

# Exploiting Systematically Web 2.0 Social Media in Government for Extending Communication with Citizens

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## **ABSTRACT**

Governments of many countries have been for long time attempting to establish communications with citizens in order to understand better their problems and needs, benefit from their collective knowledge and promote public participation and transparency in their decision making and policy formulation processes. For this purpose they exploited initially the Web 1.0, making considerable investments in developing official e-participation websites, but the results were below expectations; so recently government agencies started exploiting the emerging Web 2.0 social media, which offers big opportunities for interacting with the large numbers of users these media attract. This chapter contributes in this direction by presenting a methodology for the systematic and centrally managed exploitation of Web 2.0 social media by government agencies for extending their communication with citizens. It is based on a central platform providing interoperability with many different Web 2.0 social media, which enables posting and retrieving content from them in a systematic centrally managed and automated manner using their application programming interfaces (APIs). It also allows the deployment in various popular Web 2.0 social media of 'Policy Gadgets' (Padgets), which are micro web applications presenting policy messages and collecting users' interactions with them (e.g. views, comments, ratings, votes, etc.). The two basic critical success factors of this methodology, interoperability with Web 2.0 social media and composition of their users' base, are also discussed.

## **INTRODUCTION**

Web 2.0 has been initially used by individuals for personal and social communication (Dutton and Helsper, 2007), and later adopted by several private sector industries, such as media, publishing and advertising, having an important impact on them (Wunsch-Vincent and Vickery, 2007; Punie et al, 2009a); currently, it is beginning to have a wider impact on enterprises across sectors, being used as a tool

for improved customer relationship and ‘co-creation’ of innovations in products, services and internal processes in cooperation with customers, suppliers and business partners. Some a first knowledge base has been developed in this area, which has taken the form of guidelines and frameworks for the exploitation of Web 2.0 by private sector firms (e.g. Constantinides, 2009 and 2010). Recently Web 2.0 applications have started being used in government as well, not only for ‘soft’ tasks (e.g. public relations and public service announcements), but also for ‘core’ ones (Osimo, 2008; Punie et al, 2009b; Mergel, Schweik, and Fountain 2009); however, the dominant Web 2.0 exploitation pattern in government consists in individual and fragmented uses of a few Web 2.0 social media (for instance posting to a Web 2.0 application of some content, e.g. a political message in the form of a text, image or video, and then retrieving and reading or processing the corresponding user-generated content, e.g. comments on or ratings of this message), while a systematic and centrally managed exploitation of a wide range of Web 2.0 social media is missing.

It should be emphasized that this new Web 2.0 Internet paradigm has the potential to drive important transformations in government related to key values, such as transparency, accountability, communication and collaboration, and to promote deeper levels of civic engagement. It can considerably enhance information flow within and across government agencies and also between government and the public, offering big opportunities for interacting with the large numbers of users that Web 2.0 social media attract. This has been for long time a major objective of many governments all over the world, which have been trying to promote the values of ‘participatory democracy’, and combine decision making by citizens’ elected representatives with extensive citizens’ participation in government decisions. The development and penetration of the Internet lead many governments to use it for these purposes, in order to support and extend public participation; this resulted in a rapid growth of e-participation (OECD, 2003 and 2004; Macintosh, 2004; Timmers, 2007), which is defined as the use of information and communication technologies (ICT) for supporting the provision of information concerning government activities, decisions and public policies to citizens, the consultation with them and also their political initiatives and active participation. However, despite the high public investments for the development of ‘official’ e-participation websites for the above purposes, their usage by the citizens has been in general limited and below expectations (e.g. see Ferro and Molinari, 2009). This, in combination with the high heterogeneity of citizens in terms of political interests, educational level and technological skills (so a common government e-participation for all might not be feasible), which make it difficult to develop e-participation spaces ‘for all’, necessitate governments to investigate the exploitation of the many emerging Web 2.0 social media as well for widening and enhancing e-participation. However, only a very limited knowledge base has been developed concerning the exploitation of Web 2.0 social media by government agencies.

This chapter contributes to filling this gap by describing a methodology for the systematic and centrally managed exploitation of Web 2.0 social media by government agencies in the processes of public policies formulation. It is based on a central platform-toolset providing interoperability with many different Web 2.0 social media, and enabling posting and retrieving content from them in a systematic, centrally managed and machine-supported automated manner, using their application programming interfaces (APIs). It also enables the deployment of ‘Policy Gadgets’ (Padgets), which are defined as micro web applications, which present policy messages in various popular Web 2.0 social media (e.g. social networks, blogs, forums, news sites, etc) and at the same time enable and collect various types of users’ interactions with them (e.g. views, comments, ratings, votes, etc.). Users’ interaction data are centrally processed at a first level resulting in useful ‘analytics’, and also at a second level being used as input in policy simulation models estimating the impact of various policy options. This methodology is going to be validated through ‘real life’ pilots in the PADGETS (‘Policy Gadgets Mashing Underlying Group Knowledge in Web 2.0 Media’ – [www.padgets.eu](http://www.padgets.eu)) research project, which is supported by the European Commission the ‘ICT for Governance and Policy Modelling’ research initiative.

The chapter is structured in seven sections. In the next section the background is outlined, and then the fundamentals of our methodology and its technological architecture are presented. They are followed by an application scenario of it and a discussion of two basic critical success factors of this methodology, interoperability with Web 2.0 social media and composition of their users' base. In the final section conclusions and next steps summarizes.

## BACKGROUND

The design of public policies is a 'wicked' problem, characterized by high complexity and many stakeholders with different and heterogeneous views of the problem, values and interests (Rittel and Weber, 1973; Buckingham Shum, 2003; Gircle et al, 2003; Karacapilidis et al, 2005). Such problems do not have mathematically 'optimal' solutions and pre-defined algorithms for calculating them, but only 'better' and 'worse' solutions, and cannot be solved by formal methodologies, so they require 'second generation' approaches based on deliberation among stakeholders. This deliberation is quite valuable, because it allows a better and more multidimensional understanding of the problem that a particular public policy aims to address, its complexity and its possible solutions, which combines views and perspectives of all stakeholders, so it can result in better and more acceptable and 'balanced' public policies. This necessity gave rise to a new model of democracy, which is termed 'participatory democracy' (Pateman, 1970; Barber, 1984; Held, 1987; Rowe and Frewer, 2000 and 2004). It combines decision making by citizens' elected representatives with extensive citizens' participation, with the latter not replacing (like in the 'direct democracy'), but supporting and enhancing the former. A key principle of this model is that "the equal right to self-development can only be achieved in a participatory society, a society which fosters a sense of political efficacy, nurtures a concern for collective problems and contributes to the formation of a knowledgeable citizenry capable of taking a sustained interest in the governing process" (Held, 1987). Row and Frewer (2004) define public participation as 'the practice of consulting and involving members of the public in the agenda-setting, decision-making and policy forming activities of organizations or institutions responsible for policy development'. Participatory democracy also attempts to address the so called "deficit of democracy" and the abstention and disengagement of citizens from politics. The development and increasing penetration of ICT, and the Internet in particular, creates big opportunities for the extensive application of the above principles through electronic media (e-participation). So it is quite useful to investigate how we can use ICT (and especially the Internet, both its current paradigm Web 1.0, and the emerging paradigm Web 2.0, for the supporting and enhancing public participation and deliberation.

Most of the previous research and practice in this area has been based on the Web 1.0 paradigm and resulted in the development of many 'official' e-participation websites operated by government organizations. However their usage by the citizens has been in general limited, much lower than the initial expectations (e.g. see Ferro and Molinari, 2009); some important weaknesses of them have been identified:

- public administrations expect citizens to make the first step, moving from their own online environments to these 'official' government e-participation websites, in order to participate in public debates on various proposed public policies or legislations; however, this happened only to a limited extent;
- most of the topics discussed there were not associated with citizens' daily problems and priorities, and sometimes contributions by non-experts was difficult;
- the heterogeneity of real or potential online users with respect to educational level, technological skills and behavior (e.g. only a small minority of Internet users is willing to actively produce content or offer reviews/feedbacks) was not taken into account; however this heterogeneity makes it difficult to develop e-participation spaces 'for all';

- the tools adopted were not appropriate, or at least usable only by an educated minority;
- the methodologies used for e-participation were not scalable, so they could only be adopted in pilot trials with a limited impact;
- these ‘official’ spaces remained largely unknown to the general public, mainly due to the high costs of their promotion and the slow pace of dissemination of relevant information.

For these reasons is required a change of approach in the implementation of e-participation by government agencies, which can exploits the development and high penetration of Web 2.0. The increased capabilities provided by the latter to their users for creating content and the birth of social networks create big opportunities for the expression of political views, problems and needs. Governments should become more aware of the social complexity, and at the same time the wealth of information that is already available and is continuously developed in citizens-initiated Web 2.0 social media, in order to increase the quantity, quality and inclusiveness of e-participation. They should make a step towards citizens rather than expecting the citizenry to move their content production activity onto the “official” spaces government organizations created for e-participation.

Initially Web 2.0 was used by people for personal and social communication, and later it was also adopted by several private sector industries, such as media, publishing and advertising, and already had an important impact on them (Wunsch-Vincent and Vickery, 2007; Punie et al, 2009a). Some first knowledge base has been developed on this, resulting gradually in guidelines and frameworks for the exploitation of Web 2.0 by private sector firms, mainly for marketing purposes (e.g. Constantinides, 2009 and 2010). Recently, there has been some first evidence that Web 2.0 applications are already being used in government as well, not only for ‘soft’ tasks (e.g. public relations and public service announcement)s, but also for ‘core’ ones (Osimo, 2008; Punie et al, 2009b; Mergel, Schweik and Fountain 2009), such as:

- service provision: e.g. PatientOpinion is a website launched by a General Practitioner in order to improve the National Health Service, which collects and publishes patients' feedback and ratings on the medical services they have received at hospitals;
- regulation: e.g. ‘Peer-to-Patent’ is a web-based platform where patent applications are published and pre-assessed by self-appointed experts on a purely voluntary basis, and the evidence collected is submitted to the US Patent Office for evaluation and final decision;
- law enforcement: e.g. Mybikelane is a website where cyclists post photos of cars illegally parked, with a view to raising awareness about this problem;
- cross-agency collaboration: e.g. ‘Intellipedia’ is a wiki platform managed by the Central Intelligence Agency (CIA) of USA, which enables the direct collaboration between the analysts of the 14 US Intelligence agencies;
- political participation: e.g. Petitions.gov.uk is an online service where citizens can submit petitions directly to the Prime Minister, and also view, discuss and sign petitions submitted by other users;
- communicating information on public hearings through blogs: e.g., Federal Trade Commission;
- microblogging using Twitter to disseminate news: e.g. <http://twitter.com/dfletcher>, CTO State of Utha;
- coordinating work through wikis and RSS feeds: e.g. US Environmental Protection Agency;
- sharing expertise internally by using wikis: e.g. State Department's “Diplopedia”; Department of Defense’s Techpedia;
- information sharing between soldiers in the battlefield: e.g. CompanyCommand.com PlatoonLeader.org.

The experience from these first applications shows that the use of Web 2.0 in government can make it more simple, user-oriented, transparent, accountable, participative, inclusive and joined-up. Mergel,

Schweik and Fountain (2009) from an analysis of some cases of successful Web 2.0 use in government concluded that ‘What has fundamentally changed with Web 2.0 technologies coupled with the Internet, is the ease in which interactive collaboration can occur between organizations or between individuals with very little technical know-how. This, in our view, is foundational change’; for this reason they expect that Web 2.0 Technologies will have larger transformational effects on government than previous ICTs. However this potential is exploited only to a very limited extent, since the dominant Web 2.0 exploitation pattern in government consists in individual and fragmented uses of only a few Web 2.0 social media; it usually includes posting to a Web 2.0 application of some content, e.g. a political message in the form of a text, image or video, and then retrieving and reading or processing the corresponding user-generated content, e.g. comments on or ratings of this message), while a systematic and centrally managed exploitation of a wide range of appropriate Web 2.0 social media is missing. Our research aims to contribute to filling this gap.

## FUNDAMENTALS OF THE METHODOLOGY

The proposed methodology is based on a central platform-toolset, which can provide interoperability with many different Web 2.0 social media, and enable posting and retrieving content from them in a systematic, centrally managed machine-supported automated manner through their APIs. It also allows policy makers to create graphically micro-applications, termed as ‘Padgets’ (Policy Gadgets), which can be deployed in many different web 2.0 social media in order to convey policy messages to their users, interact with them and receive their opinions; each of these media will have a different audience, so that we can finally reach various groups of citizens, which are quite different from the ones who visit and use the official government-initiated -participation websites. This ‘Padget’ concept that we introduce in our methodology is an extension to the concept of the ‘gadget’ applications in web 2.0, which involves the use of data and services from heterogeneous sources in order to create and deploy quickly applications that provide value added services, adapted to the specificities and needs of public policy formulation. In particular a Padget is composed of four elements shown in Figure 1:



*Figure 1. Elements of a Padget*

I) A policy message, which could be a public policy in any stage of its lifecycle (e.g. a policy white paper, a draft policy plan, a legal document under formulation, a law in its final stage, an EU directive under implementation, etc.).

II) An interface which will allow users to interact with the Padget, and may give users the capability to access policy documents, be informed on relevant news, stipulate opinions, vote on some issues, upload material, tag other people opinions or content as relevant, get location based information, etc.

III) Relevant group knowledge, in the form of relevant content and users’ activities that have been produced in external social media, forums, blogs, wikis, social networks, etc., which concerns the above policy and is properly annotated in order to indicate its relation with a particular web 2.0 location.

IV) A decision support model, which includes both first level processing resulting in simpler analytics (numbers of users who saw a policy message, or agreed/disagreed with it, or downloaded a relevant video, etc.), and also more advanced second level processing, based on the use of simulation modelling

methods and tools, using as input the above data from the interaction of the Padget with the public, and possibly other types of data, and producing as output estimations of the impact of specific policies on critical performance indicators that are of interest to the policy maker.

The four main paradigms of simulation modelling have been examined and compared as to their suitability for the above purposes (Borshchev and Filippov, 2004):

- Dynamic Systems (enabling high detail simulation in continuous time, and used mainly for technical systems),
- Discrete Events Modelling (enabling high detail simulation in discrete time),
- System Dynamics (enabling simulation in medium or high level of abstraction in continuous time),
- Agent-based Modelling (enabling modelling the behaviour of the individual ‘agents’ forming the system (at various levels of granularity, e.g. citizens, groups, firms, etc.), so that from their behaviour the system’s behaviour can be derived).

From this comparison we came to the conclusion that Systems Dynamics (SD) (Forrester, 1958 and 1961; Kirkwood, 1998) is more appropriate for the analysis of public policies, because this usually requires high level views of complex social or economic systems in continuous time, and also such systems include various individual processes with various types of stocks ‘stocks’ (e.g. users and non-users of various services or new technologies, employed and unemployed citizens, citizen groups of various income levels, etc.) and ‘flows’ among them (e.g. non-users become users, unemployed become employed and vice versa), which are influenced by a public policy. For these reasons SD has been successfully used in the past for estimating the evolution of a number of critical variables for society, such as unemployment, economic development, taxation income, technologies penetration, pollution, poverty, etc. and for the analysis of various types of public policies (e.g. Liu and Wang, 2005; Homer and Hirsch, 2006; Robert and Leslie, 2006; Schwaninger et al, 2008; Armenia et al, 2008; Zamanipour, 2009; Teekasap, 2009). SD focuses on understanding initially the basic structure of a system (i.e. its main stocks, flows and variables influencing them) and then based on it estimating the behaviour it can produce (e.g. exponential growth or S-shared growth of the basic variable). This is done through seven basic steps:

- a) definition of the system/problem boundary,
- b) identification of the most important stocks and flows that change these stock levels,
- c) identification of variables that impact these flows,
- d) identification of the main feedback connections between variables and loops,
- e) formation of the equations of the model,
- f) simulation running,
- g) and finally analysis of the results (after which we might return to any of the previous steps in order to make modifications and improvements).

Such a Padget can be deployed in many different web 2.0 social media. In particular, we are going to target the following categories of media (from each category we will choose the most appropriate ones taking into account the particular public policy under discussion and the audience we would like to involve in the discussion):

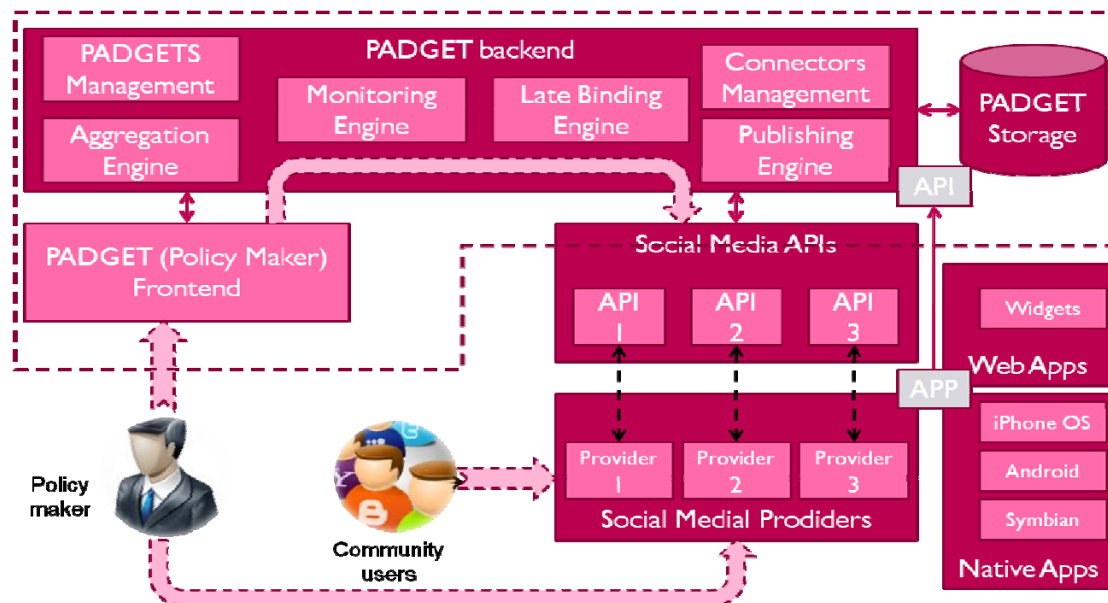
- Platforms for Communication, such as Blogs, Internet forums, Presence applications, Social networking sites, Social network aggregation sites and event sites.
- Platforms for Collaboration, such as Wikis, Social bookmarking (or Social tagging) sites, social news and opinion sites.

- Platforms for Multimedia and Entertainment, such as Photo sharing, Video sharing, Livecasting and Virtual World sites.
- Platforms for News and Information, such as Goggle News, Institutional Sites with high number of visitors (i.e. EU, Human Rights and WWF sites) and newspaper sites.
- Platforms for Policy Making and Public Participation, such as governmental organisations' forums, blogs, petitions, etc.

With respect to the decision model, it will receive as input the alternative policy scenarios and actions that have been planned by decision makers in combination with existing data referring to the policy issue (studies, statistical data, background information) and also data gathered through Padgets' interaction with end users (e.g. views, positive and negative comments, opinion polls, survey results, etc., referring to the adoption rate of the planned policy actions among citizens and other stakeholders). Based on the operation of a SD simulation engine embedded in the Padget decision model the potential policy outcomes will be estimated. These outcomes, after aggregation with existing background information about the particular policy issue, will be used as input for simulating policy actions related to the next steps of the policy making process, etc.; this procedure is going to be repeated several times (according to the alternative policy scenarios duration and the policy making process stages), creating thus several loops, in order to end up to the final outcomes and impact of each policy scenario and finally give the decision makers a basis for making the best possible decision.

## TECHNOLOGICAL ARCHITECTURE

The implementation of the proposed methodology will be based on the technological architecture shown in Figure 2. It builds on an extended Mashup Proxy that supports the seamless integration of back-office services of social media and front-end interfaces for user interaction. Furthermore, a server-side and client-side runtime environment enables Padgets to adapt dynamically to the requirements of mobile users whose devices are limited in their available bandwidth and display size. It will be built on a suite of Web components that support the integration of SOA concepts such as late binding and structured orchestration of services. The underlying architecture follows the REST style (REpresentational State Transfer) and is thus compliant with the Web's architectural style.



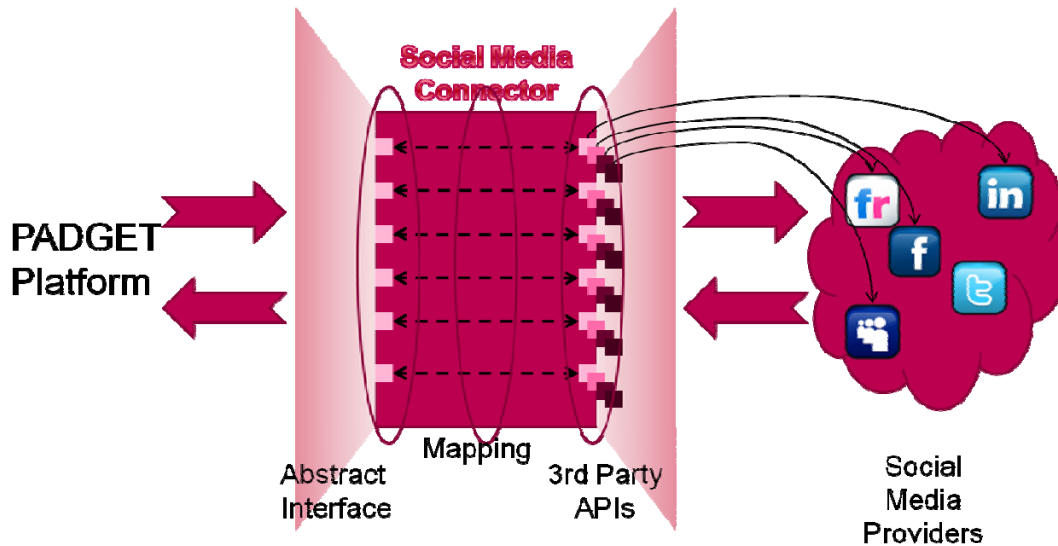


Figure 2. Technological Architecture

In particular this technological architecture includes the following components:

**Late Binding Engine** (late binding of 3rd party and local services during runtime - selection of appropriate services during runtime based on QoS parameters, user preferences, and device configuration of the service requester (end-user)).

**Repository** (repository for semantically enhanced services: REST APIs of services from 3rd party content providers can be easily described with the Web Application Description Language (WADL) and registered at the repository - semantic service descriptions extending the notion of WADL moreover enable an automatic composition of Web services and open up 3rd party APIs).

**Management Console** (a management console enables the easy provisioning of services through a graphic user interface, which also supports the management and reconfiguration of server-side service composition workflows).

**Aggregation Engine** (the Aggregation Engine realizes the server-side integration and orchestration of Social Media Services; it automatically creates server-side service compositions based on the effects that were requested either by the Policy Maker or another service; in a first step an abstract service composition plan is created, while the late binding of actual service implementations is handled by the Late Binding Engine and the Repository).

**Publishing Engine** (the publishing engine enables the partitioning of Padgets, so that parts can be executed on the server while other components are residing on the client; the client side can be Web Apps, which will be spread in the Web 2.0 environment, otherwise it is possible to publish a Padget as a Native App on mobile platforms; the published PADGETS gives users the capability to access policy documents, be informed on relevant news, stipulate opinions, vote on an issue, upload material, tag other people opinions or content as relevant, get location based information, etc.)

#### Connectors Management

The connectors' manager in Figure 2 is a Social Media Connector which maps 3rd Party APIs of Social Media Providers to an Abstract Social Media Interface. The Abstract Social Media Interface will be used for posting and retrieving activities of a policy message. A detailed description of the Connectors Management is shown in Figure 2.

**Frontend** (the Padget Frontend realizes an easy to use visual mashup composition tool to create a Policy Gadget).

**Monitoring Engine** (the monitoring engine uses the data from the interaction with end users, and performs various levels of processing of them, e.g. calculation of various analytics and simulation, in order to deliver recommendations for decision making).



## AN APPLICATION SCENARIO

A typical application scenario of the proposed methodology in the policy making processes is shown below in Figure 3.

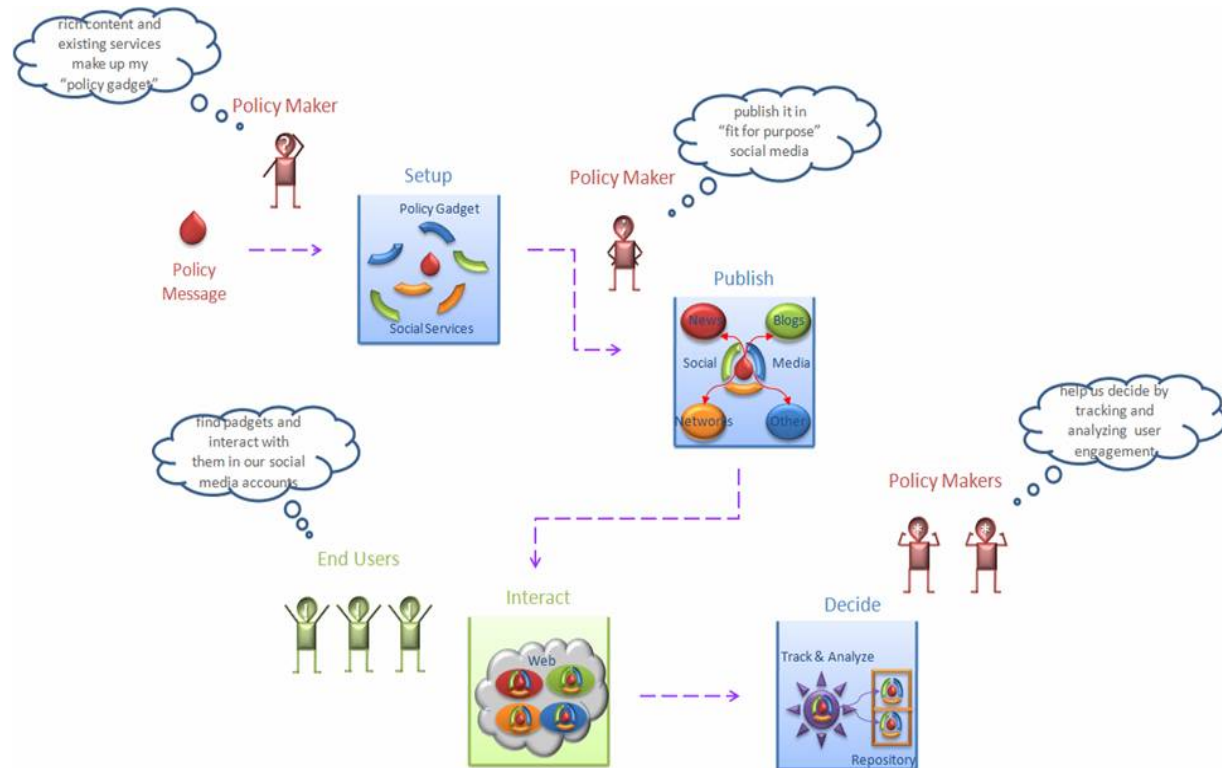


Figure 3. A typical application scenario of the proposed methodology

It is initiated by a policy maker or policy making group wanting to “harvest society’s input” before making an important policy-related decision, about a future policy to be introduced, or an already implemented policy that has to be evaluated as to whether and to what extent it aligns with society or needs modifications. The application of the above methodology in such a case would include the following steps:

A) The policy maker uses the platform capabilities in order to design/setup an appropriate Padget, in a user-friendly environment through a graphical drag-and-drop user interface, similar to the ones of existing mashup editors used for creating gadget applications. In this phase the policy maker will put together the corresponding policy (presented through text, images, video, links, etc.) and decision model of the Padget, and also the security requirements in terms of access restrictions to content as well as a suitable interface for interacting with end users.

II) The Padget will then be published via the central platform to a number of appropriate Web 2.0 social media (e.g. selected based on popularity, composition of audience, types of user activities, functionality, etc.) and becomes available to the public. There will be a variety of choices for deploying the Padget through the central platform according to its objective and targeted audience, e.g. it can be deployed to a social network in the form of a specific policy application, as an embedded petition, poll or social

tagging application in the sidebar of a popular blog, wiki or forum, or even in the platform's own registry. These multiple choices enable policy makers to make each policy gadget available to the various audiences so that a wide range of stakeholders can be involved in policy formulation.

III) The Padget interacts with the public in all these web social media; in each of them users can access it, see its policy message, access the related content and interact with it, i.e. express opinions, add material, vote and even create relations to other existing similar Padgets. The above will be performed in a privacy preserving manner and in accordance with the privacy preferences of the user and the privacy policy specified for the Padget.

IV) At the last stage the data collected through the interaction of the Padget with the end users in all the above Web 2.0 social media will be used as input a) for 'basic processing' that calculates various useful metrics (analytics), and b) for simulation modelling techniques and tools, such as the abovementioned SD, in order to support the policy maker to form a better understanding of the public policy at stake and its outcomes and impacts, and therefore to make better, more informed and socially rooted decisions.

In case that some of the targeted social media do not allow deploying applications (gadgets/widgets) in their environment their standard functionality can be used for publishing the policy message, or appropriate parts of it (e.g. only the text, or only the video or images), and then for collecting relevant user activity (e.g. counts of users who saw it, or agreed/disagreed with it, or forwarded it to other users, or even downloaded relevant videos or images, etc.) and content (e.g. comments), which will be processed as described above in step IV.

## INTEROPERABILITY ISSUES

It is of critical importance for the proposed methodology the central platform to provide interoperability with many different Web 2.0 social media, enabling both posting and retrieving content from them in a machine-supported automated manner through their APIs. In order to assess the existing capabilities in this direction we examined the following ten highly popular Web 2.0 social media in this respect: Facebook, Youtube, LinkedIn, Twitter, Delicious, Flickr, Blogger, Picassa, Ustream and Digg. In particular, for each of them we examined the following characteristics:

- Available APIs and types of capabilities they provide.
- Capabilities for pushing content in them through their APIs, where the term "push" reflects any kind of activity that results in the users adding some type of content in these platforms representing their opinion or their will, such as posts, photos, videos as well as ratings, requests, approvals, intentions, etc. (e.g. YouTube video rating, Facebook Like actions and Friend Requests, Twitter re-tweet, '@' replies and follow activities).
- Capabilities for retrieving content from them through their APIs, where the term "retrieve" reflects any kind of activity that results in the users acquiring some kind of information from these platforms representing activities that have occurred in them, such as comments on a post, photo or video, approved requests, manifested intentions, re-publication activities, etc. (e.g. how many rates a YouTube video concentrates, how many comments and shares a Facebook post brings about, how many re-tweets and '@' replies a Twitter post enjoys).
- Capabilities for deploying applications (gadgets/widgets) in their environment and having users interact with them.

In total more than 100 methods provided by the APIs of the above ten highly popular Web 2.0 social media were analysed. In the following Table 1 we can see an extract from this analysis, concerning the Create&Publish Post method of Blogger.com application programmable interface (API).

API Method:		Create & Publish Post	
<b>Description:</b>	Creates and publishes new blog entries, as well as drafts of entries. First, an XML representation of the post to publish must be created. This XML needs to be in the form of an Atom <entry> element.		
<b>URL:</b>	<a href="http://www.blogger.com/feeds/blogID/posts/default">http://www.blogger.com/feeds/blogID/posts/default</a>		
<b>Formats:</b>	Xml, Atom 1.0		
<b>HTTP Method(s):</b>	PUT		
<b>Requires Authentication:</b>	True		
<b>API restrictions:</b>	False		
Parameters:	Required	Type	Description
<b>blogID</b>	Yes	int	The blog's id
<b>Title (in xml)</b>	Yes	string	The post's title
<b>Content (in xml)</b>	Yes	html	The post's content
<b>Category (in xml)</b>	Optional	Category Term	One or more categories the post is related to.
<b>&lt;app:control&gt; (in xml)</b>	Optional	Yes/No	<p>"Yes" Specifies that the post should be archived as a draft rather than a normal post. "No" turns an <u>existing</u> draft blog post into a published post.</p> <pre> &lt;app:control   xmlns:app='http://www.w3.org/2007/app'&gt;   &lt;app:draft&gt;yes&lt;/app:draft&gt; &lt;/app:control&gt; </pre>

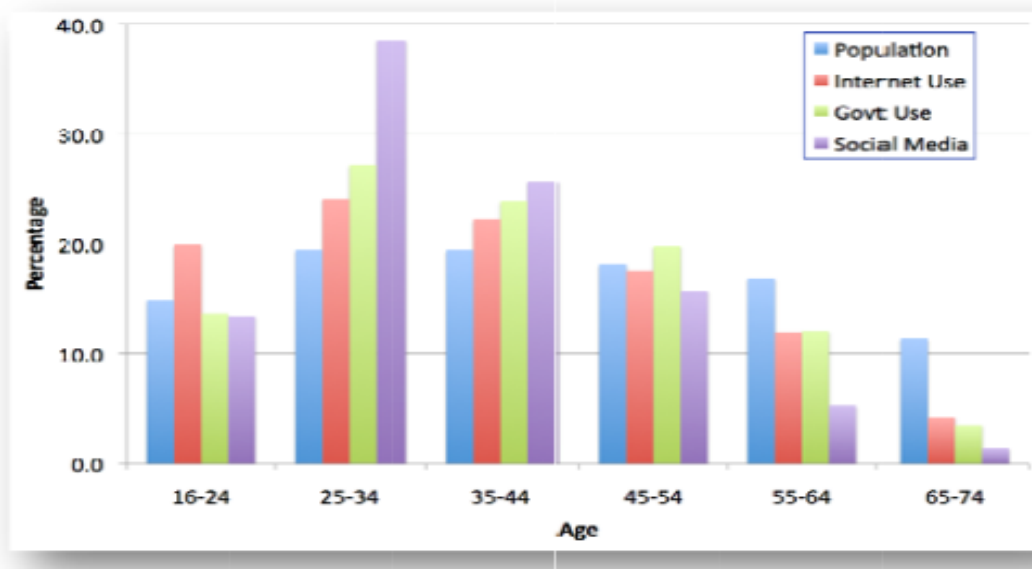
Table 1. The "Create and Publish Post" method of Blogger.com

From this analysis of the APIs of the above ten social media we have reached the conclusion that there is a clear strategy of these Web 2.0 social media to become more open and public and conform with open API standards. In this scope, they provide more and more functionalities through their APIs for posting and retrieving content, while they try to engage more developers to develop applications based on their services. The general trend is exposing methods through their APIs that "go deeply" into their innermost functionalities and provide developers with an ever growing set of capabilities. This includes on one hand content push functionality; this content can be text, images, videos or more complex forms of media such as "events" , "albums" etc. A large portion of the APIs is dedicated to the creation, (or uploading), modification and deletion of such content. On the other hand there also exists functionality that supports the direct retrieval of various types of content generated by users, such as "user ratings", "unique visits" or "retransmissions" (to other nodes of a social network). However, only Facebook and LinkedIn allow deploying applications in their environment.

However, it should be mentioned that the above APIs and other relevant capabilities provided by Web 2.0 social media are continuously evolving, providing new functionality in order to address new users' needs. Therefore developers should adopt only the most common and stable subset of available commands, if they want to ensure that the functionality of their application will be maintained across time. Moreover, every social medium has a different approach about how open and public it will be; this includes the extent to which it allows developers to automatically access its content and create embedded applications to their web sites. Therefore, our methodology should adopt an adaptive approach: publishing Padgets in the Web 2.0 social media that allow it, while for the ones that do not allow it use their APIs for posting and retrieving content.

## COMPOSITION OF USERS BASE

Also we examined the demographics of the users of the Internet in general, and several Web 2.0 social media in particular. It was concluded that in these user groups are not equally represented the various citizens' segments that modern societies comprise, e.g. with respect to gender (males are overrepresented, though gender differences show decreasing trends), age (younger ages are overrepresented), education (in Internet more educated groups are overrepresented, but in many social media are underrepresented), income, etc (similarly). For instance by combining data from various sources Figure 4 has been produced, showing for the six basic age groups the percentages of population, Internet users, e-government services users and social media users. We can see that the age group between 25 and 34 years is strongly overrepresented in social media, while the one between 35 and 44 years is slightly overrepresented; on the contrary the age group between 45 and 54 years is slightly underrepresented in social media, while the ones between 55 and 64 years, and between 65 and 74 years are strongly underrepresented. The above indicate that in drawing conclusions from the policy related content generated in various web 2.0 social media (e.g. postings, ratings, comments, etc.) it is necessary to take into account the composition of their user bases from all the above perspectives, or else conclusions concerning particular citizens' groups might be misinterpreted as concerning the whole population.



*Figure 4. Percentages of population, Internet users, e-government services users and social media users in the main age groups*

## CONCLUSION

In the previous sections of this chapter we have presented a methodology for the systematic exploitation of the Web 2.0 social media by government organizations for extending communication with citizens and e-participation in the formulation of public policies. It is based on a central platform-toolset providing interoperability with many different social media, and enabling posting and retrieving content from them in a systematic, centrally managed and machine-supported automated manner through their APIs. This platform also allows the deployment in various popular Web 2.0 social media of 'Policy Gadgets' (Padgets), which are micro web applications presenting policy messages in various popular Web 2.0 social media (e.g. social networks, blogs, forums, news sites, etc) and interacting with their users, in order to get and convey their input to policy makers. An analysis of the APIs of ten highly popular Web 2.0

social media has given encouraging results: it has shown the growing trend to provide more and more functionalities for posting and retrieving content from them in a machine-supported automated manner. However, only a few of them allow deploying applications in their environment. Also, the continuous evolution of these APIs, in order to provide new functionalities for addressing new users' needs, is expected to pose some difficulties and challenges. Another representation shows significant differences among various web 2.0 social media (e.g. in some of them wealthier groups are overrepresented, while in some others they are underrepresented); therefore developers should adopt only the most common and stable subset of available commands of the APIs, if they want to ensure that the functionality of their application will be maintained across time. Also, by examining the composition of the users' bases of several web 2.0 social media it was concluded that there is not an equal representation of the various citizens' segments that modern societies comprise, e.g. with respect to gender, age, education and income. Therefore for drawing conclusions from the policy related content generated in various web 2.0 social media (e.g. postings, ratings, comments, etc.) it is necessary to take into account the composition of their user groups from all the above perspectives.

This methodology will enable governmental administrations to make a step towards citizens, going to the web locations each group is using for interaction, rather than expecting the citizens to move their content production activity onto the "official" spaces created for e-participation; this is expected to widen and improve communication with citizens and public participation in government decisions and policies. It has the potential to leverage the network effects of existing Web 2.0 social media in order to involve users and online communities in the policy formulation process, increase citizen trust and transparency through public and established social channels, and also assist in forecasting public response and the impact of policy measures. In this way more valuable 'tacit knowledge' on important social problems and needs, and policy options for addressing them, which is possessed by various citizens' groups will be transformed into 'explicit (codified) knowledge', and used by governments for designing better public services and policies.

Further research is in progress by the authors for the validation and further elaboration of this methodology within the PADGETS research project. A number of pilot applications of the methodology in real life conditions will be performed, which will concern important policies of the three government organizations participating in this project: the Observatory for the Greek Information Society, the Centre for e-Governance Development, Slovenia, and the Regione Piemonte, Italy; all these pilots will be evaluated using both quantitative and qualitative techniques, and based on the results improvements of the methodology and the central platform will be designed.

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