

A FRAMEWORK FOR UTILIZING WEB 2.0 SOCIAL MEDIA FOR PARTICIPATIVE GOVERNANCE

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Abstract

The Web 2.0 social media have been initially exploited by private sector firms, in order to support mainly their marketing and customer relations functions, and there has been considerable research for developing frameworks and practices for the effective utilization of these new communication media in the private sector. Government started exploiting the high capabilities and popularity of the social media much later, so there has been much less research concerning their effective utilization by government agencies. This paper contributes to filling this research gap, presenting a novel framework for the effective utilization of the Web 2.0 social media by government agencies for promoting participative governance and applying crowdsourcing ideas. It is based on the centralised automated publishing of content and micro-applications to multiple Web 2.0 social media, and then collection of citizens' interactions (e.g. comments, ratings) with them, based on central platform that uses efficiently the application programming interfaces (APIs) of these social media. Finally, citizens' interactions are processed in this central platform using a variety of techniques (web analytics, opinion mining, simulation modelling) in order to provide finally useful analytics that offer substantial support to government decision and policy makers. Furthermore, an application and an evaluation model for the proposed framework are described, as well as an extension of it that combines active/moderated and passive/non-moderated crowdsourcing.

Keywords: e-Governance, e-Participation, Social Media, Web 2.0, Crowdsourcing, Decision Support Systems

1 INTRODUCTION

Government agencies are making considerable efforts in order to enhance citizens' participation in their decision making and policy formulation processes. Information and communication technologies (ICT) can be quite useful for this purpose, and this has led to a rapid development of e-participation and in general e-governance research and practice in the last 15 years (Commission of the European Communities, 2006 and 2010; Loukis et al., 2011; OECD, 2003, 2004a and 2004b; Rowe and Frewer, 2000 and 2004; Saebo et al., 2008; Sanford and Rose, 2007; Timmers, 2007, United Nations, 2008). One of the most promising recently emerged ICT for these purposes is the Web 2.0 social media (Bertot, Jaeger and Grimes, 2012; Chun and Luna Reyes, 2012). Social media are already used extensively by citizens for political discussions and for organizing and coordinating political activity

(Agarwal et al., 2011; Larsson and Moe, 2011), so government cannot be absent from them. These new communication channels have been initially exploited by private sector firms, in order to support mainly their marketing and customer relations functions, and there has been considerable research for developing frameworks and practices for the effective utilization of these new communication media in the private sector (Constantinides, 2009 and 2010; Dwivedi et al., 2011; Evans, 2010). Government started exploiting the high capabilities and popularity of the social media much later, so there has been much less research concerning their effective utilization by government agencies.

This paper contributes to filling this research gap, presenting a novel framework for the effective utilization of Web 2.0 social media by government agencies for promoting participative governance and applying crowdsourcing ideas. It is based on the centralised automated publishing of content and micro-applications to multiple Web 2.0 social media (each of them attracting different citizens' groups), and then collection of citizens' interactions with them (e.g. comments, ratings), based on a central platform using efficiently the application programming interfaces (APIs) of these social media. Finally, it includes sophisticated processing citizens' interactions in this central platform using a variety of techniques (web analytics, opinion mining, simulation modelling) in order to provide useful analytics that support government decision and policy making. Furthermore, an application model has been developed for this framework, as well as a model for its evaluation based on a number of pilot applications of it. This framework is being developed, elaborated and tested within the European research project PADGETS ('Policy Gadgets Mashing Underlying Group Knowledge in Web 2.0 Media' – for more details see <http://www.padgets.eu/>) supported by the 'ICT for Governance and Policy Modelling' research initiative of European Commission. An extension of it aiming to combine active (moderated) and passive (non-moderated) crowdsourcing is developed as part of the European research project NOMAD ('Policy Formulation and Validation through Non-moderated Crowdsourcing' – for more details see <http://www.nomad-project.eu/>).

In the following sections, we will first analyse the theoretical background (section 2), and then we describe the proposed framework (section 3) and the architecture of the ICT-platform required for its application, with main emphasis on the decision support functionality (section 4), and its political value and novelty (section 5). Next the application model of it is presented (section 6), followed by its evaluation model (section 7). Finally, its extension towards the combination of active with passive crowdsourcing is outlined (section 8) and then the conclusions are summarized (section 9).

2 BACKGROUND: COMBINING WEB 2.0 AND PARTICIPATIVE POLICY MAKING

Web 2.0 has recently emerged as a novel combination of technologies, applications and values (O'Reilly, 2005; Osimo, 2008). Its technologies, such as XML, Open API, Flash, Ajax, focus on increasing usability, integration and re-use of web applications. Based on the aforementioned technologies, applications have already been developed providing the ability to create, publish and share content and collaborate: Blogs, Wikis, RSS Feeds, Social Networking Sites, Virtual Spaces are some examples of such applications. At the beginning, Web 2.0 was used as a mean for social communication, while later it was used by the private sector mostly for marketing and promoting customers' relations (Constantinides, 2009 and 2010). Recently, there is a shift towards the use of Web 2.0 applications by the public sector, not only for public relations, but also for more complicated and significant tasks, such as knowledge management, law enforcement, and public participation (Osimo, 2008; Punie et al., 2009; Chun and Luna Reyes, 2012).

Public participation plays an important role in modern government, as increasing citizens' involvement is a fundamental component of 'Good Governance', of critical importance for the quality of government decision and policy making (Commission of the European Communities, 2009). This happens because government decision and policy making problems increasingly become 'wicked' problems, according to the analysis of Rittel and Webber (1973). In particular, societies become more and more heterogeneous and pluralistic in terms of culture, values, concerns and lifestyles, and this makes government decision and policy making problems 'wicked', i.e., lacking clear and widely agreed definition and objectives, and having many stakeholders with different and heterogeneous problem views, values, concerns and objectives. These problems demand a highly sophisticated

approach, which includes a combination of public participation and consultation on the one hand and technocratic analysis on the other (Kunz and Rittel, 1979; Conklin and Begeman, 1989; Conklin, 2003). For this reason in many countries governments promote public participation by supporting different types of interactions with the affected groups of citizens during the policy-making life cycle (Charalabidis et al., 2011), such as:

- Information Provision: governments produces and delivers the information to citizens ('one-way' relation)
- Consultation: citizens provide governments with opinions on issues that have been raised (asymmetric 'two-way' relation)
- Active participation: citizens propose new policy issues and discussion topics along with those presented by governments helping them formulate the policy agenda (symmetric 'two-way' relation)

Therefore an important component of public participation is the consultation of different stakeholders and negotiations among them and with government, in order to formulate a common definition of the problem and the targeted objectives. Having this as base, in the next phase, we can proceed to the technocratic analysis by experts using mathematical optimization algorithms for the well-defined (in this phase) problem. Additional research on this approach has revealed that the solution of such wicked policy problems can be supported by information systems that allow stakeholders to enter relevant 'topics', 'questions', 'ideas' and 'arguments' (positive and negative ones), which are called 'Issue Based Information Systems' and are able to stimulate and promote a controlled and productive way of discussion and reasoning (Kunz and Rittel, 1979). The rapid penetration of Web 2.0 social media creates more opportunities for a wider application of these approaches, involving more citizens and social groups on a decision or policy making problem that government is facing. Social media allow government agencies to collect stakeholders' knowledge and opinions in an efficient way and at a low cost. Furthermore, they enable the application of crowdsourcing ideas (Brabham, 2008) in the public sector, which can be quite beneficial. Management literature has been discussing for long time the capability of a large network of people connected through ICT, termed as 'crowd', to perform successfully difficult design and problem solving activities (Lévy, 1997). This collective intelligence has recently started being exploited systematically by organizations. This practice is referred to as 'crowd-sourcing', defined as "the act of a company or institution taking a function once performed by employees and outsourcing it to an undefined (and generally large) network of people in the form of an open call. This can take the form of peer-production (when the job is performed collaboratively), but is also often undertaken by sole individuals" (Howe, 2006).

However, the practical application of the above ideas will lead to a collection of large amounts of content generated by citizens in various Web 2.0 social media on the particular decision or policy making problem we are dealing with, which needs to be analysed in order to calculate useful analytics that offer substantial support to government decision and policy makers. This necessitates the development of appropriate decision support systems (DSS) that can increase the quality of the decision making process (Beers et al., 2002; Shim et al., 2002; Courtney, 2001; Sterman, 1994). Simon (1960) described the decision-making process as a set of three phases: intelligence, design and choice. Intelligence means searching the environment for problems, which is the fundamental need before making decisions; design includes all the development of alternative ways of solving the problem; choice consists of the alternatives' analysis and the choice of the most appropriate of them for implementation. Once the problem is recognized, it is defined with the creation of mathematical models. Alternative solutions are created and models are developed in order to analyze the multiple alternatives. The choice is finally made and the appropriate alternatives are implemented. Therefore it is necessary to develop appropriate DSS that support all the above phases of the decision-making process, exploiting to the highest possible extent the citizens-generated content collected from social media. In the government context the traditional DSS need to be combined with e-participation (Benčina, 2007; Kamel, 1998), in order to bring the needed functionality to the decision makers.

Furthermore, since a large part of this citizens-generated content to be collected from social media will be in textual form, opinion mining, defined as the advanced processing of sentiments, feelings, opinions and emotions found or expressed in a text (Maragoudakis et al., 2011), will be a critical

technology for these government DSS. Living in the era of “social web”, citizens create in Web 2.0 social media various types of content, most of which are expressed in the form of text and especially in the form of opinions; it is important to identify the main issues posed by citizens (issues extraction) on the particular decision and policy making we are dealing with, and also the corresponding sentiments or feelings (positive, neutral or negative – sentiment analysis). This first started in the private sector, as firms wanted to analyse comments and reviews about their products made from online users in various websites, in order to draw conclusions as to whether users like the specific products or not (through sentiment analysis), the particular features of the products that users have commented (through issues extraction) and the orientations (positive, negative or neutral) of these comments (through sentiment analysis). These can be applied in the public sector as well, since content created in the Web is a valuable source of information useful for government decision and policy making.

Summarizing, the nature of government decision and policy making problems (that increasingly become ‘wicked problems’) necessitate stakeholders’ participation and consultation, and the Web 2.0 social media can play an important role in this direction, and enable the application of crowdsourcing ideas in the public sector. However, the collection of a large amount of citizens-generated content from various social media on a particular decision or policy making problem we are dealing with, necessitates the development of appropriate DSS for processing it and converting it into useful analytics, which should make use of advanced processing techniques, with opinion mining being definitely the most critical of them.

3 THE PROPOSED FRAMEWORK

The proposed framework for exploiting Web 2.0 social media by government agencies in order to promote participative governance is based on the aforementioned background, and connects two established domains: the domain of mashup-based web applications (gadgets) development (which is a development paradigm that characterises the Web 2.0), and the domain of simulation modelling for the analysis of complex systems behaviour. It is based on a central ICT platform that offers to policy makers the ability to create graphically policy related content and micro-applications to be deployed in the multiple Web 2.0 social media, in order to convey messages concerning a specific policy to citizens and interact with them. In this sense, it introduces the concept of Policy Gadget (Padget), presenting a micro web application or content that combines a message on a certain policy with underlying group knowledge in social media platforms and interacts with end users in order to forward their feedback to policy makers. This central platform can be used by government policy makers in order to publish the abovementioned policy-related content and deploy these micro web applications to multiple social media, and then collect users’ interactions with them (comments, votes, etc.) efficiently, all in an automated manner using their application programming interfaces (API). The collected data will be processed through advanced methods (analytics, opinion mining, simulation modelling). The basic approach adopted by our proposed framework is illustrated in Figure 1.

Government agencies can use this platform to develop political campaigns on various topics with policy-related content in order to initiate relevant discussions in various social media. For this purpose, a set of relevant multimedia content will be initially created (e.g. description, video, images, etc.) and then it will be distributed to multiple Web 2.0 social media according to the type of content each of them can host, e.g. videos in YouTube, images in Picasa, short texts in Twitter, longer texts in blogs, etc. In particular, the categories of social media that are targeted for exploitation are the following:

- Platforms for Communications, e.g. Blogs, Forums, Social Networking Sites, Social Network Aggregation Sites, Event Sites
- Platforms for Collaboration, e.g. Social Bookmarking Sites, Social News, Opinion Sites, Wikis
- Platforms for Multimedia and Entertainment, e.g. Photo Sharing, Video Sharing, Live Casting, Virtual World Sites
- Platforms for News and Information, e.g. Google News, Institutional sites with high number of visitors (Human Rights, WWF)

- Platforms for Policy Making and Public Participation, e.g. governmental organizations' forums, blogs, petitions

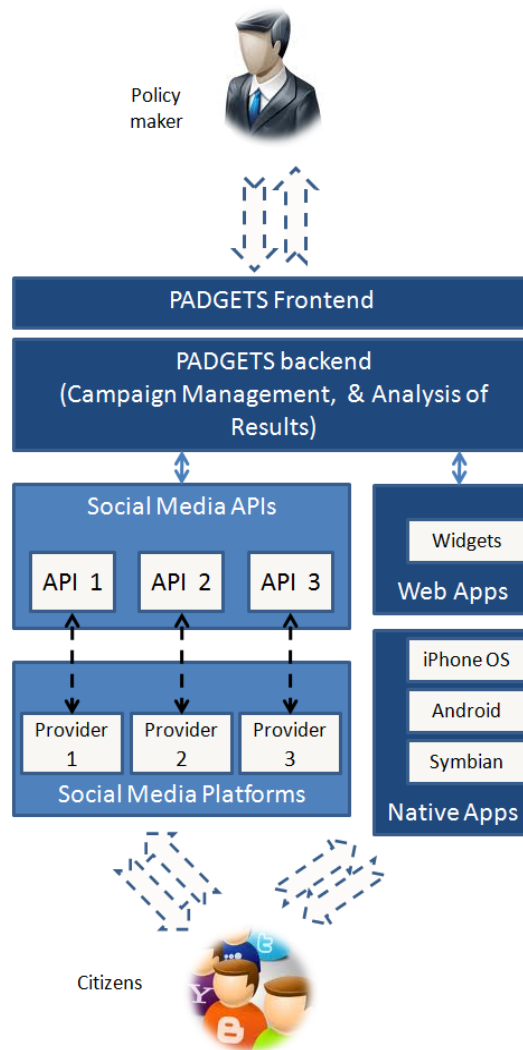


Figure 1. The basic approach of the proposed framework

For examining the technological feasibility of this framework, the APIs of the most popular social media (Facebook, Twitter, YouTube, LinkedIn, Blogger, Delicious, Flickr, Picasa, Digg and Ustream) have been analysed. For each one of them we examined the following characteristics:

- Available APIs and types of provided capabilities
- Capabilities for pushing content through their API (e.g. posts, photos, videos, rating, voting, etc.)
- Capabilities for retrieving content through their API (e.g. comments on posts, photos, videos, approved requests, etc.)
- Capabilities for deploying applications (gadgets) and interacting through them with social media users

It has been concluded that all these social media have a strategy of becoming more open and accessible and follow API standards attracting third parties to develop applications (Charalabidis et al., (2010). They provide rich functionality through their APIs for posting and retrieving content, exposing methods that provide third party developers with a growing set of capabilities. However, most of them have the policy of not hosting applications, so for them 'Padgets' can take only the form of content. Therefore, from this API analysis it can be concluded that the proposed framework is to a large extent technologically feasible.

4 ICT PLATFORM ARCHITECTURE

The technological architecture of an ICT platform that supports the application of the above framework has been designed, based on detailed functional requirements of the user-partners of the PADGETS project (Greek ICT Observatory, supervised by the Ministry of Finance, Piedmont Region, Italy, and Centre of eGovernance Development, Slovenia), and is shown in Figure 2. We can see that it consists of two main areas:

I. The Front-end area. It includes three sub-areas. The first of them provides to the policy maker an interface through the Web (enabling login/register, getting input for setting up a social media campaign, presenting citizens' feedback on policy-related content posting by government, presenting in a graphical way the results, etc.). Additionally the Mobile Native Application and Widget sub-areas, provide alternative platform access interfaces, both for policy makers and for citizens.

II. The Back-end area. It includes three sub-areas. The first of them is the Publishing, Tracking and Storing Content Area, responsible for publishing the content in multiple social media and in various content types, monitoring citizens feedback on published content and storing all the relevant information (published content, user interactions, social media analytics). The second is the Service Discovery, Composition and Binding sub-area, responsible for providing the needed infrastructure for service communication internally among platform components and externally among these components with external systems (widgets, social media platforms). Finally, the third of them is the Decision Support sub-area, responsible for processing the citizens-generated content from the employed social media (= various types of citizens' interactions with the policy messages we have published in the social media, such as views, likes, retweets, textual comments) using various advanced techniques (analytics calculations, opinion mining, simulation modeling) in order to provide useful decision support to the policy maker.

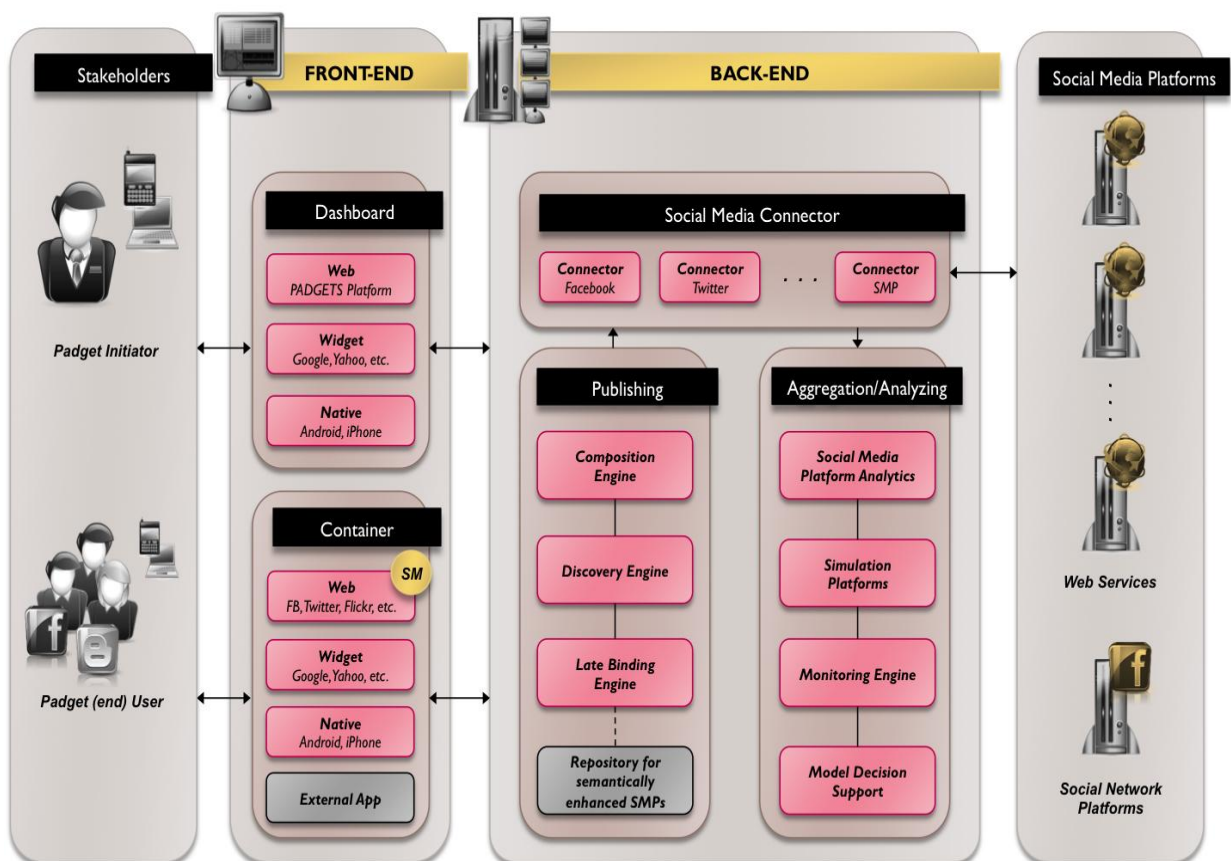


Figure 2. ICT-Platform Technological Architecture

The above decision support sub-area is particularly important, so it is worth describing it in more detail. It consists of three layers. The first layer collects and processes the 'raw analytics' provided by

the social media analytics engines. From our analysis of the most popular social media platforms and the capabilities that offer, we concluded that there is a very rich variety of raw analytics that can be provided by them, which can be exploited by our decision support components. The second layer provides more advanced analytics, called ‘Padgets Analytics’, which focuses on citizens’ textual inputs (e.g. blog postings, comments, opinions, etc.) in the chosen social media, processing them using opinion mining techniques extracting the general sentiments (positive, negative or neutral) of these comments and opinions on our policy messages, and also the main issues raised by citizens together with the corresponding sentiment orientations (Maragoudakis et al. 2011). Finally, the third layer performs simulation modelling, having mainly two objectives: estimation of the outcomes of various citizens’ proposals on the public policies under discussion, and also forecasting the future levels of citizens’ interest in and awareness of these policies. The simulation modelling takes as input various indicators produced by the other two aforementioned layers (Charalabidis et al., 2011).

The second opinion mining layer will perform the following three types of tasks (Maragoudakis et al., 2011):

- Classification of an opinionated text as expressing as a whole a positive, negative or neutral opinion (this is referred to as document-level sentiment analysis)
- Classification of each sentence in a text, first as subjective or objective (i.e. determination of whether it expresses an opinion or not), and for each subjective sentence (i.e. expressing an opinion) classification as positive, negative or neutral (this known as sentence-level sentiment analysis)
- Extraction of specific features or subtopics commented by the author of the text, and for each feature identify the opinion orientation as positive, negative or neutral (this is referred to as feature-level sentiment analysis)

A process model for the above opinion mining tasks has been formulated, which consists of five stages:

- I. Classification of each one of the posts on a policy as positive, negative or neutral, using document-level sentiment analysis, and calculation of relative frequencies of positive, negative and neutral posts.
- II. Identification of the subjective sentences included in each one of the posts, and classification of each one of them as positive, negative or neutral, using sentence-level sentiment analysis.
- III. Comparison and integration of findings from the above stages, and also of findings derived from the analysis of citizens’ non-textual feedback; this will provide a more complete picture about citizens’ general sentiments either positive or negative about government policies.
- IV. Identification of the main raised issues by further processing of all posts on a specific policy, using feature extraction methods.
- V. For each of these issues we perform classification of each sentence of it as positive, negative or neutral, using sentence-level sentiment analysis, and calculation of the relative frequencies of positive, negative or neutral subjective sentences. This will lead to the identification of not only the main issues raised by citizens, but also their general sentiments on them as well (e.g. positive/negative aspects or effects of a policy under discussion or application, improvement suggestions, etc.)

With respect to the simulation modelling, based on a literature review we identified two main approaches that can be adopted (Charalabidis et al., 2011):

a) System Dynamics, which allows modelling at a high/macro level and simulation of complex system in continuous time, so it can be quite useful for assessing the impacts or policy-related proposals (Forrester, 1961; Schwaninger et al., 2008). Complex systems are modelled as consisting of a number of ‘stocks’ (employed/unemployed citizens, groups of citizens of various income-education levels, etc.), among which ‘flows’ are taking place, which are influenced by system structure and rules (such as the ones defined by public policies). Thus, this specific approach is suitable for modelling and simulation of various policy options. Moreover, it has been used with great success in the past for modelling and simulation in various public policy related problems, so it has reached a good level of maturity in this area.

b) Agent-based Modelling and Simulation, which is an approach used for modelling and simulation at both the meso and the macro level (Epstein, 1999; Ferro et al., 2010). It does not demand any definition about the basic structure of the system in order to estimate its behaviour, but it requires us to define the behaviour and interaction rules of individual units (e.g. enterprises, personnel, etc.). Taking into account that in most socio-economic systems it is easier to define the former than the latter, it seems that System Dynamics may be more beneficial than Agent-based Modelling and Simulation. However, for cases in which the behaviour of individual units is easier to be defined, the Agent-based Modelling and Simulation would be the preferable approach.

5 POLITICAL VALUE AND NOVELTY

The proposed framework for exploiting Web 2.0 social media by government agencies for promoting participative government can offer significant political value. It can facilitate a broader, more inclusive and deeper citizens' e-participation in the formulation of public policies, through a systematic exploitation of the emerging and widely adopted Web 2.0 social media, allowing the involvement of multiple citizens' groups who do not usually visit government official e-participation websites. It can contribute to bringing government closer citizens, by exploiting electronic spaces extensively used by them, rather than expecting citizens to generate content in their governmental websites. In this way, the distance between policy making and society can be reduced. This approach can inform in a better way the decision and policy making process of government agencies, as it offers a low cost and high efficiency tool for identifying and understanding the opinions, concerns and priorities of various stakeholders. Giving to government agencies the capability to hear directly from citizens their thoughts and concerns in an online space, where they feel free to express their opinions and make some suggestions for improvements, enables the government agencies to decide about society's problems and needs using citizens input. Considering that policy design problems are 'wicked', as mentioned previously (Rittel and Webber, 1973; Kunz and Rittel, 1979; Conklin, 2003), our approach enables a more intense interaction between stakeholders of a policy under discussion or application and government in an efficient way and at a low cost, so it can contribute to the reconciliation and integration of their different problem views and concerns.

The ability of gathering citizens' feedback from different online sources, each of them usually attracting different citizens' groups, in a single point, offers capabilities for a synthesis, and at the same time for a comparison among these groups. Therefore it generates value for all stakeholder groups: there can be low cost and efficient inputs for the policy makers on the one hand and convenient participation along with balanced policies for stakeholders on the other hand. Policy makers have the ability to start online campaigns in multiple social media during all the phases of policy making cycle (agenda setting, policy analysis, policy formulation, policy implementation, policy monitoring and evaluation, according to OECD (2003)).

The proposed framework brings significant novelties in government agencies' decision and policy making processes:

- Decrease of size, quality and frequency constraints in citizens' participation. Stakeholders have the opportunity to participate to any policy process they desire, at any time, providing as much effort as they are willing to give, using the tools that are familiar with
- Integrated social media management: the central platform offers to policy makers a web dashboard in order to observe the results of their online campaigns in all targeted social media, reducing in this way the complexity and heterogeneity derived from differences in terms of interfaces, functionalities and content when using different social media platforms
- Creation of an "open" decision support system, integrated with the activity carried out over social media platforms; this allows the establishment of a direct link between the decision process area and the external world for acquiring updated information.

The decision support component of the central platform offers numerous promising functionalities that generate knowledge in order to inform the decision making process. It allows the generation of snapshots of the levels of interest, awareness and acceptance of a specific policy, the creation of

possible multiple scenarios of how these levels vary over time and the display of relevant opinions from the users' interaction with the policy message.

6 APPLICATION MODEL

A typical application model of the proposed framework has been developed. Its application is usually initiated by a policy maker, who has to decide about a new policy, or a modification of an existing policy, and would like to exploit for this purpose citizens' knowledge and opinions. The process that needs to be followed consists of the following four steps:

1. The policy maker designs a campaign using the capabilities of the central ICT platform through a graphical user interface. He/she can add various types of multimedia content to the campaign (policy related text, images, video, etc.), and then define multiple social media. The policy maker can also formulate a padget application, which can contain content and various functionalities (e.g. voting, e-survey), in order to be deployed in some of these social media that allow this.
2. The beginning of a campaign takes place by publishing the above content and deploying the padget in the chosen social media.
3. Users interactions with the published content and the padget take place in various ways in these social media: users access on them, see the policy message, rate it and make some comments on it, or even vote (positively or negatively).
4. The above users' interactions are retrieved from all the used social media in the central ICT platform, and are processed there using various advanced techniques, in order to calculate useful analytics that provide assistance and support to the policy maker. This can be the end of a campaign, or it can lead to a second round of content publishing in these social media, so these steps 1 to 4 will be repeated, etc.

The above application model has been further elaborated leading to the development of a detailed campaign implementation model, which consists of six stages (preparatory activities, campaign preparation, community building, campaign launch, results monitoring, evaluation), and is shown in Figure 3.

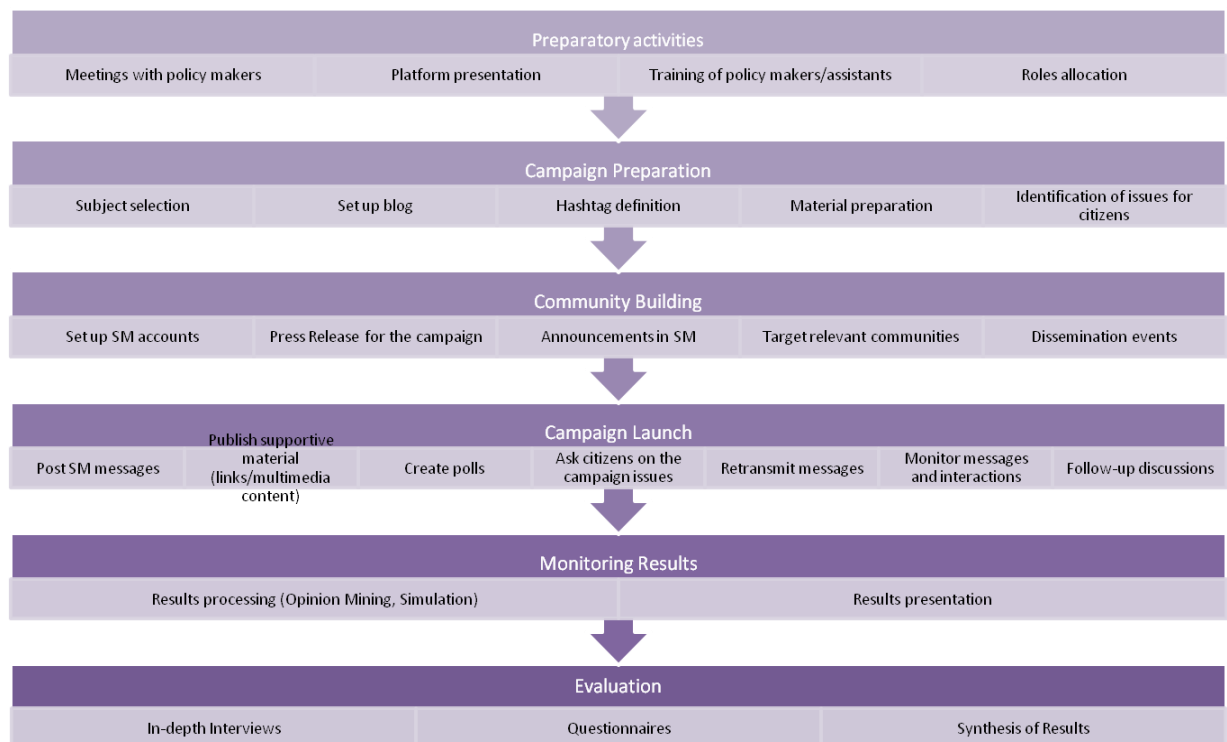


Figure 3. An implementation model of a campaign based on our proposed framework

7 EVALUATION MODEL

An evaluation model for the proposed framework, as it is implemented using the central ICT platform described in section 4, has been developed, based on one hand subjective perceptions of the two main stakeholder groups, government policy makers (= campaign initiators) and citizens (= campaign participants), assessed through both quantitative and qualitative techniques, and also on the other hand on objective actual usage metrics. Its basic structure is shown below in Figure 4.

| | Policy Initiators | Actions | Citizens | Actions |
|---------------------|---------------------------|------------------------------|---------------------------|--|
| quantitative | Structured questionnaires | Send emails | Structured questionnaires | Links on Android |
| qualitative | In depth interviews | Skype or in person interview | Short interviews | In person with special groups of citizens (e.g. workshops, students) |
| Actual Usage | Relative Platform metrics | Platform statistics | App metrics | SM metrics |

Figure 4. Basic Structure of the Evaluation Model

Its main theoretical foundations are the Technology Acceptance Model (TAM) and Rogers' Diffusion of Innovation (DOI) theory. According to the TAM (Davis, 1989; Venkatesh and Davis, 2000; Venkatesh et al, 2003), the attitude towards using an IS, which finally determines the intention to use it and its actual use, is determined mainly by two characteristics of it: its perceived 'ease of use' (= the degree to which potential users believe that using it would require minimal effort) and its perceived 'usefulness' (= the degree to which potential users believe that using it will enhance their job performance). The DOI theory (Rogers, 2003) proposes five critical characteristics of an innovation that determine the degree of its adoption: relative advantage (= the degree to which an innovation is perceived as better than the idea, work practice or object it supersedes), compatibility (= the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters), complexity (= the degree to which an innovation is perceived as difficult to understand, implement and use), trialability (= the degree to which an innovation may be experimented with on a limited scale basis). Based on the above theoretical foundations, each of the components of our evaluation model shown in Figure 4 has been further elaborated. For instance, in Figure 5 we can see the elaboration of the quantitative evaluation (through structured questionnaires) by the policy makers (initiators), whose main dimensions are ease of use, usefulness, attitude toward using and behavioural intentions to use (taken from TAM), and also relative advantage, observability, compatibility, trialability and complexity-simplicity (taken from DOI).

The above evaluation should be based on real-life applications of the proposed framework. For this purpose pilot applications are already in progress, in cooperation with four Greek Members of the European Parliament (MEP). The MEPs seems to be the most suitable persons to play the role of the policy makers in these pilot applications. They will be responsible for defining the main topics of the campaigns, formulating the main policy messages of them and creating the relevant multi-media content, monitoring the evolution of the campaigns and finally examining the results. The main topics of these pilot applications/campaigns will be: renewable energy sources, immigration issues, renegotiation of Greek Memorandum terms and growth prospects within the financial crisis. The main social media that will be used for these pilot applications/campaigns are the Facebook and Twitter accounts of the four involved MEPs, while links to them will be placed in their official webpages. Also, their Twitter accounts will be connected with other experts' Twitter accounts, so that a network

can be created. Furthermore, YouTube will be used as well as a supplementary channel in these campaigns in order to support multimedia content presentation.



Figure 5. Elaboration of quantitative evaluation by policy makers

8 AN EXTENSION OF THE PROPOSED FRAMEWORK: PASSIVE CROWDSOURCING

Since our proposed framework is a form of ‘active crowdsourcing’ (i.e. the government is actively asking for citizens’ comments, opinions, suggestions and ideas on a topic it defines through postings in several social media), an extension of it can be its combination with ‘passive/non-moderated crowdsourcing’. The basic idea is illustrated in Figure 6.

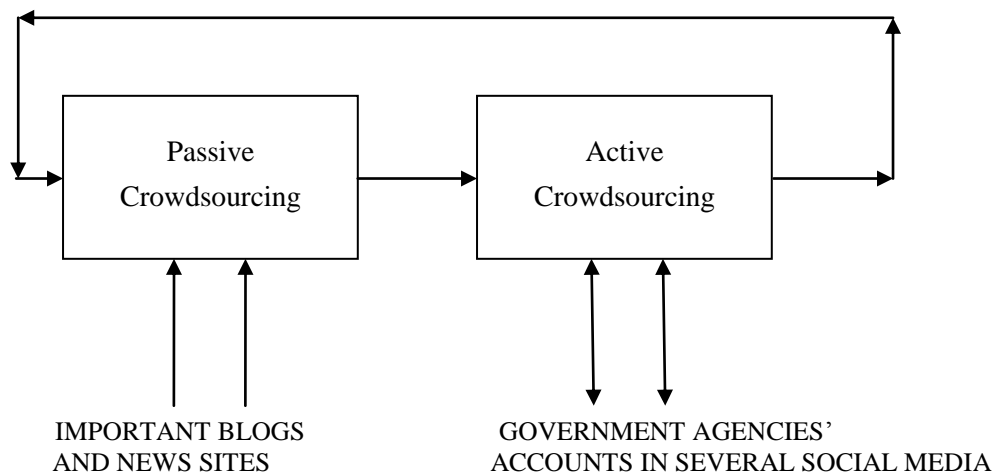


Figure 6. Combination of passive and active crowdsourcing by government agencies

In particular, before publishing some content in several social media (mainly in the accounts of the government agency) on a policy (under development or modification), it is useful to collect relevant content (on the topic of this policy) from a much wider set of social media (e.g. all the important political blogs or news sites of the country), which has been developed there without any direct stimulation by the government, and analyze it in order to identify the main problems and issues raised by citizens in this domain (using opinion mining techniques, such as issues extraction, arguments extraction, sentiment analysis). This will allow the formulation of appropriate policies for addressing these problems and issues, which will be then published in several social media in order to get citizens’ feedback from them using the framework and the platform described in the previous sections of this paper. This active crowdsourcing can then be followed by a new round of passive

crowdsourcing (in order to find out what is the response and feedback of the society to the above policies) and then again active crowdsourcing (with some new government postings responding to the above responses and feedback of the society, with clarifications or possible improvements or even new policy options), etc. We expect this combination of passive and active crowdsourcing to be a strong mechanism of intensive and effective communication between government and society.

9 CONCLUSIONS

For several decades public participation in government decision and policy making has been a consistent objective in many countries all over the world. The ICT, and especially the Internet, provide an additional strong and low cost channel for public participation. In order to exploit it government agencies created official e-participation websites for interacting with citizens, however their usage by citizens was below expectations. The emergence of Web 2.0 social media creates opportunities for achieving a wider public participation through them. Social media are already extensively used by citizens for political debates and for organizing and coordinating political activity. Therefore governments cannot be absent from them, and should efficiently organize their presence in multiple social media so that they can express their positions on various policies under development or modification, hear citizens' opinions and suggestions, and finally gain a better understanding of their attitudes and needs. These new communication channels have been initially exploited by private sector firms, in order to support mainly their marketing and customer relations functions, and this provided motivation for considerable research in order to develop frameworks and practices for the effective utilization of these new communication media in the private sector. Government started exploiting the high capabilities and popularity of the social media much later, so there has been much less research concerning their effective utilization by government agencies.

Taking these into consideration, it is necessary to generate knowledge on how social media can be used effectively by government agencies, in order to enhance citizens' participation in their decision and policy making processes, so it is important to develop frameworks and model practices for this purpose. This paper makes the following contributions in this direction:

- i) It proposes a framework for the efficient exploitation of social media by government agencies for promoting participative governance, based on a central ICT platform, which can publish content and micro-applications related to a specific policy to multiple social media, collect citizens' interactions with them from these social media, both automatically using their APIs, and finally use advanced processing of these interaction data using a wide spectrum of techniques (web analytics, opinion mining, simulation modelling). Furthermore, it analyzes the political value that the proposed framework can provide, in cooperation with the user-partners of the PADGETS project (Greek ICT Observatory, supervised by the Ministry of Finance, the Piedmont Region in Italy and the Centre of eGovernance Development in Slovenia).
- ii) It also develops a higher level model for the practical application of the proposed framework, and then elaborates it further, developing a more detailed application model,
- iii) and also a model for its evaluation based on sound theoretical foundations (the technology acceptance model (TAM), and the diffusion of innovation (DOI) model).
- iv) Finally, it proposes an extension of the above framework, which combines active/moderated and passive/non-moderated crowdsourcing.

The above two proposed approaches (active/moderated and passive/non-moderated crowdsourcing) offer a strong mechanism of intensive communication between government and society, and enable a more direct interaction among the different stakeholders of a policy under discussion or application, efficiently and at a low cost, which can lead to better and more socially-rooted government policies. It should be mentioned that the application of these approaches in government agencies will be a radical change of how they are handling public participation and e-participation, and in general will lead to new and more participative approaches to governance. While their current dominant e-participation approach is based on the development and use of a single e-participation channel, having the form of an official government e-participation website, the new proposed approach is a multi-channel one,

using both the existing channel (official e-participation website) and additionally a set of social media channels with different structure, language, target audience and characteristics. It will be characterised by a more extensive and close interaction with more heterogeneous citizens' groups, and the government agencies should be prepared for this.

For the above reasons this innovative approach will need some changes in government agencies, mainly at three levels: the organizational, human resources and technological level. In particular, it will need:

- The creation of a new organizational unit in order to manage the presence and profile of the government agency in these multiple e-participation channels, and to analyze the large volume of structured (e.g. ratings) and unstructured data (e.g. posts in textual form) that will be created in these channels by citizens.
- New advanced processes should be established so that the results and the conclusions derived from the analysis of these structured and unstructured data can be integrated in the policy making processes of government agencies.
- The human resources of the new aforementioned units must acquire new specialized skills for organizing and managing in an efficient manner the new electronic modes of communication with citizens. Government agencies' personnel should become familiar with the structure, language and style of interaction in the Web 2.0 social media, which are in fact quite different from the ones of the 'traditional' communication between government and citizens.
- At the technological level, the analysis of the large volume of the unstructured data provided in the form of text and collected from these multiple electronic channels will require highly specialized ICT-based tools for text analysis and opinion mining. These tools will have to be integrated with the technological infrastructure of government agencies and will also need specific language resources, such as lexicons of polar words, synonyms and antonyms, in order to be effective.

Further research is in progress in order to validate and evaluate the proposed framework at the technological, organizational and political level, based on its pilot applications mentioned in section 7, as part of the PADGETS project. This research will allow a first assessment of the value that the proposed framework can offer, its strengths and weaknesses, and probably the required improvements of the ICT platform and/or the application/campaigning processes. Finally, a similar validation and evaluation of the proposed extension will be conducted as part of the NOMAD project.

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