks. The next section introduces an analysis about how EA frameworks are applicable for e-participation systems analysis and design.

2.2   Enterprise Architecture Frameworks

EA is a concept of Information Systems, which gives guidance in complex sociotechnical systems development along three dimensions: (i) phases of systems

development, (ii) levels of abstraction combined with dedicated stakeholder (or owner) views, and (iii) distinct viewpoints on concepts such as data, functions, people, motivation, etc. EA frameworks define how an EA can be developed and implemented. Multiple approaches for EA frameworks exist. Since 1984 more than 20 EA frameworks have been developed and published [20], which are provided by different parties and serve different purposes. In [18] the application of three EA frameworks – Zachman Framework [28], TOGAF (The Open Group Architecture Framework) [25], and ARIS (Architecture of Integrated Information Systems) [15] – in the life-cycle of e-participation projects is analysed. EA frameworks are not supposed to ensure the success of e-participation. They are rather seen as a means to support organisational and sustainable implementation of e-participation projects. Coherences with different procedural models for e-participation can be observed. EA frameworks provide a concept to support the implementation of e-participation projects [18]. Point of criticism is that the complexity of most EA frameworks can be seen as rather high. Organizations are often struggling to get control over their ICT landscape [8]. The single use of EA frameworks in order to establish e-participation in an organisation might be immoderate. Therefore best practices in the form of reference models might be a solution to support e-participation projects [18]: TOGAF provides with the Architecture Development Method (ADM) an extensive engineering approach with a high focus on monitoring the overall process. ADM is seen as an appropriate approach to support project implementation in exploiting possibilities of using ICT for political participation through all phases of an e-participation project. In order to address relevant questions during the initiation of an e-participation project, the use of the dimensions of the Zachman Framework is recommended.

3 Research Approach for Developing the Reference Framework

The methodological approach to develop the reference framework for e-participation is based upon the reference modelling methodology described in [21]. As a starting point of the methodology the problem scope is defined. A number of problem categories are described that are relevant when an e-participation project is implemented. The problem categories have been identified based on studies in e-participation projects i.e. LEX-IS[1], VoicE and VoiceS[2] (in [17] a historical description of research undertaken is provided), and others as e.g. the Cologne Participatory Budgeting Project[3]. Based on the problem definition, the next step is to develop the reference model framework. The reference model framework reflects the coarse structure of the reference models [21,24]. It serves

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[1] Enabling the participation of youth into the legislation of national parliaments, see `http://www.lex-is.eu`

[2] Regional model for e-participation in the European Union with integration of social networks, serious games and semantics, see `http://www.give-your-voice.eu/`

[3] `https://buergerhaushalt.stadt-koeln.de`

as a master reference model that supports the modelling and puts on a standardisation of terms and model building blocks [21]. The development of the reference framework for e-participation is an iterative process. The reference framework is refined in different iterations based on desk research, expert surveys and experiences from project participation. Requirements of the reference framework are derived based on desk research, problem categorisation and a survey among e-participation researchers and practitioners. The requirements are to be understood in addition to general requirements for reference frameworks and models. Finally, the reference framework for e-participation is completed. The reference framework needs to be extended with interconnections between the reference models and with other reference frameworks [21].

4   Reference Framework for E-participation

The investigation of procedural models for e-participation unveils that there is no solution that takes into account all relevant tasks for an e-participation project. The integration of different tasks and existing technical systems (in order to support the back-office of an organisation) is under-represented in particular. EA frameworks might be a solution to overcome these challenges of e-participation projects. But the complexity of EA frameworks [18] hinder the exploitation of them in e-participation contexts.

A sophisticated and holistic engineering approach for e-participation in the form of a reference framework is seen as a solution to support e-participation projects development and implementation with customised good practice examples. The main purpose of the reference framework is to facilitate the understanding of what is required to implement an e-participation project. It should provide a lightweight approach by providing solutions for different kinds of e-participation projects and various types of organisations, which build up e-participation projects. The reference framework for e-participation aims to support different target groups to communicate with other project actors, e.g. politicians, system developers, moderators – i.e. persons with different technical and political background and having a different perspective on an e-participation project.

The reference framework consists of different concepts supporting each other (see Figure 2): 1. Dimensions that build the scope of an e-participation project 2. Domain meta model for e-participation 3. Procedural reference model for e-participation 4. Library with requirements, reference models and building blocks for e-participation. The big arrows in Figure 2 show that from one part of the reference framework the results of another part of the reference framework are accessed. The concepts are briefly introduced in the subsequent sections.

4.1   Dimensions

The *Dimensions* in the reference framework for e-participation are based upon the dimensions introduced in the Zachman Framework [28]. Applied to e-participation, the areas can be described as follows [18]:
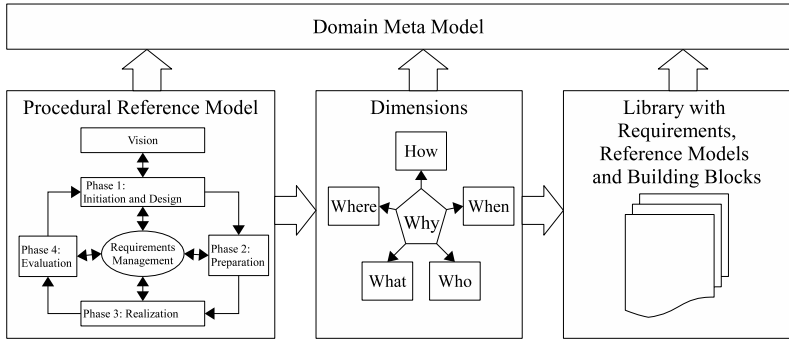
Fig. 2. Reference framework for e-participation

1. Motivation (Why): This dimension concerns the translation of e-participation goals and strategies into specific ends and means. This can be expanded to include the entire set of constraints that apply to the efforts. Principles of participation are defined, too. In an e-participation project, all other activities should start from this point.
2. Time (When): This dimension requires careful planning of when certain tasks are to be performed, what dependencies exist (e.g. a consultation should be made at a point where impact on a decision to be made is still possible).
3. People (Who): This dimension identifies and describes the stakeholders involved into the e-participation project, i. e. active or inactive actors. Following the definition in ISO 10006, stakeholders of a project are those persons who are interested in the project or are affected by the project.
4. Data (What): This dimension addresses understanding of, and dealing with data in the e-participation system. Such data may concern particular topics to be discussed in the e-participation endeavour, the political environment, the legislative procedures, participation procedures, estimated impact etc.
5. Network (Where): This dimension is concerned with the geographical distribution of the legislative and political processes, participation activities and involved actors and institutions.
6. Function (How): This dimension describes the process of translating the mission of the e-participation project successively into more detailed definitions of its operations. The legislative procedures are analysed, possible points for participation are identified and participation processes are planned.

The dimensions control the access to the other parts of the reference framework during the implementation of a particular e-participation project.
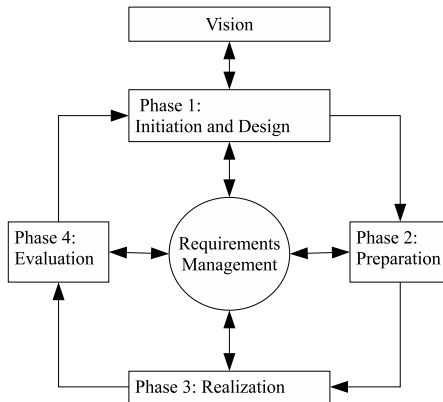
4.2   Domain Meta Model for E-participation

The use of a *Domain Meta Model for E-participation* in the reference framework bases on the concept of a content meta model presented in TOGAF [25]. It defines a formal structure of terms used in the reference framework to ensure consistency and provide guidance for users of the reference framework. The domain

meta model for E-participation bases on the *Domain Model for E-participation* by Kalampokis et al. [9]. This model is based on an e-participation framework by almost the same authors, which consists of four layers: democratic processes, participation areas, participatory techniques, categories of tools and ICT technologies [22]. The domain model for e-participation aims to represent the most important aspects of e-participation and their interrelations. The authors divide the domain into three areas: actors, participation processes, and information and communication tools. These areas are further detailed in separate models and finally brought together to visualize the key interrelations among aspects of the three areas. Kalampokis et al.'s model demonstrates the complexity of the domain. Further research is necessary in order to define a domain meta model for e-participation and align it with the dimensions of the reference framework for e-participation.

4.3   Procedural Reference Model for E-participation

The *Procedural Reference Model* shall provide guidance in order to manage tasks, which are necessary for implementing an e-participation project (see [18] for description of tasks). The steps in the different procedural models can be categorised into four main phases of an e-participation project [18]: (1) initiation and design, (2) preparation, (3) realisation (participation) and (4) evaluation. In figure 1 these four phases are visualised with the indication of how the e-participation models investigated in section 2.1 implement these phases. In addition to these phases, an e-participation project should be accompanied by continuous requirements management (based on the TOGAF ADM [25]: requirements specification as to-be specification in phase (1), preparation and realisation based on requirements in phases (2) and (3), evaluation of results (to-be state) against the requirements in phase (4). The resulting outline of the procedural reference model for e-participation is visualised in figure 3.

Fig. 3. Procedural reference model for e-participation

The procedural reference model for e-participation is structured along the four main phases identified before for implementing an e-participation project. In each phase e-participation project implementation steps are detailed using the following scheme: (a) description of the step, (b) relevant literature, (c) activities, and (d) results. It is closely following TOGAF ADM, whereby it reduces complexity by providing guidance in the form of reference models and building blocks for the domain e-participation (see section 4.4).

4.4   Library with Requirements, Reference Models and Building Blocks for E-participation

A *Library with Requirements, Reference Models and Building Blocks* supports an e-participation project with recommended practices for e-participation processes and tools. A requirement means (following TOGAF [25]) a quantitative or qualitative statement of need that must be met by the e-participation project or particular supporting processes or supporting tools. A requirements library contains requirements, assumptions, constraints and gaps relevant to implement an e-participation project. Reference participation process models serve as a guidance how to implement the participation activities based on a particular objective or goal. Thereby, the procedural reference model for e-participation is supported by reference participation process models modelled. Suitable process models are selected from the library based on the selected dimensions of the reference framework for the particular e-participation project. E-participation processes have so far not been extensively modelled and standardised. There is a lack of reference models for process patterns and process chains describing common processes in e-participation [16] even if first models and patterns exist (see e.g. [2,19,26]). Further research is necessary to identify and model reference participation processes that support different e-participation areas as e.g. consultation, participatory budgeting, petitioning. In order to ground the reference model empirical e-participation project evaluation studies is used (as e.g. [27,11]). In addition a toolbox of technical building blocks is included to support e-participation and a reference architecture to combine these blocks efficiently. Such a toolbox supports the use of standardised participation processes. Thereby, technical requirements such as interoperability of services [16] need to be considered.

5   Conclusion

This paper presented research results towards the development of a reference framework for e-participation. Based on project experiences and an extensive desk research the main phases of e-participation project development and implementation have been identified. Further research analysed how far EA frameworks can support e-participation projects and where the limitations are. The development of a reference framework for e-participation was argued as a means to support the organizational planning of e-participation projects and the incorporation of such initiatives into the daily routines of the different stages in the

policy life-cycle. The paper presented a reference framework for e-participation to support these purposes. The use of the reference framework does not automatically enhance citizens participation in e-participation projects, but makes an important step towards the flawless implementation of e-participation projects.

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Measure to Improve: A Study of eParticipation in Frontrunner Dutch Municipalities

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Abstract. eParticipation is still in its early phases of development, in which government organizations undertake many experiments. There is no systematic overview of these experiments, which inhibits learning from each other. Measuring and benchmarking eParticipation provide the opportunity to inspire new developments by sharing best practices. This paper presents the development of a measurement instrument that is subsequently used to investigate eParticipation in frontrunner Dutch municipalities. This instrument combines factors related to the role of citizens, the type of media deployed, and the organization of the municipality. Using these factors to measure eParticipation in seventeen municipalities we found a large focus on traditional media forms usually supporting informative and consultative practices for policy development. This study, however, has been largely limited to measuring the type of ICT that is used to facilitate eParticipation. Therefore, we recommend extending it with measurements that give insight into the actual use, effectiveness, and the inclusion of citizens' input in policy making.

Keywords: eParticipation, measurement, benchmarking, measurement instrument, municipalities.

1 Introduction

An important element in serving the citizens of any democratic nation is to understand their perceptions of the issues they find important. Yet many citizens lack an interest in and feel dissatisfied with politics [1,2]. In may parts of the world, voter turnout and civic participation have steadily been decreasing since the 1960s [3,4]. Traditional channels influencing policy-making, such as newspapers and town hall meetings, are decreasing in popularity, especially among younger citizens [4]. eParticipation has the potential to bridge the gap between citizens and the government [1], as well as being an instrument to make better and more supported policies [5]. eParticipation can be defined as the use of ICT by governments to support information provisioning to citizens and to engage and facilitate citizens to influence the government in their policy-formation and decision-making processes [1,6,7].

Many government organizations around the world undertake eParticipation projects. Due to the infancy of eParticipation [8,9], the current focus of government organizations is exploratory in nature. Current eParticipation experiments represent a divergent set of methods and philosophies within government organizations, and "comparative empirical classifications and evaluations remain the exception" [9, p. 5]. Measurements and benchmarking facilitate the uptake of new developments by showcasing best practices and stimulating the further use of these features. Although there is much research on measuring and benchmarking eGovernment [10-17], scant attention has been given to the measurement and benchmarking of eParticipation. This paper presents the development and validation of a measurement instrument for eParticipation in Dutch municipalities. Local government is an important level of government for eParticipation as citizens feel they are more personally involved and have a high expectation about the effect of participating in the decision making processes of their municipality [2,9]. Furthermore, in the Netherlands most contact citizens have with the government takes place at the municipal level [18].

The instrument presented in this paper focuses on the ability of ICT to facilitate and enable eParticipation. The measurement instrument includes three elements that, when connected, give insight into the state of eParticipation in Dutch municipalities: the role of citizens, the type of media being used, and the municipal organization. This paper is structured as follows. First, we will give an overview of existing benchmarks and their use for inspiring eParticipation developments. Then, we present the development of the measure instrument for eParticipation, followed by the outcomes of using this instrument to measure eParticipation in seventeen Dutch municipalities. Finally, we will present conclusions and recommendations for further research.

2   Measuring and Benchmarking eParticipation

Measurement and benchmarking have gained considerable attention in the field of eGovernment [10-17]. These measurements are often an attempt to quantify or operationalize complex and wicked problems. Breaking down such a subject into smaller and measureable parts can provide useful insights. The benefits of such measurements include being able to compare the current situation with the desired situation, analyzing the costs and benefits of investments, and providing motivation for future developments [19]. International benchmarks such as the UN Index [10,12], the OECD e-Government studies, GapGemini's Public Service Benchmark for the European Commission [13], and Accenture's Public Service Model [14] have stimulated governments to develop their eGovernment activities. While some of these benchmarks include elements of eParticipation, no benchmark exists that focuses exclusively on eParticipation. Elements of participation that are often included have a predominantly technical focus, measuring the availability of a type of media or service provided by an organization [15].

Although benchmarking is associated with the promotion of best practices and provision of incentives for improvement, it has also generated critique. Especially the criteria and indicators included as well as the method of measurement have attracted criticism [16]. Bannister [20] criticizes scoring methods on a number of accounts:

complex issues are bundled into one single score or measured by the use of proxies, the changes of scores and interpretation of criteria over time render comparison impossible, the scope and complexity involved and the associated problems of operationalizing, and the often ambiguous interpretation of the scores. Janssen et al. [21] higlighted another problem involved with benchmarking, using the slogan 'if you measure it, they will score'. This means that as soon as certain elements are operationalized in a specific way, organizations will make sure that they score high on the operationalized score, instead of looking into the underlying issues. The use of benchmarking should therefore be used as part of a wider context of assessment and quality mangement [17,20]. Bannister [20] further argues that a benchmark represents a trade-off between costs, scale and quality of information, and that measurement methodologies are too often guided by cost constraints.

3   Development of a Measurement Instrument for eParticipation

Due to the infancy of eParticipation [8,9], the current focus is experimental in nature and systematic studies into best practices are lacking. eParticipation is still in its early stages and few initiatives exist that connect the multiple elements of eParticipation, such as providing information, facilitating bottom-up initiatives from citizens and actively engaging citizens with government [1]. Furthermore, measuring the deployment of online media alone does not provide a full overview of the state of eParticipation as it is also necessary to understand the various roles that citizens can take on when engaging with the government as well as the role of eParticipation in the internal organization. Following the multiple elements of eParticipation, we opted for an instrument that consists of three interconnected elements of measuring eParticipation:

(1) Citizen engagement: the roles citizens take on in their contact with the government;
(2) ICT deployment: the types of online media used; and
(3) Organization: the internal organization of municipalities.

The choice for these three elements has been made to cover the 'demand' for, the 'supply' of, and the means of communication for eParticipation. The municipal website can be seen as the technological facilitator between the citizen as user and the municipal organization as facilitator and service provider. These elements have been part of some measurement instruments and frameworks as well [20,22,23,24]. In order to measure the state of eParticipation, all three elements should be taken into account as well as the relations between the three elements.

Per element of the instrument a different set of measures was identified. For example, different types of media were distinguished according to their potential for eParticipation and scores were derived reflecting potential and actual use. To ensure that the instrument has the possibility of prolonged use and enables comparisons over time, an 'ideal' score was set at 100% and subsequently the amount of this ideal realized was determined and a score accordingly attributed. Furthermore, to avoid the pitfall mentioned by Bannister [20], scores are not aggregated on a single measure. Scores for the individual services or components that make up the elements are, for

example, determined by the level of activity observed (e.g. posts per month, channel views, number of followers, etc.) and the level of interaction possible (e.g. one-way, reactions possible, discussions possible, etc.). Measurements are done based on the information gathered from the municipal websites, and by assessing and categorizing this information based on pre-defined patterns that were developed by carrying out fifteen interviews with expert in the field of eParticipation.

Measuring the state of eParticipation of a municipality was done in three steps. Firstly, the measures that can be obtained by looking at the websites of seventeen municipalities were scored. Then, using these measurements, their potential for each of the factors was determined. And finally, six municipalities were studied more in-depth by carrying out interviews with employees. These semi-structured interviews provided extra information by reflecting on the data gathered by assessing the website, and investigated the internal organization which could not be measured by looking at the website. The purpose of these interviews was to generate additional context for understanding the measurement results based on organizational factors such as the level of knowledge and resources available within a municipality.

2.1   Citizen Engagement

The first element of the measurement instrument is the role citizens take on in their contact with the government. Our measurement instrument uses generic roles based on user patterns to identify for which roles the municipal websites cater. Distinguishing between these roles can enable municipalities to refine their eParticipation strategy based on the type of interaction they wish to promote. Six different roles are distinguished related to internet usage [26]:

−   **Inactives** do not participate at all;
−   **Spectators** read blogs, listen to podcasts, watch videos from other users, and read forums;
−   **Joiners** maintain a social networking profile and participate in social networks;
−   **Collectors** aggregate data via RSS feeds;
−   **Critics** review products/services, comment on blogs/forums, and contribute to wiki's; and
−   **Creators** publish a blog/website, upload videos/music, and write articles or stories.

While the Inactive and Collector roles are useful in understanding different user types and their expectations about websites, they are not participatory roles. Therefore, these roles will be left out in our instrument. The information found on the municipal websites was assessed to determine to which extent the services cater for the user roles. For example, investments in social networking sites such as Facebook and Twitter likely invite citizens that have taken on the Joiner role. This gives insight in the degree to which municipalities facilitate specific user roles and accordingly, their type of involvement. Municipalities can use this information to determine the facilitation of specific roles and build an appropriate social strategy [26].

2.2   ICT Deployment

The purpose of this element of the measurement instrument is to measure how well municipalities can facilitate eParticipation on their website through the use of online media. Firstly, this element includes the selection of the type of media as well as how actively these chosen media forms are used. Based on literature, the following categorization [24] and media [6,9,24,27-29] were selected for measurement:

– **Standard media:** Email, Newsletter, Short Message Service (SMS), Poll, Survey;
– **Innovative media:** Real Simple Syndication (RSS) Feed, Blog, Forum, Webcasting, Social Networks (LinkedIn, Facebook, Hyves), Twitter, Media Community (Flickr, YouTube), Chat, Interactive Map, ePetition, Wiki; and
– **Experimental media:** Simulation or Game, Virtual World, Chatbot, Group Support System.

Standard media forms have been around for a long time, innovative media contain some Web 2.0 aspects such as social networks and indicate a popular segment of media, and the experimental media are (as of yet) rarely used [24]. This categorization shifts over time and is subjective in the sense that some media that are classified as experimental may have become innovative or standard for generic situations. We found that this classification fits the current Dutch eParticipation context by discussing these issues in the interviews with the experts.

Secondly, the media types investigated in this measurement tool can be classified according to the level of participation they are usually used for. Five different levels of participation can be distinguished according to the increasing importance they entail for municipalities to act upon [8,8,24,30,31]:

– **Informing:** one-way provisioning of information about public affairs and the municipal organization;
– **Consulting:** expertise, opinions, and/or votes are used to poll for the perspective of the citizen on selected topics. Municipalities may use these as input for their decision-making but they are not obliged to act them;
– **Advising:** expanding consultation into a group discussion where citizens can deliberate together with the municipality about problems or policy alternatives, thereby carrying more weight than consulting;
– **Co-producing:** a form of participation where the agenda is set together with the citizens and a new policy or service is created together. The municipality is beholden to the results of the process; and
– **Co-decision:** the municipality asks citizens to make a binding choice about a selection of policy alternatives.

2.3   Organization

The third aspect of the measurement tool is the organization of the municipality. The website is the online front-office for eParticipation, so it is crucial that the offline

back-office is capable of supporting this. As this cannot be studied by looking at the website, a set of interview questions for employees of the six municipalities was defined. These open interview questions are not technically part of the measurement tool as they do not provide any eventual score or assessment, but they can be used to link eParticipation to the decision making processes in the municipalities. This element included questions on whether or not people were given responsibilities regarding eParticipation, the existence of training, and the amount of budget available for example. Multiple eParticipation researchers [23,24,29,32] make a connection between the different forms of participation and the different policy phases:

− **Agenda-setting**;
− **Policy analysis**, sometimes called **Design**;
− **Policy-creation** or **decision-making**;
− **Implementation**; and
− **Monitoring or evaluation**.

Analyzing the forms of participation in relation to the policy cycle is useful because it places citizen participation in the lifecycle of municipal processes. The input from stakeholders and the openness of the process differ as projects progress [33]. Participation of citizens plays a different role in the agenda-setting phase than in the implementation phase. Municipalities can adopt eParticipation in those phases they want to focus on.

4   Findings

The municipalities chosen for this study were known for actively exploring eParticipation opportunities and most of them can be seen as frontrunners. In total seventeen municipalities were investigated by analyzing their websites, and for six of these municipalities interviews were held. Five of these interviewed municipalities were large and one was medium-sized. During the interviews held, the employees of the six municipalities generally recognized and confirmed their scores on the measurement instrument.

4.1   Citizen Engagement

The capabilities of municipalities to facilitate specific roles citizens' take on in their contact with the government are shown in Fig. 1. This shows that the municipalities generally cater to the Spectator role (i.e. listening and reading information provided by the government) and the Joiner role (which maintains a social networking profile and participates in social networks). The other two roles, the role of the Critic (those that review and comment on wiki's and forums) and the role of the Creator (people who publish their own content), are less facilitated by the capabilities of the municipal websites.
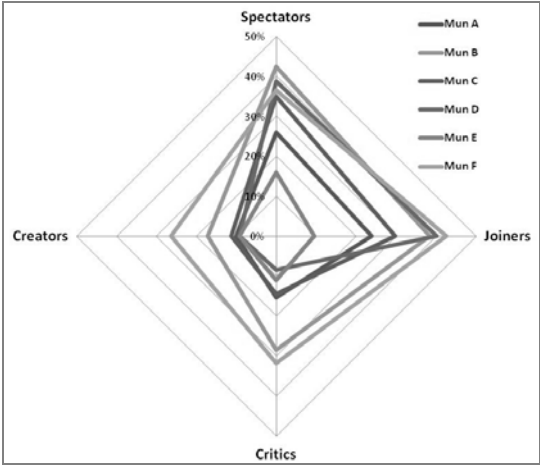
Fig. 1. Spider graph of selected citizens' Internet usage roles

4.2 ICT Deployment

The ICT deployment scores per media type – standard, innovative, and experimental – are shown in Fig. 2. Although there are some exceptions, the Standard media scores are generally the highest of the three types with scores reaching above 55% and with an average of 34%. The second most common types of media are the Innovative ones with an average score of 21%. Experimental media types are hardly – if at all – deployed by the municipalities in this study. The average score here is 6% with 7 municipalities not having any examples at all. This shows the limited level of media usage in the investigated municipalities that are considered as frontrunners, which likely has consequences for their potential to develop these media for eParticipation.
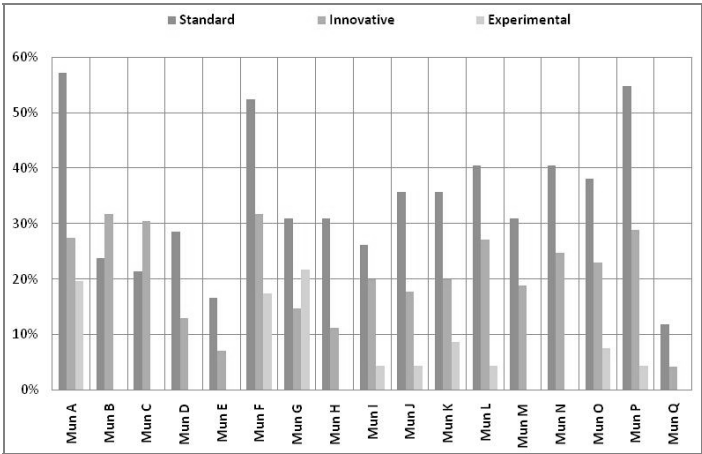

Fig. 2. ICT deployment scores per media type

In Fig. 3, the media forms deployed are categorized according to the participatory role they facilitate. A higher occurrence of the Informing (the provisioning of information) and Consulting (facilitating input from individual citizens) levels of participation can be observed. While Advising (the facilitation of input from groups of citizens) and Co-deciding (the joint agenda-setting by citizens and municipalities) can be observed in the municipalities under study, the participation level of Co-producing (where citizens are responsible for policy-making) is observed in only a few municipalities. Note that only a selection of municipalities is shown in order to simplify the graph for viewing, but the patterns shown represents the other municipalities too.
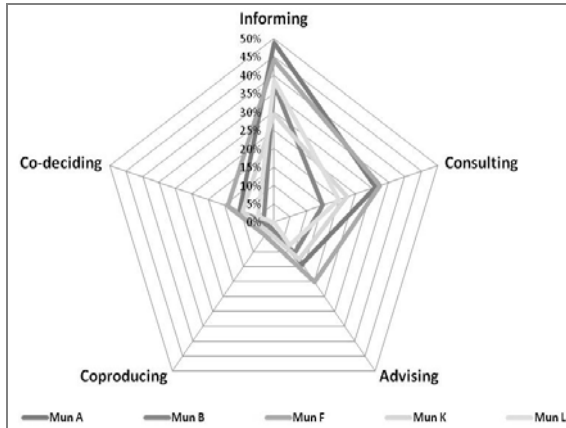

Fig. 3. Spider graph of selected level of participation scores

4.3 Organization

The data were also mapped onto the different phases of the Policy cycle. The graph pattern in Fig. 4 shows a greater focus on Monitoring and Agenda-setting. This is
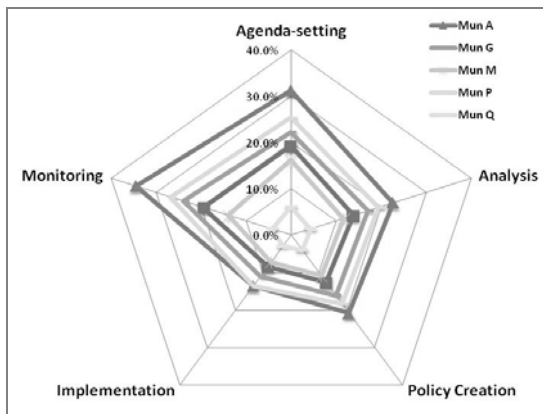

Fig. 4. Spider graph of selected policy cycle scores

likely a result of the large role that Consultation and Informing play in these phases, which are currently the most common forms of participation. The lesser emphasis on Implementation is expected as there were few participation forms observed where citizens are capable of contributing in this phase.

5   Discussion and Limitations

From the application of the measurement instrument to the Dutch municipalities it becomes clear that eParticipation in still in its early stages. Although they try to reap some of the low-hanging fruits such as deploying already common forms of ICT for purposes of eParticipation, it is clear that the municipalities participating in this study are still experimenting. As these municipalities are considered frontrunners in the Netherlands, it is likely that others lag behind. From the findings of applying our benchmarking instrument we identified two major issues that need to be addressed to further develop eParticipation in municipalities in the Netherlands: spurring the use of media forms beyond mere simple interactions, and the direct involvement of municipal administrators in more advanced forms of eParticipation.

The choice for predominantly simple media forms on municipal websites reveals the hesitance of municipalities for committing to more advanced forms of ICT and, hence, eParticipation. Insofar as municipalities have implemented media forms that can be used for interaction with citizens, they are hardly used in that way. Particularly social media such as Twitter and YouTube are very popular choices, but are only used to send information. A reason for this may be that these activities require less effort from the municipalities.

Furthermore, we observed that a major issue for the deployment of eParticipation is the degree to which municipal administrators can directly interact with citizens through social media. In case they are allowed to do so, the question what are suitable rules for this contact remains. In municipalities issues may quickly become political. This means that for the 'real' interactive tools, such as forums and simulation games, which need to be moderated real-time, this issue will prove a severe limitation in their use. Currently, there is a lack of skills and resources for process management to deal with new input. The role of civil officials in this interaction is also an issue which must be dealt with for eParticipation to succeed on a larger scale.

The instrument developed in this paper can be seen as a first step towards measuring the state of eParticipation in the Netherlands. This was generally confirmed by recognition of the outcomes by the interviewees. The instrument aimed, however, only at measuring the ability of ICT to facilitate and enable eParticipation, instead of on the actual use, influence, and effectiveness. Its main limitation thus the focus on the technical, 'supply'-side of eParticipation. The measurement tool only made use of data that were visible on the website. This resulted in predominantly measuring the type of media being used. Although roles of citizens and the municipal organization were taken into account, they could only be scored on the basis of their potential through the types of media deployed. The fact that an organization is able to deploy a certain media type and thereby has the potential to facilitate a certain user role, does not necessarily mean that they are actively engaging with citizens in an effective way.

An important reason for the limited scope of the measurement instrument was a lack of resources for in-depth assessments of a large number of municipalities. Measurements were therefore carried out in a cost-efficient manner by focusing on elements that could be measured easily. We therefore recommend for eParticipation measurements to use qualitative methods such as interviews, which allow for more substantive measurement and categorization, instead of an instrument that only measures the potential of the front-office. We also found that conducting interviews and carrying out an in-depth assessment of the state of eParticipation has the potential to inspire learning among municipalities. Furthermore, as categorization was done by experts, it was subjective. We therefore recommend that further research should be done on the development of generally accepted measurements for eParticipation.

Because of the focus on the 'supply'-side, the actual needs and desires of citizens with regard to eParticipation were not measured in this instrument. To include measures on the demand-side, the instrument should be extended to include interviews with citizens. Another issue with the focus on the supply-side of eParticipation was that some of the experts interviewed criticized the measurement instrument for including the Informing level as this is often not seen as a form of participation, but rather as a precondition. For this reason, it is useful to keep it among the levels of participation deployed in the benchmarking tool, but it should be made clear that this is step 'zero' on the way towards proper participation.

An underlying difficulty encountered in this study is the current level of eParticipation in the Netherlands. Many of the limitations of the measurement instrument are related to eParticipation still being in its early stages of development. Development of a measurement instrument for the more advanced stages is be useful when there is little to measure. Therefore, extension of the measurement instrument to cover the use of citizens' input and its effectiveness will be necessary to gain proper insight into eParticipation. Furthermore, the measurement of the more advanced stages as well as the effectiveness of eParticipation requires more in-depth research than measuring the ability of municipal websites to enable participation. The use of qualitative instruments such as interviews may be more useful for measuring eParticipation as it allows for investigating the details of enabling, stimulating, and processing the input of citizens, as well as inspiring learning from each other.

6   Conclusion

eParticipation is still in its infancy and few instruments exist that give an overview of the experiments that are undertaken by government organizations. To inspire further development, a measurement instrument used for assessing the level of eParticipation within municipalities was developed and applied to seventeen Dutch municipalities. While these municipalities undertook many eParticipation related experiments, these developments largely focused on informing and consulting citizens through deployment of informational online media. The interviews carried out in six of the municipalities revealed that they have few ideas on how to design and deploy a fully-developed eParticipation strategy. As the municipalities taking part in this study can be characterized as frontrunners this implies that the level of eParticipation deployment in the Netherlands is still rather low.

The instrument connects the roles citizens take on in their contact with the government, the types of online media deployed and the municipal organization. However, the instrument mainly focuses on the type of ICT being used, as this is currently how eParticipation is perceived in government organizations. For further investigations into eParticipation the measurement instrument should be extended to cover factors such as the effectiveness of the media types deployed in relation to the type of users and the inclusion of citizens' input in the decision-making processes in the organizations. Furthermore, we recommend the use of qualitative measurement instruments such as interviews to enable more in-depth assessment of eParticipation as well as to inspire learning.

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Direct Democracy Catalysed by Resident-to-Resident Online Deliberation

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Abstract. In the context of local civic governance, much of the interest in e-Participation concerns the extent to which online media might overcome the limitations of geography and scale, and so allow local interests to be better represented in institutionally driven participatory processes at national or regional level. In contrast, this study investigates the online deliberations of a local, geographically bounded community in a series of mailing lists that had originated from their own initiative and self-organisation. The interactions we observe challenges assumptions of democratic deliberation as mainly policy debate between citizens and government, or of lobbying administrative government. It also proposes a broader conception of the role of online deliberation in local governance, where instrumental decision-making and developing consensus is frequently over privileged in research.

Keywords: e-Democracy, e-Participation, e-Governance, Neighbourhood democracy, Online Deliberation.

1 Introduction

Over the last decade, the growing availability of simple, free online communication tools such as bulletin boards, forums and mailing lists have seen these increasingly appropriated in local communities to support civic governance conversations between residents [1]. Bottom-up technology implementations have often been ad-hoc [2] - without significant thought about design or the affordances [3] of the technology, and the assumption that the introduction of technology will likely strengthen local deliberation and coordination as long as it is sufficiently used. This paper presents a case study that investigates how the socio-technical environment [4] induced by the use of such online media mediates the governance practices of a small community, the residents of a semi-urban village in South Africa.

We approach this context of deliberation with the assumption that the dynamics of online interaction are likely to diverge from the state-centered interactions that are more commonly investigated in the research of e-democracy or e-participation [5-7]. Further, much of the related discourse implicitly focuses on how online interaction overcomes the limitations of geography and scale, and allows local interests to be represented in institutionally driven processes at national or regional level. This paper proposes the local context of a village or neighbourhood forum is conversely interesting exactly because the interaction of the online and offline is most visible there, and

for the directness of engagement that very local issues afford – much as this raises new questions for research. In other words, the study follows the case selection logic proposed by Dahlberg [8] to extend the "first phase" of understanding of online deliberation – an opportunity to test established interpretations in a relatively under-investigated context.

The local perspective questions assumptions of democratic deliberation as mainly policy debate between citizens and government, or of petitioning government locally. It also proposes a broader conception of the role of online deliberation in local governance, where instrumental decision-making [9] and developing consensus is frequently privileged in research. The dynamics we observe in the case study further raise a number of pertinent issues relevant to the design and implementation of systems to support such local governance conversations.

2   Case Description

The case study investigates the use of a range of online media in a small, geographically co-located community of approximately 1500 residents in on the outskirts of a large city in South Africa. The residents had voluntarily formed a "Residents and Ratepayers Association" (RRA) to attend to local governance and to represent the interests of the community to the city municipality which formally governs it. Because of geographic distances, low population density and limited human and financial resources, formal government have limited capacity at local level in South Africa [10].The RRA is accordingly formally recognised by the city municipality, and departments of the municipality interact with the RRA committee daily on matters ranging from infrastructure development to the delivery of basic and social services. In many cases, the RRA have assumed direct responsibility to co-ordinate and execute local governance actions.

In practice, the business of the RRA is conducted by a committee of five volunteers, elected at an annual general meeting (AGM). The committee has bi-monthly meetings that are open to all residents and ratepayers, though in reality the meetings are rarely attended by anyone but committee members. The RRA had experimented with the use of web-based tools, using volunteer technical assistance, to better co-ordinate their work, involve residents more actively and provide for a more communicative governing platform. Over a period of five years, the efforts included several iterations of a village website, an online forum, a map-based incident reporting tool and several email lists. The experimental, somewhat ad hoc approach meant that some of these tools had become redundant or had fallen into disuse when this study was conducted. Accordingly, we based our investigation on the main residents email list, as well as two topic-specific subsidiary lists, which together appeared to be the tools most prominently used to conduct governance. Though the online lists afforded users nothing more sophisticated than group email exchanges, they nonetheless appeared to afford complex deliberative interaction, and were broadly used. Residents could participate using whichever email client they already had 'at hand' [11], they were automatically forwarded conversations once they had subscribed to the list, and could reply directly from their email inbox. At the time of this study, the lists had 415 subscribers, estimated to represent approximately

half of the households in the community. Of these, 81 subscribers had contributed messages in the preceding year[1].

Our investigation focuses where off-line and on-line deliberation between citizens directly concerns questions of local governance, much as other conversations provided interpretive context. In this sense, the case study presents an example of "neighbourhood democracy" [7, 13]. However, it should be distinguished from studies of online neighbourhood democracy, or more broadly online deliberative governance, where the research focus is purely on the interaction of citizens with government, and where policy formulation in its various forms is both central object and output of communication. In this instance, the online discussion spaces were conceived, set up and are maintained entirely as a spontaneous volunteer effort by members of the community. Formal government, e.g. the city municipality, are neither the principal object of, nor significant participants in the conversations. Dialogue is between residents and largely concerns how they and their residents association might directly resolve local issues. Accordingly, residents understand the problems under discussion well, are often personally affected and appear highly motivated to participate in governance action. To the extent that they recognise the mandate or authority of external role players in issues, residents use the list to co-ordinate internally and then to provide locally consolidated input where *they* judge it will have appropriate effect.

3   Approach

Our goal was to use the case study as a form of "grounded account" [14], albeit informed by an acknowledged and developing theoretical framework, what Carrol and Swatman [15] refer to as 'structured case'. Epistemologically, the study takes an interpretive, constructivist approach. It considers governance in the first place a co-constructive [16] process - the shared defining of social reality and the possibilities for action therein, rather than a matter of primarily deciding between pre-existing options by a vote or poll [17]. The related technology is not treated deterministically, but its influence considered from the perspective that "sociotechnical developments do not determine political outcomes, but instead simply alter the matrix of opportunities and costs associated with political intermediation, mobilization, and the organization of politics" [18].

The research design incorporates several forms of triangulation [19] to improve the validity of interpretive claims: multiple data sources are used, constructs are developed correlating the outcomes of multiple methods of analysis, and the analysis relies on the direct interpretations of research participants as well as a group of external evaluators, as much as those of the principle researcher.

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[1] While these numbers follow the expected pattern of diminishing participation at each level of engagement (relative to the overall population), the proportions are much higher than one might expect from examples in the literature 12. Preece, J., Abras, C., Maloney-Krichmar, D.: Designing and evaluating online communities: research speaks to emerging practice. International Journal of Web Based Communities **1** (2004) 2-18. To compare the online audience with that offline, the most recent AGM had 80 attendees, of whom 20 had an opportunity to make comment.

In this paper we report on the second stage of the ongoing research project. An initial exploration of interactions on the community forum [20] employed course grained analysis of message content to establish an interpretive foundation for further work. The outcomes of this first stage of analysis were presented as a number of 'patterns of governance conversation', as well as preliminary observations on the dynamics contributing to each of these.

To investigate these preliminary findings in more detail, in particular to establish what interpretation community members themselves make of what had been observed, individuals were interviewed about a selection of thirty messages from the discussion archive. The material was theoretically sampled to be representative of the dynamics that had been proposed, while also giving a good cross section of authors and types of contribution. We interviewed 14 residents, as well as 4 'external' observers, chosen to triangulate our own interpretations with those of residents. The objective was to steer any further investigation and analysis through these grounded accounts, which used the sampled messages primarily as an aid to memory of specific events and the interactions related to them.

A triadic card sort [21] was used to structure the interviews, requiring participants to select 3 messages from the sample at random for each round of sorting and discussion. The 'triad sort' required that they identify a dimension that two of the messages shared, the third message representing an opposite or alternative. Participants were also requested to vocalise their thoughts as they worked. This produced two levels of data: by sorting and comparing messages participants produced 'personal constructs' [22] reflecting their interpretation of online interactions, and which could be used as the conceptual frame for further content analysis; at the same time, the in depth discussion of the material, as well as participants' rationale for sorting decisions, produced rich interpretive data.

4   Interview Results and Content Analysis

The interview process generated a set of 70 dimensions, too many to present in detail in this paper. However, as a first step of analysis, the constructs were grouped into four broad themes, which we do present below. Within these themes we present a number of 'key issues' – each informed by one or more of the constructs identified by participants in the card sort, relating these back to the governance interactions of the community. The themes are arranged here to reflect our own process of sense making and understanding, each theme developing on the basis of concepts presented in the previous themes.

The (Local) Online Public Sphere

This theme reflects on the affordances [3] of (geographically local) online interaction, compared to what may have been afforded otherwise. This presents the most literal interpretation of the 'matrix of opportunities and costs' [18] that we proposed to investigate of the new sociotechnical environment.

- Participants report a paradox: it is less intimidating to write a message on the forum than to confront a neighbour but, at the same time, almost everyone interviewed said

they post less often than they would otherwise for fear of the response their message might evoke. A common response – "because I don't want to go there". This was particularly true of anything discursive or potentially contentious. In a local forum such as this, participating is everything but impersonal and anonymous. A comparison with contemporary field notes taken at the local ratepayers annual general meeting suggests the opposite in an 'offline' meeting – it is intimidating to speak up in front of a room full of people, but the stricter meeting protocol includes certain 'protections', if only a better sense of where opinions lie before speaking.

- Asynchronous conversation has its advantages and disadvantages. People are not excluded from conversation simply because they cannot be in a particular place at a certain time. On the other hand, the broken timeline can be very disruptive, with participants interjecting once a discussion had potentially moved on, and a number of conversations effectively mixed up in one channel. Where a face-to-face group discussion affords participants some sense of its progression, an indication of where opinions lie (e.g. by seeing nodding heads or agitated gestures), online a single dissenting voice can (for better or worse) derail a line of thinking because of the absence of these clues.

- Some of the residents we interviewed feel the online channel can be divisive – creating 'sides', or even victims and perpetrators, where previously there had simply been a range of opinions. Related to this, participants express the concern that the 'open channel' reduces the possibility of a negotiated solution between directly affected parties, face-to-face. In stead, positions are established publically, broad judgements made, and often enough legal steps threatened (or taken) – damaging what many had perceived as a 'laissez faire' approach that the village is historically known for.

- Experience both during formal meetings and informal face-to-face conversations suggests that the online conversation often enough flows smoothly into offline interactions and back again. It is really not a separate 'space' as much as an extension of daily interaction. At the ratepayers AGM, issues that had emerged and been argued online are taken up and discussed exactly as any other. In turn, discussion at the AGM is smoothly continued online after the meeting. This is potentially a negative aspect for those who are not part of the online governance conversation – though many of the online stalwarts are conversely not seen at the AGM. Their reasons vary from feeling co-opted by the meeting, to simply not being able to attend because of parental duties.

Imagined Community

The theme of 'imagined community' [23] departs from the notion that a sense of community, and the placement of oneself within that, is necessarily subjective and projected [24]. The forum, in turn, significantly impacts the sources an individual draws upon when constructing their sense of local community. This is particularly relevant if one approaches governance as a form of collective action - a co-constructive process of 'creating' meaning and therefore the potential for specific actions [1, 25], rather than a simple poll between pre-arranged options.

Key Issues Include

- Participants are exposed to a potentially broader (less self selected) range of opinions and values on the list. Often enough residents interact with community members online that they have never met, or otherwise do not recognise from other contexts. In interviews, participants do however express unease over the projection of an 'online personality' versus that offline, the potential that the interaction online is one sided and participants quickly typecast after a 'hobby horse'.
- Participants identified how some shape roles for themselves online, in relation to their imagining of the community and their place therein. In some cases these roles extend their offline reality fairly directly, but not in all cases. Either way, some participants put a great deal of effort into 'presenting themselves', what Habermas [26] described as 'dramaturgical action.' It may be that the expectation of continued contact, and the likelihood of encountering other participants offline, is part motivation.
- The online conversation creates a shared frame of reference. During the card sort, participants would frequently immediately recognise a topic of conversation, identified consistently across interviews by some key phrase that had significance in the discussion. Often this would be the subject line of the email initiating a conversation. "Ah, the 'dogs out of control' story," someone would exclaim. This may otherwise not have been shared to the same extent. What these topics mean, or how they are interpreted, is however less shared than participants assumed. The divergent interpretations and perceptions of the value of different sorts of content (and styles of interaction) is a prominent feature during interviews. Participants also have divergent views on what 'belongs' on the forum.
- Might the forum place the ratepayers association, or particular role-players such as the forum moderator, more prominently in the residents' imagined community?

Collective Action

The previous section discusses aspects of each resident's imagined community, a potential driver and also modifier for collective action. This next section develops on this by focusing on some of the aspects of the collective action that were raised during interviews.

Key Issues Include

- During the first phase of the study we noted the organic, frequently ad hoc nature of local civic action, based on tacit agreement rather than formal decision-making process[20]. We reported evidence that the online interaction particularly facilitated the development of the shared frame of reference that made relatively informal governance possible - by supporting ongoing pluralist discussion, and particularly admitting expressive contributions which participants may have been too inhibited to make at a meeting. Yet, many of the interview participants communicated, to varying degrees, their disappointment with the online deliberation. For some, the discussions had become "more of the same", "rants" or "fear mongering." They felt that the deliberation derails all to often, leads nowhere, and may detract from people's willingness to eventually engage in practical action.

- Many none the less agree that the forum has been very successful at mobilising the community and co-ordinating action *where there is a clear course of action* – to arrange community orientated events, co-ordinate the business of the local volunteer fire service, even to encourage local response to government requests for stakeholder input to regulations or policy. There are many who feel this is the forum's strongest use.
- The co-ordination of action was however not always as clear-cut or politically neutral as some would suggest. In many cases, what was presented as straightforward co-ordination did serve an additional agenda: the encouragement for residents to provide feedback would be accompanied by a 'briefing' that presented a very one sided view, and then go as far as providing 'template' objections, a range of arguments (from a particular point of view) for respondents to draw on. Though residents were presumed free to present alternative points of view on the forum, there is significant social pressure once consensus is so strongly implied. While this could be considered undemocratic on one hand, it does potentially serve to restore the balance of power where the 'opponent' – e.g. an external developer, or a government agency – is significantly better resourced than any single community member. In cases where the forum serves the interests of a group of participants over an individual however, a similar process may amount to 'bullying'.

The Work of Governance

One participant commented on the way that decisions are "usually" made at local level: a meeting is called, and those attending are assumed a quorum by virtue of their presence, the only ones with sufficient interest to share in the decision making process. While the online discussion alters this dynamic somewhat by allowing more open-ended participation, there are nonetheless new forms of potential exclusion as a result. Such issues of power and representation reflect an underlying tension between the 'work of governance', and the power associated with being in charge of local events. As another participant implied, there are many 'on the sidelines' who are quick to accuse the 'doers' of the abuse of power, though they themselves are unwilling to become involved beyond making comment.

Key Issues Include

- The residents association set up the forum as a tool to lower the cost of communication with residents, and, the moderator claims, to make their actions more transparent, given that residents did not attend monthly meetings of the committee. Yet the input on the forum remains informal, with almost deliberate steering away from giving the forum any more official status as deliberative tool. The chair claims discussion on the forum significantly influences their decisions – yet one might argue that the forum is potentially a strategy of containment [27], a way to give the community the impression of being informed and consulted – yet selectively so.
- The residents association sometimes deliberately conducts matters 'on the quiet' on the pretext that a storm of empty, habitual protest will quickly render any sort of action impossible. They argue that they are, after all, a democratically constituted body with clear duties that cannot allow constant interference with their efforts. Is there 'too much' democracy as a result of the online deliberation, allowing uncon-

structive 'armchair dissent' to obstruct the work of governance? There is clearly a balance to be struck – the committee members are volunteers with little to gain by their local involvement, nor their role as go-between with government on matters of local service delivery.

- Some residents choose not to be subscribed to the forum at all, the 'cost' of being subjected to periodic conflict, or regular messages they have no immediate personal interest in, is too high. Those that are subscribed mentions 'noise' on the list (though definitions thereof diverge greatly) as one of their key complaints, and discuss various mechanisms which might be used to filter the stream of messages to a 'daily me'. Yet, the value of the list as community building and governance tool lies exactly in its reach and unfiltered nature, the fact that it is a genuinely shared channel. The list is potentially a 'public good', but one which requires work of its participants to maintain.

- Where there has been success, the list has been effective at sharing this and so developing both individual and collective political efficacy [28]. From the interviews, there is strong evidence that both the opportunity to provide input online, and the outcomes of some of the more visible community processes, has strengthened people's belief that 'something can be done' and that their input has been effectual. This is however not necessarily the outcome of online interaction – it clearly depends on how the list is used, and subsequently how both success and failure is communicated.

5   Conclusion

The work presented here is ongoing, and so any interpretations we make of the case must be provisional, much as we had not set out to propose predictive or causal hypotheses. The case does highlight how, much as the online public sphere might otherwise overcome issues of distance and scale, the geographically local context of resident-to-resident deliberation is shaped by particular dynamics and concerns exactly because conversations remain bound to place. It also shows that there are important processes of governance happening 'below' the level participative dialogue that would normally be considered in a top down process. Particularly relevant is the ability of a community or neighbourhood to self organise, to negotiate a dynamic and pluralist understanding of their governance reality, as well as to develop the efficacy to communicate this externally where required. This diverges from the conventional understanding of e-participation in terms of where the process initiative is placed, and what sort of process is potentially supported in the first place.

The detailed issues raised by participants in our study are not "new" of themselves - many ground insights that the discourse of online deliberation already has of the opportunities and challenges of web enabled communication recently e.g. summarized by Davies [29]. The responses do however propose shifts in emphasis, and invite fresh evaluation of the potential impacts in the local context. To summarise each of the themes we identified in turn:

- There are clearly advantages to communicating online, while at the same time the impersonal, asynchronous and above all uninhibited online interaction may at

worst bully, divide and newly exclude [30, 31]. The potential for online interaction to be divisive, or otherwise destructive was the most broadly voiced concern of study participants, particularly salient in a context that implies continued face to face association, and where online dissent spills over very directly and unavoidably into daily life.

- To the extent that governance is a co-constructive process, the (local) online space provides access to a broader range of opinions [32], but also potentially affords relatively one-sided interaction within which this understanding must be constructed. While residents as a result likely had a broader view of the community than they may have otherwise had, active participants in the forum were typecast in a way that framed, sometimes for the worst, their potential contribution to future processes offline.

- Online tools removed some of the 'costs' associated with collective action, but introduced new costs [33], which must be negotiated if the space is to provide a long term 'public good'. For residents who did not previously participate in governance, joining the list simply resulted in an unanticipated rise in the cost that association had for them. Nonetheless, given the potential direct impact of the deliberation on their lives, relatively few chose to unsubscribe or avoid the list. Accordingly, almost all respondents had suggestions how this cost might be reduced by stronger moderation and filtering – particularly of more contentious issues.

- Much as the tools might be used to make governance transparent, they can be used as a strategy of containment, a diversion. To complicate the matter, there appear to be 'armchair critics' within the community who would use this argument unreasonably to subvert those willing to become involved in the thankless work of local governance. The RRA found themselves engaged on issues that were previously considered matter of course – greatly increasing their workload rather than reducing it, and potentially driving contentious issues 'under the radar' for fear of rendering their (volunteer) task impossible.

This is not to say these issues are intractable, but that there are balances to be struck, and that local online processes require careful facilitation, ideally informed by clearer understanding of the particular dynamics of geographically local deliberation than has often been the case. The dynamics within a community, and the interactions of its residents, are complex and a poorly managed attempt to reinvigorate local governance process online is just as likely to damage as it is to make governance more democratic or transparent.

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Knowledge as Power on the Internet

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Abstract. In this study we explore how knowledge produced on the Internet can reflect objectivist or subjectivist views. These different views shape participation dynamics in the knowledge production process in ways that are bound up with power. To explore these issues, we conducted a comparative case study of websites under the Development Gateway, an initiative launched by the World Bank in 2001. We examined how objective knowledge is associated with tightly controlled processes of knowledge production dominated by an elite that limits electronic participation, while subjective knowledge is associated with processes characterized by more inclusiveness, polyvocality and (qualified) egalitarianism.

Keywords: knowledge, power, discourse, Development Gateway.

1 Introduction

For some observers, the Internet is a revolutionary technological development that offers the ability to liberate the production of knowledge from Orwellian constraints. It acts as a democratizing force that facilitates participation, increases access to information, promotes open debate, encourages multiple perspectives [23], and offers the promise of a Habermasian cyber-café [13]. Part of this emancipation involves large numbers of "ordinary" people around the world who can now participate electronically in the production of knowledge that affects their lives. Under this view of technology, it has been argued that the Internet has undoubtedly facilitated the collective production of knowledge [26] as, perhaps, best exemplified by Wikipedia – a rapidly growing, collaborative website fuelled by the contributions of some millions of people around the world. Such a view of collective knowledge production is consistent with what has been called "subjectivist" perspectives of knowledge, which emphasize the participatory, constructionist processes whereby knowledge is generated using a bottom-up approach, thus suggesting a decoupling of knowledge from the strictures of control. There are, however, others who uphold more dystopian perspectives of the Internet, suggesting such new technologies provide governments and business with opportunities for enhanced control and surveillance [18]. Under such views knowledge and information continue to be produced and/ or controlled by an elite. This leads to arrangements that

sustain traditional objectivist accounts of knowledge, which emphasize the view that knowledge creation involves limited participation. Under this view, knowledge is thus produced and dispensed in a top-down manner.

However, neither traditional objectivist nor more recent subjectivist accounts of knowledge production place much emphasis on the role of power in knowledge production processes [5]. As a result, we know relatively little about whether knowledge produced on the Internet reflects objectivist or subjective views, how participatory these two modes of knowledge production are, and how these different processes of knowledge production are bound up with power. To explore these issues, therefore, we conducted a case study of the Development Gateway, a global knowledge sharing web-based initiative launched by the World Bank in 2001. By examining the discursive resources on the portal (instead of simply focusing on the presence or absence of features like news items and discussion fora), we are in a position to learn more about different ways by which knowledge is produced, how knowledge production processes are shaped, and how these processes have diverging outcomes in terms of power positions for various stakeholders.

2   The Production of Knowledge

Researchers have identified different approaches to, and conceptualizations of, knowledge [2]. Von Krogh [34] distinguishes between cognitivist and constructionist views of knowledge; Wasko and Faraj [36] differentiate between knowledge as a private and as a public good; and Orlikowsi and Baroudi [25] contrast positivist and interpretivist approaches. In this section, we focus primarily on the distinction between "objective" and "subjective" knowledge.

In particular, what might loosely be described as "objectivist" views of knowledge have been contrasted with knowledge described as "subjective". Knowledge under these two views can be contrasted in five ways: applicability, coherence, articulation, instrumentality, and resulting interactions between knowledge producers and consumers. Universal knowledge in this case is seen to be universally applicable [19], coheres systematically into a single monolithic body [21], is articulated in scientific (often technical) terms [22], and is mobilized for problem solving, prediction, and the control of both natural and social phenomena [1]. Because knowledge is technical, scientific, and often costly to produce, its production is often limited to an elite group of experts who create and disseminate it to consumers [20]. In contrast, subjective knowledge is context-specific [19]; does not converge into a single and coherent body [20]; exists in practices and language and can be articulated in "non-scientific" and tacit forms such as experience, tradition, or intuition [17]; and can be purposeful, for example for understanding, but is not exclusively mobilized for problem-solving and control [25]. Because of its nature, subjectivist knowledge is produced as a result of sense-making among actors in different contexts, for example in communities of practice, and knowledge production processes are not limited to an elite group of experts [3] [15].

One limitation about this dichotomy is that power does not feature greatly in either of the above two perspectives. In the case of objective knowledge, power is repudiated as anything that smacks of "emotive involvement and subjectivity" [16]; while

Contu and Willmott [5] argue that even constructionist approaches fail to acknowledge the wider societal and organizational power relations that shape the context within which knowledge is socially constructed. Orlikowski & Baroudi [25] thus emphasize the importance of a third approach, which they call critical. Like the subjective approach, a critical approach acknowledges that knowledge is historically and socially located; but it goes considerably further in drawing attention to the way in which power shapes the production of knowledge, including the inequities and inequalities that exist in relation to the ability to produce knowledge, as well as the way in which the constructive effects of knowledge can have political consequences. Using a critical approach, one can achieve a more explicit recognition of the ways in which knowledge and power are linked. For example, Roberts [30] argues that communities of practice consist of individuals with different standing in terms of experience, expertise, age, personality and authority, and the knowledge that is produced reflects and reinforces existing power structures.

We therefore seek to explore how knowledge and power are linked as knowledge is produced on the Internet. The Internet has been seen as a potentially emancipatory force that allows people to circumvent traditional barriers to accessing and producing knowledge in ways that challenge authority [35], decentralize decision making [9], and facilitate self organizing communities [31]. More recently, however, many researchers have become skeptical that with knowledge comes emancipation. Foucault's work in particular has brought about a greater understanding of how power and knowledge are inseparable, having argued that "the exercise of power perpetually creates knowledge and, conversely, knowledge constantly induces effects of power" [12].

According to this view, therefore, knowledge can never be neutral. It is integral to the operation of power [33]. Power produces individuals who are rendered knowable in particular ways through particular forms of knowledge [6]. The question, therefore, is not "whether the knowledge that is generated is objective or subjective … [but] what is involved in rendering an arena or individuals knowable: What are the processes by which they become known … What are their effects?" [33]. Our interest, therefore, is to empirically explore the links between knowledge and power by analyzing not just the type of knowledge that comes to be constructed on the Internet, but also their effects in terms of participation of people in knowledge production processes, as well as the power positions that result from these dynamics.

3   Methods

Our study involves the comparison of 29 Web portals that formed part of the Development Gateway – a multimillion-dollar initiative launched in 2000 by the World Bank in line with its mission to "fight poverty and improve living standards of people in the developing world" [37]. The Development Gateway was envisioned to be a global portal for knowledge creation and knowledge sharing. It was built on participatory models and intended to be the premiere point of entry for finding Web-based knowledge on poverty and sustainable development, such as reports, articles, statistics, discussion groups, transactions, and policy analyses, which could be used by a variety of stakeholders – from large banks to grassroots organizations to individual users. In addition to the main website there are also 28 country-based versions, known

as Country Gateways. These web portals were all set up under the same mandate i.e., to use ICT to help reduce poverty [8].

We selected this research site for three main reasons. First, the production of knowledge is integral to the Development Gateway and the Country Gateways. The main purpose of the Development Gateway, for example, was to "improve people's lives in developing countries by building partnerships and information systems that provide access to knowledge for development", with one major goal being to "increase knowledge sharing" [DG2005-06].

The second reason for selecting this site was it seemed likely that we would be able to compare the implications of different models of knowledge production. On the one hand, the World Bank Report on Knowledge for Development [38] employed language reminiscent of an objectivist view of knowledge [20], when it opened with:

> "Knowledge is like light. Weightless and intangible, it can easily travel the world, enlightening the lives of people everywhere … Knowledge is often costly to create and that is why much of it is created in industrial countries. But developing countries can acquire knowledge overseas as well as create their own at home" [38]

In contrast, other documents authored by the World Bank stressed a view of knowledge more consistent with the subjective view by emphasizing building knowledge through partnerships and creating communities of practice that would facilitate knowledge sharing and collective problem solving [37]. In this way, the research setting offered the prospects of examining both approaches to knowledge and any tensions between them.

Third, the Country Gateways present a compelling research site for a multiple case study design [11] – they were all set up under the same mandate by the World Bank; received funding from the same World Bank grant; and are subject to the same guidelines. In this way, the research site constitutes a natural experiment, in which the 28 Country Gateways that use English, as well as the Development Gateway itself, can be systematically compared [8].

Data collection commenced in June and July of 2005 by downloading the home pages of 28 Country Gateways, as well as the original Development Gateway, in MHTML format. The home pages of all the portals were downloaded again between September 2005 and January 2006, together with subordinate pages one level deeper than the home pages i.e., each page immediately linked to every clickable item on the home page.

We began our analysis by creating a list of all the individual features that could be identified from the 29 home pages. A feature is a group of website elements held together by an explicit or implicit frame, such as white space or logical clustering. For example, a "news article" may be a feature made up of multiple elements: words, photos, and a comment box, and all these are implicitly linked together by virtue of location and content. Another feature might be the box containing a special report, which might contains three elements: an icon, a description of the special report, and a link to where the report can be downloaded, all bound together by an explicit frame.

Our initial analysis involved attempts to map the presence or absence of certain features with specific types of knowledge (for example, centrally-produced news articles suggested objectivist views, discussion fora suggested subjectivist views). This was in line with literature that suggests that certain website features can be mobilized to

achieve certain levels of participation: for example, a website aimed at educating users requires the use of a discussion forum; one that aims at input probing calls for web comment forms [29]. However, a deeper examination of the portals showed that a single feature was often endowed with too much complexity to be used as the most basic unit of analysis. For example, we found that a discussion forum feature, which some have equated with subjectivist and participative forms of knowledge, was often a convergence of many elements: words, visuals, rules, roles assigned to parties, and these elements could send out different signals. We found cases of discussion fora wherein words and headings were welcoming and inclusive, yet rules and roles were so restrictive and confining that only one expert participant could give input, and all other participants were restricted to "silent" reading [26]. Cases such as these would call into question the assumption that interactive mechanisms like a "discussion forum" or "chat" can automatically be equated with participative forms of knowledge.

Thus instead of analyzing the contents of websites using features as a unit of analysis, we made use of techniques that allowed us to "disassemble" websites into finer units, in this case discourses. Discourses include written language, spoken language, cultural artifacts, or visual representations [15]. On a website, these discourses took the form of words, visuals, and interactivity elements. The ways that these discourses are mobilized are referred to as "discursive strategies." Our analysis of these resources is a methodology called "discourse analysis", which involves the systematic qualitative investigations of such "texts" i.e., the examination of what these texts are, how they relate to other texts, and what their meaning is.

Our analysis took place in three stages. First, we created a table for each portal in which we analyzed the discourses present on their homepages, in order to generate detailed interpretations. To analyze words on the homepage, we drew from traditional discourse analysis [28] and journalism [24] and analyzed the written text according to four categories (a single category overarches multiple questions): the genre of resources; sources, speakers, and authors; topicalization; and tone. This enabled us to detect characteristics such as the use of detached, scientific, "objective" language as opposed to more emotional or personal tones. To analyze visual resources, we drew from marketing and visual design [16] to analyze the website using another six categories: the organization of the webpage (e.g., streamlined, simple layout); composition (e.g., many elements or few); modality (saturation, differentiation) and color scheme; salient elements; nature of visual resources; and the content of visual resources. This enabled us to discern characteristics such as whether or not real people were being shown and portrayed in certain ways, or if detached, clinical icons were being used instead. We also analyzed interactivity according to nine categories, drawing from the field of information systems [14] [32] to examine features such as ease of access to site; spread of site; use of tools like chat or bulletin boards; use of forms like dropdown menus or radio buttons; transactional capabilities (type, depth, rules and assumptions); language capabilities; linking; and functionalities that establish an item as salient. This enabled us to discern if a website was open to input and interaction, or if it was primarily pushing material out at a "passive" audience.

Second, we categorized these interpretations using categories from knowledge theories: applicability, coherence, articulation, instrumentality, and relationship between producers and consumers of knowledge, discussed earlier. This allowed us to aggregate

our interpretations for each portal to see if an overall pattern could be discerned that indicated the dominance of one or other of the two views/forms of knowledge.

Finally, in the last stages of analysis, we selected two cases as "ideal types" – one that conformed closely to the ideal type associated with the view of knowledge as objective – the Development Gateway – and one that conformed closely to the ideal type associated with the view of knowledge as situated – the Croatia Country Gateway. These two selected portals are value adding for theoretical development in that they are, to use Flyvberg's [11] terminology, prototypical cases. We then explored these two cases in more detail to show in greater depth the implications of these two different views of knowledge. Specifically, we examined the power effects of these web portals, in particular the way in which they constructed different power positions; most notably the producers, legitimators and consumers of knowledge. In doing so we addressed the following questions: *(1) What are the characteristics and knowledge production processes associated with objective and subjective knowledge on web-based portals?* and *(2) What are the power dynamics associated with stakeholders on portals that reflect different views of knowledge?*

4   Findings and Discussion

We selected two portals which show contrasting patterns in the way knowledge is produced and disseminated which, broadly speaking, can be characterized as objective and subjective. The Development Gateway [8] presents knowledge that is consistent with the objective view, while the Croatia Country Gateway [7] shows knowledge that is consistent with the subjective view. These views in turn have implications on interactions and power positions of stakeholders of these portals.

4.1   Knowledge and Power in the Development Gateway

In earlier work [27] we investigated the Development Gateway and concluded that it conformed to characteristics associated with objectivist forms of knowledge. We summarize findings here in order to set up the comparative case study. Under "Knowledge" we explore the categories of applicability, coherence, articulation, and instrumentality. We explore the fifth category, interactions between producers and consumers, in the subsequent sub-section, "Interactions and Power".

Knowledge in the Development Gateway. First, an analysis of the website [DG2005-01][1] indicated that knowledge was presented in universally applicable terms. For example, the home page showed an emphasis on global rather than country-specific matters. On this main page, the "Special Report" focused on the Millennium Development Goals, which are global indicators dealing with poverty eradication. The "Featured Book" focused on the macro phenomenon of inequality between countries. The Aid Harmonization and Human Development Reports, as well as the databases and statistics, were not focused on a particular country although they did provide a regional basis for the data. Knowledge about specific countries was more short-lived – highlighted only for a limited period. There are also claims of universality in the form of broad

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[1] A reference in brackets refers to a page that was downloaded as part of data analysis.

invitations ("All who are interested in ICT for Development are welcome to join us... This site is aimed to help all of you!") [DG2006-08].

Second, knowledge was presented as a coherent, comprehensive, detailed and systematic taxonomical scheme. The home page divided information 28 different development areas, originally called "topics" and, subsequently, "communities" [DG2006-02]. The topics were diverse, ranging from nanotechnology to indigenous issues to microfinance. An examination of the topic ICT for Development showed that it was further broken down into 47 key issues linking ICT to e-commerce; poverty; disabled persons; and arts and culture. The ICT for Development topic contained a total if 8991 resources [DG2006-08], more than the total number of resources found on the Australia Development Gateway.

Third, knowledge was articulated in highly technical terms, making use of extensive jargon and employing the specialized language of development. The homepage's list of its five Most Popular Items of the Week included UNCTAD's World Investment Report, which "presents the latest trends in foreign direct investment (FDI) and explores the internationalization of research and development by transnational corporations (TNCs) along with the development implications of this phenomenon". A second popular item is a book that aims to teach readers to "employ a uniform, coherent, and time-tested methodology for identifying and quantifying the impact of various disasters on the affected social, economic and environmental sectors" [DG2006-01]. The portal thus uses the language of experts, not laymen.

Fourth, much of the knowledge on the Development Gateway was constructed to serve the purpose of systematic problem solving. Problems published include "internet access and staff capacity [being] key constraints in SMEs seeking to grow", "donor support for pure infrastructure projects [having] dropped dramatically"; and "access to and benefits to ICT [still being] limited to a subset of the population" [DG2006-21]. Solutions included a new fund for rural innovation in India; an online community to link 100,000 youth around the world, and how a new Iraqi media institute has been set up to facilitate war and peace reporting [DG2006-08].

As a result of the type of knowledge that is privileged on the portal, knowledge production processes take on a very distinct shape. Knowledge production is controlled from the very start of the contribution process by a number of filters that restrict access into the arena: before a person can contribute, one must sign up to be a member, then find the appropriate topic under which one's work can be published, and then submit one's work to designated people who will still screen the quality of one's work. The ICT for Development community, for example, was overseen by three "guides", 51 "advisors", two "coordinators", one "volunteer", and 27 "cooperating organizations"; in its discussion forum it is noted that "The Development Gateway may edit or remove your comments" [DG2006-07].

The hurdles that one must go through before one can have a voice in the arena have been taken by some to be excessive. For example, on May 29, 2001, a potential contributor wrote, "Great site, please add a community on anti corruption, also I tried 4 times to add my article under law and justice but was not successful, although I am quite technical. Thanks." [DG2006-42]. This statement indicates the presence of filters in the form of technical difficulties (tricky even for one with technical skill, as indicated) as well as taxonomical filters due to the absence of a desired subject. Upon

being told that the Anti-Corruption site requested was being constructed off-line under the management of Transparency International, the same contributor responded

> "I work with Transparency International that is why I told you to add the category. I told you, and that was when it was done. Stop trying to discourage individuals just because you do not know who they are connected with." [DG2006-42]

Hence the comment would suggest another filter, a lack of affiliation. A third message posted by this same contributor complained about how guides appeared to be privileging their own postings, saying that they put their names on their own postings but did not label members', hence "…it does not look like a knowledge sharing database but a way for guides to blow thier [sic] own horn." [DG2006-43]. This would indicate a screening mechanism, arguably one for quality control, but which has also been interpreted to favor appointed topic guides and like-minded people with a certain definition of what constitutes a good article. Certain individuals thus decided which material was ultimately published and which material was deemed "inappropriate". Interestingly, in earlier work it was also found that different strategies were being (consciously or unconsciously) employed to "keep out", or at least modify, indigenous forms of knowledge, in favor of more scientific forms [27].

Interactions and Power in the Development Gateway. Our findings show that three sets of stakeholders appear to have the strongest power positions in the knowledge production process. First, international organizations (the World Bank, IMF, as well as organizations or individuals who are capable of producing specialized, technical, Western-type development knowledge) are privileged, being the so-called "experts" who populate the communities. Second, the Development Gateway Foundation is also privileged because it plays a dual role of publisher and author of materials. Third, community guides, advisors, coordinators, volunteers, and cooperating organizations are given significant influence. They have decision-making power, and they are further legitimated through their published curriculum vitas. In contrast, people who are non-specialists, limited to layman's language, are non-technical English speakers, as well as authors and users "indigenous" materials on development, will also not be in a strong position to contribute.

The type of knowledge, the nature of key players, and the dynamics of interaction in the knowledge production process can be interlocked into a power pattern that legitimates only a certain type of knowledge, and leaves out others. By virtue of size, international status, and reputation, the website owner (first the World Bank, then the Development Gateway) is endowed with a certain degree of credibility. It publishes mostly robust, technical, largely economic, Western information on a portal that comes across as an expert. By virtue of authorship, the nature of contents ("credible" statistics and scientific reports), and the packaging of contents on the portal (detached, jargon-laden, heavily screened), the materials also become endowed with a certain degree of credibility. Mechanisms are put in place to maintain certain levels of quality. Thus we see the beginnings of a cyclical process of knowledge legitimation, in this case the ongoing construction and reconstruction of a body of knowledge that is technical, scientific, objective, and applicable anywhere, by selected players.

4.2   Knowledge and Power in the Croatia Country Gateway

Knowledge in the Croatia Country Gateway. The Croatia Country Gateway was selected as the prototypical website associated with subjectivist characteristics, and hence an interesting contrast to the Development Gateway. First, the applicability of knowledge is more focused and context-specific. There are global or international resources ("Global security attacks up 36%"; "UNDP launches Human Development Report 2003"), but many resources provide a more specific geographic context, e.g., the European Union ("European Commission proposes new e-government initiative"), Eastern European resources ("Eastern Europe is overtaking the west in use of IT within government, says new research"), and Croatia ("Nominate best Croatian e-content for World Summit award") [CROA2005-01].

Second, knowledge was not presented as a coherent body of resources classifiable into strict taxonomies of topics. The Croatia Country Gateway did not even list topics that it specialized in, and overall the home page indicated an absence of a unifying theme. There was an article "Baring It All For Breast Cancer"; a banner saying "Help Asia" with a child who is a victim of the December 26, 2004 tsunami; a letter written by an individual named Branko Mijic to George W. Bush about the war on Iraq; and a news article from Wired! magazine about research on helping people with missing arms and legs "grow your own limbs". The diversity of these articles served to create an unstructured approach as to which articles could be incorporated into a loosely defined "smorgasbord" of resources. Further, the portal does not appear to carve out spaces for neatly organized topics; instead it creates spaces for different users. Spaces are allocated to the editor (who gets his own little domain instead of the run of the entire page), syndicators, different types of users like business and government. Based on our analysis, rather than a well-integrated, carefully pieced together picture of development solutions, the objective of the website appears to be giving "voice" to different participants, regardless of characteristics [CROA2005-01].

Third, knowledge on the Croatia Country Gateway is articulated in catchy and accessible form. The subjects, such as new games and downloadable material, can be said to be of general interest. This is consistent with the subjective view of knowledge: that there are many forms of legitimate knowledge, some of which go beyond the technical and scientific, and which may in fact be classified as mundane. As mentioned earlier, headlines such as "Baring It All for Breast Cancer", "Eye-Popping Streaming Film Debuts", and "Journey to the End of the Night" [CROA2005-01] appear to be framed in provocative ways which could presumably arouse an ordinary person's interest. This leads to a fourth point – it suggests also suggest a departure from purer forms of instrumentality where knowledge is clearly linked to some useful purpose like solving a problem, focusing instead on purposes such as simple entertainment.

As a result, there are a number of processes that are left loose and flexible in the Croatia Development Gateway, allowing knowledge production to be inclusive. First, there is no strict agenda or fixed list of topics that could potentially lock out certain contributions. Second, barriers to entry into the arena are lowered: the editor is confined to a specific space; language is made accessible; immediate publication is hinted at. Finally, the quality of the discussion is not strictly regulated, as shown by the diversity and novelty of specific articles.

Interactions and Power in the Croatia Country Gateway. Interactions in the Croatia Country Gateway are characterized by greater participation, and hence power is seen to be dispersed across a broad base of stakeholders rather than concentrated in the hands of an elite. We can see this in a number of ways, some of which have already been mentioned. The portal makes a broad invitation to almost anyone, saying "We promote independence and creativity, innovation and openness and we welcome unsolicited papers, articles, columns...Write to us – so you can start writing for us... " There is no explicit indication that it caters only to a particular group such Croatians (that is, the site is not even limited to Croatian visitors, as there is only one small reference to Croatia in the entire homepage) [CROA2005-01]. The reference to "unsolicited" work makes an even stronger statement for its openness. In this context, even the seemingly "most powerful" players get interrogated (there are criticisms of the World Bank, the US government, and George W. Bush). Hence the portal comes across as an environment available to just about anyone, and a domain for bringing up any subject.

The Croatia Country Gateway's "openness" must, however, be qualified: it is open, but still does not ensure that the playing field is completely equal for all players. This portal demonstrates what has been suggested by Marglin [19]: that a community can be pluralistic without being completely egalitarian. Some parties still have more say than others. The dominance of articles on information technology could lead one to suggest that the portal is not completely open taxonomically to non-IT articles. Furthermore, because of the nature of the topic, the language can come across as quite jargon-laden: terms like "Blu-ray", "Phish", "EV1 servers", "Router Worm" might be seen as intimidating to the layman, hence screening out non-IT users and making the portal an arena for computer science aficionados. Also, a look at the sources of many of the materials indicates that they are of Western origin: Slashdot is Michigan-based; Reuters' main offices are in London and New York; Netcraft is based in England. Large international organizations of the development community are also heavily drawn from. What is worth noting, though, is that these "privileged" sources are still just a few of many voices. They are present, but do not dominate. Further, some of these sources are not immune from criticism (for example, the World Bank is simultaneously portrayed as a sponsor and criticized on the homepage). These arguments would support the view that Croatia Country Gateway is an open, pluralistic environment, albeit with traces of hierarchy.

5   Conclusions

In addressing the two research questions we have made three contributions. First, we have contributed to current understandings of electronic participation by showing how views of knowledge can impact on participation dynamics on the Internet. The Internet is widely perceived as a tool that facilitates participation, but our research has shown specific ways that participation can be constrained as a result of assumptions about what legitimate knowledge is and who should be allowed to create it in an electronic arena. Second, we have shown how diverging assumptions embodied by these two types of knowledge shape interactions and knowledge production processes, thus resulting in certain power positions for different stakeholders. In showing this we

have contributed to understandings of how knowledge and power are linked. Third, we have demonstrated the value of a discourse analytic approach to analyzing websites, showing how dissecting websites into more finely tuned texts can enable researchers to discern patterns that may not emerge from an analysis of features.

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Revisiting the Conceptualisation of e-Campaigning: Putting Campaign Back in e-Campaigning Research

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Abstract. As political parties' and candidates' e-Campaigning has become increasingly complex and sophisticated, scholars accordingly devise conceptual frameworks to understand and describe this social phenomenon. Yet, there is little scholarly debate concerning the varying conceptualisations of political parties' or candidates' utilisation of e-Campaigning. A review of existing e-Campaigning conceptualisations reveals three major limitations: namely, lack of academic rigour, a technologically deterministic orientation of e-Campaigning practices, and variation in the coverage of e-Campaigning practices. Potentially, these limitations might impede the comparability of e-Campaigning studies over time and across countries. In response, this research paper proposes a conceptual, practice-based framework that builds on the existing research. This paper then uses empirical data from a New Zealand political party to illustrate the application of the proposed framework.

Keywords: e-Campaigning, election campaigning, conceptualisation, e-Campaigning practices, framework.

1 Introduction

Political election campaigning is a long-standing ritual practised by campaign teams representing political parties or candidates during an election period in an effort to garner votes and hold political offices [1], and also the research focus of electoral politics.

Within the realm of election campaigning, an emergent, global phenomenon can be observed that sees the Internet and its related applications being utilised for election campaigning. This phenomenon illuminates a new research avenue in electoral politics and is commonly referred to as *e-Campaigning* in academic literature [2, 3].

Since its inception, e-Campaigning has attracted scholarly interest, including a number of e-Campaigning research frameworks, and analyses of political parties or candidates' e-Campaigning practices [e.g. 2-4]. Typically, these studies have been based on a bottom-up study of the occurrence or frequency of using specific technology-enabled content elements, for example the use of social media or blogs on campaign websites. Those elements are then grouped into higher-level categories such as *information dissemination* [2, 5, 6], *interaction* [2, 3, 6], or *targeting* [6, 7] by the authors. However, divergent, incommensurable categories have been proposed by different scholars, and although academic research in this area is at an early stage, it is

already difficult to compare and contrast different scholarly studies, or to combine studies in a meta-analysis. We propose to address this issue using a conceptual, practice-based framework informed by studies on campaign practices.

Political campaigning lends itself to practice-based theorising [4, 8]. A practice-based framework focuses on our understanding of campaign practices, which predate the advent of electronic commerce, and how new technologies are appropriated to enable these; effectively, we want to put the *campaign* back in e-Campaigning. Although campaign practices can change over time, and may be influenced by the emergence of new technologies or applications, overall, campaign practices change much more slowly than the technologies and media used to enact them. They therefore potentially provide a stable and extensible basis for theorising about e-Campaigning. Accordingly, our research question is: **How can political parties' or candidates' e-Campaigning utilisation be conceptualised in a way that leverages existing understanding of campaign practices and is consistent and extensible?**

The remainder of this paper is organised as follows: first, we investigate current conceptualisations of e-Campaigning utilisation and their related issues; then, we propose and discuss our conceptualisation; following that, we illustrate the application of the proposed conceptualisation with an empirical example; and last, we provide our concluding remarks.

2   Conceptualisations of e-Campaigning Utilisation in the Literature

e-Campaigning first emerged as a mere information kiosk in cyberspace. However, as political parties and candidates continuously engage in e-Campaigning utilisation, it has become increasingly professionalised, sophisticated and complex [9, 10]. Since each campaign is unique and discrete, and technology is constantly evolving, the changing landscape of e-Campaigning utilisation is compared to the aphorism that one never can step into the same river twice [11].

As such, scholars often devise conceptual frameworks, commonly with a practice-based approach, to explore and understand the e-Campaigning phenomenon [8]. A practice-based approach to theorising translates a series of practices observable in a social phenomenon into contemporary theory. Supporting or enabling tools, such as those offered by ICTs, are introduced and used within those practices [8]. In the context of e-Campaigning, political parties' and candidates' practices are operationalised in a compendium of e-content elements on their e-Campaigning websites; that is, the e-content elements are manifestations of e-Campaigning practices [8]. We posit a practice-based framework that focuses on campaign practices exhibited by e-content elements. To sum up, e-Campaigning utilisation entails at least one e-Campaigning practice and each practice can be observed by one or more e-content elements.

While a practice-based approach is deemed appropriate for theorising the e-Campaigning phenomenon, three main issues surfaced from a comparison of the varying theoretical frameworks in the literature: lack of academic rigour in conceptualising and theorising e-Campaigning utilisation, a technologically deterministic orientation of e-Campaigning practices, and variation in the coverage of e-Campaigning practices in existing frameworks.

Lack of academic rigour. A scientific theory about an observable phenomenon – be it derived from another theory, a confirmed hypothesis or an empirical observation – must include the constructs within the phenomenon and the relationship between the constructs, so that the theory can be falsifiable or enables understanding about the phenomenon under study [12]. Under that principle, in order to theorise the e-Campaigning phenomenon, both the key constructs and the relationship between the constructs need to be articulated. Most existing theoretical frameworks of e-Campaigning utilisation have clearly stated the key constructs concerning e-Campaigning utilisation: namely e-content elements, e-Campaigning practices, and election campaigning; they also explain the relationship between e-content elements and e-Campaigning practices. However, hardly any of these theoretical frameworks articulates the relationship between specific e-Campaigning practices and election campaigning [e.g. 2-4, 13]; in other words, it is unclear what rational purpose each e-Campaigning practice serves in relation to election campaigning. The missing explanation between e-Campaigning practices and campaigning is a major weakness in existing conceptualisations of e-Campaigning utilisation.

A technologically deterministic orientation of e-Campaigning practices. In some theoretical frameworks e-Campaigning practices are classified in accordance with the latest technologies or applications, such as RSS feeds, interactive opinion polls, and podcasts [e.g. 13, 14]. This particular orientation demonstrates a *technological deterministic* viewpoint of the scholars concerned: the assumption that it is the technology that drives the utilisation of e-Campaigning. We would argue that it is the wider election campaign and its associated practices that shape the utilisation of e-Campaigning. This view is more closely aligned with the research orientation of scholars such as [10, 15]. It is worth noting that our perspective does not diminish the involvement of technologies in e-Campaigning but acknowledges their enabling role with regard to e-content elements that are manifestations of campaign practices.

Variation in the coverage of e-Campaigning practices. Some scholars focus on only one e-Campaigning practice [e.g. 16, 17], whereas others cover a wide array of e-Campaigning practices [e.g. 5, 6, 18]. A possible explanation for this variation is that many studies have constructed their frameworks on the basis of a single election. Since the nature of e-Campaigning is evolutionary and contextual, it is likely that changes will happen to e-Campaigning adoption and utilisation within a specific institutional context, as well as across time [10]. Further, e-Campaigning studies in countries where ICT adoption is relatively advanced, tend to have a broader coverage of e-Campaigning practices compared to studies in countries with low levels of ICT adoption and utilisation. Generally, with the focus on a single election, many e-Campaigning studies have limited themselves to ICT-supported campaign practices in that particular campaign.

3   Towards a Conceptual Framework of e-Campaigning Utilisation

Given the issues associated with existing frameworks, we propose a conceptual framework for better exploring and understanding e-Campaigning utilisation.

The underlying approach of the conceptual framework proposed in this paper follows the basic principle underpinning most frameworks, namely, the inclusion of two interrelated components: e-Campaigning practices and their associated e-content elements. An extensive academic literature review was used to identify e-content elements, e-Campaigning practices, and their relationship. Before discussing the framework in depth, we explore the link between the e-Campaigning practice and election campaigning in order to solidify the theoretical foundations of the framework.

Some scholars warn that it is paramount for organisations to practice *technological realism*; that is, technologies per se rarely yield miracles or a competitive edge, and therefore organisations should hold a realistic view and focus on organisational practices [19]. We agree that *technological realism* should also be fostered in academic research of ICT-related social phenomenon. In this light, this paper posits that it is the wider campaign practices that shape the utilisation of technologies. Consequently, the e-Campaigning practices in the proposed framework are related to wider election campaign practices.

The e-Campaigning practices in our framework are derived from a review of e-Campaigning in multiple elections across countries, as opposed to the common single election focus in existing frameworks. This provides a solid empirical base for the proposed framework. The framework includes the following five campaign practices: *information dissemination* [2, 4, 5]; *voter interaction/engagement* [6, 18]; *support mobilisation* [2, 4, 20]; *targeting campaigns* [6, 7]; and *resource generation* [5, 21, 22]. Each of these campaign practices will be further discussed below.

3.1 Information Dissemination

Information dissemination is considered the most fundamental, long-standing practice of election campaigning for two reasons [9].

First, election campaigns ultimately aim to influence voters' decision-making process and, with that, try to achieve votes maximisation. Information about political parties or candidates plays a critical role in this decision-making process. As Zaller explains, "every opinion is a marriage of information and predisposition: information to form a mental picture of the given issue, and predisposition to motivate some conclusion about it" [1]. This is confirmed by empirical research, which suggests that voting behaviour is strongly affected by the awareness and knowledge of political parties or candidates, formed by the availability and quality of information about political parties or candidates from sources such as election campaigns [23]. Consequently, in order to shape voters' awareness, opinions, knowledge, and, most importantly, their decision, campaign teams benefit from producing, disseminating, and reinforcing information in a timely fashion. Moreover, research shows that swing voters are most responsive to campaign information: clearly, they are the voters whom most campaign teams endeavour to woo throughout an election period [24].

Second, voters' active political involvement is crucial to election campaigning [10]. However, research from countries around the world demonstrates that voters' political involvement has declined for various reasons [10]. Thus, generating voters' interest to be involved election campaigning has been a major issue for a campaign team. Scholars point out that campaign information serves as an important stimulus for voters' political involvement. That is, the greater amount of campaign information being disseminated, the more stimulated voters could become to get involved in campaign activities [10].

Generally, the campaign practice of information dissemination is undertaken through a one-way, top-down approach – from campaign teams to voters. That is, no feedback or information from voters is expected [1]. This important characteristic distinguishes information dissemination from another campaign practice, namely voter interaction/engagement.

E-content elements describing the operationalisation of information dissemination. The following e-content elements are commonly associated with information dissemination: 1. the political party's or candidate's information, such as the history of the party or candidate, ideology and values that the party or candidate stands for, and key personnel of the party; 2. candidate biographies, such as background details and the constituency of political candidates; 3. an archive of press releases; 4. a collection of key policies; 5. a list of the campaign news; 6. a full coverage of campaign events; 7. an series of campaign speeches; 8. contact information of the party office, party leader and party candidates; or 9. information about the party's or candidate's other online presences, if there are any [2, 4, 6, 8, 18].

In general, the practice of information dissemination is considered highly standardised, due to its long existence. However, technological advancement enables campaign teams to innovate the dissemination of campaign information in order to generate and sustain voters' interest. For instance, many political parties or candidates utilise Internet multimedia technology to disseminate information in text, images, sound, video, or in combination [2, 6]. Also, political parties or candidates disseminate campaign information through their campaign blogs, which in essence are online journal entries [18].

3.2   Voter Interaction/Engagement

This practice is also referred to as *voter involvement* [25]. Its underpinning rationale consists of two explanations: 1. interact with voters for campaign feedback, and 2. engage voters for building trust and relationships.

The first explanation argues that voters' constant feedback on an election campaign is critical for campaign team to evaluates the impact of the campaign on voters. Feedback provides the campaign team with an opportunity to take necessary actions to enhance or rectify its campaign practices in a timely manner [1]. The second explanation holds that voters, especially swing voters, are more likely to cast their votes to the political party or candidate whom they trust or feel more closely connected with [26]. Often, trust and connectedness are developed as a result of continuous efforts by a political party or candidate to interact and engage with voters. Furthermore, trust and connectedness are considered as taking precedence over securing, sustaining and mobilising grassroots support [8].

E-content elements describing the operationalisation of voter interaction/ engagement. Offline interaction and engagement can be categorised in two forms: synchronous and asynchronous [27]. The former refers to real time interaction, such as face-to-face communication; the latter denotes delayed interaction, such as postal mail. Those forms of interaction and engagement can be simulated online.

Synchronous voter interaction/engagement can be observed in: 1. instant chat/messaging; 2. instant opinion polls that are initiated by either the campaign team or voters; 3. instant surveys; or 4. applications that allow voters to interact with the

political party's or candidate's key policies – such as tax/debt calculator – or campaign events – such as interactive events calendar, in real time [5, 6, 13, 14, 18].

Asynchronous voter interaction/engagement in e-Campaigning is reflected in: 1. means to contact the political party or candidate, such as email or web form; 2. discussion forums; 3. interactive campaign blogs – blogs that enable readers to leave feedback or comments, in contrast to those disabling readers feedback or comments and thus considered as a form of information dissemination; or 4. means for voters to provide feedback about political party's or candidate's policies [6, 13, 14, 18].

3.3 Support Mobilisation

This practice represents the *mobilisation* theory [8]. It suggests that political parties' or candidates' effort to maximise their votes/seats is reliant upon voters' support. Such support is reflected in different forms, such as organising and participating in campaign events – for example political rallies, and, most importantly, casting vote to the political party or candidate on election day. In this light, it is vital for campaign teams to identify potential supporters and translate support sentiment from them and the existing faithful into tangible support actions [8].

Support mobilisation has been frequently regarded by campaign teams and scholars as an ever-increasing challenge [22]. Voters not only have taken a back seat but also spend less time to participate in events supporting their party or candidate [20]. A further assault to this challenge is political disengagement of young voters who are below the age of 30. Those young voters represent the fastest growing voting population; they are the least likely to vote on election day and also account for the largest group of voters who are least interested in conventional politics [22]. Given an increasing number of people, particularly the youth, connected to the Internet across the globe, it is anticipated that e-Campaigning can shed light on alleviating the severe challenges in campaign teams' practice of support mobilisation.

E-content elements describing the operationalisation of support mobilisation. In e-Campaigning, political parties' or candidates' support mobilisation is generally operationalised through providing: 1. means to invite supporters' friends and relatives to participate in campaign events organised by the parties or candidates; 2. means to inform voters of electoral information, such as voter registration, election date and voting location; 3. means to receive campaign information and updates; 4. links to supporter groups that are either formed by the parties or candidates, or by supporters themselves; 5. means to download campaign materials; or 6. means to forward campaign materials to others [2, 6, 20].

3.4 Targeting Campaigns

As a campaign practice, targeting campaigns in general encompasses two distinct forms. The first is reflected in political parties' or candidates' election campaigns targeting their political rivals in the same election; it can be the rivals' specific views, policies, or the rivals in general. The fundamental assumption is that in order to sway voters' opinions and decision, a political party or candidate can devise an alternative practice to information dissemination, which aims at persuading and converting voters, especially swing voters, through "painting the public perception of the

political party or candidate in a more favourable light" by launching attacks on its political opponents or their policies [1].

The second form of targeting campaigns pertains to election campaigns that target specific voter strata. Its underlying discourse, *narrowcasting*, suggests that the needs and wants across voter strata vastly differ. Hence, effective campaigns depend upon not only increasing information being disseminated, but, more importantly, disseminating the *right* information to the *right* addresses [7, 10]. In contrast to information dissemination that fosters mass communication and assumes that the characteristics of all voters are homogeneous, this form of practice emphasises *tailored* campaign information based on the unique characteristics of each voter stratum. Due to its nature, campaigns targeting specific voter strata require the precise voter segmentation.

Although the two forms of targeting campaigns differ fundamentally in their strategic aims, they both emphasise targeting a specific subject – be it a political rival or voter stratum – in order to achieve the ultimate purpose of election campaigning.

E-content elements describing the operationalisation of targeting campaigns. The operationalisation of e-Campaigns targeting political rivals could be observed in online contents such as speeches or press releases, which specifically aim at attacking political rivals' policies or the rivals in general [25].

Political parties or candidates' e-Campaigns targeting particular voter strata is reflected in contents dedicated to a specific voter segment or an individual visitor [7].

3.5   Resource Generation

To political parties and candidates in general, election campaigning is acutely dependent upon scarce resources [28].

Specifically, human resources are highly required in order for campaign teams to plan, organise and conduct different campaign activities. Ever since the practice of electioneering entered the era of *modernism* – characterised by television becoming the predominant technological platform for election campaigning – campaign advertising on television has become the norm in many democracies [1]. That, among other campaigning activities, often consumes the largest share of political parties' or candidates' financial resources. In addition to televised campaign advertising, political parties or candidates need to finance other electioneering activities, such as direct mailing, in-person engagement with voters, telephone and door-to-door canvassing [1].

Given the intense reliance on resources, it is essential for political parties or candidates to establish a solid practice in election campaigning to solicit resources of different forms. Resource generation is not directly associated with influencing voting decision; it, however, affects the *sustainability* and *continuity* of political parties' or candidates' election campaigning in general. The practice of resource generation in traditional election campaigning is often reflected in recruitment of members or volunteers, and different forms of fund raising.

E-content elements describing the operationalisation of resource generation. Resource generation in e-Campaigning is largely similar to that in traditional offline campaigning. Specifically, it involves establishing: 1. means to make online donations, such as online credit card payment; 2. merchandise shop; 3. means to become a party member; or 4. means to become a volunteer [5, 6, 20].

3.6 Summary

In this section we propose and describe a conceptual framework of e-Campaigning utilisation. Figure 1 encapsulates our conceptualisation and represents the framework proposed in this study.

e-Campaigning practice	e-Content elements
Information dissemination	Political party's or candidate's information
	Candidate biography
	Press releases
	Policy statements
	Campaign news
	Campaign events
	Speeches
	Contact information
	Information about the political party's or candidate's other online presences
	Campaign blogs without visitor comments allowed
Voter interaction/engagement	Instant chat/messaging
	Instant opinion polls
	Instant surveys
	Applications for interacting with the political party's or candidate's policies
	Interactive calendar of campaign events
	Means to contact the political party or candidate
	Discussion forums
	Campaign blogs with visitor comments allowed
	Means to provide feedback
Support mobilisation	Means for voters to invite their peers to participate in campaign events
	Means to inform voters of electoral information
	Means for voters to receive campaign information and updates
	Means for voters to connect with supporter groups
	Means for voters to download campaign materials
	Means for voters to forward campaign materials to others
Targeting campaigns	Contents targeting political opponents
	Contents targeting political opponents' policies
	Contents targeting specific voter strata
Resource generation	Means to make donations
	Merchandise shop
	Means to become a party member
	Means to become a volunteer

Fig. 1. The Conceptual Framework Proposed in This Study

4   Applying the Conceptual Framework: An Empirical Example

We use a New Zealand political party National's 2011 e-Campaign home page, as depicted in Figure 2, as an empirical example to illustrate the application of the conceptual framework proposed in this study.

National's e-Campaign is content rich, consisting different forms of information and applications. Our framework suggests that the party's e-Campaign consists of five practices: information dissemination, voter interaction/engagement, support mobilisation, targeting campaigns and resource generation.

Information dissemination. This practice can be directly observed by: 1. CE 1 (party information); 2. CE 2 (candidate information); 3. CE 5, 6 and 7 (information about the party's and its candidates' other online presences); 4. CE 12 (speeches); 5. CE 13

Fig. 2. The Home Page of the New Zealand National Party's 2011 e-Campaign

(press releases); and 6. CE 18 (campaign blogs without visitor comments allowed). Voter interaction/engagement. This practice is reflected in CE 19 (interactive calendar of campaign events). Support mobilisation. This practice is operationalised in: 1. CE 3 (means to inform voters of electoral information); and 2. CE 4 (means to receive campaign information and updates). Targeting campaigns. This practice can be found in CE 8, 9, 10 and 11 (campaign targeting specific voter strata). Resource generation. This practice can be seen in: 1. CE 14 and 15 (means to make donations); 2. CE 16 (means to become a party member); and 3. CE 17 (means to become a volunteer).

The preliminary analysis indicates that National's e-Campaign encompasses all five e-Campaigning practices, with a particular focus on information dissemination and resource generation. We can also observe that a variety of different technologies are used to enable different content elements within the same e-campaigning practice. For example, information dissemination utilises drop-down boxes for CE 1 and 2 (to enable the viewer to select the information of most interest to them), links to social media (CE 5) and hyper-links to speeches and media releases (CE 12 and 13). We can see that different media can be used to enable the same practice, conversely, similar media (for example click-through links as shown in CE's 4, 14, 15, 16 and 17) can be used to enable different practices. This suggests that a practice-based framework will provide a more robust, and extensible basis for evaluating and comparing e-Campaigning practices than frameworks with a technologically deterministic orientation.

5   Conclusion

With an increasing uptake of new media in countries around the world and an institutional requirement for governments to organise election campaigns on a regular basis, it is clear that e-Campaigning practices will continue to be an important research topic for scholars working in the broader field of e-Participation. Consequently, having a comprehensive and robust analytical framework for understanding and explaining e-Campaigning practices over time and independent of the utilisation of specific technologies is a necessary condition for the development of theory and knowledge in this emerging research field. Thus far however, existing frameworks used for the study of e-Campaigning practices vary in the forms and types of e-Campaigning practices they cover and strongly focus on available technology to date.

Drawing from political science literature, this paper aims to close these gaps by proposing a comprehensive analytical framework that puts the purposes of election campaigning back into e-Campaigning research. Further research will be needed to test the application of the proposed framework in a variety of political election campaigns and with the availability of new technologies over time.

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An Overview Assessment of ePetitioning Tools in the English Local Government

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Abstract. According to legislation introduced in 2009, all English local authorities were expected to implement an online petitioning facility by the end of 2010. This mandate offers a unique opportunity to assess the impact of a national eParticipation policy at such scale focusing on a particular engagement tool. A web content analysis methodology was used to collect data from the 353 English local government websites. Different variables measuring the implementation of this initiative were explored, including evidence of other eParticipation activities such as online consultations. The data were then cross-examined with institutional background factors such as political affiliation of the leading party. The study results question whether the legislation actually achieved its purpose since they indicate apparent efforts of minimum institutional compliance and low actual use of ePetitions. Among others, population density and previous experience with eParticipation were positively correlated with the implementation effort and actual use of those systems.

Keywords: ePetitions, UK local government, Web content analysis, Impact assessment, Institutional factors, eParticipation adoption, eParticipation policy.

1 Introduction

An established conclusion in digital governance research is that citizen engagement in democratic processes is gaining far narrower attention at the policy level compared to public management efficiency [1]. In most cases, the use of ICTs for public engagement seems to be largely restricted to those fitting existing institutional frameworks [2-3]. Sparse international progress in operationalising eParticipation policies has resulted in limited opportunities for assessing the regulatory potential and impact of ICT-enabled engagement. Consequently, beyond a series of relatively isolated case investigations, uncovering more generalised elements on the interaction between eParticipation and institutions remains quite open [4].

Certain overview studies have attempted to explore the extent and type of eParticipation adoption in European countries [5-7]. Those studies, despite identifying a set of interesting hypotheses, were not presented with the opportunity to examine the implementation of an institutionally enforced eParticipation tool at national scale. Such an opportunity has been recently offered in the English local government, following the introduction of the 2009 Local Democracy, Economic Development and

Construction Act by the Labour government [8]. According to this legislation, English local authorities (LAs) were expected to implement a facility for receiving petitions in electronic form by December 2010. This directive did not solely advocate the development of local ePetitioning websites; it came along with a duty to design a coherent response process for both paper and online petitions.

In this paper, we present and discuss the findings of an overview web content analysis study conducted to assess progress with this policy about three months after the implementation deadline. The particular motivation was to examine how LAs responded to the ePetitioning call and identify institutional socio-economic factors associated with those responses. The study results are not encouraging about the early impact of this national policy: they indicate minimum effort of institutional compliance and low actual use of ePetitions. Factors such as population density, progress with other eParticipation activities and council political orientation were found to be related with the effort placed on implementing ePetitions and the actual use of those websites.

Before elaborating on the methodology and results, the next section develops the study's theoretical background and provides further information on ePetitioning in the UK. The paper concludes by discussing the impact of this national policy and presenting implications for future institutionally enforced use of eParticipation tools.

2   Study Background

Public participation at the local level is considered more feasible compared to national government due to the reduced distance between local authorities and the public [9]. Furthermore, as noted by Gronlund [10], enhancing local democratic processes becomes even more desirable since central planning authorities around Europe seem to be increasingly re-allocated locally.

2.1   EParticipation in the Local Government Context

Previous work has attempted to associate institutional characteristics with eParticipation developments by LAs in the Netherlands [5], Italy [6] and the UK [7]. Van de Graft and Svensson [5] found political orientation of the party leading the authority not having a significant effect. In most cases, initiatives seemed to be motivated by pressures to innovate in anything the Dutch central government monitoring sought to audit. Medaglia [6] identified three influential factors: scale, local politics and socio-economic conditions. Larger authorities were considered more supportive of eParticipation initiatives due to increased geographical diversity and scale effectiveness from a cost/benefit perspective. Centre-left parties were also found to favour online engagement. From the socio-economic perspective, wealthier cities were more eager to experiment with eParticipation initiatives.

Finally, in the UK, a study by Pratchett et al. [7] assessed the eParticipation components offered by English and Welsh websites. They found positive evidence of eParticipation channels along with significant variations on the scale and depth of opportunities available to citizens.

   Those studies point to several interesting directions for up-to-date research. In particular, the English local government presents an appealing environment for eParticipation research and practice. In England, LA policy implementation is planned, funded and audited centrally by the Department of Communities and Local Government. This centrally-led institutional framework does not necessarily impose absolute homogeneity. It encompasses a more complex combination of intentional *diversity* to account for localised settings and a set of auditing processes for rewarding or punishing local performance *selectively* in terms of funding distribution [11]. As a result, despite the existence of centralised strategies, important diversity patterns might occur on how ICTs are used in localised settings.

   In this institutional context, the 2009 legislation offers a possibly unique opportunity to focus on a specifically mandated, centrally-funded tool for public engagement and examine LA responses at the national level. As elaborated on the next section, ePetitioning in the UK is well developed.

2.2   EPetitioning in the UK and Beyond

EPetitioning in the UK has been a well-exploited tool long before it became a key element of the 2009 legislation. Since 2004, two influential LAs, namely Bristol and Kingston-upon-Thames had been regularly handling ePetitions. Such petitions cover a variety of local decision-making topics, for example, recycling, parking, library closures, bus stops and so on (see e.g. [12-13]). The perceived success of those two pilot initiatives indicated that the practice could be transferable at the national level. Along with other more widespread eParticipation tools such as online consultations, surveys or webcasting, a few English LAs experimented with ePetitions during the 2005-2009 period, for example Lambeth and Brighton & Hove.

   Complementary to the local government, there has been strong evidence of the ePetitioning popularity in the UK, starting from the pioneer work of Scottish Parliament's ePetitions [14-15]. From 2006 until its termination in 2010, the Labour government's ePetitioning website accumulated millions of signatures in thousand different topics; it generated extensive debate over its impact and future potential [16]. Miller [16] provides some very interesting examples about the government's website and the dilemmas generated when engagement technologies attempt to merge with existing policy making structures.

   Outside the UK, there have been numerous examples of ePetitioning tools being used in formal engagement processes, e.g. [17-18]. Those examples include ePetitioning systems used by different Parliaments such the German, the Australian, as well as the Welsh Assembly. There was also an effort to consider this activity at the European level by providing a common system for LAs around Europe [19]. The EuroPetition initiative reveals some interesting lessons about the transnational organisation of petitioning tools around Europe.

   In the UK, the 2009 Act was one of the Labour government's last legislations before losing the May 2010 elections by the new coalition government. Despite earlier arrangements and most LAs having already formally decided upon their petitioning schemes, in September 2010, the new government announced its decision to withdraw previous central guidance on how this facility should be implemented. The motivation for this was the forthcoming Localism Bill aiming to offer more

freedom to local communities on organising their democratic processes; it was also part of a political decision to reduce public sector budgets.

Nevertheless, LAs were still asked to comply with the statutory requirements, even if the details for implementing this tool were more left at their local discretion and needs. As an effect, close to the December 2010 deadline, it was not clear what LAs would decide to implement. Would LAs decide not to offer ePetitioning channels at all? Would they discourage petitioners in other ways, for example, by setting high signature thresholds to generate the petition response process or by keeping the new website away from publicity? Those circumstances provided an exceptional opportunity for exploring the implementation of this national eParticipation policy and examining its impact.

3   Research Methodology

Motivated by the opportunity to examine LA responses to the ePetitioning duty, an overview web content analysis was conducted [20]. Content analysis is a systematic technique for coding symbolic content, for example by identifying common patterns in media [21]. Web content analysis is a broad methodological paradigm which adapts traditional content analysis for Internet research. For the purpose of this study, there was no need to code symbolic content. The web content analysis was used to carry out a feature analysis of all the 353 English LA websites based on a specifically developed coding framework. The framework included 19 variables describing particular features relevant to the local implementation and use of the ePetitioning facility. Those variables, as presented in the next section, were drawn from:

(1)   *Basic characteristics* such as the existence of contact details within the website or instructions to assist petitioners.
(2)   *Indicators of good practice* such as providing notification services for new petitions or encouraging users to offer their feedback on how this new initiative could be improved.
(3)   Elements that could *constitute innovation effort* such as launching the system before the December 2010 deadline or providing a commenting facility or discussion forum for petitions.

To indicate the system's actual use, the numbers of open, completed or closed without yet responded number of ePetitions were also recorded in each website. The framework further included five complementary variables assessing other eParticipation activities (webcasting, use of social media, online consultations, online forums and online surveys).

The initial framework was validated by four experts, revised and then piloted with 35 websites. Amendments were made to ensure that the selected variables would accurately capture the most important features in a reasonable amount of time per website. A team of six coders was trained and instructed to visit each website following a specified protocol. Although most variables did not entail subjective judgements, coding disagreements or ambiguities were resolved on the spot. To

prevent possible non-systematic errors between the different coders, about one third of the websites was randomly re-coded by a senior researcher.

The final dataset contained 337 usable results. The rest 16 websites were not used for the analysis because for some of them their fit with the coding framework was ambiguous in some variables. Others were not used because certain groups of 4 to 6 authorities were sharing the same ePetitioning website without clarifying individual differences relevant to the coding framework. Even if fit with the coding framework was ensured, for reasons of consistency it would not be possible to take into account the group cases for the cross-examination with background factors.

The data were collected within the first two weeks of March 2011 which corresponds to about 2.5-3 months subsequent to the December 2010 ePetitioning implementation deadline. The dataset was analysed with the help of PASW Statistics 18, along with secondary background data for each LA. Those data were collected from the September 2010 release of the Office for National Statistics [22] and included: population density, area size, population, average weekly income per household, employment rate, regional broadband Internet access percentage and political affiliation of the council leading party. The next section presents the study findings and the statistical analysis details. The variables used are numbered in parenthesis.

4   Study Findings

The ePetitioning facility is a space where users can start new petitions, sign the petitions offered by other users and view the outcome of previous petitions. The first characteristic examined (V1) related to whether ePetitioning was actually implemented or not and, if implemented, how easy it is to find from the LA's homepage. An important observation was that an ePetitioning facility was not offered in 61 of the 337 cases (17.6%). In 21 of those (6.2%) it was stated that the ePetitioning implementation is in progress. Furthermore:

- 19.3% or 65 facilities were linked with the council's home page.
- 26.1% or 88 facilities were one click away from the council's home page.
- 12.8% or 43 facilities required further ad hoc searching.
- 24% or 81 facilities were found using the council website search function.

In most cases, everyone working, living or studying in the area is eligible to petition the authority. Usually, a certain amount of signatures are randomly validated by responsible officers to ensure that the minimum threshold that triggers the response process is met. There are different types of petitions. Some types require thousands of signatures; for example those asking for a full council debate on a particular topic or seeking to hold a public officer accountable. Most petitions fall into the ordinary category which deals with everyday local issues such as council services, planning applications, road issues, parks and so on. Ordinary petitions are usually discussed in one of the council's specialised committees.

Despite expectations for high thresholds for ordinary petitions, in 178 LAs (52.8%) there was either no explicit threshold set or it was clearly stated that all petitions,

regardless of how many signatures they collected, would be taken into account by the authority. Thresholds up to 50 signatures were found in 80 websites (23.7%). Higher thresholds, in the 100-500 range, were found only in 19 (5.6%) cases (V2). In addition to the signature thresholds, as summarised in table 1, a set of variables representing different implementation characteristics were examined (V3-V11).

Table 1. Summary of the main variables examined for the ePetitioning implementation

Variable	Found in...
Is there a forum, commenting facility or other linked space to discuss petitions? (V3)	7 or 2.1%
Is there evidence that the system was operating before the December 2010 deadline? (V4)	28 or 8.3%
Are there links to other council material in petition descriptions in order to assist petitioners get an informed opinion about the topic? (V5)	28 or 8.3%
Are there notification services for new petitions (e.g. RSS feed or mailing list)? (V6)	93 or 27.6%
Are there contact details within ePetitions? (V7)	110 or 32.6%
Is there evidence of seeking encouraged user feedback on the website design or the petitioning process? (V8)	13 or 3.9%
Is there any connection with paper petitions handled by the authority? (V9)	55 or 16.3%
Is there evidence of also accepting petitions from other online sources apart from the official council website? (V10)	9 or 2.7%
Is there an adapted privacy statement about the information collected? (V11)	84 or 24.9%
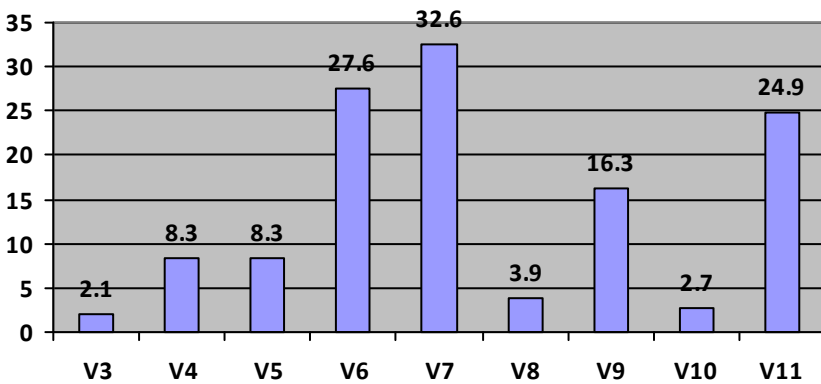
Fig. 1. Percentages of LAs implementing the features examined in table 1 (V3-V11)

The level of assistance and instructions offered to users about the website and the petitioning process was also assessed (V12). Four different levels were used, spanning from "no or almost no instructions" (66 websites or 19.6%) to "detailed instructions including step-by-step wizard" (35 or 10.4%). Most websites were classified in the second level (107 or 31.8%), followed by the third (69 of 20.5%).

Finally, the actual use of those systems was examined (V13). Not a single petition was open for signatures in 192 (57%) websites. In some websites there was either one (41 or 12.2%) or two open petitions (22 or 6.5%). In the rest 22 or 6.5%, there were up to 15 open petitions. At least one petition completed, including decision by the authority, was found in only 44 websites (13%) (V14).

Table 2 summarises the group of five variables examining other eParticipation activities. Although the study did not aim to capture in-depth details, official use of social media by LAs was found in more than two thirds of the cases. Twitter, Facebook, Flickr and YouTube were the most common social networks identified in council websites. Online consultations and surveys were also popular. Authorities were classified as positive in the consultation category only if there was an online route to participate in consultations (without email or post contact). The same was applicable for online compared to postal-only surveys. Webcasting, despite its high cost, was also offered in 57 cases. Finally, online forums or community discussion groups were far less common: they were found in less than 10% of the cases.

Table 2. Summary of other eParticipation activities examined

Variable	Found in...
Are council meetings webcasted? (V15)	57 or 16.9%
Are social media officially used by the authority (e.g. Facebook groups, Twitter updates, Flickr, YouTube videos and others)? (V16)	231 or 68.5%
Are there online forums or community discussion groups? (V17)	32 or 9.5%
Are there mechanisms to participate online in consultations organised by the authority (e.g. forms, questionnaires or an online commenting facility)? (V18)	147 or 43.6%
Are online surveys used to ask for citizen feedback on public services, budget decisions or other local issues? (V19)	177 or 52.5%
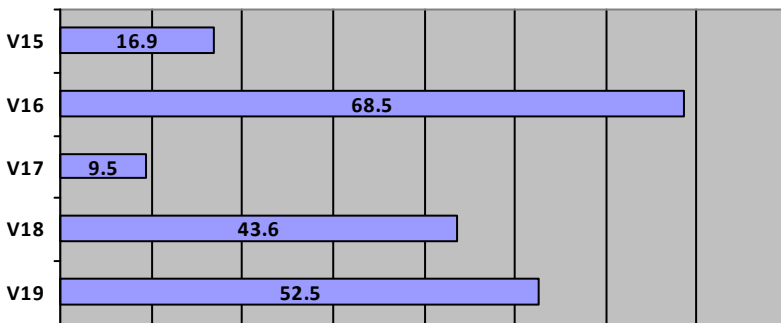
Fig. 2. Percentages of LAs implementing the features examined in table 2 (V15-V19)

For further statistical analysis, two composite variables were formed; they were named ePet1 and ePet2 respectively. Their aim was to indicate the extent of effort and creative thinking placed on implementing the ePetitioning facility by each authority

(ePet1), as well as the level of system use (ePet2). Many different combinations of the available individual variables could have been selected to form those indexes. To create ePet1, the characteristics outlined in table 1 were added (V3-V11), also taking into account the total number of authorities implementing each variable. In this way, for example, offering a commenting facility for petitions gave an authority more points than having contact details (0.93 for the first and 0.68 for the second, see table 1). The system visibility within the council website (V1) and the level of assistance and instructions (V2) were also added without weighting (0-3 points).

Next, LAs were classified in four categories and assigned points (0-3) according to the number of petitions open, completed or submitted to the council without response yet. Adding those three variables created ePet2 which represented the level of system use. The volume of petition signatures was not taken into account for two reasons that didn't facilitate meaningful comparisons. The first is that signatures mainly reflect the level of support that petitioners manage to raise about topics which can be more or less localised, for example, concerning a single street or the whole authority. Second, during data collection, petitions could be open for various amount of time (e.g. a day or a month) which highly affects signature volumes.

Finally, an eParticipation index was formed by adding the five variables shown in table 2 (V15-V19, absence or presence of each feature counted as 0 or 1 respectively). Having defined those three indexes, it was possible to examine relationships with the background institutional factors through correlations (Pearson, two-tailed) and t-tests. From this analysis, the following interesting observations emerged:

- The effort placed on implementing the system (ePet1) was positively correlated with its level of use (ePet2) ($p<0.01$).
- The eParticipation index (ePart) was positively correlated with both ePet1 ($p<0.05$) and ePet2 ($p<0.01$).
- Regional Internet broadband adoption, area size and employment rate were not related to any of the ePart, ePet1 or ePet2.
- The average weekly income per household was not related to ePart and ePet1, but was positively correlated with ePet2 ($p<0.05$).
- Population and population density were positively correlated with all three indexes ($p<0.05$).
- The LAs that decided not to implement ePetitions did not perform significantly better or worse in other eParticipation activities compared to those who did comply with the ePetitioning mandate. Political affiliation of the council was also not found to be important in terms of adoption or not.
- Early and late ePetitioning adopters had no difference in other eParticipation activities, but early adopters performed significantly better in both ePet1 and ePet2 ($p<0.01$). Political affiliation of the council was also not found to be important in terms of early adoption.
- Conservative-led authorities (200 in total) performed significantly worse in ePet2 ($p<0.05$) than other authorities.
- Authorities led by Liberal Democrats (21) or Labour (50) performed significantly better in ePart ($p<0.05$) than other authorities.

5   Discussion

This overview study can certainly be interpreted from several perspectives and inevitably comes with limitations. Examining online channels offered to citizens by LAs and their implementation details reveals little about actual political engagement and the combination of local institutions that enact and support such efforts [23]. For example, case study work has illustrated how the ePetitioning facilities have been institutionalised in the early adopters' cases, e.g. [12]. The web content analysis exercise cannot straightforwardly uncover such elements nor provide evidence of local systems being actually promoted or silently resisted. The study was also conducted in rather short time after the December 2010 deadline when it is normal to expect that the new practice will not be yet fully embedded in the majority of LAs.

Nevertheless, despite its limitations, this study allows drawing some useful conclusions for eParticipation in a national case where the concept seems to be maturing from the theoretical/experimental to the policy implementation level. As Medaglia notes [6], assessing a new policy at the early stages can be important for its future impact due to the usually high cost of changing initial decisions. While the future of this particular policy depends on the new UK government's forthcoming regulatory work (Localism Bill), the current state-of-the-art demonstrates that, for most LAs, the ePetitioning mandate was certainly not seen as an opportunity to revolutionise local democratic processes.

The study results shows that institutional compliance was indeed achieved to a large extent despite hints by the new government that the initiative might be repealed by future legislation and not be audited. Although in about 25% of LAs ePetitions suffer from apparently low visibility, in about 45% of them locating the system requires at most one click from the council home page (see V1). Furthermore, despite initial expectations, the study did not find evidence of signature thresholds being a real barrier for prospective petitioners (see V2). In most cases, LAs appear willing to take into account petitions on quite localised issues potentially signed by a limited number of citizens.

Despite those positive indicators, it seems evident that most LAs allocated the minimum possible effort and resources to this new initiative. This conclusion is signified from combining two observations coming from the findings: limited implementation of the features examined in table 1 and low actual use of ePetitions (V13-V14). The first observation shows that LAs did not wish to or possess the resources to enhance the online petitioning process with support characteristics such as notifications for new petitions and commenting facilities.

The second observation illustrates that, regardless of most systems operating for less than three months, in most LAs the initiative was not advertised or promoted; the absence of even a single petition in 192 out of 277 websites looks like a clear indication. It was further noticed, but not formally examined as a separate variable, that in many cases where up to 5 petitions were present, usually more than one of them had been initiated by the same citizen or group of citizens. In this sense, online petitioning was relevant to the "usual suspects" in the local political life. A more detailed study with German Parliament ePetitions also points to this direction [18].

Beyond ePetitioning, the study also offers some suggestions about the state-of-the-art in other eParticipation activities. Certain activities which were thought to be at the experimental stage a few years ago, such as online consultations, now have become more standard (V18). Furthermore, the low use of webcasting (V15) and community forums (V17) in comparison to consultations (V18) and surveys (V19) probably suggests LAs tend to favour forms of participation which do not require significant resources and, importantly, can be bureaucratically controlled by public officers. The more widespread use of Facebook groups, YouTube videos or Twitter updates should not be confusing in this direction: disseminating council information through social media does not imply continuous interaction with the public nor empowers citizens to set the agenda as for example petitions do.

In comparison with the studies reviewed in section 2.1, there are certain similarities and differences. First of all, as in the Netherlands case [5], institutional compliance was the main motivation to implement this initiative: in their majority, those systems were not used at all after almost three months and/or were implemented at the basic level. This study also seems to confirm most of Medaglia's findings [6]. Authority population and population density were strongly related to all three indexes. Bigger cities led by centre and left-wing parties performed better than rural areas led by conservatives. The fact that income per household was positively related with higher system usage probably confirms the conclusion that political participation online favours traditionally privileged citizen groups, e.g. [24].

6 Concluding Remarks

This paper presented and discussed the findings of an overview study of ePetitioning tools in the English local government. Following regulatory arrangements introduced in 2009, all English LAs were required to implement those tools by the end of 2010. Less than three months after this deadline, the web content analysis shows that the impact of this policy is questionable. Certainly, the legislation couldn't be expected to transform local democratic processes at such short time. Nevertheless, the overwhelming number of petitioning websites being implemented at the very basic level and/or being not used at all is certainly not encouraging.

An interesting question emerges from the outcome of this study: is regulatory enforcement the best option to enact the impact of eParticipation tools? Despite offering an opportunity to empirically address this question, the English experience with local government petitioning provides a rather ambiguous if not negative answer. Examining the evolution of those systems in time might point to more solid grounds. It is also important that future research takes into account citizens' views on available public participation channels. As Carman suggests [15], the existence of online engagement opportunities, whether regulatory enforced or not, can have limited impact if citizens do not view engagement processes as fair and politically neutral. Especially with respect to local government petitioning, this aspect can be even more important than the technological artefacts themselves which, even when simply implemented, might still be able to demonstrate positive impact on local democratic processes.

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Questão Pública:
First Voting Advice Application in Latin America

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Abstract. Questão Pública was a Voting Advice Application website set up for the 2010 Senate elections in Brazil. Promoted by a consortium of Brazilian and international NGOs as well as universities, Questão Pública was not only a research but also a political initiative. The consortium understood Questão Pública as a complementary tool to reinforce transparency and accountability during an election campaign. The paper presents a description of this experience, of candidate and user response resps wellas a discussion of the main features of the Voting Advice Application. We furthermore report on technical aspects, the questionnaire, and the diffusion activities the consortium undertook to convince candidates to participate as well as to attract users.

Keywords: Voting Advice Application, election, online survey, Brazil.

1 Introduction

A Voting Advice Application (VAA) is defined as a non-partisan online device assisting voters to find out more about the candidates and political parties running for office in an election. A VAA attempts to achieve this goal by offering the Internet user systematic information about the policy preferences of political parties or candidates. The Internet user typically has to respond to a questionnaire touching upon select political issues with the parties or candidates having positioned themselves beforehand. As a result, the VAA produces a match between the political positions of the potential voter (in our paper the VAA user, or simply the user) and a party or a candidate [1]. The VAA usually represents this match in the form of a chart or a table (oftentimes based on a percentage) illustrating how far away the user is from the political parties or candidates. Electoral offer and demand are thus compared and graphically displayed on a website for each individual user.

Since the first experience with a VAA (1998 in the Netherlands), the number of constituencies with VAA platforms during election time as well as the number of VAA users have considerably increased[1]. VAAs became quite common in Europe and

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[1] See [1] for examples. The Swiss VAA 'smartvote' increased the number of voting advices from 255'000 in 2003 to almost one million in 2007, whereas in Germany the Wahl-O-Mat (www.wahl-o-mat.de) started with 3.6 million voting advices in the 2002 elections, and delivered over 6.7 million voting advices during the campaign of the 2009 elections [3].

the United States over the last decade [2], [3]. Until recently, however, this democratic innovation had not made it to Latin America. Questão Pública (QP) contained the first VAA implemented on this continent[2]. Promoted by a consortium of Brazilian and international NGOs together with universities[3], QP aimed at being a complementary tool helping to reinforce transparency, to promote civic education and to increase accountability on the occasion of the Brazilian Senate elections of 3 October 2010.

Out of a total of 272 eligible candidates for the Senate elections in all 27 Brazilian states, 58 candidates in 16 states completed the QP questionnaire. The VAA was consulted about 8'000 times. In the following pages we describe and analyze this Brazilian VAA experience in 2010. The article starts off with a brief review of the discussion on VAA research so far, followed by a description of QP, then addresses project implementation and results, and finishes by drawing up conclusions and providing avenues for future research.

2   Why Using a VAA?

VAAs have become a well-known tool during election campaigns in most European countries. One of the strongest arguments in favor of them is the fact that, by requiring parties and candidates to openly declare their positions on a series of policy issues, they can help to situate the public discussions during the campaign. Furthermore, VAAs try to raise awareness for (perhaps neglected) political issues and offer guidance related to party preferences, taking into account topics of the current political debate [2]. In most cases VAAs are advertised as reliable tools capable of aiding voters to make informed decisions, enhancing and strengthening fundamental democratic principles such as transparency and accountability [3], but also as a means to have a positive effect on voter turnout. More recently, researchers are trying to use VAA generated data to analyze the positioning of political parties in an ideological space [4].

According to Fivaz et al. [3] a 'first wave' of publications on VAAs has focused more on the description of VAAs and their features, whereas a second wave, larger in respect to the number of published studies, is attempting a more in-depth approach by focusing on empirical studies and by developing a more critical stance towards the object under study [14]. The spread of VAAs in the last decade has created a new field of research in which contextual factors such as the features of the political system or the role played by the media are taken into account for the analysis [5].

In the case of the very popular Swiss version, called smartvote, Nadig and Fivaz [6] explain that its growing popularity among the candidates can be attributed, to a certain extent, to the "marketing" instruments deployed to promote the website (e. g. candidate profile with smartspider and smartmap visualizations), which is also linked

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[2] Since Spring 2010 the e-Democracy Centre (www.edemocracycentre.ch) started to cover selected elections with their own VAA (see research section for a full list).

[3] ABRACCI, Avina Foundation, Ethos Foundation, Agora Institute, Center for Research on Direct Democracy (c2d), Transparency International and Gov2u were members of the consortium (http://www.questaopublica.org.br/).

to the rise of the Internet in general. The mass media show a high interest in these candidate profiles and frequently print them – often in an attempt to compare candidates. For Garzia [7] the main reason for the success of the ideas behind VAAs lies in the increasing number of swing and undecided voters who need help in making up their mind. Accordingly, cross national analysis stresses that these tools are more popular in highly fragmented political systems and/or complex electoral systems where casting an informed vote is more time consuming. In some cases it was found that such tools encouraged voters to acquire more information on politics and political parties, positively affected turnout and even affected their vote intentions [7]. For other authors there is only little evidence supporting a positive relation between the use of VAAs and voter turnout [8].

Questão Pública was the first VAA implemented in an emergent and at the same time very large country such as Brazil (with 191 million inhabitants) combining a considerable digital divide with a growing Internet diffusion and online activism in civil society [9]. According to data from the International Telecommunication Union [10] 39.2% of the Brazilians are Internet users, positioning the country as one of the leaders in the region. Furthermore, several studies have shown the active use of online social networking sites[4]. However, only middle and upper classes have taken advantage of this development. Most Internet users are young, have a high level of education and live in urbanized areas.

On the political side, Brazil has a strong presidential system and a highly fragmented party system since the transition to democracy, with a large number of political parties forming coalitions in order to be able to access political power. Political parties are weak but individual political leaders are strong [11]. This is the context in which candidates interact with a VAA. However, QP was not only a research initiative but also a campaign by political activists.

3   Questão Publica, the Brazilian VAA

3.1   The Senate

With 191 million inhabitants, Brazil is a federal presidential republic of the federal government, states and municipalities. The president is both head of state and chief of the executive branch of the federal government. The legislative power is vested in the Chamber of Deputies and the Federal Senate, and these two houses make up the National Congress. According to Desposato [12] the Senate is the more powerful of the two institutions, given that it has the sole authority to set total debt limits for all levels of the Brazilian government and to decide on international financing. The Senate has the exclusive power to impeach and try the president, ministers, Supreme

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[4]   Brazilian consumers spend an average of 19.3 hours online for personal use versus 9.8 hours watching TV, according to a study released by Deloitte.
See: http://venturebeat.com/2009/06/22/brazil-social-advertisings-next-frontier/ (accessed in September 2010). Another study by the social media company Sysomos Inc shows that Brazil is the fifth-largest nation of Twitter users.
See: http://latamthought.org/2009/07/13/twitter-in-brazil/ (accessed in September 2010).

Court justices, and other authorities. The Senate also approves many key appointments and chooses many federal judges.

Each one of the 26 federal units as well as the Federal District elects three senators (total of 81), for an eight-year term. In one election (every four years) one third (27) of the senators are elected and in the following one the other two thirds (54). The Senate is selected via single and multi-member plurality elections and is headed by the Board of Directors[5], elected by the members of the Parliament every two years.

Brazil has a multi-party system, highly fragmented since 1985, with a large number of political parties forming coalitions in order to access political power. Since 1990 not fewer than eighteen parties were represented in the Chamber of Deputies, and none of them gained a quarter of the seats[6]. Finally, though political parties are weak, in the states the political leaders are strong. An incumbent senator can simply switch political parties and take with him most of his supporters. Furthermore, candidate nominations are quite often declared by the senators themselves.

The consortium also decided to implement the VAA for the senatorial elections in order to counter the mass media focus on the presidential elections. A number of organizations aiming to reinforce democracy see the platform as a complementary tool to turn around the growing lack of confidence that citizens have in the Parliament, bolstered by frequent corruption scandals. Many citizens do not know who their representatives are and what they stand for. The focus on the Senate was seen as a way to reinforce the institution and its role, to provide information about candidates and to center the campaign on ideological issues. Asking candidates to position themselves during the campaign was seen as a way to reinforce the role of ideology in an election and to promote control and accountability beyond elections (positioning as the basis to exercise control after the elections).

3.2 Project Design

Three important decisions have to be taken in order to implement a VAA. These are the design of the questionnaire, the options to collect candidates' positions and more technical aspects such as the algorithm applied to compare users' preferences with those of the political parties or candidates.

a) *The questionnaire*: The main challenge for the design of a VAA questionnaire is to identify the most relevant issues on the political agenda, to establish a balance between different ideological positions, and to avoid ambiguous phrases.

Therefore, the language used should be simple and widely understandable, especially when the target is the entire electorate. The questionnaire composed of 35 issue statements was elaborated by specialists, discussed by the network of the NGOs and tested with different social groups before being uploaded. As it is a political activism initiative, tension occurred between the NGOs and partners with a more

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[5] The Board is composed of the President, two vice-presidents, four secretaries and four deputy secretaries.

[6] Coalitions are usually headed by the four major parties: the Workers' Party (PT), the Brazilian Democratic Movement Party (PMDB), the Brazilian Social Democracy Party (PSDB) and the Democrats (DEM). Sorted according to their ideological position from left to right: PT (left-centre), PSDB (centre-left centre) PMDB (centre) DEM (right centre) [13].

academic profile with regard to the definition of some questions, which were considered to be crucial for some, but biased for others. Here is a sample of statements (for the complete list in Portuguese, see Annex 1):

1. *The age of criminal responsibility should be reduced to 16 years*
2. *Brazil should stimulate the transformation of MERCOSUR into a supranational institution such as the European Union*
3. *The fuel tax should be increased to subsidize public transport*
4. *Public universities should charge a monthly fee to those who can pay*
5. *Religious education must be part of the public school curriculum*
6. *Abortion in early stages of pregnancy should be legalized*

The questionnaire provided a five-point response scale allowing one to express strong or moderate positions of agreement and disagreement. The categories were: absolutely agree, agree, neither agree nor disagree, disagree, absolutely disagree, and not interested. The crucial question regarding answer categories is whether you allow the user, the candidates, or both to be neutral towards an issue statement, or even not to answer at all. All those choices linked with the set up of a VAA have consequences of how the applied matching algorithm performs – in the end deciding on the validity of the whole exercise.

b) *Positioning:* The answers of candidates or political parties can be provided via the assessment of non-partisan experts, the political parties themselves or via an individual response of candidates. In the QP experience the last option was the only one considered, given the overall focus of the project on political activism. In that sense, QP sought to have an effect not only on the voters but also on the candidates and on the future senators who should expect to be controlled by the NGOs in the fulfillment of their promises.

A problem to be considered when a VAA is applied on this basis is timing. Given that the list of official candidates was provided at the end July, although legal procedures continued until the election, there was a delay in starting the campaign to get candidates' answers. Then, the novelty of the initiative meant that several discussions had to be conducted with most of the candidates until some of them decided to provide answers to the questionnaire. In a huge country such as Brazil, the consortium was able to focus only on some regions. Initially, these regions were the ones with more Internet access, despite the fact that a few candidates from places with very low Internet spread joined (e.g. Amazonas), while in areas with a higher Internet diffusion such as São Paolo QP did not reach a very high response rate. This produced a second problem, which is that the electoral campaign was developed in a short period but QP needed candidate answers in order to work as such and to be meaningful for the users. The fact that there were not enough answers resulted in a delay of the launching, decreasing the opportunity for a greater impact. Some lessons should therefore be learned for future experiences[7].

c) *Linking preferences, procedural and output options*: Setting up a VAA involves a couple of procedural and methodological decisions. In a nutshell, we can observe

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[7] A more detailed project report can be found at www.dd-la.ch (4th ZDA-AVINA Report, November 2010).

from our recent VAA experiments around the globe that every single parameter of a VAA can have an effect on the result, usually being a matching coefficient or a percent match value between the candidate's and the user's political preferences. Even factors we cannot control such as the number of candidates and the perception of what a good match actually is in the eyes of the users (distance vs. directional voters) will influence the validity of the whole exercise.

For a VAA the quality of the questions asked is crucial. First of all, the catalog of questions has to cover the political spectrum of all the political parties or candidates otherwise the result will be biased. In our view it is best to test the questions beforehand with a representative survey as Walgrave et al. suggest [14]. For each question we could then test how they perform for they are supposed to divide candidates and users into distinct political camps in order to work out the ideological differences between them. We therefore prefer questions producing an M-shaped frequency distribution with more answers on each side of the argument and fewer in the middle (on a five point scale with a neutral category in the middle). However, and probably quite typical for the ordinary VAA providers, such a time consuming and costly procedure was not an option for the QP project. The questionnaire was thus developed with the help of secondary data and literature [13], generating the already mentioned debate between political activists and academics. It goes without saying that one and the same question can perform very well in one electoral system and context but not in the other.

Question specific traits such as the scale, whether to allow a middle category, whether to allow candidates to refuse answering a question or not, simply the number of questions asked are all factors influencing the quality of a VAA. Some VAAs also allow their users to attach more or less weight to certain questions or thematic sections of questions.

Last but not least, there is a myriad of matching algorithms available. Depending on the context of the election either Euclidian distance models, scalar products, matrix models or rank-order coefficients perform better. Based on our VAA experiments we opted for a Euclidian distance model which seemed to produce stable results.

3.3   Outcomes

In October 2010, the Brazilian Senate was about to renew two thirds of the seats, out of a total of 81. Those seats were contested by 272 candidates in 27 districts. Despite the intense campaign to contact all candidates, and the strong influence reputation of some of these NGOs (such as ABRACCI), only 58 candidates from 16 states answered the questionnaire. The VAA was consulted by roughly 8'000 Brazilian citizens. 6'360 of them reported their socio-demographic data after completing the questionnaire.[8]

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[8] The data set for the socio-demographic questions was generated from the MySQL database of the VAA via a csv-file. Original treatment was done with the help of Notepad++. The data was then read into PASW Statistics 18.0.1 (better known as SPSS). The data set consists of 6'360 entries and the following variables: ID, IP-ID (anonymous), State, Duration, Date, Gender, Year of birth, Education, Vote intention (Presidential), and User location. You can obtain it via Email from the authors or find it on www.dd-la.ch .

Table 1 shows the total candidates by state, and the candidates who responded (CwR); the number of users by state (n=6'360) and the percentage over the total users. A first finding that emerges is that there is no correlation between the size of the district in terms of voters, the number of seats contested or the number of candidates and a bigger or smaller rate of answers. Although the users came mostly from São Paolo (66.7%), only 33% of the candidates answered the questionnaire (5 of 15). Whereas in Rio Grande do Sul 78% of the candidates answered the questionnaire (7 of 9) but there were only 147 VAA users declaring to live in that state (2.3% of the total users).

Table 1. QP, candidates and candidates positioning, user and percentage over the total users

States	Candidates	CwR	CwR %	Users	Users %
São Paolo	15	5	33	4242	66.7
Rio do Janeiro	11	7	64	519	8.2
Minas Gerais	10	4	40	499	7.8
Paraná	7	5	71	248	3.9
Santa Catarina	11	5	45	211	3.3
Rio Grande do Sul	9	7	78	147	2.3
Bahia	10	4	40	120	1.9
Amazonas	8	2	25	109	1.7
Goiás	8	5	62	71	1.1
Ceará	10	3	30	51	0.8
Alagoas	10	2	20	46	0.7
Maranhão	11	2	18	28	0.5
Acre	4	2	50	23	0.4
Rondônia	7	2	28	18	0.3
Sergipe	14	1	7	19	0.3
Piauí	12	2	17	9	0.1
Total	157	58	--	6360	100

Regarding gender, we can further report that there is a dominance of men among the total number of candidates (86.8%), the candidates who responded (84,5%) and the elected candidates (85%). The same applies for the educational level, whereby the ones with a higher level of education dominate among the number of candidates (82.4%) and candidates who responded (87.9%). The same applies to age. There are no major differences between the total number of candidates and respondents. In both cases most of them are located within the age-group 45 to 59 (representing 55% of he total candidates and 55% of the candidates who responded), followed by the groups before and after, that is, 35 to 44 (representing 18.7% of the total candidates and 17.2% of the candidates who responded) and 60 to 69 (representing 18% of the total candidates and 17.2% of the candidates who responded).

The previous suggests that the profile of candidates who joined QP fits with the general profile of candidates who were running for the Senate in terms of gender, age and educational level.

How can the small number of candidates' answers be explained? Although further research should be done, it is possible to suggest some hypotheses. Although the campaign is the place to share and discuss ideas, taking public positions on issues

such as abortion tends to be a risk for a 'catch-all' party candidate. In a highly fragmented political system, strong candidates such as incumbents from major parties have fewer incentives to include innovations in their campaign strategy (such us joining a VAA), given their dominant or powerful position in the political arena. In contrast, weaker candidates (from small or new political parties) have a much higher incentive to innovate in order to increase their influence or their presence in the mass media, which is normally dominated by leaders of the bigger political parties. Given that QP was used for the first time, the application had to win a space in the media (mass and social media). Other experiences (e.g. smartvote in Switzerland) have shown that, as soon as a VAA gains in importance, a certain pressure to join can build up on the candidates [15].

The expected link between small parties and a bigger incentive to join an innovative campaign tool such as a VAA can be confirmed. Although some candidates of parties that gained more seats in the Senate created their public profile on the QP website (eg. 23 candidates were from PMDB, which won 16 seats, while 5 candidates answered the QP), we found that there was a greater participation of candidates from parties that won only a few seats (PSOL, PV, PPS, DEM) or none at all (PCB, PSTU). For example, PSO presented 39 candidates, 8 answered the questionnaire and only 2 were elected. PCB presented 21 candidates, 8 answered the questionnaire but none of them got elected. Table 2 also shows that, among the 58 candidates who responded, only four won seats (PMDB, PT, PSDB and DEM won 16, 11, 5 and 2 seats, respectively).

Table 2. Elected senators, candidates and candidates who responded (CwR) by party

Political Parties	Elected senators		Candidates		CwR	
	Nº	%	Nº	%	Nº	%
Party Socialism and Liberty (PSOL)	**2**	**3,7**	**39**	**14,3**	**8**	**13,8**
Brazilian Communist Party (PCB)	**0**	**0**	**21**	**7,7**	**8**	**13,8**
Socialist Party of Workers´ Unified (PSTU)	**0**	**0**	**26**	**9,5**	**8**	**13,8**
Brazilian Democratic Movement Party (PMDB)	**16**	**29,6**	**23**	**8,5**	**5**	**8,6**
Green Party (PV)	**0**	**0**	**16**	**5,9**	**5**	**8,6**
Socialist Peoples´ Party (PPS)	**1**	**1,8**	**7**	**2,6**	**5**	**8,6**
Democrats (DEM)	2	3,7	12	4,4	4	6,9
Progressist Party (PP)	4	7,4	13	4,8	3	5,2
Labour Party of Brazil (PT do B)	0	0	3	1,1	3	5,2
Workers´ Party (PT)	11	20,4	22	8,1	2	3,45
Christian Labour Party (PTC)	0	0	2	0,7	2	3,45
Brazilian Labour Party (PTB)	1	1,8	6	2,2	1	1,7
Brazilian Social Democracy (PSDB)	5	9,2	17	6,3	1	1,7
Brazilian Labour Renewal Party (PRTB	0	0	7	2,6	1	1,7
Communist Party of Brazil (PC do B)	1	1,8	10	3,7	1	1,7
Party of National Mobilization (PMN)	1	1,8	3	1,1	1	1,7
Brazilian Republican Party (PRB)	1	1,8	3	1,1	0	0
Republic Party (PR)	3	5,5	5	1,8	0	0
Christian Social Party (PSC)	1	1,8	4	1,5	0	0
Socialist Brazilian Party (PSB)	3	5,5	8	2,9	0	0
Democratic Labour Party (PDT)	2	3,7	6	2,2	0	0
Others*	0	0	19	7	0	0
Total	54	100	272	100	58	100

* Others: parties did not win seats or candidates did not respond: PCO; PHS; PSDC;PSL; PTN

On the side of the citizens, starting from the point in time when the VAA was activated, the QP website received a total of about 20,000 visitors (not visits) according to Google Analytics, most of them concentrated in the ten days before the election. The peak was reached 2 October 2010 with 3'600 visitors.

The majority of the users answered the questionnaire from home (68%), followed by those who responded from the workplace (26%), while the other options (academic center, public access centers, houses of other people) were chosen by 2% or less (n=6'109).

Analyzing users by age (n=6'214), it is possible to observe that the greatest number of responses came from the group of 21 to 30 years old (38%), followed by the group 31 to 40 years old (20%). The same data, disaggregated by gender (n=6'220), shows the existence of a gap, which is reinforced in older age groups. 60% of the total users were men and 40% women. However, the average gender difference of 20 percent goes down to a 3 percent difference within the group of the youngest users with an age of under 20 years.

What the previous data suggests is that the profile of citizens who used QP is related to the features adopted by the digital divide, which includes more young, males, and people with an Internet connection at home.

4   Conclusions

Although VAAs are now well-known and accepted in Europe and the United States since more than a decade, QP was the first experience in Latin America promoted by a consortium of local and international NGOs together with universities. It was focused on the Senate with the intention to reinforce the role of an institution characterized by the lack of confidence and clientelistic practices. Important goals of QP were to provide information, to promote a politically neutral campaign and to create the basis for more democratic control and transparency.

Candidates had to position themselves. Despite the campaign developed by the consortium only 58 out of 272 candidates responded. A curious finding comes from the fact that although the promoters in São Paolo developed a stronger campaign, and most of the users were concentrated in that state (66%), only 33% of candidates answered the questionnaire, much less than the 64% in Rio de Janeiro, 71% in Paraná or 78% in Rio Grande do Sul.

At the same time, a good proportion of the answers came from candidates of small parties. This could be explained by their limited access to mass media and their reduced chances of being elected. In these cases, incentives to join an innovative application are stronger than it is for their counterparts, who have greater chances of being elected and have more incentives to keep their voters uninformed about their detailed political preferences.

Future research should find out to what extent the ideology of political parties plays a role in increasing (or not) the probabilities of a candidate to join a VAA application. As an exploratory hypothesis, it could be suggested that 'catch-all' parties are less inclined to show positions on controversial issues such as abortion or gay marriage. In contrast, small parties could have more incentives to show a clear position trying to increase their public support.

The profile of users is not surprising, represented more by the young, males, the educated, and people with Internet connections at home. The gender gap is a generational one, with a huge divide between older people and less of a difference found among the young (only 3 percentage points).

For future experiences in the region some recommendations could be considered: contact with candidates is crucial and the response is not obtained immediately; thus, it is essential to develop a solid strategy. It is recommended to expand the networks to communicate with all the parties while reinforcing the contact with main parties, which can produce a 'snowball' effect; mass media should not be underestimated, given that their support could also be crucial for diffusion. Finally, in countries like Brazil, with many initiatives and organizations working for the improvement of democracy, it seems more efficient for everyone to build synergies. In that sense, a VAA could be online on several websites with a common database to collect data, instead of running on one site only.

However, the Internet is spreading and it will reinforce the impact of political initiatives based on VAAs. Despite the low number of users and participating candidates, this VAA has shown the consortium promoting the initiative that a new tool is available for political activism. Future elections will show to what extent the wave of change stimulated by ICTs could generate a change in the political arena.

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Annex 1

1. A carga tributária no Brasil deve ser reduzida
2. Os cidadãos devem participar diretamente das decisões sobre políticas públicas
3. As universidades públicas devem cobrar mensalidades daqueles que podem pagar
4. O desmatamento deve ser totalmente proibido no Brasil
5. O voto no Brasil deve deixar de ser obrigatório
6. Os lucros obtidos com a extração de petróleo devem ser divididos entre todos os estados da federação
7. A adoção de crianças por casais homossexuais deve ser permitida
8. As empresas privadas devem ser proibidas de financiar campanhas eleitorais
9. As invasões de terra são instrumentos legítimos de pressão
10. Um político deve poder indicar pessoas competentes para cargos no setor público, mesmo que sejam seus parentes
11. O governo deve investir em programas sociais para complementação de renda, como o Bolsa-Família
12. Obras culturais financiadas com recursos públicos devem ter livre acesso
13. A maioridade penal deve ser reduzida para 16 anos
14. Para aumentar o número de empregos, direitos como férias, décimo-terceiro e fundo de garantia devem ser flexibilizados
15. Políticos condenados, mesmo em primeira instância, devem ser impedidos de se candidatar
16. Negros devem ter direito a cotas nas universidades públicas
17. O governo deve aumentar o percentual de reciclagem de resíduos sólidos para 50%
18. A anistia geral concedida ao final da ditadura deve ser revista
19. O ensino religioso deve fazer parte do currículo da escola pública
20. As privatizações são benéficas para o país
21. O Brasil deve exercer o papel de mediador em conflitos internacionais
22. A opção pelo aborto deve ser legalizada
23. O imposto sobre combustíveis deve ser aumentado para subsidiar o transporte público
24. Em alguns casos, a violência policial é justificável
25. Mudanças na Constituição devem ser submetidas a referendos e plebiscitos

26. O Brasil deve estimular a transformação do MERCOSUL em uma instituição supra-nacional, como a União Europeia
27. Se o Brasil precisar de novas termoelétricas, são preferíveis as nucleares às que queimam combustíveis fósseis
28. O número de vezes que um parlamentar pode se reeleger deve ser limitado
29. Oferecer tratamento para viciados em drogas na rede pública legitima o uso
30. A busca da sustentabilidade não deve prejudicar a liberdade do mercado
31. Crimes graves devem ser punidos com pena de morte
32. O Brasil deve aumentar os subsídios econômicos a países vizinhos
33. Políticos e grupos religiosos devem ser impedidos de receber e manter concessões públicas de TV e de rádio
34. A legislação ambiental federal deve levar em conta a particularidade dos biomas e não fronteiras estaduais
35. A qualidade do trabalho dos senadores é de responsabilidade dos eleitores

iLeger: A Web Based Application for Participative Elections

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Abstract. *iLeger* is a Web Application that seeks to concentrate, in a single place, the stakeholders in a political election allowing multi-directional and structured communication between them. Using a citizen and candidate centered approach; *iLeger* supports collaborative interaction with the purpose of fostering communication, deliberation and participation. This paper aims at presenting the main functionalities of this Web application, as well as the results from a case study about the Portuguese Presidential Elections held in 2011.

Keywords: Elections, Campaigning, eDemocracy, eParticipation, Deliberation.

1 Introduction

The current economic and social context calls to civic intervention and stimulates the search for solutions and answers. Recently we have been witnessing a growth in the adoption of Information and Communication Technology (ICT) and the widespread access to the Internet. Following this trend, the field of public participation [1] has seen a growing integration of ICT and the Internet, leading to the concept of electronic participation - eParticipation [2]. The potential of technology to increase public participation has been a topic of debate in recent years. Although there are skeptics [3], we believe, as [4, 5] that the Internet-based technologies have the potential to change and improve how the stakeholders interact with each other in the democratic process.

The research area of eParticipation is still in its infancy [6]. Although there are already some initiatives [7], they generally tend to serve a specific purpose and scope [8]. This article describes a Web application, *iLeger*, specifically designed to gather during the election period, voters and candidates in an election in a shared deliberative space. With this application it is intended to contribute to close the communication gap identified between these two key stakeholders.

ILeger is integrated into the project *Liberopinion* (*http://www.liberopinion.com*) which aims to create a technology platform in the field of eDemocracy and social networks, with emphasis on interaction between users. Currently, the platform

Liberopinion consists of two applications, the one described in this paper, *iLeger*, and *Governmeter*, which is intended to monitor the performance of governmental activity. In summary, Governmeter is a web application based on the principles of eParticipation, specifically designed to monitor and discuss, objectively and independently, the government activity and new laws at national, regional or local level. In a first stage, Governmeter is mainly focused on three aspects: the evolution of conjuncture indicators, the government objectives and government measures.

In more detail, *iLeger* combines in a neutral and civilized single space the key stakeholders in an election, the candidates and citizens, and promotes multidirectional communication between them. Interaction and collaboration is supported through questions, answers, suggestions, comments, votes and live debates. *ILeger* was recently tested in the Election of the Chairman of the Portuguese Medical Association (*http://om.ileger.sapo.pt*) and used in partnership with the largest Portuguese Web portal (SAPO – *http://www.sapo.pt*), property of Portugal Telecom, in the Portuguese Presidential Election of 2011 (*http://presidenciais.ileger.sapo.pt*).

In the use of Web communication tools to reach voters on general elections, there has been major investments by all political parties and corresponding candidates on either social networks such as Facebook, Twitter, MySpace, or on dedicated websites through which the candidates attempt to present their positions and their electoral program. This combined with the traditional television debates, ads, and rallies through the country, make up for the most part of the political campaign.

If we consider now the citizen perspective and the information gathering process that precedes the voting decision, we have two main sources of information. The first, which might be called passive, consists of watching the news or debates and speeches by the candidates in the TV or radio, as well as the analysis by political experts. In the second, an active one, usually the citizen consults electoral program of the different candidates, typically on the candidates' website, or at best consult other media websites which aggregates this information and provides a comparison of the candidates position on each topic or issue.

After observing the traditional type of political communication and media coverage, important questions emerged: in the era of widespread social interaction can this be the best method for citizens to decide for a particular candidate? How can we, as individuals and as a community, make sure that our most important problems are being correctly identified and directly addressed by the different candidates? Is there an efficient way to take advantage of the collective knowledge and ideas of the community, to help the candidates draft the solutions to these problems? Finally, how to find the best candidate for us, both as an individual and as a community?

In an attempt to answer such questions, we realized that there must be a better way to manage the citizen-candidate interaction. We consider that it would be useful to have an application that unites, in a single, neutral and civilized place, the stakeholders in the electoral process so as to allow multidirectional communication between them. Such perspective takes into consideration the need to provide an e-participation citizen and candidate centered tool. This would enable, on the one hand, the citizens to become clarified on the most important questions and problems of society and, on the other hand, the candidates to be aware of the citizens' ideas and the main concerns of the community in different governance topics (education, health, economy, justice, and so on).

This paper is structured as follows: Section 2 describes the major functionalities of the *iLeger* Web application, while section 3 presents the results from a case study about the Portuguese Presidential Elections held in January 2011. Section 4 contains topics for future work. Finally, the section 5 closes the paper by presenting conclusions.

2   The *iLeger* Web Application

Considering either general online tools such as blogs, Internet campaign sites of the political parties, email, email newsletters, or more traditional media covering TV broadcasts, debates, telephone calls, door-to-door contact or town hall speeches, they are mostly concentrated in unidirectional communication and do not support an efficient, scalable communication process based on all stakeholders' goals and needs.

Before the 2008 presidential TV debate between Obama vs. McCain, the TV station prompted the population to submit their questions to the candidates. From the pool of questions, a selection would be made and the resulting questions would be presented to the presidential candidates, in addition to the ones presented by a panel. Six million submissions were received by means of email, comments in the TV station website, telephone calls, among others. The number of questions formally submitted to the official website for this purpose, Mydebates.org, was about 25,000 [9]. This is one example of the willingness and initiative of citizens when prompted to interact with candidates, especially when they are prompted to bring forward their own problems and concerns to their potential representatives.

Moreover, it was found that three-quarters (74%) of Internet users went online during the 2008 US election to take part in, or get news and information about the campaign [10]. This represents 55% of the entire US adult population, and marks the first time the Pew Internet & American Life Project has found that more than half the voting-age population used the Internet to connect to the political process during an election cycle. The Internet has therefore emerged as an ubiquitous support means used by citizens to clarify the issues important for their voting decision.

Several online initiatives have been made available to help citizens clarify the issues and proposals by the different candidates. A known approach presents a questionnaire to citizens covering different issues, make a statistical comparison with the candidates' stances and derive the candidate that best matches the user answers [11]. This does not allow the citizen to communicate and submit questions to any of the candidates. The questions formulated are based in the electoral program as defined by each candidate and does not provide any basis for interaction. Other websites comparing the different candidates' proposals in several topics also exist [12].

On the other hand, another approach seeks to close the communication gap between citizens and politicians [13]. The list of political representatives, as well as election candidates, is displayed and it is possible for citizens to submit questions and for the politicians to answer. However, the website is designed around each political representatives and doesn't seem to provide neither a scalable solution when the number of questions increase, nor a direct comparison of candidates' answers to the same question and debate around the question and answers.

ILeger is a Web Application designed and developed from the ground up to meet the needs and stakeholders goals in the electoral process, considering the two major groups of citizens and candidates. As illustrated in Figure 1, it consists of five main areas: questions from the citizens and corresponding answers from the candidates, proposals and ideas from the community, citizen surveys, the candidates´ electoral program and finally live debates.
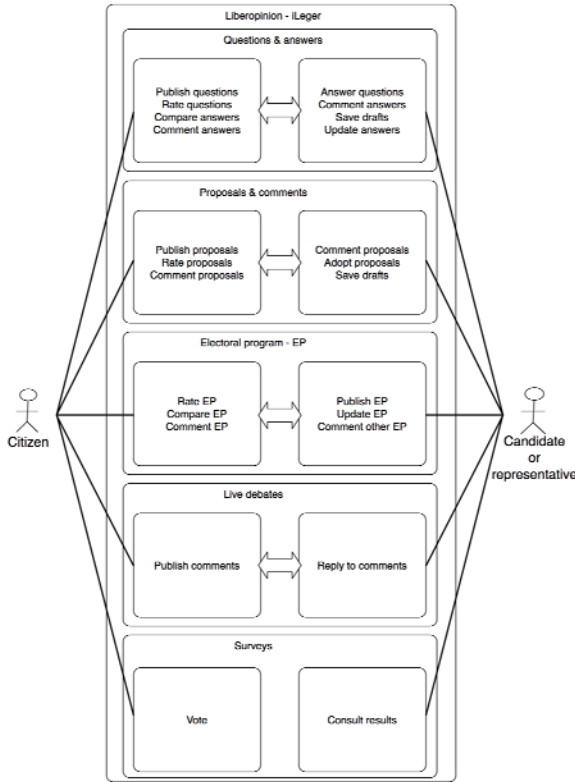
Fig. 1. Functional structure of iLeger

We believe that online social networks will be increasingly important for communities and citizens. We considered from very important to provide *iLeger* platform with social networking features at an early stage. Therefore, a registered user can follow other users registered on the platform, and see all the questions, suggestions and comments made by those users.

Seamless integration of the platform with existing social networks is also of paramount importance [14]. For this reason, and as a first step in that direction, it is possible for a citizen to publish his questions and proposals to Twitter and Facebook directly from the platform. Thus provide a more open interface to foster participation of enhanced opinion voice, as it augments the scope and potential impact of each individual's participation.

In relation to user registration and access to the platform, by default, each user must be previously registered on the platform and have to login to take advantage of key capabilities such as submit questions, suggestions, comments and voting. If the user is not logged in, it is only possible to view the contents of the application. Nevertheless, it is possible to configure *iLeger* for different settings so as to enable interaction by non-registered users. For example, there is a setting in which non-registered users can vote but cannot introduce content and other that allows voting and content introduction. In the latter configuration, the only limitation to unregistered users is the lack of email notifications and additional features known from social networks such as following user and the access to a public profile.

By default, all the content submitted by citizens is subject to moderation [15] according to the platform terms of use. When the user registers in the platform, the user must accept these terms of use. The actions of the candidates, on the other hand, are not moderated. The platform is configured to support different settings for moderation. For example, it is possible to publish directly all content, i.e. disable moderation, or moderate only entries denounced by the platform users. In order to encourage participation, citizens are permitted to request anonymity for all content submitted to the platform.

Currently, *iLeger* can be configured regarding the type of interaction of candidates. *iLeger* is foreseen to be used in two scenarios: with or without interaction by candidates. With interaction, the candidates have an access account and are responsible for the introduction of content, allowing direct communication with other users. In the absence of candidate interaction, *iLeger* can still be used to identify key issues and suggestions from voters, as well as their views on the key issues about the election.

In the following sections, the *iLeger* platform is described in more detail.

2.1   Questions from the Citizens

ILeger can be configured to be used with or without direct interaction of the candidates. Without direct interaction this area of *iLeger* serves primarily to generate a TOP of questions that will be used to fuel the discussion directly with the candidatures. In a first phase, users are invited to submit questions to the candidates and vote on its relevance during a predetermined period of time. Then the TOP questions will be asked to representatives of the candidatures during live debates. In a more interactive mode, the candidates have an access account to *iLeger* and this area allows them to directly answer questions from voters and participate in debates with other candidates and citizens.

The voters are given the chance to raise questions in previously defined topics simultaneously to all candidates whose answers could help them decide which candidate to vote for. Questions and corresponding answers are published for all too see, comment and rate.

One major result of the citizen centered design is the possibility to compare side by side the answers of different candidates to the same question. The voter can thus have a better overview on the substance of the answer, helping to clarify remaining doubts about whom to vote. On the other hand, for answering the questions, the candidates have a dedicated interface in the application where they can write the reply and

automatically publish it. In order to help the candidate draft a reasoned and thorough answer, it possible to save the answer as a draft to be finished and published at a later stage.

ILeger was designed in such a way that the candidates can answer every question using the same kind of interface, providing a consistent user experience. For instance, when browsing through the list of questions as a citizen would do, the candidate can press the button "answer" to start typing the text or even bookmark a question for a later answer. In order to foster deliberation [16], all interactions between citizens and candidates are associated with a specific comment area. The comments section associated with every question and answers allows easy and intuitive follow up of discussion threads by implementation of a "reply to comment" mechanism. This way, the candidates have a greater insight about main concerns and opinions from citizens and are given the opportunity to present in greater detail their points of view.

2.2 Proposals and Ideas from the Community

In this area, the citizens can provide their own ideas and solutions to problems on different topics of governance so that the candidates can benefit from the collective knowledge of the general and specialized community. The interaction model used in this area is similar to the questions: the proposals can be listed per topic; rated for degree of support among the community; and commented on. This way, it provides a community-based mechanism for enhancing and identifying the best proposals ranging different topics such as Health Care, Education, Economy, among many others possible, which can serve as a source of ideas for candidates and political parties (this occurs in a particular time when they are asked for solutions to the national or local themes / issues).

In the configuration without candidate interaction this area allows identification of the best proposals from the citizens, the most voted by the community, in the various areas of governance. Some of these proposals may subsequently be used in direct discussions with representatives of the candidatures to get to know their views.

On the other hand, in case *iLeger* is configured for direct interaction by the candidates, they are also given the chance to provide, in this area, feedback on the proposals by leaving comments on a text area designed for this purpose. As in the section dedicated to the candidate´s answers to the questions, the comments by the candidates are placed side-by-side for an easy comparison by the reader. To foster constant feedback to the candidate and to provide means to ascertain the community reaction to the comments, all these entries are also subject to rating by the citizens.

In order to encourage citizen participation and, possibly to recognize and benefit from the good ideas coming from the community, the candidates can point out by a special icon any proposals that were fully or partially incorporated into the candidate's electoral program. This feature provides, on the one hand, an incentive for the citizens to present their proposals and, on the other hand, a means for the candidates to collect ideas to their programs and emphasize them, a nice feature that encourages a more collaborative political process.

In summary, *iLeger* provides an additional channel created to foster community participation and communication between the citizens and candidates with the

objective of identifying the best solutions to the problems faced by society stemming from the community.

2.3   Citizen Surveys

Similarly to known e-consulting approaches [17], in this section, several questions are presented to the citizens about key issues about the election. Through a simple and intuitive interface, as shown in Figure 2, the electors are invited to give their opinion through voting.
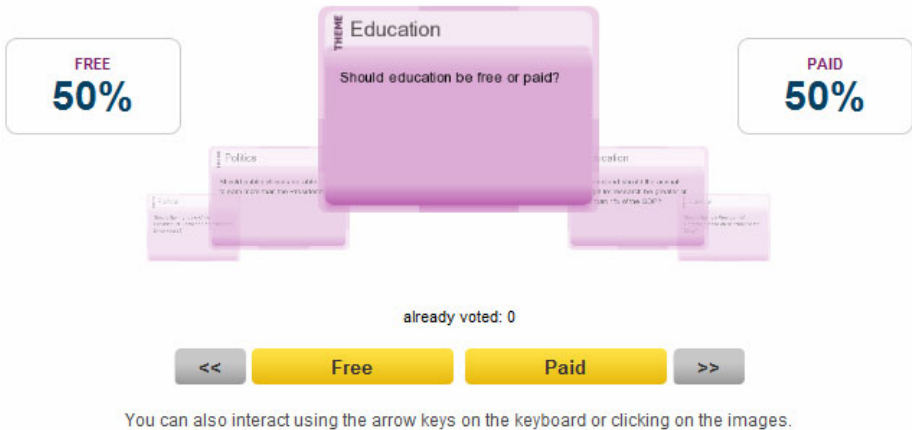
Fig. 2. Interface used for citizen surveys

In the setting where users are required to register to vote, each user can only vote once, but it is always possible change the vote. The main purpose of this section is to know the community opinion in relation to key topics.

2.4   The Candidates` Electoral Program

The fourth main area of the proposed platform offers the citizen the means to compare side-by-side the different candidates` electoral programs, and the candidate with an additional channel to broadcast the political messages to the electorate.

If *iLeger* is configured to be used directly by the candidates, in this section they can introduce via the Web interface the individual proposals in a given topic, e.g. Economy or Health Care. These proposals are then voted and commented by the citizens directly on the platform. Predicting cases of low-ranked proposals, the platform was designed such that the candidates can easily re-write or even remove unpopular entries. This area has the potential to create an interactive process for drafting a candidate´s program taking into account direct feedback from the community. Moreover, the candidates can publish their comments to the other candidate's proposals, possibly for identifying their disadvantages and weaknesses, enriching therefore the debate around the electoral programs. With this debate and discussion around the political issues at hand the citizen can have a better idea of the

position taken by each candidate, not only based on their own program but also by the contributions in the debate around the political position taken.

If *iLeger* is configured without the direct interaction of candidates, this section can be used to publish the editorial version of the electoral programs for the various candidatures structured by topics, and to enable citizens to issue their opinion by voting and by commenting on the various measures proposed by the candidatures. Naturally, with this configuration the debates between candidatures and between candidatures and citizens are lost.

In addition, as a direct consequence of the compilation of all electoral programs from the candidates, they can easily be held accountable after the elections since a clear list of proposals will be available for monitoring. This also opens the way to future use of the content in this section after the electoral period.

2.5 Live Debates

In this area of *iLeger*, users can read archived discussions, gather information about scheduled debates, and if there is a live debate ongoing, they can access and participate in this debate. To enable the live debates this section incorporates the component *CoveritLive* (*http://www.coveritlive.com/*).

Throughout an election period several live debates with the candidatures may be conducted. As mentioned previously, the discussions are moderated and will not require that citizens log in to submit questions and comments.

One of the innovative features of the *iLeger* consists of the use of the section dedicated to questions and suggestions for the creation of TOPs that can then be used during the live debates. With the purpose of creating these TOPs, the citizens are initially invited to submit questions and suggestions and vote on their relevance for a predetermined period of time. Then, along with the statistical information collected in the section dedicated to citizen surveys, the TOP questions and suggestions may be used to feed the live debates.

Therefore, even if *iLeger* is configured without direct interaction by the candidatures in the other sections, it can still be used in such a way that the candidatures can be invited to participate sporadically in live discussions with citizens. This feature can be useful for situations in which the candidatures do not want to commit themselves for longer periods of time due, for example, to scarcity of resources. In this scenario, *iLeger* assumes then the role of technological support for an editorial user.

3   Case Study: The 2011 Portuguese Presidential Elections

iLeger was used in partnership with SAPO, the largest Portuguese Web portal, during the Portuguese Presidential Elections held in January of 2011. It covered the last two weeks before the elections. All the six candidatures were invited to join and participate in *iLeger* and all of them accepted.

The version of *iLeger* used in these elections was configured so that users had to be registered in order to submit contents and vote, all written content submitted by

citizens were subject to moderation and representatives of the different candidatures only participated in live debates.

For user registration, the single sign on (SSO) mechanism from our partner was used. This way, users already registered on SAPO could log in to iLeger without the need for new registration. We recorded 947 distinct users who have logged in, that is, who were enabled to submit written content and vote. Statistics extracted from Google Analytics showed that during the two weeks 23,512 unique users visited iLeger (total of 62,306 page views). The logged in to (unique) visitors ratio amounts therefore to 4%.

During the first week, citizens were asked to create a Top 10 questions to be posed to the representative of each candidature in live debates held in the second week, the last before the election. To this end, users submitted questions and voted for their relevance. At this stage, were accepted by the moderator 187 of the 253 questions posed by users, indicating a rejection rate of 26%. In addition, there were submitted 48 comments around some of the questions, indicating a low level of debate. These results are in line with others found in the literature [18].

In the second week six live debates were conducted, one with each candidature. Each debate lasted an hour and a half. It is important to note that from the 23,512 unique visitors over the two weeks, 9862 entered *iLeger* for the first time during these debates, demonstrating the interest of citizens to participate in live events of short duration.

During the live debates, the Top questions generated during the first week were asked to the representatives of the candidatures, with additional questions submitted by citizens during the live debates. Over the six debates there were 972 entries submitted in the form of questions or comments. However, by restrictions of time and moderation, only 93 of these entries were addressed by candidatures.

Over the two weeks the registered users submitted a total of 201 suggestions, of which 20 were rejected by the moderator. In this section of *iLeger*, the users were encouraged to say what they would do if they were President of Portugal. Overall there were 886 votes on questions, 1292 votes on suggestions and 6265 votes on the 12 questions of the survey.

It is also interesting to note that from the 947 users who have logged in, only 251 have submitted written content (253 questions, 201 suggestions and 48 comments), showing a percentage of 26.5%. Moreover, considering the 23,512 unique users who visited *iLeger*, then only 1% has submitted written content.
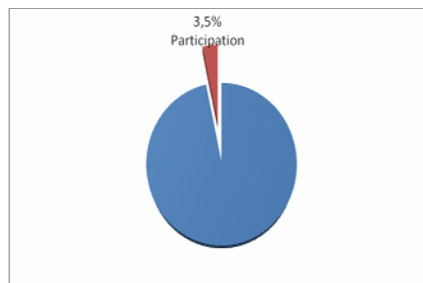
Fig. 3. Percentage of participation within unique visitors

If, besides the introduction of written content, we account for the action of voting on the questions, suggestions and inquiries, we will then obtain 845 different users that actively interacted with iLeger. Following these measurements, as shown in Figure 3, we accounted for 3.5% of unique visitors actively participating in iLeger.

From Figure 4 it can be verified that 89% of the users that logged in, participated in *iLeger*.
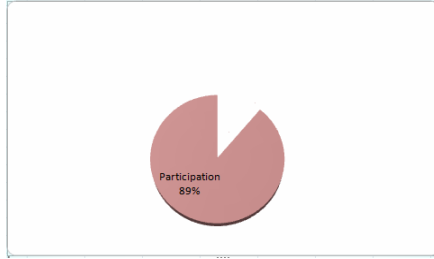
Fig. 4. Percentage of participation within logged in users

In these elections *iLeger* was primarily used to identify key issues and suggestions from voters, as well as their views on the key issues of the election. Through live debates, it was also possible to obtain a better insight of the viewpoint of representatives of the candidatures regarding the 10 questions most voted by the citizens in the previous week as well as other live questions. By comparing the viewpoints, the citizens will have additional information about the candidates´ position on the important issues, helping them decide for their best candidate. However, due to the short time iLeger was online and, consequently, due to the limited amount of data gathered, it is still not possible to respond accurately to all research questions left open at the introduction of this paper.

4   Future Work

In a project as ambitious as this, there are certainly many improvements possible and many directions for future development and further research. It should be emphasized that this Web application is based on an incremental development process starting from a limited set of features, allowing for an early release date and for feedback already in the first stages of the project. In addition, from the user's perspective it is also advantageous since simpler and fewer functionalities are easier to learn. New functionalities can therefore be acquired, in an incremental way, as they are made available. The users themselves can provide their ideas and suggestions for new functionalities which will be taken into account when deciding the development path for the application.

Considering the continuous development of this electoral application, after more detailed consultation of the stakeholders (the citizens and the candidates), the main needed functionalities are workflow and staff management to the candidates, and management of favorite contributions to the citizens. It is also our intention to assess the quality of the platform.

In addition, as a direct consequence of the application development and usage, the following open questions were identified for future research and development: What should be the role and scope of user moderation? How to implement self or mutual moderation mechanisms? How important is the role of an information curator in this context? How to improve usability and optimize information architecture? How to prevent duplicated entries? How to manage a possibly large amount of questions, proposals and historical data? ILeger takes several approaches to deal with this scalability problem. In order to keep the number of comments, questions and ideas manageable, the users are encouraged to vote on the existing questions or ideas instead of submitting repeated or re-phrased ones. Additionally, the content is categorized by topics providing navigation structure and organization to the data submitted.

Moreover, it is a subject for further investigation the perceived idea that citizens prefer to participate in events of short duration instead of ongoing a lasting discussion.

One important direction of future work concerns the technological support for live debates which, due to the general interface used, can be better tailored to this particular context. Another identified area for future work concerns the incorporation of comments in the section dedicated to citizen surveys to foster debate about the issues under discussion.

5   Conclusion

All candidates are well aware of the current momentum in Internet-based social networks and dedicate more and more financial and human resources for transmitting their messages across the electorate through Web channels such as Twitter and Facebook and their own websites.

From the experience gather during the 2011 Portuguese presidential election we can conclude that publicity is a key factor in this kind of initiatives. Every time our partner placed *iLeger* on their headlines the number of accesses increased enormously.

After observing how users interacted with *iLeger*, the statistics derived there from, and the overall reactions both from the citizens and the candidates contacted, we believe Internet-based tools to support eDemocracy such as this one will become mainstream. These digital tools would provide a major contribution to reverse the current disengagement from political and electoral debate, as well as provide a valuable means to bring together both citizens and politicians through open and direct dialogue – a dialogue with a digital memory open to future consultations. Moreover, we believe that continuous dialogue may also improve citizen trust and accountability of politicians, although more research is needed to confirm this assumption.

We are deeply convinced that *iLeger* can be an effective tool for elections 2.0, and we hope that it provide a new way of citizen-candidate interaction who can also inspire other initiatives for finding innovative solutions in eDemocracy.

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One for All, All for One – Performing Citizen Driven Development of Public E-Services

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Abstract. The notion of citizen driven development of public e-services has been vivid for a number of years in eGovernment research, practice and policies. A variety of expectations are coupled with the idea of citizens participating in the development process; ranging from, roughly outlined, more efficient services (economic gain and customer satisfaction) and enhanced democracy (deliberation and empowerment). There are less conceptual analyses resting on a critical stance analysing how this notion is translated in practical settings, leaving a gap in between for practitioners to solve. This paper presents explorative work made in a Swedish authority, setting out to understand their structure, and the available methods used, in relation to the concept. The results show that besides difficulties in creating systematic work processes, what surfaces is the complex task of estimation.

Keywords: eParticipation, citizen driven, participation, development, public e-services, analysis of concepts, estimation.

1 Introduction

The European eGovernment Action Plan 2011-2015 [1] stress, as several earlier documents have, the imperative of "involving users actively in design and production of eGovernment services" [1 p.7]. Throughout the document the notion of participation is repeated over and over again in different shapes: involvement, empowerment, collaboration, flexible and personalized, user satisfaction etc. From reasoning it is understood that participation is perceived as fundamental. Descriptions of why and how is though not that present, besides the statement early in the document saying that; "the majority of EU citizens are reluctant to use them [the public e-services]" [1 p. 3] generating a strong need to "move towards a more open model of design, production and delivery of online services, taking advantage of the possibility offered by collaboration between citizens, entrepreneurs and civil society" [1 p. 3]. So, the logic being that the citizens would use the e-services if they could be part of their creation, why so is not elaborated upon. The underlying reason for the existence of e-services at all is though that they can "help the public sector develop innovative ways of delivering its services to citizens while unleashing efficiencies and

driving down costs" [1 p.3]. The relation between these two statements and their interdependent logic, citizens would use the e-services if part of their creation and e-services would enhance service delivery and drive down costs, is however not further problematised. Thus, their intersection is highly interesting and stress other questions such as; resistance among administrative personnel in fear of losing their employment, or resistance by citizens for carrying out the administrative work of the government employees already paid for in terms of taxes, or, where the added service value appears if you perform the administration yourself [2].

The notion in itself, of citizen driven development (which will be the wording used in this paper), is though existing in many contexts; in policies, in research and in practice. For example in public administration and political science as 'new governance' and 'citizen participation' addressing issues of quasi-legislative and quasi-judicial governance processes as deliberative democracy, e-democracy, public conversations, participatory budgeting, citizen juries, study circles, collaborative policy making etc. in order to permit citizen and other stakeholders to actively participate in the work of government [3]. Some more related to input on how to improve the quality in administrative work whereas some refer to facilitating active political involvement of the citizenry (different themes of so called deepening democracy) [4, 5]. In the IS community as 'eParticipation' with concerns such as; how to accumulate needs and preference, how to ensure cohesion across processes and how to select tools and methods, how to secure interactivity and scalability and how to evaluate impact [6]. Generally resting on a focus on liberal collaborative forms of participation which could rather be defined as some form of consultation than a more direct form of democracy [7, 8].

In this paper the focus is thus directed more closely on how the notion of citizen driven development then could be performed, that is, not why citizens should participate but how, and how their participation could be taken care of in government. If citizen participation is an imperative from the European Commission it ought to be translated and enacted on a national level throughout public sector [9]. The point of departure for the analysis at hand is therefore that of a critical analysis of concepts i.e. to understand how the notion is 'done' one need to understand how it is translated in the specific context. The final aim being that of by doing so, contribute to the gap in between policy visions and practical undertakings by and large for practitioners to solve. This paper presents explorative work made in a Swedish authority setting out to understand their systematic, and the available methods used, in relation to the notion of citizen driven development of public e-services. As a background the idea of 'participation' is put forward from two perspectives (as a design issue and as a political agenda). Thereafter the critical analysis of concepts as a methodology is explained, the case is described and the results are shown. Finally, in the conclusion the main findings are reflected upon in relation to the background setting.

2   Participation as a Design Issue

Since the focus in this paper is on performance, how citizen driven development of public e-services is actually put into practice, the design perspective is imperative in order to understand the actual processes. It should thus be noted that in design practices

related to the design of information systems (here used as equivalent to e-services) the 'participating user (here used as equivalent to citizen)' holds an almost indisputable position. Already in 1984 Ives & Olson [10] made a literature review touching upon user involvement and indicators of system success, and since then many others have followed; Kappelman & McLean [11]; Hartwick & Barki [12]; Iivari & Igbaria, [13], among others. In these studies it has for long been claimed that the involvement of appropriate and representative users is critical to the success of a system.

Overall, there has developed several different aspects of the basic notion of a participating user; user participation, prototyping, participatory design (PD), computer supported cooperative work (CSCW), usability engineering , and user-centered design. Sanders and Stappers [14] have, from a design perspective, illustrated the great variety in the landscape of participatory design as ranging from seeing the user as a subject to the user as partner and the process led by design or led by research (se figure 1 below):
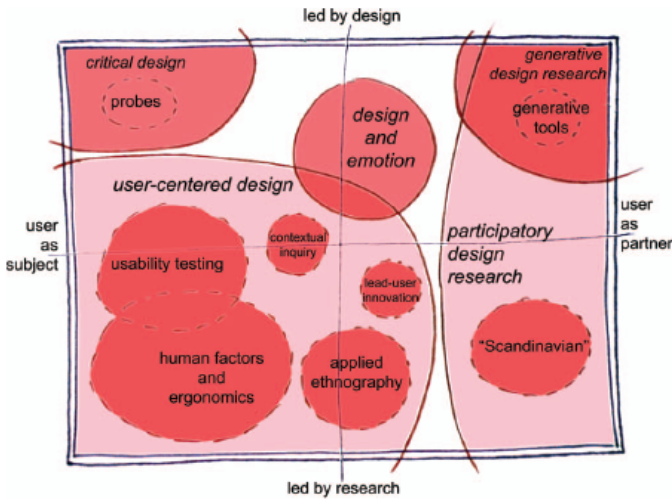
Fig. 1. The current landscape of human-centered design research as practiced in the design and development of products and services

These are all different ways of involving the user in some way, and to some extent and they offer a wide range of techniques on how to do so. Even though they differ with regards to who should be involved, when, and in what role [14]. Thus, taken together they all share the assumption that it is crucial that the voices of the users-to-be are present in the design process. The reasons behind this might vary from democratic reasons, such as work place democracy or counteracting discrimination, to purely economic reasons (i.e. it is necessary to be able to develop a product that will meet a market), and it is notable that there are several differences between them concerning how this should be done and why.

In recent years, another complexity in the notion of a participating user in the design process is however added, the dispersed and unknown users, for example in relation to the shift towards the citizen as user of public e-services. Traditionally,

most user-focused studies [15] concentrated on the organizational individual since from the beginning the research was aimed at designing technology for workplaces [16]. Work practices and professional use was as such a natural focal point due to the fact that the computer had not yet reached the private sphere to the extent it has today [17]. Moreover, since many systems today are developed for very large user populations (even in some workplace settings), it is hard, not to say sometimes impossible, to involve all users or even to find suitable user representatives, or create fictive users [18, 19]. To then create a useful set of fictive users or a useful number of representative users, we will have to extract a very large number of heterogeneous characteristics from a very small number of generalized characteristics. Such an extraction, resting on what is considered as important characteristics in the specific situation, might run the risk of losing what really matters during the process because the information is mistakenly perceived as beyond the scope. As Mackay [19] touches upon (which is an interesting distinction related to user participation in IS design); are everybody's insights equally welcome or are there preconceived ideas about what kind of user should be given opportunity to formulate requirements, and who decides who should be listened to? Summing up, existing methodologies and techniques face new challenges and might need adjustment to be developed further in consistency with societal changes.

What is maybe even more interesting is though that the notion of a participating user as such is seldom questioned. As Sanders and Stappers state; "It is interesting to note that participation in the design process, as it is practiced today, is focused more on the exploration and identification of presumably positive future opportunities than it is on the identification and amelioration of adverse consequences" [14 p.8].

3 Participation as a Symbolic Political Construct

There are some interesting voices raised addressing the perceived shift in several policy settings towards emphasizing 'users' as an increasingly vital actor, Shove and Rip [20] being one of the most interesting ones. Even though the context of their argumentation is research policy and the considerable emphasis on users as important in order to determine relevance and suitable funding projects, the logic is applicable to participatory eGovernment development policy as well, especially from two points of view; the 'taken for grantedness' and the ignorance regarding the details and performance of the inner logic. Or, as Shove and Rip [34] put it, there is an "over-reliance on an embodied notion of use and uncritical acceptance of associated pathways of influence" [20   p.175]. This strongly relates to what is stated in the European eGovernment Action Plan 2011-2015 [1]; the strong need for citizen participation in the development of e-services at the same time as "the majority of EU citizens are reluctant to use them [e-services]" [1 p.3]. Shove and Rip raise important questions such as; what is the nature of this relationship and what constitutes participation, who qualifies as a user and what is their role in the process are raised, and argue that there are relatively little systemic discussions of who users are, what they do, how they interact and what it means [20].

They continue by stressing the symbolic function of the notion of the participating user and reflect on the extent to which these rhetorical interpretations mesh with practice; it dominates the rhetoric but not always the reality. As such they do not exist a

priori but needs to be defined and constructed, and their characteristics heavily depend upon the purposes they are supposed to fulfil (such as for example legitimate particular practices) [20]. Such a point of departure is very rewarding and creates opportunities to reflect upon the symbolic quality of the notion of a participating citizen as well. Show and Rip conclude by stating that the concept of the user is a device for invoking potential value; if the user exists and he or she wants and uses what we produce it is proven to be essentially good. As such it is upheld by both sides (even if there might be hidden reluctance on the side asked to produce the user driven artifacts) in case of a strong political demand. However, in the real world (opposed to the symbolic constructs) the notion of the participating user creates some complexities. First the good users (the influential, interested, involved and powerful) are in absolute minority leaving it to be hard work for practitioners to actually find them. Secondly, it is easy to go astray and create mythical users, created for rhetorical purposes, and risking to lose track of the real ones. Giving that, proposals may go forward and priorities may be adjusted, to the needs of the mythical user. Thirdly, being a user is not a stable position and efforts to embody the process of use are easily misguided.

Applying their analysis on the notion of a participating citizen in the development of public e-services creates equally interesting thoughts; who qualifies as a citizen, how are we to find among them the citizen interested in participating, if we find someone qualified and interested how are we supposed to interact with them, what is the nature of our interaction, how do we constitute what is labelled as participation or not. Fischer [21] raises these questions in a governmental setting by addressing the cultural politics of discursive space in participatory governance, concerned with the degree to which citizens are able to participate meaningfully and the implications for the nature of professional or expert practices. Even if it is not that easy to parallel governance with the design and development of public e-services the question of how participation should be done remains in both cases. In line with Cornwall [22] Fischer then argues, that participatory governance readjust the boundaries between the state and the citizens with the establishment of new places were the participants can engage each other in new ways. From a governance perspective this readjustment of boundaries then asks for a clear understanding and clear rules asking questions such as; "Are the rules governing who gets to speak fair and equally distributed? Is the discussion open? Is the deliberative agenda transparent to all participants, or are particular elements hidden and secretive? To what degree are all participants represented?" [21 p.22]. In governance literature participation is thus not thought of as an easy task and Fischer conclude that: citizen participation, in short, is a complicated and uncertain business that needs to be carefully thought out in advance [21]. To be aware of the complexity and to deal with it carefully is central, again stressing issues of representation, the discursive space (who gets to speak and who gets to decide etc.) and the hard task of finding the interested citizens is a reoccurring theme.

4   Conceptual Disentanglement as a Methodology

As indicated from the discussion on the notion of citizen driven development above, it is far from consistent or finally defined. The use of wording differs (participation, cooperation, involvement, empowerment, collaboration etc.) and so does also the expected value (enhanced and deepened democracy, improved administrative

efficiency, and better services etc.). This gives that the notion is hard to grasp, and in line with what several other studies have shown, in strong need of clarification [23]. Not in order to end up with a final and generic definition to be used in every specific context but rather as a critical exploration on how this fuzziness works and extends and some of its consequences, especially to practitioners in public administration.

On a general level the design of the study rests upon the interpretative tradition in IS research (24, 25, 26) focusing on the complexity of human sensemaking. Complexity in terms of acknowledging conflicting interpretations among stakeholders [see e.g. 26] but also the need of being sensitive to rich, in-depth and idiographic meanings that the participants assign to them. The intent is to increase the understanding of the interpretation process in its natural setting [25]. The ambition is therefore not to gain repeatability or generalisations in a positivistic sense, the value of the results is rather judged in terms of the extent to which it allows others to understand the phenomenon [24].

Second, which is closely related to the above, the study is not guided by any propositions in terms of Cavaye [27] but is strictly explorative and aims at conceptual disentanglement for a richer understanding of the interpretation process. The anticipation is therefore not to create answers to a set of questions but to analyse the phenomenon in its context which might then be used to inform other settings [28, 29, 30, 31]. As such, the aim is to identify the concept's extension in a specific setting [32]. The notion of citizen driven development is seen as "sufficient information about a hypothetical scenario" and the subjects (respondents) are seen as in a position to identify the extension of the concept [32]. The disentanglement of the concept then proceeds in part through consideration of a concept's extension within hypothetical scenarios, noting regularities that emerge and reveal that certain features of the world are highly relevant to determining the extension of the concept and, that other features are irrelevant [32]. According to Chalmers and Jackson,"[w]hat emerges as a result of this process may or may not be an explicit definition, but it will at least give useful information about the features in virtue of which a concept applies to the world" [32]. This means that the empirical material is treated as 'displays of perceptions' [33] or manifestations and not valued in terms of true or false representations, allowing the explorative nature at the same time as linking the assigned perceptions to the structure of the overarching notion of citizen driven development.

Third, the empirical material is gathered through loosely structured interviews and focus groups in a Swedish public authority setting (hence called the SPA). The chosen authority is greatly involved with the asked for national transformation in public sector towards e-governments (both as a member of the national delegation and as the responsible public authority for development initiatives). The SPA is also part of the group of authorities developing the flagship of co-operation, an e-service directed towards the process of business establishment and supporting their administration, were several public authorities have been working together (trying to cope with stovepipes and cultural differences).

We started with initial interviews (4 interviews) with what was considered key-actors from different positions and these respondents were chosen by the executive group and director-general. They were so to speak our guides into the administrative business. These guiding interviews were analysed and we came back to the authority with a request of doing complementary focus group interviews with three distinctive

groups; the IT-experts, the business experts and a group consisting of people with experience from a specific development project (in this case the co-operative flagship since it was mentioned a lot in the initial interviews). We chose the grouping but the SPA chose the specific participants:

Table 1. The focus group interviews

	Focus groups	Number of persons
Group A	The "IT-group" (holding positions as IT-experts)	3
Group B	The "Business development group" (holding positions as business development experts)	7
Group C	The "Development project group" (holding positions as heavily involved in a specific development project, besides their regular positions)	5

The semi-structured interview guide for both the initial key guiding actor interviews and the focus group interviews had five themes each holding several sub questions; (i) *the source of the notion*, (ii) *the definition of 'citizen'* from the SPA perspective, (iii) *the definition of 'public e-service'* from the SPAs perspective and (iv) *the definition of 'citizens driven development'* from the SPAs perspective and finally, (v) *the expectations* linked to the notion of citizen driven development of public e-services. These interviews were carried out through October-December 2010 and the results were presented to the executive group and director-general in January 2011 and a workshop was held in March 2011 with significant representatives from four different sections at the SPA (the head of the register department, the head of the project office, part of the project team of the flagship project towards business establishment, head of usability issues). Some of the reflections from the presentation and the workshop will also be commented on in the analysis.

5   Results and Analysis

The extension of the notion of citizen driven development of public e-services turned out to be complex from several points of view in the SPA. What surfaced quite early in the gathering of empirical data was that the concept 'citizen' was hard to define for the respondents. Of course they knew the official definition but it did not suite their processes, they altered between citizens, businesses, clients and customer and when asked they could not really choose one over the other. They wanted to use all of them and claimed that they needed to refer to a precise context in order to be more specific, but still they were a bit insecure about what was actually referred to. The citizen concept was as such indistinct and multi-facetted and we, as interviewers, had to repeat the whole pile of "citizen/business/client/customer" wording throughout the interviews. As such, channel strategies were brought to the fore, the respondents

touched upon the fact that they had different strategies to communicate with the "citizen/business/client/customer". They also discussed that sometimes it was just one "citizen/business/client/customer" giving them input on a service performance and how should they then estimate the value of that single input in relation to the total users of their services.

Moreover, how this 'citizen driven development' should be performed were described as rather unsystematic. The respondents did not know of an official strategy or process description. On specific levels they knew of some strategies developed to deal with citizen/business/client/customer input, but they could not derive them to the overarching idea of citizen driven development. Furthermore, the methods of citizen driven development were not that clear or manifested but more in terms of 'incoming viewpoints on existing services'. There were not many examples of innovative development co-operations with "citizens/business/client/customers", mainly because they thought it to be difficult and they did not really know how to deal with that kind of input. This invoked discussions on a need to distinguish between improvements of existing services and completely new development, innovation from scratch demands other processes, competencies and channel strategies and also touched upon complex issues of rules and regulations.

Regarding the source of the notion of citizen driven development of public e-services, the respondents referred back to 'some official document' but could not point to a specific document. The reason for pursuing a citizen driven development of e-services were though often referred to as that of a 'customer focus'; we (the SPA) exist for the customers so they should have a saying. So the reason for the SPA was that of being customer-oriented. However, most of them could not really explain the actual driving forces even though they thought it to be important. Of course, it was rewarding with input in order to develop the SPA further but they did not really link that to their individual work processes.

Taken together, the disentanglement of the notion of citizens driven development of public e-services, first in terms of separating the different parts of the concept (citizen, driven, development, e-services) and then in terms of the extension of the parts displayed several interesting gaps (se figure 2 below):


Citizen	driven	development	of e-services
Who	**How**	**Degree of dev.**	**What**
-Indistinct	-How do 'drive'	-Degree of innovation	-Possible degree of innovation
-Multifaceted	-Should they 'drive'	-New or improve existing	-Rules and regulations
-Hard to define	-How are they invited		
-Hard to reach			
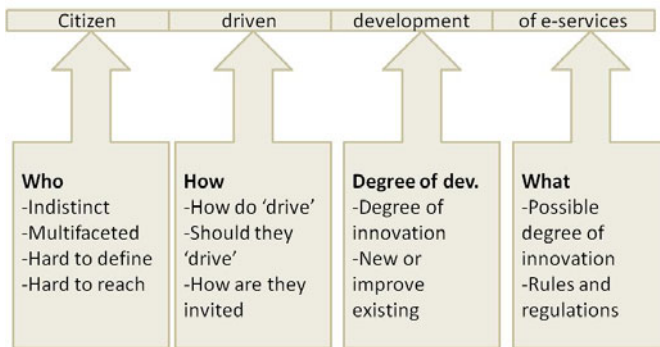
Fig. 2. The extensions of the notion of citizen driven development of e-services

One interpretation of the above is that of the difficult task for practitioners of deciding on who to listen to and how. If the citizens should be the driving force of part of the development of public e-services how should then the practitioners decide in between the widely dispersed input they get? Should they just count how many has put that exact request forward? And if too few, not consider the input at all? Or the opposite, very many, import and execute the input irrespective of the content? And what is more, should the process of taking input into consideration be the same between proposals for improvement of existing services as proposals for a completely new one?
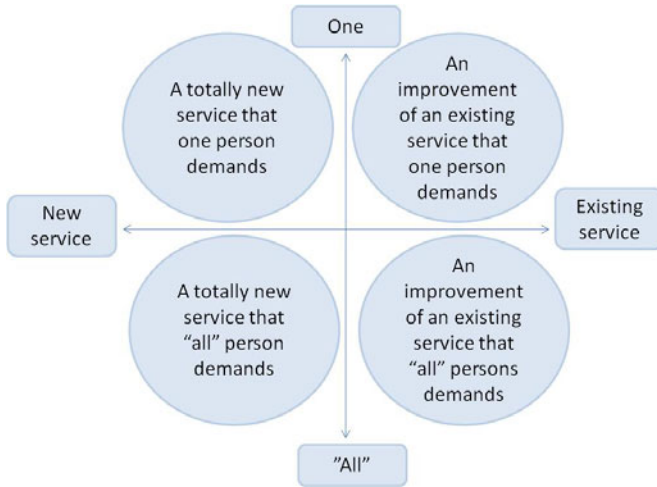
Fig. 3. Processes and method for handling input

The results and the figure (figure 3) above were presented to parts of the executive group and director-general in January 2011 and a workshop was held in March 2011 with significant representatives from four different sections at the SPA (the head of the register department, the head of the project office, part of the project team of the flagship project towards business establishment, head of usability issues). Especially the workshop amplified several reflections from the interviews; the difficulties in estimating the value of the diverse forms of input and the lack of the big picture of how the SPA could turn their logic into being more citizen driven in their development processes. The workshop participants stated that the estimation of the value of different forms of input was very dependent on who made the estimation. How the input travelled in the SPA, where it was filtered and by whom. In worst case scenario a really valuable input could actually end up in the garbage can if it got in the hands of the "wrong person". "Wrong" in this respect was versatile, it could mean lack of competence but it could also refer to a situation in the SPA were the person had been going through so many changes lately that he or she could not really absorb yet another suggestion for changes. Moreover, they also touched upon the hard task of estimating how many "citizens/businesses/clients/customers" were needed in order to say that the input they got were to be considered as representative. Even if

constructed, the selection process in gathering of input from the "citizen/business/ client/customer" was hard and they had trouble in getting in touch with representatives that would participate in the design process.

More so, the process of value estimation of input was often based on how the input could create value for the SPA. If it only created value for the "citizen/business/ client/customer", and not the SPA, it would hardly survive the selection process. There were some exceptions where they could focus on customer value only, but most often the estimation were done with a SPA focus in mind. The perfect match was then when the input and asked for development created value for the customer and the SPA at the same time, these situations were talked about as win-win situations. In these discussions they also reflected upon that importance of the business ratios, if they were directed mainly toward internal efficiency, other initiatives were down-sized in competition for development resources.

The SPA is in this respect not unique. On a specific level related to more distinctive activities there exists knowledge on how to deal with input (both in respect to traditional customer service and design techniques to develop IT-based services). But the notion of 'citizen driven development of public e-services' forms a whole that transgress many of these known processes and methods. It transforms the relation between "citizen/business/client/customer" and the public authority and it is supposed to influence and reshape the public sector profoundly. The question however remains on how this should be done in a holistic manner and the systematics of the combination of all these different methods, processes and techniques were absent.

6   Conclusions: The Complex Chore of Estimation

This paper started out with the aim of taking a closer look on how the notion of citizen driven development of public e-services is performed; the conceptual extensions and locally situated manifestations. In line with Sanders and Stappers [14] the hypothetical contribution being that of identification and amelioration of adverse consequences, and not only exploring and identifying presumably positive future opportunities. The chosen methodology of conceptual disentanglement (as in identifying extensions of the concept, noting regularities and reveal relevant features) drew attention to two central themes; representativeness and estimation and they, in different ways, surfaced throughout the study. The picture evolving is that of an overreliance and an uncritical acceptance of the notion of citizen driven development of public e-services that fails the practitioners. The results highlights Shove & Rip's [20] statement that there is a need for systemic discussions of who users are, what they do, how to interact with them and especially what it means (expectations and the possibilities to live up to them), in order to deconstruct the taken for grantedness of the notion of user involvement and deal with the ignorance regarding the details and performance. It is evident that this leaves the practitioners to solve a number of dilemmas and the symbolic function of citizen driven development add to the confusion and hides the need of support for their practical performance. They are in urgent need of critical analyses of how this notion should be performed, presenting guidance through the forest of eye-catching rhetoric. In this study three important knowledge areas evolved; the need to more professional methods in choosing who

should be acting as filter in order to avoid personal dependence, the need to see the existing methods and techniques in a more holistic process perspective in relation to the goals of the authority, and finally, how to weight the value of the input (value for citizens and/or value for the authority (in this case the SPA).

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Talking about Public Service Processes

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Abstract. Many discussions enforce the need to encourage Society's involvement and participation in public issues. This paper moves towards the idea that the use of conversations about public services encourages closer ties between Society and Government. It presents a tool to support discussion and share of information about public service processes. The tool also enables the use of information obtained from conversations to identify service improvements.

Keywords: Public Process, Collaboration, Transparency, Memory.

1 Introduction

A great number of discussions enforce the need to encourage Society's involvement and participation in public issues. In Brazil, a number of Government initiatives attempt to provide information about public services in order to stimulate Society's greater involvement in these issues [1][2][3]. One initiative is the "Charter of services" [4], a document which must be prepared by any public institution to inform citizens about the kind of services are offered, how to access them and how this public organization is committed to providing them. Another initiative comprises public consultations, in order to collect contributions from Society about actions to be performed in different public issues [5][6][7].

Research in e-Democracy and e-Gov enforce ICTs' potential to improve information access. ICTs can be enablers to allow Government to be open to citizens, offer new channels for disseminating information, increase awareness and participation, and improve operations and integration within and between governments [8][9][10][11][12][13].

E-Democracy and e-Gov discussions argue that Society's involvement follows an increasing scale of participation 14. It is argued that closer ties between Government and Society must start from the most basic levels of participation, especially by providing information about public services. However, difficulties are still found in finding effective solutions to provide information and opportunities for participation concerning public services [3][15].

The aim of this paper is to suggest a form of public participation based on conversations about public services. A tool was designed to facilitate the conversations about public services among citizens, between citizens and Government and to allow for

their analysis. It is proposed that services be presented in process model form, allowing for better understanding of their performance. The tool enables participants (Society and Government) to talk about services, while this data can be organized and used as the basis for service improvement identification.

The paper is structured as follows: Section 2 describes proposals for Society and Government interaction through ICT use; Section 3 presents the proposed approach for talking about public services; Section 4 presents the environment supporting the conversations about public services; finally, section 5 concludes the paper and suggests future work.

2   Interaction between Society and Government in Public Affairs

There are several classifications for different participation levels in democratic contexts through ICTs use [14][16][17][18][19]. These classifications show the degree of democratic participation in a scale, from government information provision to public deliberation. At each level, participation, discussion and decision-making power is increased.

The barriers to provide access to citizen participation at each of these levels involve technological, social, cultural and economic aspects [15][20]. Moreover, research on e-Democracy indicates that it is still difficult to find effective solutions encouraging civil society participation in public affairs. The World Economic Forum report on the use of ICTs by governments points to Brazil as the 41st in e-participation ranking [15].

It is argued that closer ties between Government and Society through ICTs use must start from the most basic levels of participation, especially by providing information on public services. The aim of this work is to examine public services provision by the Government and the use of these services by Society. The effectiveness of this interaction comprises: (i) availability of relevant information about the services; (ii) possibility of expression by those involved in the public services; (iii) use of participants' comments as a basis of Citizen discussion; and (iv) the organization of participants' comments as an input to service improvement identification.

Usually, Society express itself via links like "Contact us", at government sites, or via Ombudsman offices provided by public agencies responsible for service delivery. Citizens can send pre-classified messages (suggestions, praise, criticism, etc.), to be received by an internal public agent, and may be answered or not, according to the agency relationship policy. Examples of such interaction are (a) the Ombudsman office of the Rio de Janeiro city hall [21], at which citizens may clarify doubts, request the use of a service and follow up a request, and (b) "Talk to President" and "Join the website" of the Presidency website [22], at which citizens can send messages to the presidential office, and send comments and suggestions on the website content.

In literature, it is possible to find research papers proposing the use of services as a way of establishing closer ties between Government and Society, in which Citizens may request use of these services and follow up their requests [23][24]. These proposals argue that online services can improve public service delivery in terms of availability, ease of use and lower costs; increase transparency and accountability; and alter the relationship between Government and Citizens.

Berntzen [25] presents a new perspective about public participation, in which Government and Society work together in service delivery. Citizens are not only consumers of public services, but also comprise a resource which can add value to the existing government setup. It is argued that the Government is responsible for providing the infrastructure (servers, databases, software, etc.) and a basic set of public service information, and Society provides new information on these services.

Despite the potential of using services as a way to establish closer ties between Government and Society, most of the solutions proposed are focused on how to allow online service request in order to reduce existing bureaucracy and provide agility to the process. The solutions attempting to maintain a closer dialogue between Society and Government are focused on how to provide mechanisms allowing voting on pre-established matters and mechanisms through which Society can provide information about the service. The information provided by Society may or may not be used by Government for service improvement. Furthermore, these proposals do not explore the possibilities for discussion about the service provided and for stimulating interaction among citizens.

3   Talking about Public Services

The present work proposes the possibility of supporting conversations about public services for a closer relationship between Society and Government. Conversations are narratives made by those involved in discussions about services. Conversations are a common activity in public service contexts, especially in Brazilian culture. For instance, while standing in line, waiting to be served, people use to talk to one another, referring to the service issues, perceived problems, the way that attendees perform their work, documentation needed, etc. Usually people prefer to ask people in place about doubts or information, rather than going out for someone responsible for these issues in the room. In another context, while sitting at a bar table, or during any social interaction, people can talk about difficulties they had while trying to have some public service, like driving licenses. Others will surely have and express their own experiences or opinions, and what they did to avoid any problem. Others in the same social context will probably take this information and use it when their turn comes to have the same service provided.

However, in these situations, participants usually talk, complain or discuss with no familiarity with process details, especially those concerning how it can or must be provided by the public institution. When citizens are not aware of why the service must be provided that way, it may happen that complaints can be not useful and will require extra effort from the staff and from the public institution to treat them. Additionally, Government representatives or the public institution staff are not present or near enough to correct or explain any wrong view or information, leading to mistakes and dissatisfaction. Finally, the conversation is not recorded, and useful information which can be quickly used by others may be lost; only those who are physically present are able to participate or benefit from them.

Therefore, the proposed solution aims to support this kind of interaction in a virtual environment. The first argument of this proposal is that, to talk about services, citizens must have access to an explanation about how the service is provided. To this

end, it is proposed that public services be presented in the form of process models [26]. This choice can take advantage of process management and modeling initiatives which possibly exist in the public organization. For example, in the Brazilian Government, we can find processes which explain how to declare the income tax [27] and how to transact laws in the Federal Congress [28].

Regardless of process representation chosen, it is argued that it is possible to create simple representations of the main process elements: objective (why the process exists), actors (who performs each process activity), activities (process steps), artifacts (inputs and outputs of activities), resources (equipment or systems that support activities), events (process triggers), business rules (laws which govern the process) and possible paths (decisions and alternatives in the process) [29] (Fig.1).
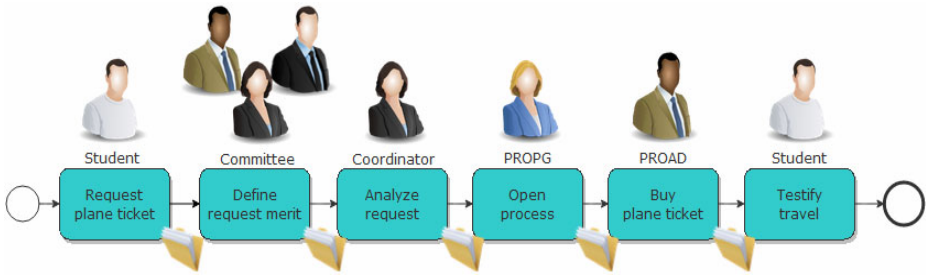
Fig. 1. Process model example

Once one is able to view how the service is provided as a process model, it is argued that citizens will be able to point their issues, complaints, experiences, and so on, to specific elements of this process – an actor, an activity, a rule etc. Thus, the proposed solution must offer participants the possibility of expressing themselves about any portion of the process or about any of its elements. This may help participants to better express their opinions, putting them into a context, while conversations can be kept focused on the service/process.

In order to enhance the possibility for sharing information, citizens can view other people's opinions, and comment on them, adding, correcting or just commenting on previous information. Government may also participate in, being, just like the citizens, a participant in this conversation. Government can also use the conversation to identify clues of the need of process improvement.

4   Supporting Public Service Conversations

To illustrate the proposal and explain the use of the tool, we will use a hypothetical scenario in which a student from a public university – Ann – attempts to have a service provided by this institution:

"Ann is a student in the first year of the Information Technology course of a Public University. She received an email informing her that the period for registration in disciplines is close and, to do so, she must access the registration system. Last semester, the registration was made personally, and Ann does not know how to proceed.

Attempting to find some information about the topic, she decided to access the college website. She found that the college offers a list of all services rendered (Fig. 2). When she selected the service "Veterans' registration in discipline", she saw that it was represented by a description and a model showing the steps which are necessary for performing her registration. She also found that a description of each step of service is available, where she can discover who is responsible for execution, when to perform a step, the necessary documents etc (Fig. 3)."

The environment presents an overview of services provided by the organization, from which participants have visibility of how organization works (Fig. 2). The details for all services provided by the organization can be accessed from the organizational view. This presents a model and a description explaining service operation, and a description for each process activity (Fig. 3).

SERVICES PROVIDED BY THE SCHOOL OF APPLIED INFORMATION TECHNOLOGY (EIA)

The processes of EIA services are divided into academic processes and administrative processes. The academic processes are those which are related with the main activities of the organization. The administrative processes are those that support the academic processes and are classified in management processes and support processes.

1. Academic processes
   1. Student registration in disciplines
      1. **New students' registration in disciplines**
      2. **Veterans' registration in disciplines**
   2. **Create timetable**
2. Administrative processes
   1. Management
      1. **Making decisions**
   2. Support
      1. Manage registration
         1. **Blocking registration**
         2. **Perform registration**
      2. Handle request
         1. **Handle diploma request**
         2. **Handle declaration request**
         3. **Handle grades history request**
         4. **Handle jubilate request**
         5. **Handle blocking registration request**
         6. **Handle utilization of disciplines request**

Fig. 2. Organization view

VETERANS' REGISTRATION IN DISCIPLINE

1. Student requests registration in discipline
2. Tutor schedules a week for confirmation of registration in discipline
   Week for confirmation confirmation of registration in discipline
3. Student and tutor verify the request of registration in disciplines

Student	Student	Tutor	Secre
	Tutor		

Início

Request registration in discipline → Schedule confirmation of registration → Verify request of registration in discipline
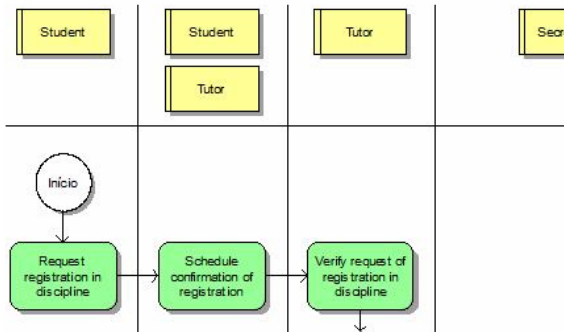
Fig. 3. Service details

"When she had finished reading the description of the service, she felt a lack of information: last semester the system had a problem and it did not register her in a discipline. She only discovered this when her name was not on the list of students in the discipline. She believes a step is missing in the model by which students in this situation are informed. But how to communicate this situation to the service manager?

While she thought about it, she noticed the existence of some circles, in different colors, next to each process step (Fig. 4). Curious, she discovered that they represent positive, neutral and negative positions. But what are these positions? Clicking on one of the circles, she saw several comments. Reading its content (Fig. 5a), Ann discovered that they were related to the "Veterans' registration in discipline" and that they had been made by members of the college (Mark was her teacher and director of the college, and John was a veteran student who went to disciplines with her)."
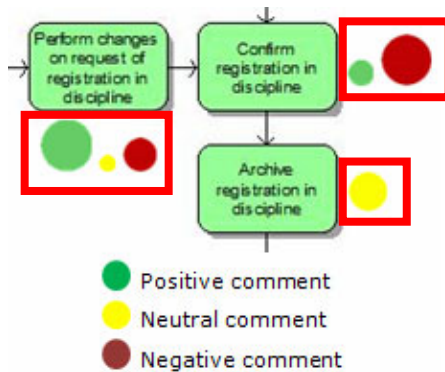
Fig. 4. Comment visualizations

Fig. 5. Comment details

It is possible to generate visualizations about what is being said during the conversation (Fig. 4). Visualizations are generated for each process element depicted in the model (activity, actor, etc) (Fig. 5).

"*Now Ann discovered that she could pose comments about services and how to do it, Ann decided to report the lack of this communication. She has indicated on the form (Fig. 6) that this was a negative position and has commented: "It is possible to sit in class without being registered. A step is missing where the system notifies students that an error occurs in registration".*"

Participants may pose their experiences, opinions, questions, problems, suggestions, etc., about the process. They should point out the process element to which the comment will be made, and indicate if this is a positive, neutral or negative comment to the process (Fig. 6).

Fig. 6. Position about an activity

"*After a few days, Ann received an email explaining that Christine had responded to her comment about "Veterans' registration in discipline". When Ann accessed the environment, she discovered that she was not the only one who had gone through that situation. The same thing happened to Christine, who reinforced the need to create a new step to inform students who had problems.*"

The tool provides mechanisms which enabling interactions among them (Fig. 5b). It provides the possibility of establishing a dialogue between participants, which increases the knowledge about the service and encourages conversations. After learning service details, participants can report new information about the process, as well as problems in previously-provided information and suggestions for solving difficulties and inconsistencies encountered. Comments may be used by other participants as an argument, or as complement to the previously-provided information.

"*Besides Christine, Paul, who is responsible for the services provided by the college, also read the statements made on the tool. He can retrieve the comments mentioned in tool and use them to identify the snippets of text which indicate possibilities for service improvements (Fig. 7). He can also discover which content has generated more discussions (Fig. 8) or which members of the college most express themselves about the service (Fig. 9).*"

Fig. 7. Comment analysis

Besides contributing to citizens' interaction, comments can help process analysis. The process manager can perform analyses to identify clues of the need for process changes and improvements (Fig. 7)(Fig. 8)(Fig. 9).
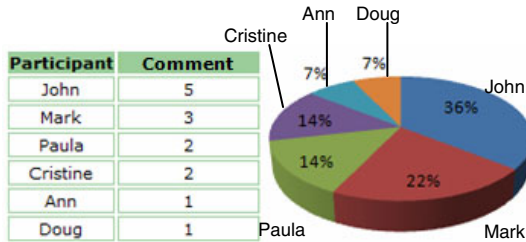

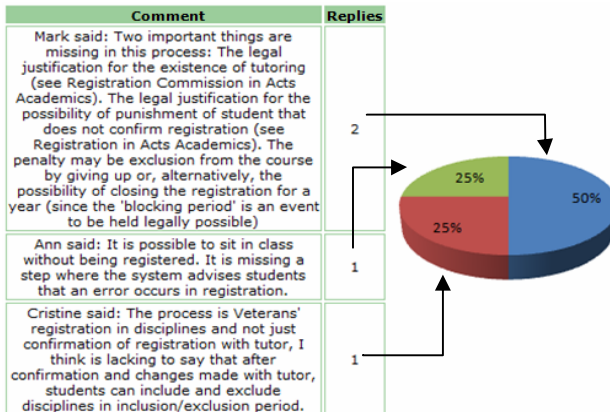**Fig. 8.** Most active participants

Fig. 9. Position about an activity

5 Conclusion

This paper presented the specification of an environment supporting conversations among citizens and Government about public services. It is argued that the process model keeps the conversation focused and provides visibility to information on the operational services, often unknown to Society.

The main benefits of the proposed solution are alignment with organizational initiatives in process management, greater involvement and participation of Society in government service, possibility of interaction between Citizens in public service discussions, and identification of service improvements from comments made by Society, which may be invisible to managers.

As future work, studies will be conducted to identify how to insert this environment into the Federal University of the State of Rio de Janeiro (UNIRIO) context, through its website. The services provided by UNIRIO will be available to its community, so that citizens may know about, and interact with them, and with each other, by exchanging ideas and process improvements. Through this interaction, it is expected that the inputs secured allow for visualization construction and evaluation of use of conversations about public processes as a mechanism to facilitate greater interaction between the organization and citizens.

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Innovation and Evolution of Services: Role of Initiatives

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Abstract. This paper discusses the role of initiatives in dynamic collaborative processes of services innovation and evolution in the organizational context of an enterprise. The research is based on the current state of the art on modeling initiatives and services and studies phenomena of innovation and evolution for supporting services. Within our approach, we propose definitions for the key concepts related to modeling processes of services innovation and evolution, and define their main characteristics, stakeholders and roles. Furthermore, we introduce our services-oriented approach for initiatives management and show how it could be used for the process of services innovation through knowledge actionalizing. This theoretical founding is then discussed from the implementation viewpoint: we introduce a trans-disciplinary collaboration platform, Cross-Pollination Space, and briefly describe its framework. We conclude with the scope of current work and identify some context limitations of this research and reposition them as perspectives for our future work.

Keywords: Initiatives, services innovation, services evolution, information systems, services creation, collaborative innovation, services science.

1 Introduction

The general interest to service innovation and evolution has increased in the context of services society. Services constitute a major component of the enterprise development: no wonder that innovation and evolution in services are envisaged as the main instruments allowing the development of an enterprise.

This research question and its practical importance have been thoroughly studied by different research teams and innovation entrepreneurs and a number of impressive results have been acquired. However, the complexity of this issue and the interdependence of different aspects of innovation in multiple contexts leave a vast field of more profound investigation.

In this paper, we distinguish between two main concepts – service innovation and service evolution – and discuss their main characteristics, by positioning our research in the organizational context of an enterprise. It is important to underline that we envisage an enterprise not only from a most traditional business-based point of view as a company or a firm. In our research, an enterprise is seen in its broader meaning as

a working environment, "a unit of economic organization or activity" that is characterized by "industrious, systematic activity, especially when directed toward profit" and includes all internal and external (e.g. economic, social, etc.) activities of providing goods and services undertaken by a service, commercial, industrial entity.

We furthermore discuss the role of initiatives in processes of innovation and evolution in services, and underline the essential impact of collaborative decision constructing for services innovation. By underlying the dualistic nature of initiatives, we make a parallel between initiatives, which are traditionally seen as a part of information systems, and initiatives related to and analyzed from the point of view of informational services. Consequently, their role varies from integrating (and positioning) services into existing information systems to identifying the knowledge, which could be actionalized and as such would lead to creation of new services.

In order to illustrate the feasibility of the theoretical findings, we aim at developing an applied tool that supports innovation and evolution in services, and enriches it by capitalizing the practical results of the related projects [4].

The paper is structured as follows. In Section 2, we propose the genesis and the state of the art related to this complex question. Section 3 concretizes some key definitions and shows the complimentary interdependence between them. Section 4 focuses on processes on innovation and evolution and Section 5 describes our conceptual approach for supporting these collaborative processes. In Section 6, we introduce the cross-pollination space developed according to our services-based approach and discuss its keystones. Practical aspects of the implementation of our approach are discussed in Section 7 on the example of the use case of the CTI project [4]. Finally, we conclude with ongoing and future works and underline the perspectives of this research.

2   Genesis and State of the Art

From its **political background**, the initiative might be seen as the ability to begin and follow through with a plan or task, the willingness to take the first step, or the act of taking the lead [13]. The semantics of initiatives might differ, according to the context. Therefore, one should consider country- and usage-related aspects of the notion of an initiative. For example, in Switzerland, the initiative is often seen in its political context, as the right of citizens to propose laws, or constitutional amendments, for approval (or rejection) by the voters. This understanding cannot be generalized in different contexts (e.g. most European countries or USA) where the political system has different ways to support this type of citizens' activity. Another broad – and more common – understanding of an initiative comes from business that perceives it as "the drive to achieve results" or a complex of different activities and tools leading to the desired result. Such a rich understanding of an initiative explains a variety of approaches for research and modeling: by evaluating the degree of its credibility and polarization [14], by concretizing a general approach for modeling politics-oriented collaborative processes [18], by analyzing a case study of integrating few collaborative initiatives within the governance framework [15].

Speaking of **economic, business and technological facets of services**, in the recent years the role of services can hardly be underestimated. It refers from one hand

to increasing importance of the services sector in the global economy in a large scale and of service component in any product – up to designing products through services – in a small scale. From the other hand, services have gained the key role in business and technological processes that has led to the creation of a new interdisciplinary approach to the study, design, and implementation of services systems that provide value for others – Service Science [8]. In this context, it is important to underline the growing role of services-oriented approaches [5] in modeling current business and economic processes that rely on the interactive exchange and functioning of interoperable services. In its complexity, such service orientation is introduced at different levels of service science [17]: services are not only incorporated into the core of all economic processes, but also are widely used in paradigms of conceptual modeling and technical implementation.

With the phenomenon of **Living Labs and multiple collaborative interactions**, it is important to note that services can be seen as the main components that enable different types of collaborative working groups and social networks, and lead to the creation of new types of collaborative environments.

One of such environments whose growth has marked the development of the last decades is a Living Lab. Generally speaking, a Living Lab is a user-driven open innovation ecosystem based on a business – citizens – government partnership which enables users to take an active part in the research, development and innovation process [12]. Living Labs are also often referred as open living labs, in order to emphasize the openness and motivation to collaborate within such environments. The importance of the phenomenon of living labs can be explained by different factors. For us, the most significant one is the fact that it is strongly related to the concept of initiative. Indeed, open living labs represent triggering and promoting environments for initiatives that are based on a sustainable strategy for enhancing innovation on a systematic basis. Open Living Labs aim to create a shared arena in which digital services, processes, and new ways of working can be developed and tested with user representatives and researchers. It is an environment where businesses, researchers, authorities, and citizens work together for creation, validation, and test of new services, business ideas, markets, and technologies in real-life contexts [1].

The general discussion on the possibility to support collaborative innovation is trans-disciplinary [10] supporting the idea that the knowledge origin goes within and beyond the scientific disciplines, and involves arts, culture, etc. In the services domain, we understand trans-disciplinarity as a capacity of building knowledge, methods and tools for creating a new service discipline from the intertwinement of several existing disciplines and domains (which may find themselves enriched in the process of such creating, as well as by users of a service itself). In [11] innovation is perceived as creation, i.e. a dynamic process in which an organization creates, maintains and exploits different kinds of knowledge. Some conflicts of interdisciplinary collaboration are defined in [18], whilst [3] distinguish between task and dialogue initiatives and discuss different aspects of collaboration related to each type of initiative (e.g. direct proposition of actions for task initiative or establishing mutual beliefs between agents for dialogue initiative).

3 Key Definitions

This section introduces our definitions for the main concepts of the studied research question. By having defined the concepts of *initiative* and *service*, we show their impact on the complementary nature of *innovation* and *evolution*, and contextualize our analysis in the scope of *enterprise*. We furthermore concretize the concept of *ontology* for innovation and evolution of services and propose its enriched definition, according to our approach for supporting innovation and evolution.

We underline that these definitions are developed and used in the context of the services domain, and referred as such in the whole text of this paper.

Initiatives. Our definition of an initiative in the services domain, or more precisely of an e-government initiative, is based on and enriches the definition developed in our previous research [13]. E-government initiative is seen as a proposal leading to actions and mechanisms allowing placing the stakeholders concerned by the development of e-government information systems in a situation of exploration for the discovery of new e-government services. According to this definition, it is important to distinguish two types of initiatives, which are defined by their origin: (i) initiative as a part of information systems; (ii) initiative as an informational service. An initiative that is a part of information systems, which already exist and function, aims to improve and maintain existing services by being integrated into them and, as such, to improve the relationships between involved actors/stakeholders (e.g. State and citizens). An initiative that is considered as an informational service, aims at creating new services. Supporting such initiatives is one of the main elements of an innovative approach to create value through information.

Services. We consider that a service should be defined at the junction of the organizational domain, the ontological domain, the technological domain and the informational domain. Consequently, we define a service as the result of a process of acquiring knowledge in the **context** of the IS engineering. It can correspond to an action or series of actions to characterize the relationships or the interaction between the involved actors/stakeholders (e.g. State and citizens). It is based on four dimensions: (i) *ontological* dimension; (ii) *informational* dimension; (iii) *technological* dimension; and (iv) *organizational* dimension. Let us briefly introduce each of these dimensions.

We envisage the ontological dimension of a service as the one that describes not only all the invariants of the information system domain, in particular knowledge and concepts, but also some business rules, roles of actors which are independent of the information system development. The informational dimension of a service describes the information semantics necessary for defining services. This dimension of a service describes the static aspects, the dynamic aspects and the integrity constraints aspects.

The organizational dimension of a service relates to the business rules, the organizational roles, the responsibility zones and business processes inside an enterprise/organization. It allows one to clarify the decisions and responsibilities inside the enterprise/organization. The technological dimension of a service permits to study the implementation of the specified entities. It is a question then of choosing the appropriate technology, the informatics architecture and the corresponding environment, in order to implement this service.

Complimentary Nature of Innovation and Evolution of Services. In correspondence to two main types of initiatives, we can establish two main types of their impact on services. Indeed, initiatives are substantially useful for enabling: (i) evolution of services – when they define the principles of the integration and positioning of services into existing information systems [4]; and (ii) innovation of services – when they help to identifying knowledge that could become actionable and as such would lead to creation of new services. We underline that in its complexity, the processes of innovation and evolution of services are complimentary. Indeed, whilst creating a new service based on an initiative, it becomes a part of an existing information system and/or creates its own environment as an informational service with additional value and knowledge.

Innovation Context: Enterprise. Generally speaking, services constitute a major component of the enterprise development. They become relevant conceptual instruments for the management. In the same way, the processes of innovation and evolution are context-dependant: they are envisaged in the context of an enterprise and can be supported only by taking into consideration the enterprise environment. It is important to underline that we envisage an enterprise not only from a most traditional business-based point of view as a company or a firm. According to our approach, an enterprise is seen in its broader meaning as a working environment that is characterized by industrious, systematic activity directed toward profit and includes all internal and external (e.g. economic, social, etc) activities of providing goods and services undertaken by a service, commercial, industrial etc. entity.

Ontologies in Services Innovation. To avoid the ambiguity in using special terms that might execute different semantics, we find it important to concretize our definition of ontologies within the scope of this research.

Ontology is used here in the meaning of "a formal, explicit specification of a shared conceptualization" [7]. For our research, we enriched the definition of ontologies as knowledge bases that have the following characteristics: (i) ontologies are defined as a conceptual information model that describes some specific domain in terms of concepts, facts and business rules; (ii) ontologies allow the formal representation of the knowledge, which is mandatory for developing an information system and/or service; (iii) the knowledge defined by ontologies is non contradictory and shared by domain experts; and (iv) the design principles of information systems/services supported by ontologies are sustainable in the meaning that they cannot be doubted during the development of information systems/services and their functioning. In other words, this knowledge is valid during the whole lifecycle of information systems/services. Therefore, ontologies supporting the processes of services innovation and evolution should correspond to these characteristics.

Moreover, in our approach for supporting services innovation and evolution (described in Section 5), we show that they are based on the process of knowledge actializing that allows enriching ontologies during innovation and evolution. For this reason, the proposed complex definition of ontologies should also be enriched by the following characteristics: (v) ontologies are enriched and updated by the knowledge actialized during the processes of innovation and evolution of corresponding services, as well as by the knowledge retrieved from their usage.

In other words, the processes on innovation and evolution should include the techniques for knowledge actionalizing and ontology management, in order to allow continuous sustainable development of ontologies. In Section 5, we briefly discuss how we propose to do it in the context of our research.

4   Processes of Innovation and Evolution

Traditionally, there is a certain ambiguity in understanding of the phenomenon of innovation. Usually it is seen as introduction of something new: a new material, way of doing, a new concept, etc. This definition is however different from the widely used meaning of the notion of innovation – the process that aims at bringing new features into an existing thing (concept, good), renewing something that already exists, i.e. evolution of an existing thing. To distinguish between these aspects, in our research we study two interdependent phenomena: innovation and evolution. Innovation, as the process that allows the change of state from the component of a system, in so forth emerging a system, which its characters or behaviors are different from the previous time [6] can be viewed as the source of evolution. Innovation can be thus defined as a dynamic and participative process that leads to co-creation and value creation of a product (artifact, method, etc.) thanks to its evolution.

We note also that these *dynamic* and *collaborative* processes generally lead to *sustainability* of a product (good, process, service, etc.), as well as to enriching the related services and knowledge bases (for example, in the process of evolution of e-government services, the corresponding regulatory ontologies and organizational context are also enriched). In other words, innovation and evolution result with added value to a product, service, related knowledge bases, information systems and services in their dynamic environment.

According to the type of such added value as the result of innovation and evolution, it is also possible to distinguish between two types of initiatives [13]: (i) initiatives which aim to improve and maintain existing services and to improve the relationship between different stakeholders; and (ii) initiatives which will create new services. Such initiatives are particularly aimed at creating value through information.

It is important to underline the multitude of stakeholders involved in the process of services innovation. They include but are not limited to the following groups: (i) a citizen (in a broad sense, an individual who interacts with an enterprise or the government); (ii) public administration; (iii) private enterprise; (iv) association - political party - interest group; (v) government; and (vi) international organization.

Indeed, stakeholders are all those individuals and groups who have a strong motivation and interest to participate in services innovation and could provide relevant information – from business, non-profit activities, organizational context, strategy of an enterprise, etc. Their roles are defined according to three main criteria. Firstly, they are designed to reflect responsibilities of stakeholders over the environment of an initiative. Secondly, there is a strong interdependence between the knowledge provided and co-created by a stakeholder and the created service itself. Thirdly, roles of stakeholders in the innovation process should guarantee their authorizations over the informational space of initiatives.

Without focusing on particular scenarios, the stakeholders' roles can be grouped into the following types: (i) initiator: any stakeholder disregarding her actual position and/or hierarchical level in the enterprise. This role represents the power to initiate, which is particularly important for the bottom-up initiative origination. An initiator owns the initiative throughout the initiative process; (ii) domain expert: a stakeholder who provides valid information about the initiative and its domain(s) and has valid actionable knowledge on identifying relevant aspects for this initiative and the corresponding service under creation; (iii) facilitator: a stakeholder who designs and conducts collaboration processes to support a specific group in achieving its specific goals [2] by taking into consideration viewpoints of all stakeholders.

5   Towards Supporting Innovation and Creation in Services

Our approach for supporting innovation and evolution in services is based on two main ideas. First, we find it important to implement ontological modeling for content-based analysis of an initiative that might lead to creation of a new service. Second, we aim at modeling the lifecycle of initiatives during their discussion by interested stakeholders, as well as the environment of such collaboration. For these purposes we adopt services thinking and aim at modeling decision constructing for innovation in services, as a dynamic sustainable co-creative collaboration process.

5.1   Content-Based Analysis and Development of Information Kernel

One of the most important phases of the process of innovation in services is the content-based analysis of an incoming initiative that might lead to service creation. We need thus to analyze the semantics of this initiative, identify its concepts and their interdependencies, and to create the necessary relationships (i.e. `relatedTo`, `isDefinedBy`, `hasResultedFrom`, etc.) with the corresponding categories.

By identifying the main semantics of an initiative, such content-based analysis allows one to define and construct its information kernel. Generally speaking, the information kernel was introduced in [9] as "*a conceptual model which is derived from the ontological level. It represents the static aspects, the dynamic aspects and the integrity constraint aspects of an information system*".
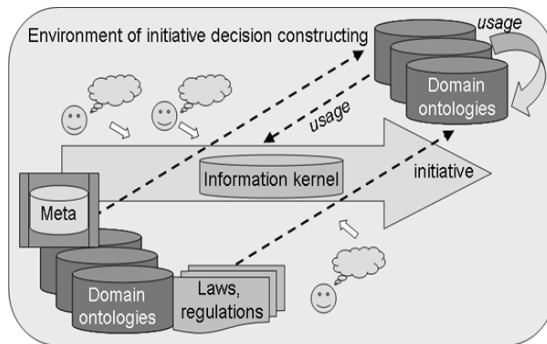

Fig. 1. Constructing information kernel

In our current work, the information kernel is viewed as the conceptual model of the exchanged knowledge, which will trigger the proposition of an initiative to be implemented as a new service.

Let us demonstrate how the information kernel of a proposed initiative can be developed (cf. Figure 1). For analyzing the content of an incoming initiative, it is important to identify the knowledge, which will be used to create the corresponding service: initial domain ontologies, expert knowledge, common practices in the field, rules and regulations, etc. Generally, they all represent the *ontological level* on which information kernel of an initiative, i.e. the conceptual model of the exchanged knowledge, is build. In the process of discussions and implementation of this knowledge in different contexts, or in usage of the kernel, it becomes clear that certain ontologies should be modified, according to *usage-based knowledge* retrieved in practical situations. Consequently, there will be corresponding changes in the conceptual model of the initiative-related knowledge, and as such, in the information kernel itself.

Based on such interdependent reciprocal exchanges, our approach thus allows concretizing the information kernel as the conceptualized knowledge necessary for defining and implementing services, which is shared by main stakeholders and participants of the process of decision constructing.

5.2   Management of Initiatives through Knowledge Actionalizing

The development of the information kernel is based on the process of knowledge actionalizing that we enrich and adapt for the task of services development.
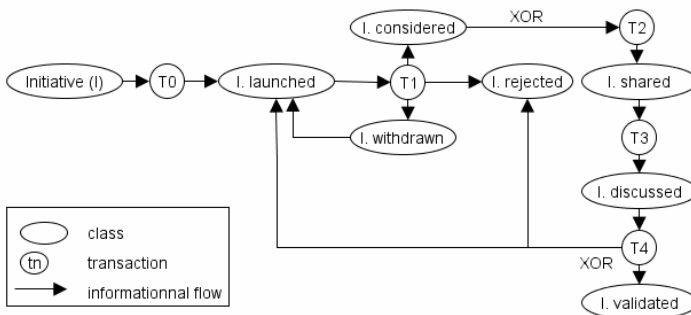

Fig. 2. Lifecycle of initiatives

Actionalizing of the knowledge of an initiative is done during its lifecycle (cf. Figure 2) in the perspective of collaboration between actors taken part in discussions.

The initiative lifecycle starts with the occurrence of an event or of a requirement. An initiative In has an initiator who owns the initiative. To make it understandable by other actors, this initiative should be actionalized: the knowledge describing it is formalized, modeled and published on a collaborative platform.

After the initiative has been launched, the initiative is analyzed and positioned in one (or more) activity domain (or context) through the Repository of ontologies. This

leads the initiative's owner to call for participation domain's experts. Once participants are gathered around initiative In, they define the initiative objects: they extract its main concepts and relationships to end with a shared pool of concepts and relationships that define the information kernel. The discussion around the initiative also allows actors to identify the scope of different knowledge, which is necessary for this initiative to be actionalized and to define the ontological rules for actionalizing this knowledge. Comments of various forms arise such as: arguments, counter-arguments, proposals, counter-proposals, questions, answers. This process ends when a new version of initiative In is ready. Finally, the actors of collaborative discussions vote to find a consensus. At this stage, either the initiative In is validated, or rejected, or re-launched. Its validation leads the initiative to become a specified service, and thence, the development of the corresponding service can begin.

This process also requires the development of supporting services allowing the usage of actionalized knowledge of an initiative. These services contribute to creating the environment facilitating initiatives management and allow integrating a newly developed service (based on a discussed initiative) into the services environment.

5.3 Supporting Continuous Development of Services-Related Ontologies

The development of the information kernel helps to enrich the initial ontologies by the knowledge coming from their usage (cf. Section 5.1), and by the knowledge actionalized during the process of initiatives management (cf. Section 5.2). In this perspective, we underline that such development contributes to sustainability of the related ontologies and services. Indeed, a sustainable service is envisaged as a service that is capable to adapt to its environment, to dynamically integrate the ever-changing conditions of this environment, and as such to be sustainably coherent with its evolving challenges. Analogically, the enrichment of underlying ontologies is also provided in a sustainable way – by capitalizing the dynamic changes of the environment and by enriching the initial ontologies by their usage in different contexts and practices. Thus, we argue that the information kernel is in fact the tool and the environment for developing sustainable services and supporting continuous development of services-related ontologies, according to the results of creative collaboration of involved actors.

6   Implementation: Cross-Pollination Space

For the practical implementation of our approach, we are currently working on the development of the cross-pollination space (CPS). We note that this term has also a *cross-pollination* character adapted from genetics: cross-pollination is the pollination of a flower with pollen from a flower of a different genotype.

CPS represents a platform for enabling the creation of new domain services and is, in fact, a collaborative space that brings together experts and non professional users from different domains that work together on innovation in services. It gives them the possibility to collaboratively participate in creating services from an initiative (represented in a formal or – more often – informal way) by offering a complex tool for conceptualizing, sharing and expliciting ideas. During this process, the CPS

knowledge base is also enriched by capitalizing the mutual understanding of the knowledge expressed and shared by participants in the process of CPS functioning. The CPS framework is based on 5 main keystones: (i) participants; (ii) groups; (iii) concepts; (iv) targets; and (v) documents.

For this research, we focus on the notion of targets: the description of initiatives in the process of services innovation. Targets can be seen as important subjects of discussions that require a response and are in the centre of CPS interactions. The prospect to use them as ideas for service creation motivates participants to take part in these conversations, while approaching it from different spheres of interest, domains and business practices for collaborative decision constructing. According to the type of a target, there are different scenarios of its processing by CPS.

For targets of the type "request for discussion", CPS allows the actors to formalize this non explicit and not yet defined problem, or in other words to concretize an intuition of a participant that CPS negotiation might help in a particular field. CPS thus concentrates on the tasks of collecting the most diverse ideas from a variety of interested participants, of reducing the semantic noise around these targets and of formalizing them. For targets of the type "request for design", the main CPS activities are around concretizing the well defined situation, identifying scenarios for creating and evaluating possible designs, as well as reducing the semantic noise from different complimentary views to possible/proposed designs. The most concretized targets are of type "direct proposition of actions" where CPS activities focus on formalization of an initiative and a proposed scenario and discussions around it. If it is evaluated as consistent and agreed by the corresponding CPS group, this initiative enters the next phase of its implementation as a service.

The CPS is supported by underlying ontologies and is enabled by services that simplify the exchange of experts around the proposed initiatives and adapt the corresponding ontologies according to the results of their interactive collaboration.

7   CTI Project

In this section we explain how we can use the proposed approach for supporting innovation and evolution in services in the context of our project, which aim is "the analysis of semantic interoperability of ISs associated to businesses domain in Geneva" [4]. We believe that this practical example contributes to illustrating the feasibility of our conceptual approach.

This project was done in collaboration with the Center of Information Technology at the Canton of Geneva (Switzerland). A Working Group within the Center of Information Technology has analyzed the issues concerning the exchange of information between the institutions on businesses in the Canton of Geneva (CTI, 2009). In the Canton of Geneva, several information systems (ISs) co-exist, handling data about businesses at the cantonal level: (i) Commercial Register (RC): its aim is to build and identify the legal entities in the State of Geneva and to register their associated legal events; (ii) Tax IS (R-Fisc): its aim is to store the taxation data about businesses at the cantonal level; (iii) Business Repertory (REG): This repertory contains administrative information on businesses. REG permits to centralize the update data on businesses and companies located in the canton of Geneva, to make them usable for administrative purposes and to disseminate the data to public and

private sectors. These ISs interact already with each other's and with two other information systems at the federal level: (i) Federal Commercial Register: its aim is to build and identify the legal entities and to register their legal events associated at the federal level, and (ii) Federal Business Repertory (REE): its aim is to store addresses for statistical or administrative purposes.

In the context of this project, we consider an initiative as a part of information systems from one side and as an informational service from the other. For each service we describe its different aspects: (i) its organizational contexts (describing describes business rules, legal constraints and the capability of the organization to enforce laws and policies) and the ISs concerned; (ii) the information that is necessary for its implementation (data and processes); as well as (iii) the roles associated with it. In fact, initiatives in the context of this project promote knowledge intertwinement allowing the collaboration of multiple business and Stakeholders involved in the process of services innovation and services evolution. These initiatives are important for: (i) evolution of services: as positioning of services upon existing information systems; and (ii) innovation of services: as identifying knowledge that could be actionalized and as such would lead to creation of a new service.

A complete validation of this approach, which is in the scope of this project, requires the development of an environment facilitating initiative management in a particular context. The process of its management requires the development of supporting services that allow the usage of actionalized knowledge of an initiative. These both axes represent the ongoing work within Working Group of the Center of Information Technology at the Canton of Geneva.

8   Conclusions

In this paper we introduced our approach for supporting innovation and evolution in services, while identifying the key role of initiatives in these processes. We discussed the complementary nature of innovation and evolution in services and showed their interdependence in processes of knowledge actionalizing for collaborative decision constructing. For the purposes of practicality of this conceptual contribution, we introduced the cross-pollination space, the collaborative environment for managing initiatives, followed by a practical context of business ISs in Geneva that implements this approach and illustrates its feasibility.

Inspired by the first theoretical findings and a successful pilot implementation, we further focus on the contextual implementation of the proposed approach in different domains. Among the main scientific perspectives, we envisage developing more semantically powerful formal characteristics of the related concepts and further formalization of the methodology for defining a set of guidelines to support the evolution and the innovation of services through knowledge actionalizing. Ultimately, we aim at developing a set of services implementing this methodology.

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Citizen Engagement with Information Aggregation Markets

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Abstract. Participatory governance entails converting citizens from passive users of administrative decisions into active participants of political procedures. Public institutions and organizations can benefit from methods and tools able to aggregate and interpret information dispersed among citizens. In this paper we explore the use of Information Aggregation Markets (IAMs) for citizen engagement. We identify the benefits of IAMs and explain how markets can be used to aggregate citizens' opinions and views on policy issues. Furthermore we report on two real life cases where we deployed IAMs to assist the decision making processes of public organizations. The positive feedback from participants and decision makers provides empirical evidence on the benefits of IAMs as a method for engaging citizens in public policy decision making.

Keywords: Information aggregation markets, public participation, citizen engagement.

1 Introduction

In social systems, information, beliefs and opinions are heterogeneous and dispersed among individuals. Public institutions and organizations can gain a considerable advantage by exploring methods and tools which are able to aggregate and interpret dispersed information. For instance, having precise knowledge of citizens' opinions and viewpoints can support public bodies in effective administration, while at the same time creating an enduring bond between citizens and administrators, based on active participation, trust and transparency.

Participatory governance entails converting citizens from passive users of administrative decisions into active participants of political procedures. In the recent few years there has been an observed trend toward increased involvement of the public in the affairs and decisions of policy-setting bodies [1]. To this end, a number of Internet technologies which allow users to interact, collaborate as well as express their beliefs and opinions can be utilized. These technologies, termed as Web 2.0 [2], provide wider applicability compared to traditional approaches since they can be used to address issues at different political levels (small, medium or large cities, regions or

nations) and can significantly reduce the cost and time of monitoring and aggregating citizens' opinions and preferences.

In the "Web 2.0 era" of services and applications citizens collectively contribute to a Web presence and generate massive content behind their virtual collaboration [3]. An exemplar of this new paradigm is "collective intelligence". Kapetanios [4] introduces this paradigm as "human–computer systems in which machines enable the collection and harvesting of large amounts of human-generated knowledge, while enabling emergent knowledge, i.e. computation and inference over the collected information, leading to answers, discoveries, or other results that are not found in the human contributions". Typical examples of collective intelligence include collaborative filtering, folksonomies and Information Aggregation Markets (IAMs). IAMs are speculative markets, the purpose of which is to collect and aggregate information in the price of contracts representing different outcomes of future events [5]. Contract prices hinge on the probability of an event occurring or not. Individuals influence these prices by buying and selling contract shares based on their prediction of the outcome. IAMs are characterized by their relatively easy deployment and high potential in providing significant value to organizations by leveraging contributions from a broad community of contributors and aggregating information about issues that would otherwise be difficult to capture.

In this paper we propose IAMs as a method which can be used by public institutions and organizations for engaging citizens in public decision making. In section 2 we discuss the various levels of citizen engagement in the Web 2.0 era and explain what citizens contribute and why. Section 3 introduces IAMs whereas section 4 analyses how such markets can be used to support citizen participation. In Section 5 we present the results of two real life cases where we utilized IAMs to support the decision making processes of public organizations by allowing citizens to evaluate policy options as well as to propose new ones. The paper concludes in Section 6 with a summary of our observations and suggestions for further research.

2   E-Participation and Citizen Engagement

According to OECD [6] democratic political participation must offer the means to be informed, the mechanisms to allow citizens to take part in the decision-making and the ability to contribute and influence the policy agenda. OECD defines three levels of interaction according to the nature and direction of the relationship between public bodies and citizens: a) Information, which is a one-way relationship in which the government produces and delivers information for use by the citizens, b) Consultation, which refers to a two-way relationship with the government in which citizens provide their feedback and c) Active participation, referring to a partnership in which citizens actively engage in defining the process and content of policy making.

Based on the aforementioned scale of citizens' engagement Macintosh [7] provides three levels of engagement that characterize e-Participation initiatives:

- e-Enabling citizens is concerned with how technology can be used to reach the wider audience by providing a range of methods to cater for the diverse technical and communicative skills of citizens.
- e-Engaging with citizens addresses the issue of consulting a wider audience to enable deeper contributions and support deliberative debate on policy issues.
- e-Empowering citizens is concerned with supporting active participation and facilitating citizens' ideas to influence the political agenda.

The role of citizens in public decision making becomes increasingly important in consultation (e-Engaging) and active participation (e-Empowering) initiatives as they can contribute in a variety of different ways, including exploring, validating and reconciling ideas [8]. With validating and evaluating ideas the public can support the decision-maker to check ideas with the on-the-ground perspective. With exploring ideas, the focus is on divergent input and conversations, whereby the public can bring ideas, suggestions, information and perspectives into the decision-making process. Another contribution that the public can provide relates to reconciliation of diverse ideas. These are more convergent discussions that emphasize trade-offs and the weighing of values. The aforementioned concepts are not mutually exclusive as one public involvement initiative might be designed to explore an issue and validate (options, while another might encompass all three types of input).

To interact with the public, one must somehow communicate with it. Recent innovations in the technologies of communication have affected the feasibility of various methods for public participation, leading to a renewed interest for engaging the public in decision making with the emergence of information technology applications for e-Participation. This is evident from the number of implementations around the globe such as Estonia's TOM portal (http://tom.riik.ee/) and Singapore's Government Consultation Portal (http://www.ura.gov.sg/econsult/index.htm). The impetus to implement e-Participation can also be attributed to the growing awareness of the need to attain more democratic governance [9]. OECD [6] has indicated that democratic governments are under pressure to adopt a new approach to policy-making, placing greater emphasis on citizen involvement both upstream and downstream to decision-making.

Regarding the question of why citizens participate in policy decision making, the review paper of Phang and Kankanhalli [10] lists five major theories: (1) the Socio-economic Model of Participation, (2) the Rational Model of Participation, (3) the Civic Voluntarism Model, (4) the General Incentives Model and (5) the Social Capital Theory of Participation. The socio-economic model attempts to explain citizen participation in terms of the social circumstances of individuals, such as age, education level and financial status, which shape their attitude towards participating [11]. Individuals who are older, better educated and wealthier are more likely to participate than those who are not. The rational choice model of participation views citizen participation as a rational activity that serves to promote or defend the goals of participants with the maximum of benefits and the minimum of costs [12]. Citizens obtain benefits such as the ability to influence policy outcomes in ways that is to their advantage, while costs include effort and financial resources that one needs to incur to participate.

The civic voluntarism model [13] explains participation by addressing the question of why people do not participate, and suggests three answers: because they can't due to lack of resources (e.g. money, time, and civic skills); they don't want due to lack motivation; and because nobody asked them to. The general incentives model [14] explains citizen participation by synthesizing social factors (e.g. norms) and individual factors (e.g. perceived costs and benefits). The social capital theory of participation attempts to explain citizen participation from a social network perspective. The main premise of the theory is that a community with stronger bonds between its members has a distinct advantage over a community with poor bonds [15].

Besides the aforementioned theories, IT features that affect citizens' participation are anonymity, simultaneity capability, connectivity and communality [10]. Research on group support systems has found a positive impact of anonymity on group performance (e.g. [16]) as anonymity may reduce unfavourable evaluation apprehension effects due to the social status of certain members. Evaluation apprehension is unwanted as it tends to inhibit participation in traditional face-to-face meetings [17] and by avoiding its occurrence, GSS are found to increase participation level of a group (see e.g. [18]). The simultaneity of IT is found to increase participation by overcoming production blocking that inhibits content generation process, as there is no need for one to wait for one's turn to express one's ideas [19]. It can also reduce the cognitive load and distraction of members in trying to remember their ideas while waiting for their turn.

Connectivity refers to the ability that enables individuals to directly communicate with each other, whereas communality refers to the availability of a commonly accessible pool of information to all ([20], [21]), ease individuals' participation in information sharing and exchanges. For example, Monge et al. [21] propose that increased provision of connectivity and communality would lead to an increased amount of information generated in the context of inter-organizational information systems.

Interventions on the non IT related factors that affect citizen participation cannot be easily controlled as they depend on characteristics of the society that require time in order to be enhanced such as educational status, financial status. On the other hand introducing methods and tools that encompass the IT features that positively influence citizen participation, such as Information Aggregation Markets, can be beneficial for public organization on shorter time-frames.

3   Information Aggregation Markets

Information Aggregation Markets (IAMs) are markets designed and run for the primary purpose of mining and aggregating information scattered among participants and subsequently using this information in the form of market values in order to make predictions about specific future events. IAMs are commonly known as 'prediction markets' because they are often used to predict future events. They are essentially "futures markets", i.e. forums for exchanging contracts whose payoffs are tied to unknown future events. The contracts in IAMs can be considered as a subset of the financial derivative called "future" and differ from those in traditional equity markets in that they are not typically tied to a claim of an ownership stake in a firm. Instead,

the final price of these futures contracts depends on the outcome of a future event; upon market end, contracts' price incorporates the available information with respect to that event.

IAMs offer substantial benefits, including real time information aggregation as participants are incentivized immediately to submit new information, extraction of realistic expectations as traders 'put their money where their mouth is', high accuracy in predicting future events, as shown by previous papers cited later in section and increased scalability, due to their resemblance to financial markets.

In recent years, a significant increase has been documented in both the volume of academic literature on the subject [22], and enterprises putting the concept into actual use for information aggregation and decision support. In the corporate world, a number of companies including Hewlett Packard, Microsoft, Google, Siemens and Eli Lilly have experimented with IAMs to forecast sales, the success of new products or even estimate projects' completion time [23]. A number of information aggregation markets solutions for corporate applications are offered by specialized companies such as Inkling, Consensus Point in the US and Nosco and Pre:Kons in Europe whereas many sites on the Web (e.g. Intrade.com, Betfair.com, Nadex.com) offer information contracts in a number of areas including sports, politics, finance, law, entertainment, and even the weather. In addition, a recent study published at the European e-Participation portal suggests the use of information aggregation markets as a tool, which can leverage citizens' participation in European public policy [24].

Recent research has explored the use of IAMs for preferences' aggregation. In 'preference markets' participants engage in securities trading, the price of which represents the degree of preference for a decision option. Participants reveal their own preferences and their expectations of others' preferences, and converge towards an equilibrium that captures the consensus view [25]. This type of IAMs has been mainly applied in corporate settings for the selection of new ideas (see for example [26], [27]).

The public sector seems quite reluctant to introduce IAMs to improve public decision making, despite the benefits expected from the design of information markets for governance. In particular, Hanson [28] proposes IAMs as a new tool that 'will revolutionize governance' and Ledyard [29] and Hahn and Tetlock [30] describe a framework and identify the main characteristics an IAM should fulfil in order to perform well in situations relevant for policy decision making. In 2003, there was a controversial proposal to deploy information markets in order to predict terrorist events in the US and, based on the market outcome, to design appropriate policies relevant to national security. The so called Policy Analysis Market (PAM) was cancelled because the officials objected to the fact that terrorists could possibly affect the outcome while the government did not wish to disclose the kind of sensitive intelligence that an information market would reveal.

4   Information Aggregation Markets for Citizen Engagement

The characteristics of IAMs are in line with IT features that affect participation. With IAMs, the private information and preferences of citizens are reflected in the price of contracts that represent policy options. Citizens buy contracts of policy options they prefer and sell those they do not approve. The target is citizens' motivation and their

participation in the decision making process. As an example, suppose that a new policy addressing the problem of excessive CO_2 emissions by automobiles is proposed. The IAMs e-Engaging approach would be to model the consequences of either adopting or not the proposed policy, by creating different contracts which reflect e.g. the impact on the percentage of CO_2 emissions after 5 years.

IAMs can be configured to allow citizens propose alternative policy options raising the level of participation to e-Empowering. The new options are traded in the market together with the ones introduced by the policy makers. As a result the public, through the market, can indicate policies that experts have not considered yet. Table 1 summarizes who participates, what is being traded, how participants are involved and what the objective of IAMs in e-Empowering and e-Engaging is.

Table 1. Information Aggregation Markets for e-Participation

	e-Empowering	*e-Engaging*
Who?	Citizens	
Why?	Identify the preferred and most promising policy options	
How?	Participants express their preferences by trading on decision options – they can suggest alternatives	Citizens predict the impact of alternative policies or express their preferences through trading
Why?	- Aggregate stakeholders' preferences - Identify new decision options	- Prediction of policies' impact - Aggregation of citizens' preferences

When applying IAMs for citizen engagement, one should specifically consider liquidity, participants' incentives and the synthesis of participants groups. Liquidity, i.e. a significant number of transactions in the market, is needed to generate a reasonable price signal on the underlying value of a contract since transaction prices may not be representative of market participants' beliefs in markets with low number of transactions. In other terms, the outcome of an IAM can be used by decision makers only if prices do not provide biased measures of traders' beliefs. Nonetheless, theoretical analysis has shown that the practice to interpret IAM prices as probabilities that aggregate the information held by traders should be applied cautiously regardless of the liquidity problem. Manski [31] argues that in an all-or-nothing IAM (i.e. markets populated with contracts that pay a fixed amount if a specified event occurs and nothing otherwise) populated with risk-neutral traders endowed with heterogeneous beliefs, the mean belief and the equilibrium price may differ substantially. Gjerstad [32] and Wolfers and Zitzewitz [33], however, show that the bias diminishes if traders have risk-averse utility function, and that the bias disappears if the coefficient of relative risk aversion is equal to one. These findings demonstrate that interpretation of prices in actual IAMs requires some knowledge of trader's risk preferences which is not always feasible.

With respect to incentives in IAMs, play money can be endowed to participants in order to avoid excess technical, regulatory, and fiduciary costs and redeem best

performing participants with prizes as incentives. Past research showed that even play-money IAMs can be a dominant source of information ([34]).

Furthermore, in order for IAMs efficiently to aggregate information, they should attract a sound group of participants. Surowiecki [35] has provided a qualitative analysis of participant characteristics necessary for the market to be trustworthy: diversity of opinion, independence of thought and decentralization of knowledge. Wolfers and Zitchevitz [33] established a theoretical model and provided an account of sufficient conditions under which IAM prices aggregate private information held amongst participants. They concluded that, when participants are typically well-informed, IAM prices will aggregate information into useful information. In the following sections we present two real-life use-cases of IAMs designed to assist public organizations in decision making.

5   Real Life Cases of Information Aggregation Markets for Citizen Engagement

The purpose of our pilots was to deploy IAMs in real settings in order to support the decision making processes of public institutions while allowing citizens to contribute by expressing their opinion. The first case was designed and executed at the State of Bremen in Germany in cooperation with the local ministry of education where citizens were asked to express their preferences on a set of policy options relevant to restructuring the bible history class at schools. In the second case we cooperated with the European Commission in the context of a public consultation held in order to acquire and evaluate future research directions regarding the use of information and communication technologies for enabling energy efficiency.

In both cases, the software IAMs were deployed on was IDeM [26]. The system can be utilized for aggregating participants' preferences for alternative policy options in market prices (relevant for e-Enabling initiatives) and with proper configuration it can allow traders to introduce new contracts in the market representing new policy options (relevant for e-Engaging initiatives).

To ensure adequate market liquidity even with low number of traders, IDeM implements a trading algorithm called continuous double auction with market maker (CDAwMM). When there are no matching offers the system acts as an 'always there' buyer and seller ready to accept buy and sell offers at a certain price. A logarithmic price function is used to determine the transaction cost [36].

Participants traded using play money; an initial amount 10.000 play money units was endowed to each trader upon registration together with an initial bundle of 50 contracts per policy option available in the market. Contracts could be traded at a price range of 0 to 100 since the price indicated the potential of success of the related policy option and were initially valued at 50 play money units in order to ensure a fair chance for all options. The duration of each market was fixed and announced at the home page of IDeM. A detailed tutorial explaining the basic principles of IAMs as well IDeM functionalities was included in the 'help section' of the software.

5.1   Reforming the Bible History Class at the State of Bremen

In cooperation with the ministry of education of the German State of Bremen, we designed a real-life use of IAMs with the goal to evaluate policy options for refactoring the 'Bible history' class in Bremen schools. The officials at the State of Bremen wanted to modernize the class in order to address the needs of a multi-religion society while involving citizens in the decision making process. The initiative was carried out in two phases. Initially a web-based forum was setup where the citizens of Bremen could submit ideas and views on the issue while engaging in an online discussion. The purpose of the forum was to gather citizens' views and remained open from 9/3/2009 to 20/3/2009. Next, the submitted views and comments were processed by the officials and a set of seven alternative options were derived.

We created a web-based IAM, registered the seven policy options together with their descriptions (as an example one of the policy options was: Title 'Separate classes for each religion', Description 'BGU is replaced by separate classes of Christian, Jewish and Islamic religious education, as well as philosophy / ethics. Skilled teachers with deep knowledge of the specific religion are responsible for each class') and posted a call for participation on the web-based forum. The multilingual capabilities of IDeM allowed us to use the German language in this case. Participants could not propose new policy options in the market and expressed their opinion by investing on the existing ones. The market remained active for 14 days, between 20/3/2009 and 3/4/2009. 42 users registered in our IAM of which 30 participated actively. The total number of transactions was 302; hence the average number of transactions per participant was 7.1. The maximum number of transactions per contract was 60 and the minimum 28.

The officials agreed that participation was satisfying. Two different questionnaires were prepared, one for the administrators and one for the traders. The former was completed by 3 administrators and the latter by 7 traders. Market administrators were satisfied by user participation and the results of the market. As quoted by one of the decision makers of the pilot in Bremen "Using Information Markets we experienced increased participation. Although we didn't take any specific measures to promote participation, people simply responded promptly".

Furthermore the ranking provided by the market, which was calculated using the weighted average price of the transactions, proved particularly useful and the officials at the ministry of education informed us that they were going to consider it when reaching their final decision.

Traders stated that they participated for the first time in an IAM. All but one agreed that they would be willing to take part in a similar market in the future. The trader who objected expressed the opinion that the capitalistic characteristics of the IAMs could lead to manipulation effects and speculative bubbles like those we are experience in the present economic crisis. Furthermore all traders expressed their concerns whether the outcome of the market would be considered by the officials as they felt that the decisions were directed by the central government and their opinion would not matter the most.

5.2 European Commission Consultation on Information and Communication Technologies for Enabling Energy Efficiency

The case was designed for a European Commission (EC) public consultation on Information and Communication Technologies for enabling energy efficiency. This endeavour was part of the interactive policy making initiative of the EC. The purpose of deploying IAMs in this context was to allow people from all over Europe to submit and evaluate future research directions relevant to the use of ICT for enabling energy efficiency, allowing them to express their opinions by proposing and trading idea contracts. Ideas placed in the market had the benefit of being scrutinized by a wide range of peers. In the invitation that was sent, participants were encouraged to especially consider and focus on the potential effects of user-driven open innovation in the area of Structural Change, i.e. ICT-enabled structural changes for a low-carbon society. The reason was that that enabling structural changes in Business/Work/ Mobility models across the economy and society is the most challenging, least clear and yet potentially greatest area of opportunity.

   An initial number of three ideas were used for the commencement of the market. Traders were able to enter new ideas in the 1st week of the market operation. We asked participants to describe their ideas as clearly as possible but shortly. Once the appropriate information had been entered, the ideas automatically were inserted in the market. We agreed with the stakeholders that no more than 18 ideas should enter the market, so a 'first come first served' approach was enforced. The invitation was sent to approximately 2000 people from across Europe and 63 registered. Non-monetary and monetary incentives were provided to the idea creators and the market winner.

   For the idea creators the incentive was that all proposed ideas were to be communicated to the EC officials thus increasing the likelihood of potential funding of the winning ideas. The market winner received a complementary registration for the international conference in a relevant area. The market operation started on 4/7/2008, remained open for approximately 3 weeks until 21/7/2008 and participants were able to trade 24/7. Traders were asked to perform as many transactions as possible, on the basis of what they thought the "winning ideas" could be and at the same time would maximize the valuation of their portfolio. As a minimum, traders were encouraged to visit the market once every day and revise their position accordingly. During the trading period 561 transactions occurred by 34 active members of the market (active members were considered the users that made more than 1 transaction in the market). We managed to attract a diverse group of participants from across Europe (10 difference European countries), with fairly wide age range (28 to over 57 years old), experience (1 to over 21 years of working experience) and professional background (including Engineering, Management and Marketing).

   Upon market end participants were asked to fill an online questionnaire; we received a total of 14 completed questionnaires. An overwhelming majority of the respondents (85%) indicated that they use information market as for the first time. 78% of them also stated that they would participate again in a similar market if they were requested. This percentage is quite important and shows the success the market had. It is noteworthy to mention that before participating in the market almost 72% of them did not believe that the concept of IM would be useful. However, after

participating in a 78% of them support that they, now, believe that IAMs is a means to successfully evaluate policy options and also propose new options.

Furthermore semi-structured interviews were conducted with decision makers in order to gather feedback on the usefulness and the benefits of our approach and a positive feedback was received. An EU official stated "This endeavour proved very interesting and useful. We received many interesting, diverse and innovative ideas Overall, we were very satisfied with the quality of the contributions, although certain ideas were pretty 'wild' and cannot not be readily utilized". With respect to the submitted ideas, we reached our target to receive 18 ideas by participants fairly easily and all were submitted during the first two weeks of market operation.

6   Conclusions

In this paper we proposed Information Aggregation Markets as a promising method for citizen engagement in public decision making. We analysed the benefits of such markets for e-Engaging and e-Empowering initiatives and explained how markets can be designed and deployed by public institutions and organizations in order to allow citizens' involvement in the processes of selection and evaluation of new policies. Moreover we reported on two real life cases in which we applied IAMs in cooperation with public bodies. In both cases decision makers where pleased by the market output and appreciated the fact that they gained insight into participants' opinions. Furthermore they stated that they would consider the results before reaching a final decision. Users participated actively in the markets while admitting that IAMs can provide the means to successfully evaluate policy options and also propose new ones.

IAMs provide a sound solution to the incentive problems and can outperform alternative approaches to informing public administrations' decision-making. In addition they are scalable and can support an arbitrary number of participants whereas the output, i.e. the price signal, is simple enough to be directly taken into consideration. Nonetheless markets raise certain practical challenges; they are not suitable for all settings, and need to be designed and implemented carefully and sensitively to be effective. Markets may leak sensitive information in a way that other mechanisms do not (or do less), and this in turn can impact morale and motivation negatively, create legal complications by turning participants into "insiders". Markets may be subject to manipulation and it can be challenging to sustain participation.

However the practical performance of markets should not be compared to some absolute ideal, rather to the benefits or limitations of other alternatives [23]. Holding meetings, relying on 'expert' opinion, conducting surveys, or polling citizens are all information mechanisms with costs and potential weaknesses. Often these methods are not sufficiently appreciated and challenged. Our research provides evidence that IAMs can constitute a tool for public organizations in order to engage citizens in the decision making process and tap into citizens' knowledge and private information.

Future research should focus on more systematic comparison of IAMs with alternative mechanisms in real world cases. For example, Graefe [37] compares the Delphi method of structured group deliberation with IAMs in a field experiment and concludes that markets perform as well as the Delphi method. On a more practical level, future integration of IAMs into well known social networks such as twitter and

facebook could provide a much larger user base while overtaking the need for registration to new platform, not familiar to most citizens.

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Towards a Structured Online Consultation Tool

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Abstract. The Structured Online Consultation tool (SCT) is a component tool in the IMPACT Project which is used to construct and present detailed surveys that solicit feedback from the public concerning issues in public policy. The tool is underwritten by a computational model of argumentation, incorporating fine-grained, interconnected argumentation schemes. While the public responds to easy to understand questions, the answers can be assimilated into a structured framework for analytic purposes, supporting automated reasoning about arguments.

Keywords: policy-making, online consultation, argumentation.

1   Introduction

The Structured Online Consultation tool (SCT) is a component of the IMPACT Project, a European Union funded Framework 7 project in the ICT for Governance and Policy Modeling theme. The focus of the IMPACT Project is to improve public policy-making. In this paper, we first briefly outline the policy-making context of the Project and the other tools. We elaborate on the role of the SCT and introduce Argumentation Schemes. We give an example of how an argumentation scheme, Practical Reasoning, is represented in the SCT as well as how the respondents are led to consider various aspects of the argument, so that specific points of agreement and disagreement can be registered. The tool is underwritten by a computational model of argumentation, which is briefly outlined. Using the model, we can implement a program to automatically reason with respect to arguments that represent defeasible and inconsistent information, to assist in the construction of surveys, and to aggregate, analyse, and evaluate responses to a completed survey. We discuss how argumentation schemes can be analysed in a form compatible with this model of argumentation. As the model is not presented to the respondent, usability is maintained since the respondent need only answer easy to understand, often "yes/no", questions. This version of the SCT is more advanced than previous versions (or related tools) in that it uses richer forms of interconnected, formalised argumentation schemes.

2   Context and Current Tools

Policy making is generally viewed as a cyclical, multi-stage process [2,3]. Simplifying, we have the following stages:

- Evaluation: policy analysts look at existing laws and regulations, considering how the laws and regulations achieve the intended goals and identifying conflicts among goals.
- Agenda setting: based on the evaluation, public administrators define areas for change or improvements.
- Policy formulation: given an agenda, policies are proposed and criticised.
- Decision: after consultations about the proposed policies, the draft laws and regulations are introduced into the legislative process.
- Implementation: Once enacted, legislation is enforced.

The IMPACT Project contributes to the policy formulation stage, where proposed laws and regulations are made available for comment to the general public as well as to a selection of stakeholders with a special interest in topics of the policy. Presuming that the policy has been formulated, we can refer to the commenting activity as policy consultation.

There are several current or proposed policy-making support tools in the European Union and the United States which use currently available wiki, comment, email, or social networking technologies (See [7,4] for discussion of other tools such as IBIS+, Compendium, DebateGraph). We discuss several of these briefly in order to set the context for the contribution of the SCT[1].

The United Kingdom's Cabinet Office Public Reading website[2], which currently presents the Protection of Freedoms Bill, uses a website that unfolds the proposed bill, allowing online readers to look at specific sections. At the bottom level, the user can use a threaded comment facility to respond to a particular portion or responses made by other users. With the Public Reading tool, it is difficult to get an overview understanding of the whole policy and the relation of responses to it. Thus, the role and impact of responses is not highlighted. There is no support for analysing the responses, which is then done "manually" by analysts of the consultation, making the contribution of the responses to the development of the policy draft obscure. Moreover, while the responses are specifically linked to parts of the legislation, the unconstrained nature of the responses means the consultation is unstructured and unsystematic. Not only does this allow inappropriate or irrelevant responses, but it may not elicit the kind of important or useful information that is the primary motivation for the consultation in the first place. The Bill itself proposes a solution to some legislative problem; comments on the Bill may discuss alternative solutions. Yet understanding the Bill or alternative solutions may rest on the motivations and justifications underlying the solutions, for example, in terms of social values that the solution promotes. Making these motivations and justifications overt would further support rational analysis and understanding of the Bill, which in turn would better represent the stakeholders' interests and objectives.

The UK Prime Minister's Office ePetition and the European Commission's The European Citizens' Initiative facilities allow citizens to electronically create,

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[1] All websites accessed March 29, 2011.
[2] http://publicreadingstage.cabinetoffice.gov.uk/

sign, and submit petitions[3]. By the same token, these tools can be used to "vote" on a policy proposal. The tools, which enable respondents to submit petitions, are web-based versions of what is has been traditionally accomplished manually. Both of these tools contribute to the policy formulation stage of the policy-making cycle, but not to the comment stage. There is no analytic framework. A particular problem is that it is unclear exactly *what* respondents are signatory to; that is, it provides an unrefined *all or nothing* representation of a point of view, whereas there may well be respondents who agree with some parts of the proposal, but not other parts, yet nonetheless sign on to the whole. The SCT is designed to *differentiate* and *draw out* such subtle alternative viewpoints.

Other initiatives aim to improve the quality of comments to proposed legislation. The US General Services Administration is preparing a tool to support consultation, ExpertNet, which draws "crowdsources" expertise and attempts to structure responses with social networking facilities such as ranking responses, providing specific questions for community voting, or annotating responses, among others. While this does give indicative information on respondents' reactions, the legislation is not represented in an analytic form, much less supporting machine analysis. Rather, the content of the legislation and the reactions to it must be further analysed, though there is no analytic framework. There are additional issues raised about how to identify, certify, and monitor the community of experts. The RegulationRoom is an academically hosted facility for commenting on proposed legislation, providing guidelines on effective comments. This is more substantive than ExpertNet, yet requires highly skilled individuals to follow the guidelines; it may best suit respondents who already participate in policy consultations[4].

Finally, in the US state of Massachusetts, legislators are using a wiki tool, LexPop, to "crowdsource" the incremental development of legislation[5]. The question here concerns who is in a position to use such a tool, not just in terms of representing the interests of others and reasoning about legislation, which often requires a deep understanding of law and how to author legislation, but also reasoning about legal values and consequences. The success of current wikis (e.g. Wikipedia) rests on an often small coterie of self-selected, self-regulating authors who write about specialist topics, where questions and controversies can be left unresolved and where there are no legislated consequences.

Despite these drawbacks, these current tools and initiatives are clearly potentially important and useful in leveraging current technologies to draw in greater citizen participation to policy-making by making participation easier and improving the informativeness of feedback. However, providing the means to address or avoid these limitations would positively impact on policy making. In particular, the tools discussed above do not further the substantive semantic

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[3] http://petitions.number10.gov.uk/ (archive only)
    http://ec.europa.eu/dgs/secretariat_general/citizens_initiative/
[4] http://expertnet.wikispaces.com/
    http://regulationroom.org/
[5] http://lexpop.org/

analysis of the comments in a form that supports machine-processing of rich, complex information, particularly where the comments introduce conflicts and inconsistencies that must be reasoned with, that is, they do not make use of current thinking or techniques found in Artificial Intelligence on argumentation.

3   Contribution of the SCT

The SCT is based on a formal, computational model of argumentation and argumentation schemes, providing a semantic analysis of the comments in a form which can be processed and reasoned with further. Thus, it contributes what other tools lack. The proposed version of the SCT is more advanced than current tools for it makes use of interconnected, expressive, and formalised argumentation schemes. While it does structure the feedback, it does so in a way that is accessible and corresponds closely with intuitive considerations. Not only is the informativeness of comments increased, but reasoning about conflict and inconsistency is facilitated. Consequently, analysts, policy-makers, and members of the public will have a greater understanding of the meaning and implications of the policy as well as how they might specifically critique or contribute to it. Along with the other tools in the IMPACT toolbox, described below, the SCT provides a means to identify, represent, and reason with information concerning policy, using an underlying computational model.

The SCT is one out of four tools in the IMPACT Project, which is developing a suite of interconnected tools to facilitate public policy deliberations. All the tools share the underlying computational model of argumentation.

- Argument reconstruction, which applies text analytic techniques and tools to source texts and comments on policy.
- Argument visualisation, which provides a graphical representation of elements of the debate concerning the initial policy and responses.
- Policy modeling, which allows users to model alternative outcomes of policies when applied in particular circumstances and the effect on selected cases.
- Structured consultation, which harvests justifications for particular elements of proposed policies in a structured manner.

For the purposes of the IMPACT Project, the four tools, the SCT among them, will be integrated into the IMPACT Project argumentation toolbox, allowing other components of the toolbox to access and exchange common data. The SCT will be a Rich Internet Application (RIA), which are web applications that have many of the characteristics of a desktop application, but are delivered over the internet in a browser, plug-in, sandbox, or virtual machine. In addition, the SCT will be implemented to adhere to the OSGi standard, which provides an environment where applications are modular bundles that are collections of classes, jars, and configuration files that declare their external dependencies and that can be remotely installed, started, stopped, updated, and uninstalled without requiring a system reboot. Finally, as the SCT is to use data from and provide data to other IMPACT Project tools, the SCT will support the

export and import of argumentation scheme elements in an Extensible Markup Language (XML) format, e.g. the Legal Knowledge Interchange Format (LKIF), via Application Programming Interfaces (APIs). On the project website, one can find further information about the other tools in the toolbox. Underpinning all four of the tools is a formal, computational model of argumentation and policy.

4   The Representation of Argumentation

In policy-making, arguments are central since, given the deliberative context of the consultation, contributors respond to some point of the proposed legislation either by arguing for or against that point, or providing alternatives (which may or may not be construed as incompatible). The arguments may take a range of forms such as giving reasons against a point, giving a definition, adding a premise, identifying anomalies, giving a counter-example, or stating conditions under which the rule is inapplicable, among others. While contributors are aware that they are deliberating, they do not usually systematically address issues raised by other contributors, much less formalise the arguments as might a logician so as to enable further reasoning over the responses. By the same token, without some formalisation, further automated processing for reasoning is infeasible. The latter is rather important given the sheer amount and complexity of information users can submit. As most contributors are not trained logicians or computer scientists, they cannot be expected to provide systematic, formal, machine-readable arguments. Given this, we must attempt to bridge the "gap" between the deliberative inputs that the respondents provide and the systematic, formal representations that can be used for further automated processing such as for reasoning. To this end, the IMPACT Project and the SCT use a formal theory of argumentation using *Argumentation Schemes*.

We briefly outline a formal theory of arguments and argumentation schemes using simplified examples to give a flavour of the main ideas. We initially outline familiar notions of *deductive* and *defeasible* arguments. These are related to *Argumentation Frameworks* (AF), which reason with arguments at an abstract and formal level and which can be implemented and used to calculate sets of consistent arguments. A key problem is to bridge between the arguments that people use and AFs. We address this problem with *Argumentation Schemes* (AS), which are accessible, prototypical reasoning patterns. After this review, we return to discuss how the SCT uses and presents policy-making arguments.

4.1   Arguments and Argumentation Frameworks

Arguments generally are understood as premises followed by a claim; we say that we infer the claim from the premises. In Classical Logic, we can have the following argument, where *All men are mortal* and *Socrates is a man* are premises and *Socrates is mortal* is the claim.

All men are mortal and Socrates is a man, so Socrates is mortal.

In this *deductive* argument, where the premises are true, the claim must follow; additional statements would not change this inference.

There are other arguments in which the claim only presumptively or usually follows from the premises; we refer to these as *defeasible* arguments. For instance, someone may present the following argument (A):

A *Nixon was a Quaker, so Nixon was a pacifist.*

Others may dispute (A) with (B)-(D), arguing:

B *Nixon was a Republican, so Nixon was not a pacifist.*
C *Nixon was not born in Pennsylvania, so Nixon was not a Quaker.*
D *Nixon never mentioned Quakerism, so Nixon was not a Quaker.*

The claim (B) is contrary to the claim of (A), while claims of (C) and (D) are contrary to the premise of (A).

The arguments we have presented so far we call the level of *fully instantiated arguments* in the sense that all the predicates (e.g. *being a Republican* or *mentioning Quakerism*) and terms (e.g. *Nixon* or *Quaker*) are explicitly represented; that is, we have sentences that human users can understand and process in the argument. To automatically process sentences, we need a formal, computational representation of the sentences and of the arguments.

One formal level of representation is provided by *Argumentation Frameworks* (AF) [5,8], which have been shown to formally represent and reason with inconsistency and defeasibility. Here we provide some of the intuitive ideas behind AFs. At this level of representation, we *abstract* from the particular contents of the arguments to view arguments as *nodes* (this is a move similar to how Classical Propositional Logic abstracts from the particular contents of propositions) and represent the *attack* relations between the arguments, where *attack* is derived from a notion of *contrariness*: since (B) has a contrary of (A), we say that (B) attacks (A); similarly, (C) attacks (A) and (D) attacks (A). In AFs, the attack relation is viewed as an arc between nodes. Given an AF, the arguments and counter-arguments can be represented as a *graph*. Moreover, conditions can be given for which nodes "survive" attack. For example, since neither C nor D are attacked, they "survive"; they both attack (A), so (A) is eliminated; (A) and (B) attack one another, but (A) has been eliminated, so (B) "survives". The result is that we have a set of arguments which are consistent, namely {(B), (C), (D)}, which we refer to as an *extension*. Maximal consistent positions are called *preferred extensions* of the framework; in a policy-making context, preferred extensions may be understood as *policy positions*. While in this simple example, AFs may appear as more technically complex than required, where we deal with many nodes in attack relations, the strength of the formalisation, which has been implemented, comes to the fore.

4.2   Argumentation Schemes

For the purposes of the SCT, we cannot expect that respondents in the survey are familiar with expressing themselves in terms of deductive or defeasible ar-

guments, in identifying contrary statements, or in providing ways of attacking arguments. On the other hand, we do not wish to allow entirely unconstrained arguments as discussed in section 2. Yet, the arguments must be understandable to the respondents in the survey. To navigate between the formal and informal yet provide an accessible format for survey respondents, we use argumentation schemes (AS), of which there are many sorts [10].

Here, we consider two ASs, *Practical Reasoning* (as in [1]) and *Expert Opinion*. Practical Reasoning relates to determining *what people should do in a given situation*, which is often central to policy-making consultations; Expert Opinion is what is often used to back up or support particular premises of an argument. We outline each of these schemes in terms of two *levels*, schematic and instantiated, adding further levels in section 6. Other schemes may also be relevant such as *Argument from Analogy*, or *Ad Homenim*, among others [10].

Schematically, the Practical Reasoning argumentation scheme is:

- Premise 1a: The current circumstances are R;
- Premise 2a: Doing action A realises goal G;
- Premise 3a: The goal G promotes value V;
- Claim: We should do action A.

The scheme is instantiated when we provide ground terms for the variables R, A, G and V. For example, concerning a policy-making discussion about a ban on fox hunting, the following argument may be put forth[6]:

- Premise 1a: The ban on fox hunting negatively affects the livelihoods of those who make a living from fox hunting;
- Premise 2a: Repealing the ban on fox hunting creates more jobs in the countryside;
- Premise 3a: Creating more jobs in the countryside promotes prosperity.
- Claim: We should repeal the ban on fox hunting.

This may be one of several arguments put forth in favour of this claim.

The Expert Opinion argumentation scheme may be used to argue for or against a particular statement of another scheme, which we give as a template and then as an instantiated example.

- Premise 1b: E is an expert in subject domain S
- Premise 2b: S contains proposition A;
- Premise 3b: E asserts that it is true that A;
- Claim: A

We connect our argumentation schemes – the claim of this Expert Opinion argument is Premise 1a of the previous Practical Reasoning argument. Other premises of the Practical Reasoning argument might also find support from an expert. For illustration, we use made up individuals and domain knowledge.

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[6] Derived from an ePetition on fox hunting
http://petitions.number10.gov.uk/huntingactrepeal/.

- Premise 1b: Professor James is an expert on UK rural economic research.
- Premise 2b: UK rural economics research contains the proposition that the ban on fox hunting negatively affects the livelihoods of those who make a living from fox hunting.
- Premise 3b: Professor James asserts that it is true that the ban on fox hunting negatively affects the livelihoods of those who make a living from fox hunting.
- Claim: The ban on fox hunting negatively affects the livelihoods of those who make a living from fox hunting.

Given these arguments, one might be persuaded to repeal the ban on fox hunting. Alternatively, one might object to particular statements within the arguments, thereby denying that the presumptive claim – that the ban on fox hunting should be repealed – follows; such objections are often presented as questions which, if answered negatively, represent objections to a statement in an argument and so imply an attack on the argument. For instance, one might object to Premise 1b, claiming that Professor James is not an expert on UK rural economic research; one might then support this claim by showing that he has not been a member of any professional research organisation for 10 years and has no qualification. Or, one might object to Premise 3a, citing research that jobs which are created in the countryside are so low paying that they are only marginally better than government support, and thereby do not promote prosperity. For each argumentation scheme there are a range of objections (see [10] and [1]). Note in particular, that the argumentation schemes provide clear, fixed, and fine-grained "discussion points", such as those concerning current circumstances, actions, goals, values, expertise, domains, and so on; objections are directed at these points specifically. It is this aspect of argumentation which *structures* and makes *coherent* the policy-making. In this way, it returns very specific information to the policy analyst about exactly *what* respondents object to.

To this point, we have set the context of the SCT and some of the formal technology that it uses. In the next section, we present an overview of a current implementation of the SCT. Then, in the following section, we outline how argumentation schemes are further analysed so as to support fine-grained argumentation about policy-making.

5   A Prototype Structured Online Survey Tool

In developing the SCT, the Practical Reasoning argumentation scheme is central, since all policy proposals are based upon a justification of what to do on a specific issue [1]. Moreover, as we have discussed, the Practical Reasoning argumentation scheme is related to and supported by other schemes (e.g. Expert Opinion), which in turn may be supported by still other schemes, thus requiring a network of interrelated schemes. In this section, we discuss elements of a current prototype online application, Parmenides developed in [4], to illustrate some of the interactions between the system and respondents[7]; future, richer SCT

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[7] http://www.csc.liv.ac.uk/~parmenides/

implementations, as discussed below, will improve upon this prototype, drawing on evaluation studies from [4]. We indicate the initial presentation of the argument and sample information that leads the respondent through a structured investigation of his views on the proposed policy. While the system is highly structured, it also allows respondents to introduce their own additional information, which can be used in later iterations of the consultative process.

We consider the question of whether or not to repeal the ban on fox hunting in the UK as provided on the Parmenides website. In responding to the survey, the user is led through a series of screens of information, each screen presenting some particular aspect of the debate. The initial screen presents the argument for a particular action as proposed by the government, using the Practical Reasoning scheme of the fox hunting debate above.

Our example is simplified as the implementation allows more complex expression of the current circumstances, a range of goals, and various expressions of the promotion of a value by a goal. For example, rather than one proposition for the statement of current circumstances, Parmenides presents several (based on the ePetition on fox hunting):

> The ban gives succor to animal rights extremists; The ban ignores the findings of a government enquiry; The ban prejudices those who enjoy hunting with dogs; Less humane methods of controlling fox population have been introduced; The ban affects the livelihoods of those who make a living from hunting.

The argumentation scheme can have a number of propositions as premises, but there can only be one action that is the claim.

The argumentation scheme gives us a structured presentation of the initial state of the elements of the topic which is being surveyed. This leads to subsequent screens that solicit the respondents' views on particular aspects of the argument. Where a premise is complex, each proposition can be investigated independently. In particular, the respondent is asked questions about each proposition of each portion of the argumentation scheme, choosing whether he agrees, disagrees, or the question is not applicable. By doing so, the respondent indicates precisely what he accepts in connection with the initial argument. For instance, after the initial argument is given, the user will have a screen with some of the following questions about the starting circumstances:

- Does the ban give succor to animal rights extremists?
- Does the ban ignore the findings of a government enquiry?
- Does the ban prejudice those who enjoy hunting with dogs?
- Have less humane methods of controlling fox population been introduced?
- Does the ban affect the livelihoods of those who make a living from hunting?

Answering "yes" endorses a statement from the initial argument, while "no" registers disagreement with the argument on a specific point.

Where the respondent indicates "no", he is led to further screens that examine the justification for the particular proposition and offer the respondent ways to

object to it, for example, resorting to the Expert Opinion scheme, as discussed above. The survey ends when the respondent has answered all the relevant questions and submitted his answers. At each stage along the way, the respondent has the option to introduce novel elements, which are submitted to the system developers for consideration in future surveys.

In the next section, we discuss theoretical developments to advance the SCT.

6 Advancing a Structured Online Survey Tool

To advance the SCT, we must analyse additional argumentation schemes, identify interconnections between them, and decompose them into their fundamental expressions as well as formalise the expressions so we can compute with them. As this is ongoing work, we briefly sketch some of the directions.

6.1 Additional Argumentation Schemes

Part of our current research is directed at spelling out additional arguments and their relationships as may be required for policy-making.

Over the course of the presentation of the survey, various statements found in the policy proposal may require additional, appropriate justification. For instance, while the statement concerning livelihoods might be justified by an expert opinion, a statement such as "The ban prejudices those who enjoy hunting with dogs" might instead require justification from survey data since it is not sufficient for one individual to report his opinion on the matter. Similarly, values such as "economic freedom", "animal welfare", or "human rights" may be justified following an Argument from Commitment, for example, citing a government's manifesto in which the government commits to upholding a value. Thus, we must find the relevant set of argumentation schemes for policy-making.

Another aspect of current work is to decompose existing schemes into central and subsidiary schemes. As we have indicated, statements in the policy require different sorts of justifications. One family of justification concerns the sources of information [10] such as Expert Opinion, Position to Know, Citation, Witness Testimony, Perception, Popular Opinion, and others. In our view, such schemes are related to a *root* argumentation scheme, which we refer to as Argument from Credible Source: *E is a credible source in subject domain S; S contains proposition A; E asserts that it is true that A; therefore, A.* The idea is that there are different ways to establish the premises using another argument such as Expert Opinion, Position to Know, and so on. In other words, there are *levels* of justification, giving rise to a tree-like structure.

Another aspect of the decomposition of argumentation schemes is the elaboration of a particular scheme, especially with respect to implicit or presupposed information as indicated by the objections. While some objections are directed at the truth or accuracy of statements given in the initial position, other objections ask whether there are *alternatives*, for example, *Are there alternative ways of realising the same goal?* or *Does doing the action have a side effect which demotes some other value?* For such objections, it is not sufficient simply to state

that there are alternatives, but that there must be additional justification why those alternatives *negatively* impact on the initial position.

6.2   Towards a Formalisation of Argumentation Schemes

Argumentation schemes can be expressed at several levels of representation, from abstraction to instantiated. We have identified four key levels, partially indicated in section 4.2, each of which is needed to formulate the schemes so we can compute with them, for example, in a logic programming language such as Prolog. Given the focus of this paper and that our analysis is ongoing, we give only a flavour of this work, leaving aside many details, issues, and elaborations.

In section 4.2, we discussed two schemes; here we refer to the Expert Opinion scheme. At the most abstract level, the argument is taken as a whole - there is no differentiation between premises or claim, nor identification of predicates or terms. At the next level, we distinguish premises and the claim, e.g. *Premise 1b: Professor James is an expert on UK rural economic research.* Note that at this level, the premise is but an unanalysed string. At the next schematic level, we identify the predicate and variable terms in a pseudo-logical form: *is-an-expert-on(E,D)*, where E is an individual and D is a domain. Finally, where we substitute variables for instantiated terms, we have an instantiated level: *is-an-expert-on(Professor-James, UK-rural-economic-research)*. We can compute with these different representations.

The other statements in the Expert Opinion scheme are analysed into predicates and terms. For example, *inDomain(T, negAffect(B,L))*, which instantiated, gives us a expression about the negative affect of the ban on fox hunting to livelihoods, which is true in the domain of UK rural economic research; as well, we have *asserts(E, negAffect(B,L))*, which is true where an instantiation of E asserts the statement about the ban on fox hunting. For the problem domain, additional predicates will be needed. From such predicates, we can construct a *knowledge base* as well as arguments according to the schemes. For example, Expert Opinion is the rule *holds(A) ← [expert(E,D), inDomain(D,A), asserts(E,A), not untrustworthy(E), not notCredible(E,D)]*, meaning that A holds where an expert in a domain asserts A, *unless* the expert is untrustworthy or not credible.

Although a range of schemes have been identified [10], research to systematically create formal representations has only recently begun [11,6,9]. In this way, our work furthers research on argumentation as well as e-participation.

7   Conclusion

In this paper we have outlined a Structured Online Consultation tool, which is to be used for the policy consultation phase of the policy-making process. We have described current policy-making tools in use in the UK and the USA along with several limitations. Various tools in the IMPACT Project, the SCT among them, are designed to address these limitations using current web technologies and state-of-the-art computational argumentation techniques. The SCT uses formalised argumentation schemes which enable defeasible reasoning such as found

in policy consultations, where respondents may disagree. A current prototype implementation was outlined. In the final section, we indicated some aspects of our richer, interconnected, and formal analysis of argumentation schemes.

In future work, we will formally specify the argumentation to be used in the SCT, which will then be implemented in the tool. The tool will also be used and tested in "real world" settings by policy-making organisations, comparing and contrasting the existing tools to the SCT along with taking further guidance on developments of tools for policy making.

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A Review of Opinion Mining Methods for Analyzing Citizens' Contributions in Public Policy Debate

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Abstract. Electronic Participation (eParticipation), both in its traditional form and in its emerging Web 2.0 based form, results in the production of large quantities of textual contributions of citizens concerning government policies and decisions under formation, which contain valuable relevant opinions and knowledge of the society, however are exploited to a limited only extent. It is of critical importance to analyze these contributions in order to extract the opinions and knowledge they contain in a cost-efficient way. This paper reviews a wide range of opinion mining methods, which have been developed for analyzing commercial product opinions and reviews posted on the Web, as to the capabilities they can offer for meeting the above challenges. The review has revealed the great potential of these methods for the analysis of textual citizens' contributions in public policy debates, both for assessing contributors' general attitudes-sentiments (positive, negative or neutral) towards the policy/decision under discussion, and also for extracting the main issues they raise (e.g. negative and positive aspects and effects, implementation barriers, improvement suggestions) and the corresponding attitudes-sentiments. Based on the conclusions of this review a basic framework for the use of opinion mining methods in eParticipation has been formulated.

Keywords: Electronic Participation (eParticipation), Electronic Consultation (eConsultation), Web 2.0, Opinion Mining, Sentiment Analysis.

1 Introduction

Electronic Participation (eParticipation) results in the production of large quantities of textual contributions of citizens concerning government policies and decisions under formation. In the 'traditional' Web 1.0 based eParticipation (conducted in official government-initiated eParticipation spaces) are offered to the citizens tools for entering not only simple contributions of yes/no or rating type (e.g. various on-line voting and survey tools), but also more sophisticated contributions of textual type as well (e.g. various on-line discussion forum tools) [1-4]. Similarly, in the emerging Web 2.0 based forms of eParticipation (exploiting highly popular social media for publishing policy messages and collecting citizens' feedback on them) is offered to the citizens functionality for providing feedback not only of simple 'like/dislike' or

rating type, but also more of sophisticated comment type as well (e.g. comments on YouTube videos, or postings in blogs) [5-8]. So hundreds or even thousands of citizens' textual contributions are generated from these eParticipation channels, in numbers much higher than in the off-line public policy debates; these contain valuable opinions on the government policy/decision under discussion, and knowledge on the societal needs or problems this policy/decision attempts to address and the proposed government actions/interventions for this purpose. While the above simple forms of citizens' contribution can be easily analyzed using statistical methods, so that sound conclusions can be drawn from them, this does not hold for the numerous textual contributions collected. The big effort – and therefore the long time and high cost - required for reading hundreds or thousands of citizens' textual contributions on a public policy under formation (in traditional eParticipation spaces, Web 2.0 social media and also in offline public policy debates), summarizing them and extracting the general attitudes of the contributors and main points and issues they raise (e.g. positive and negative aspects and effects of the policies and decisions under discussion, implementation barriers, improvement suggestions) usually leads to a limited exploitation of them. This results in losses of valuable citizens' knowledge and opinions, which would be quite useful to the competent for public organizations for making better and more socially acceptable policies and decisions. Also, this does not allow feedback to be provided to the citizens as to how and to what extent their contributions have been taken into account, resulting finally in 'e-consultation fatigue' and disappointment [3]; providing such a feedback would greatly promote government transparency, accountability and openness.

For these reasons ten years ago in the first report of OECD discussing the potential of eParticipation [1], and also in the subsequent reports on this topic [2-3], is recognized as one of the most important challenges for the practical application of eParticipation ideas the analysis of the vast amounts of unstructured information that citizens' contributions (e.g. in 'threads' of e-conversations) contain using appropriate technologies. These technologies should aim to 'support the summarization and content analysis of contributions', 'help highlight areas of agreement and disagreement' and 'identify the participants main concerns, their level of support for any draft proposals, or their suggestions for action they think necessary to address problems raised'. At the same time it is argued that the lack of such analysis of citizens' textual contributions results in a lack of feedback to the citizens on 'how the results of the engagement have influenced the decision-making process and changed policy outcome' and has negative impact on citizens' trust in government and eParticipation. Subsequently Rose & Sanford [9] from a comprehensive literature review in the area of eParticipation conclude that one of the main research challenges in this area is to use appropriate tools for the analysis of citizens' input to policy-making. Similarly, Macintosh, Coleman & Schneeberger [10] in the introductory paper of the *ePart 2009* Conference Proceedings discussing the research gaps in the eParticipation area state that there is a lack of effective and efficient technologies for the analysis of unstructured eParticipation data and note that this poses a significant challenge to on-going research.

This paper contributes to addressing this critical for the large scale application and institutionalization of eParticipation research and practice gap, by critically reviewing a wide range of methods and algorithms developed in the area of opinion mining for

the analysis of product opinions and reviews posted on the Web. For this purpose we made a systematic search of relevant journal and conference papers using as keywords 'opinion mining' and 'sentiment analysis'. This literature was reviewed focusing on the capabilities that opinion methods provide for meeting the above challenges in the area of eParticipation in a cost-efficient manner (so that we can use them to the largest possible extent), and ii) the main principles of these methods (so that we can select the most suitable ones and use them effectively and efficiently). Based on the results of this review a basic framework has been formulated for the use of opinion mining methods for analyzing citizens' textual contributions in eParticipation. The content of this paper can be very useful for the numerous researchers and practitioners interested in the analysis and exploitation of citizens' textual contributions in various forms of eParticipation.

It should be mentioned that the research presented in this paper has been conducted as part of the project PADGETS ('Policy Gadgets Mashing Underlying Group Knowledge in Web 2.0 Media – www.padgets.eu)[8], which is supported by the 'ICT for Governance and Policy Modelling' research initiative of the European Commission. The research objective of this project is to develop a methodology and a technological platform for the systematic and centrally managed exploitation of the emerging Web 2.0 social media by government organizations in the processes of policy and decision making. This platform will enable publishing content and deploying micro-applications (termed 'Policy Gadgets' - PADGETS) simultaneously to many different Web 2.0 social media, and also retrieving the corresponding users' interactions (e.g. views, likes/dislikes, ratings, comments, etc.) and processing those using advanced methods. Taking into account the high popularity of the targeted Web 2.0 social media it is expected that a large quantity of valuable textual contributions (e.g. blog postings, comments) will be collected from them, so it is of critical importance to make the best possible analysis and exploitation of them in a cost-efficient manner.

The paper consists of five sections. In the following section 2 the objectives and basic concepts of opinion mining are presented. In section 3 is reviewed the main research stream of this area dealing with sentiment analysis at the document and sentence level. Then in section 4 is reviewed the second most important research stream of this area dealing with feature-based sentiment analysis. Section 5 discusses issues related to our initial framework for dealing with sentiment analysis under project PADGETS, which incorporates linguistic peculiarities such as extensive use of idioms and ill-formed sentences (i.e. short sentences which do not necessarily follow syntactic rules). The final section 6 includes the conclusions and also a framework for the use of opinion mining methods for analyzing citizens' textual contributions in eParticipation.

2   Opinion Mining Objectives and Concepts

The Web has dramatically altered the way people express their opinions, offering them the capability to post comments and reviews on commercial products and express their views on a plethora of issues in forums, discussion groups, chat rooms, social networking groups and blogs. This user-generated content has been recognized

as a valuable source of commercial and political information. However, the large amount of this information and its natural language form make it difficult to extract the useful elements, such as the general feeling/sentiment (e.g. positive, negative, or neutral) on the particular topic (e.g. a product/service or a new policy proposal) and the specific issues raised about it by the users/visitors of these websites. For these reasons methods started being developed for supporting the above tasks, and this lead to the development of the sentiment analysis or opinion mining research domain, which according to [11] aims to develop methods for the computational processing of opinions, sentiments and emotions found, expressed and implied in text. Its initial motivation has been to enable firms to analyze online reviews and comments entered by users of their products in various review sites, blogs, forums, etc., in order to draw general conclusions as to whether users liked the product or not (sentiment analysis), and also more specific conclusions concerning features (characteristics) of the product that have been commented positively or negatively (features extraction and analysis).In general, opinions can be expressed on anything, e.g., an item, a product, a service, an individual, an organization, an event, or a topic, so we use the collective term 'object' to denote the target entity that has been commented on; however, comments can be expressed not only on objects, but also on particular 'features' (characteristics) of them [12], e.g. on the "*battery life*" feature of a mobile phone.

This research domain can be subdivided into two main streams. The first research stream deals with the classification of an opinionated text (i.e. a document consisting of several statements, such as a forum or blog post) as expressing a positive, negative or neutral opinion. More recent research in this research stream focuses on the sentence level, dealing with the classification of a sentence as objective (fact) or subjective (opinion), and then on the further classification of the subjective sentences as expressing a positive, negative or neutral opinion [13]. The second research stream of this area deals with the extraction of the most commented features of the commented object, and for each of them, the classification of relevant opinions as positive, negative or neutral is performed. Throughout the following sections 3 and 4 these two research streams are reviewed.

3   Document and Sentence Level Sentiment Analysis

Sentiment analysis is perhaps the most widely studied topic in this domain [14,15,18, 19,20,21,22,23,24]. Sentiment classification is similar in some aspects to, but also different in some other aspects from, standard topic-based text classification, which classifies documents into labeled topic classes, e.g., politics, sciences, sports, etc. In topic-based classification, topic related words are important, while in sentiment-based classification it is opinion words denoting a positive or negative attitude (e.g. great, excellent, amazing, horrible, bad, worst, etc.) that are really important. Initially, sentiment-based classification was focused on the document level.

3.1   Document-Level Sentiment Analysis

Existing supervised learning methods have been readily applied to document-level sentiment classification. Pang et al. [25] followed this approach to classify movie

reviews into two classes, positive and negative. It was shown that using unigrams (a bag of individual words) as features in classification performed well with either naïve Bayesian or SVM classifiers. Subsequent papers used a large variety of features and techniques in learning. As most machine learning applications, the main task of sentiment classification is to find a suitable set of classification features. Some of the most widely used features for this purpose are (for a more comprehensive survey see [11]):

- Terms' frequencies and positions: these features are individual words or word n-grams and their frequency counts, while in some cases word positions may also be considered.
- Part-of-speech (POS) tags: It has been observed by a plethora of early research studies that adjectives (e.g. "interesting", "bad", etc.) were important indicators of subjectivities and opinions, so they have been treated as special features.
- Opinion words and phrases: By definition, "opinion words" are words commonly used to express positive or negative sentiments, e.g. "beautiful", "wonderful", "good", and "amazing" denote positive opinion words, whereas "bad", "poor", and "terrible" indicate negative opinion words. Although many opinion words are adjectives (as previously shown), adverbs, nouns (e.g. "rubbish", "junk") as well as verbs (e.g. "hate" and "like") can indicate sentiment as well. Apart from individual words, there are also opinion phrases and idioms, such as in the English language "something cost an arm and a leg" that indicates sentiment.
- Syntactic dependency: Word dependencies generated from syntactic parsing or dependency trees are also used as features by several researchers.
- Negation: Clearly negation words are important because their appearances often change the opinion orientation, e.g. the sentence "I don't like this camera" is negative.

An interesting conclusion in this research stream is that the "domain adaptation"is very often of critical importance. In particular, it has been found that sentiment classification is highly sensitive to the domain from which the training data (e.g. positive and negative opinion words) have been extracted. A classifier trained using opinionated texts from one domain often performs poorly when it is applied or tested on opinionated texts from another domain. The reason is that words and even language concepts that are used in different domains for expressing opinions can be substantially different. It is possible that the same word in one domain may mean positive, but in another domain may mean negative. For example, as remarked in [26], the word 'unpredictable' may have a negative orientation in a car review (e.g., "unpredictable brakes"), but it could have a positive orientation in a movie review (e.g., "unpredictable scenario"). Thus, domain expertise is required. Ontologies are very beneficial in this respect since they encode human domain knowledge in a machine readable format. Nevertheless, since ontology construction is a painstaking process, most articles use labeled opinions originated from one domain and apply general opinion words to unlabeled opinions of another domain [18, 27, 28].

Also, some research has been conducted on the use of unsupervised learning techniques for document-level sentiment analysis. In these techniques, weighted terms

and phrases are the main indicators for sentiment classification. The use of unsupervised algorithms, such as Mutual Information, which utilize a neighborhood of k surrounding terms around a standard syntactic element (e.g. adjuncts or adverbs) that are likely to express opinions, can give good results [26].

3.2   Sentence-Level Sentiment Analysis

In the more recent research in this area the level of granularity increases to the level of sentence [45,64,65], focusing on sentence-level subjectivity and sentiment classification. In particular, the main objective is: given a sentence, one has to perform the following two sub-tasks:

i)   subjectivity classification: i.e. to determine whether it is a subjective sentence (opinion) or an objective one (fact),
ii)   sentence-level sentiment classification: if the sentence is subjective determine whether it expresses a positive, negative or neutral opinion.

Traditional supervised learning methods are here applicable as well. For instance, one of the early works reported by Wiebe et al. [13] performed subjectivity classification using the naïve Bayesian classifier, while subsequent research has used many other learning algorithms [29,30,31,32].One of the main bottlenecks of using supervised learning for the above purposes is the manual effort involved in annotating the very large number of training examples (i.e. labeling the available examples as either positive or negative). To reduce the manual effort a 'bootstrapping' approach to label training data automatically is reported in [30,33], using a form of re-sampling that aims to estimate the variability of statistical properties of interest.

Yu and Hazivassiloglou [34] propose a technique that identifies subjective (opinion) sentences and also determines their opinion orientations. For the initial identification of subjective sentences it uses supervised learning examining three particular learning methods: sentence similarity, naïve Bayesian classification, and multiple naïve Bayesian classifiers. Then for sentiment classification of each identified subjective sentence it uses a similar method to the one used in [26], but with several words (instead of two used in [26]), and the score function was the well-known log-likelihood ratio. It should be noted that inn [26] the semantic orientation of a phrase is calculated as the Mutual Information between the given phrase and the word "excellent" minus the Mutual Information between the given phrase and the word "poor". The same issue is examined in [35] considering gradable adjectives. In [24] a semi-supervised learning method is applied, and in [36] the decision is made by simply summing up opinion words in a sentence. In [37,38,39] statistical prediction models are built to identify some specific types of opinions in reviews. A significant conclusion of this research is that sentence-level classification is not suitable for compound sentences. Wilson et al. [16] pointed out that a single sentence may contain not only multiple opinions, but also both subjective and factual clauses, making the problem even more difficult. In a more recent work [40] the problem of sentence-level sentiment analysis is studied using machine learning by considering contextual sentiment influencers such as negation (e.g. not and never) and contrary (e.g. nevertheless and however). A list of such influencers are provided in [41].

3.3   Polar Words

For the application of the above sentiment analysis methods it is important to define particular words that bear a positive or negative meaning, which are referred to as 'opinion words' or 'polar words' in the literature and form the so-called opinion lexicon. Examples of positive polar words in the English language include "beautiful", "good", "amazing", "astonishing", etc., while negative polar words include "poor", "bad", and "awful". Apart from individual words, there are also opinion phrases and idioms indicating positive or negative sentiments, e.g., "the service cost me an arm and a leg" (indicating a negative sentiment of having paid too much). For developing a polar word list three main approaches have been proposed:

- The 'manual' approach, which is very time-consuming [20, 42, 43, 44] and thus it is usually used in combination with automated approaches as a final check, since such automated methods usually make mistakes.
- The 'dictionary-based' approach. One of the simpler techniques in this approach is based on 'bootstrapping', using a small set of seed opinion words and an online dictionary such as WordNet [45]. The strategy is to first collect a small set of opinion words with known orientations (positive and negative) manually, and then to grow this set by searching within the WordNet for their synonyms and antonyms. The newly found words are added to the seed list, and this can lead to a next iteration, etc.; this iterative process stops when no more new opinion words are found. This approach is successfully used in [46,56]. After the iteration process is completed manual labeling can be carried out to correct errors. Researchers have also used additional information (e.g. glosses) in WordNet and additional techniques (e.g., machine learning) to generate better lists [46,47,48,49,50]. So far several opinion word lists have been generated [51,52]. The dictionary-based approach and the opinion words collected from it have a major shortcoming: it is unable to find opinion words with domain specific orientations. For example, for a speakerphone if it is 'quiet' this is usually negative; however, for a car if it is 'quiet' this is positive. The corpus-based approach described next can help coping with this problem.
- The 'Corpus-based' approach and sentiment consistency: The methods following this approach rely on syntactic or co-occurrence patterns and also a seed list of opinion words in order to find other opinion words in a large corpus (= set of documents). A representative work of this approach is the one of Hazivassiloglou and McKeown [53]. The technique starts with a list of seed opinion adjective words, and uses them and a set of linguistic constraints or conventions on connective words to identify additional adjective opinion words and their orientations. For instance, one of the constraints concerns the conjunction (AND), and says that conjoined adjectives usually have the same orientation, e.g. in the sentence "This vehicle is beautiful and spacious" if "beautiful" is known to be positive it can be inferred that "spacious" is also positive. This is so because people usually express the same opinion on both sides of a conjunction. Similar rules or constraints also hold for other connectives, such as OR, BUT, EITHER-OR, and NEITHER-NOR. We call this idea sentiment consistency. Also, clustering can be used to produce two

sets of words: positive and negative ones. In [54] Kanayama and Nasukawa expanded this approach by introducing the idea of intra-sentential (within a sentence) and inter-sentential (between neighboring sentences) sentiment consistency (called coherency in [54]). This approach has a major advantage in comparison with the dictionary-based approach: it can identify domain specific opinion words and their orientations if a corpus from only the specific domain is used.

4   Feature-Based Sentiment Analysis

Classifying opinionated texts at the document or sentence level is useful, but does not provide a complete view on the commented object: a positive opinionated document does not necessarily mean that the author has positive opinions on all aspects or features of the object; likewise, a negative opinionated document does not mean that the author dislikes everything. In a typical opinionated passage, although the general sentiment on the object may be positive or negative, the author can express opinions on both positive and negative aspects of the object. Document-level and sentence-level classification does not provide such information, so in order to drill down such details we need to go to the object feature level. Therefore feature-based sentiment analysis includes the following two sub-tasks:

- identify object features that have been extensively commented on,
- determine whether the opinions on each of these features are positive, negative or neutral.

4.1   Feature Extraction

Its first task is to specify the topic or the feature of an object commented, which is essential in order to proceed to the second task of classifying its positive or negative meaning. The most widely known approaches that discuss unsupervised learning for identifying explicit features, such as nouns and noun phrases, involve the following two steps ([44],[48]):

I)   Finding frequent nouns and noun phrases: Nouns and noun phrases are straightforwardly identified by using a POS tagger, which is a linguistic software tool for labeling each word with its part-of-speech. Their occurrence frequencies are counted, and only the frequent ones are kept (a frequency threshold can be decided). This approach is based on the assumption that when people comment on object features the vocabulary that they use usually converges, and most object features are nouns. Thus, those nouns that are frequently talked about are usually genuine and important features.

II) Finding infrequent features by making use of opinion words: Opinion words are usually adjectives and adverbs that express positive or negative opinions. The basic idea is that the same opinion word can be used to characterize positively or negatively different object features. Opinion words that characterize frequent features can also modify infrequent features, and thus can be used to extract infrequent features.

The precision of first step of the above algorithm was improved by Popescu and Etzioni in [55]. Their algorithm tries to remove those noun phrases that may not be object features. It evaluates each noun phrase by computing a pointwise mutual information (PMI) score between the phrase and 'meronymy' discriminators associated with the object class, e.g., a scanner class. In WordNet, Y is a meronymy of X if Y is a part of X (e.g. wheel is a meronymy of car). The meronymy discriminators for the scanner class are, "of scanner", "scanner has", "scanner comes with", etc., which are used to find components or parts of scanners by searching on the Web. The algorithm also distinguishes components and parts from attributes and properties using WordNet's is-a hierarchy (which enumerates different kinds of properties) and morphological cues (e.g., "-iness", "-ity" suffixes).

Other related works on feature extraction mainly use the ideas of topic modeling and clustering to capture topics/features in reviews [56, 57, 58]. For example, in [59], Mei et al. proposed a probabilistic model called topic-sentiment mixture to capture the mixture of features and sentiments simultaneously. One topic model and two sentiment models were defined based on language models to capture the probabilistic distribution of words in different topics/features with their associated opinion orientations. Su et al. [58] also proposed a clustering based method with mutual reinforcement to identify implicit features.

After the extraction of object features two additional issues need to be resolved the synonyms issue. It is common that people use different words or phrases to describe the same feature. For example, photo and picture refer to the same feature in digital camera opinions and reviews. Identifying and grouping synonyms is essential for applications. Although WordNet as well as other thesauri and dictionaries help to some extent, they are far from sufficient due to the fact that many synonyms are domain dependent. For example, picture and movie are synonyms in movie reviews, but they are not synonyms in digital camera reviews as picture is more related to photo while movie refers to video. Carenini et al. [60] proposed a method based on several similarity metrics similar to those in information integration [61]. It requires the use of a taxonomy of features to be given for a particular domain. The algorithm merges each discovered feature to a feature node in the taxonomy. The similarity metrics are defined based on string similarity, synonyms and other distances measured using WordNet. Experiments on digital camera and DVD opinions show interesting outcomes.

4.2   Identification of Opinion Orientation

An important issue in feature-based sentiment analysis is how to identify the orientation of opinions expressed on an object feature in a sentence. Clearly, the sentence-level sentiment classification methods discussed previously are also applicable here, i.e. they can be applied to each sentence containing object features. However, there is an additional lexicon-based approach to this problem [51]. This lexicon-based approach basically uses opinion words and phrases in a sentence to determine the orientation of the opinion. Apart from the opinion lexicon, negations and but-clauses in a sentence are also taken into account. In particular, this approach includes the following four steps:

A) Identify opinion words and phrases: Given a sentence that contains an object feature initially are identified all opinion words and phrases. Each positive word is assigned the opinion score of +1, each negative word is assigned the opinion score of -1, and each context dependent word (i.e. word having meaning positive or negative depending on the context) is assigned the opinion score of 0. Suppose for example that we are given the sentence "The picture quality of this camera is not great, but the battery life is long." After this step, the sentence is turned into "The picture quality of this camera is not great [+1], but the battery life is long [0]" because "great" is a positive opinion word and "long" is context dependent.

B) Handling negations: Negation words and phrases are used to revise the opinion scores obtained in the previous step based on some negation handling rules. After this step, the above sentence is turned into "The picture quality of this camera is not great [-1], but the battery life is long [0]" due to the negation word "not".

C) But-clauses: In English, the word "but" means contrary, so a sentence containing but is handled by applying the following rule: the opinion orientation before but and after but are opposite to each other. After this step, the above sentence is turned into "The picture quality of this camera is not great [-1], but the battery life is long [+1]" due to "but". Apart from but, phrases such as "with the exception of", "except that", and "except for" behave similarly to "but" and are handled in the same way.

D) Aggregating opinions: This final step applies an opinion aggregation function to the resulting opinion scores to determine the final orientation of the opinion on each object feature in the sentence.

4.3   Ontology-Based Sentiment Analysis

One of the most recent developments in feature-based sentiment analysis is the use of domain-specific knowledge through ontologies, which constitute a well-known formalism for representing knowledge in a both human and machine comprehensible manner. Using ontologies for web classification and document extraction has been a successful technique that inspired researchers from the sentiment analysis domain to incorporate such knowledge in order to define a taxonomy (or hierarchy) of object features and then build sentiment analysis subsystems that apply rules denoted by the structures of such taxonomies. Most research and commercial systems that incorporate ontologies [62,63] consist mainly of two main modules: an ontology-based extraction module and a sentiment analysis module. The ontology-based extraction module creates a small hierarchical tree using a set of relevant texts from which terminology is extracted. In the analysis module this small tree is compared against the large core ontology tree for analyzing the sentiment labels of its nodes.

5   Sentiment Analysis in Project PADGETS

From the aforementioned review on existing techniques on sentiment analysis in every granularity level, ranging from document-based to feature-based opinion

mining, we could state that given a language with a plethora of tools and opinionated text in a well-structured format, the performance of sentiment classification could reach very high percentages in the range of 80%-90%. Furthermore, a significant portion of those techniques have been applied and evaluated in domains where users state their opinions in a formal language and using large textual inputs such as electronic commerce, media presentations (i.e. movies or music albums), etc. Nevertheless, as regards to PADGETS, the application languages would be Greek, Slovenian and Italian, which lack of abundance in linguistic resources. Additionally, the domain of social media is not similar to the aforementioned cases, since users tend to utilize a smaller vocabulary with linguistic idioms or utilize the grammatical phenomenon of ellipsis in the texts. This phenomenon resulted in a novel approach that incorporates Social Network Analysis theory in order to deal with connecting opinions. To our knowledge, this is the first time such an approach is being exploited for sentiment classification. The idea is borrowed from the social network analysis (SNA) domain, which considers humans participating in social networking activities as *actors* and studies their *relationships* (see the PageRank algorithm of Google® for further details). SNA views the above process as a graph, where actors are *nodes* and *edges* state a kind of relations between two actors (e.g. friends in Facebook, Followers in Twitter, etc.). Opinions in social media may be suffering of short texts, encompassing linguistic idioms that are **more difficult** to be analyzed using traditional tools. However, if we consider opinions as actors and their inter-reference as links, we could form a common basis between opinion mining and SNA. The achievement of such a correspondence lies to the utilization of the **prestige** attribute, commonly found in SNA. Prestige is a refined measure of prominence of an actor. An actor is considered prestigious if he/she is the object of many references by other actors. Similarly, an opinion is significant (either positive or negative) if it is being addressed by other opinions. Furthermore, an opinion which is referenced by prestigious opinion is more significant than ones which are not referenced by opinions of great prestige. An analogue to real life is the case where a person who is recommended by a CEO of a company is more prestigious than a person who is recommended by the clerk of the company. By connecting opinions (where applicable) and grading their **rank prestige** accordingly, we could identify which sub-graph contains nodes of positive of negative sentiment and proceed with the classification of all other nodes. A reference can of course be positive (agreement) or negative (disagreement).

6   Conclusions

Both the traditional and the emerging eParticipation forms result in the production of large quantities of citizens' textual contributions concerning policies and decisions under formation, in numbers much higher than in the off-line public policy debates. It is of critical importance to use appropriate technologies for analyzing them in a cost-efficient manner, in order to extract the valuable opinions and knowledge they contain, and then integrate them in the policy/decision making processes and provide feedback to the citizens. In this paper we review methods developed in the area of opinion mining as to the capabilities they provide for meeting the above challenges.

From this review it has been concluded that a useful body of knowledge has been developed in this area consisting of methods for addressing mainly the following three problems:

- classification of an opinionated text as expressing as a whole a positive, negative or neutral opinion (document-level sentiment analysis),
- classification of each sentence of such a text as objective (a fact) or subjective (opinion), and then focus on the latter and classification of each of them as expressing a positive, negative or neutral opinion (sentence-level sentiment analysis),
- extraction of the particular features/subtopics commented by the authors of these texts, and for each of them identification of the orientation of the opinions expressed about it as positive, negative or neutral (feature-level sentiment analysis).

Based on the conclusions of this review a basic framework for the use of opinion mining methods in eParticipation can be formulated consisting of five stages:

I. Classify each particular posting on the policy/decision under discussion as positive, neutral or negative, using methods of document-level sentiment analysis (section 3.1), and then calculate relative frequencies of positive, neutral and negative postings.

II. For each posting identify its subjective sentences (expressing opinions) and classify each of them as positive, neutral or negative using methods of sentence-level sentiment analysis (section 3.2), and then calculate relative frequencies of positive, neutral and negative subjective sentences.

III. Compare and integrate findings of the above steps I and II, and also findings from the analysis of other types of citizens' non-textual feedback (e.g. numbers of users who voted in favor or against the policy/decision under discussion in an e-vote tool, or rated it positively or negatively in an e-survey tool, or even liked or disliked a relevant content we published in social media). This will allow conclusions to be drawn as to the citizens' general sentiments/feelings (positive or negative) on this government policy/decision.

IV. By further processing all postings on this policy/decision using feature extraction methods (section 4.1) identify the main issues raised and commented by citizens.

V. Finally for each issue classify each of the postings' sentences containing it as positive, neutral or negative using methods of sentence-level sentiment analysis - opinion orientation (section 4.2), and then calculate relative frequencies of positive, neutral and negative subjective sentences. This will allow the identification of the main issues raised by the citizens and the particular sentiments/feelings on them (e.g. positive and negative aspects and effects of the policies/decisions under discussion, implementation barriers, improvement suggestions, etc.).

It should be noted that for the practical application of the above opinion mining methods it is of critical importance to have sufficient language resources, such as lexicons, POS taggers, name entity recognizers, and tokenizers. The availability of

these resources varies among languages. Further research is in progress by the authors for the application of the above framework for analyzing citizens' comments on policy messages posted by government organizations in several social media, as part of the PADGETS project mentioned in the introductory section.

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