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Complete Research

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Abstract

Social media monitoring has been initially adopted by private sector firms in order to collect opinions, complaints and questions concerning their products and services, to be used for making appropriate changes and improvements of them and also for designing communication strategies. Recently government agencies have started adopting SMM, as a form of 'passive citizen-sourcing', in order to collect useful information from citizens concerning their needs, problems, opinions and suggestions, to be used for public policy formulation. It is therefore important to evaluate these first initiatives, so that the potential of SMM with respect to public policy making can be exploited, and at the same time appropriate adaptations and improvements of relevant ICT platforms and practices can be made, in order to reach higher levels of maturity. This paper makes a two-fold contribution in this direction. Initially it develops a framework for evaluating the use of SMM for supporting policy making, initially from the 'classical' ease of use perspective, and then from a public policy perspective, based on the wicked social problems theory. This framework is then used for the evaluation of three pilot applications of a novel method of SMM by government agencies and other policy stakeholders, which has been developed as part of a European research project.

Keywords: Social Media Monitoring, Government, Public Policy, Wicked Problems, Crowdsourcing.

1 Introduction

Social media monitoring (SMM) has been initially adopted by private sector firms in order to collect opinions, complaints and questions that have been posted in various social media (e.g. forums, blogs, Twitter, Facebook, news feeds, etc.) about their products and services, and also about the ones of their competitors, which are used for making changes and improvements of their products and services, for designing communication strategies, and for making appropriate communication interventions in the social media (e.g. replying to negative postings and questions) (Croll & Power, 2009; Sen, 2011; Kasper & Kett, 2011; Järvinen et al., 2015). Government agencies have been traditionally monitoring citizens' opinions and attitudes towards their policies and activities (e.g. through surveys based on representative citizens' samples), and also relevant articles in the 'traditional' media (e.g. newspapers). The emergence and wide use of social media by citizens provide an efficient channel for the creation and exchange of extensive political content, and also for the quick organization of collective political action by citizens (Chadwick, 2009; Soares and Joia, 2015); the political potential of social media poses serious challenges to government agencies, as 'strategic surprises' can suddenly emerge due to the rapid expansion of issues and also the mobilisation and synchronization of numerous citizens enabled by the social media (Shirky, 2011; Bekkers, Edwards, Moody & Beunders, 2011). For the above reasons government agencies have recently started adopting SMM, as a form of 'passive citizen-sourcing', in order to collect useful information from the citizens about their needs, problems, opinions and suggestions, to be used for public policy formulation (both for the design of new policies and for the improvement of existing ones), and also for the design of relevant communication strategies (Bekkers et al, 2013; Charalabidis et al., 2014). This constitutes a big innovation in the policy formulation practices and processeses of government agencies, which can help them to address the increasing complexity and 'wicked' nature of the problems of modern societies (Rittel and Weber, 1973; Conklin and Begeman 1989; Conclin 2003).

It is therefore important to evaluate these first initiatives of using SMM in government from various perspectives, in order to learn from them as much as possible, and develop new knowledge in this recently emerged area. Their evaluation will enable us to understand better the value and benefits that SMM can offer to government agencies, so that its potential can be exploited to the highest possible extent, and at the same time will allow us to identify its weaknesses and critical success factors, so that appropriate adaptations and improvements of relevant ICT platforms and practices can be made, in order to reach higher levels of maturity in this area. This paper makes a two-fold contribution in this direction:

i) It develops a framework for the evaluation of the use of SMM from a public policy making perspective, assessing to what extent it is useful for addressing the fundamental complexities of public policy formulation, based on sound theoretical foundations (wicked problems theory – see section 2.2);

ii) It uses this framework for the evaluation of three pilot applications of a novel method of SMM by government agencies and other public policy stakeholders (described in more detail in Charalabidis et al. (2014); Loukis and Charalabidis (2014)), which has been developed as part of the European research project NOMAD ("Policy Formulation and Validation through Non-moderated Crowdsourcing" – for more details see www.nomad-project.eu/), partially funded by the "ICT for governance and policy modeling" research initiative of the European Commission.

The paper is structured in seven sections. In the following section 2 the background of our research is presented. The proposed evaluation framework is presented in section 3. The abovementioned novel method we have developed for SMM in government is outlined in section 4, while the research method of our study is described in section 5. Then results are presented in section 6. Finally, in section 7 the conclusions are summarized and future research directions are proposed.

2 Background

2.1 Social Media Monitoring in Government

Social media were initially used by private sector firms, mainly in their marketing and customer service activities, and later were adopted and utilised by government agencies as well, in order to take advantage of the large numbers of users that social media attract, and the unprecedented capabilities they provide to simple non-professional users for developing, distributing, accessing and rating/commenting various types of digital content, and also for the creation of on-line communities (Chun et al. 2010; Bertot et al. 2012; Bonsón et al. 2012; Chun et al. 2012; Margo 2012; ; Nam, 2012; Criado et al. 2013; Ferro et al., 2013; Klischewski, 2014; Zheng and Zheng, 2014; Stamati et al., 2015; Wahid and Sæbø, 2015).

The first generation of social media exploitation by government agencies focused on setting up and operating their own accounts in several social media, posting policy-related content to them (in order to stimulate relevant discussions with citizens), and then analysing citizens' interactions with this content (e.g. views, likes, retransmissions, textual comments, etc.), either manually, or automatically, using central systems accessing various social media platforms through the application programming interfaces (APIs) of the latter (Charalabidis and Loukis, 2012; Ferro et al., 2013; Loukis et al., 2014). Recently a second generation of social media exploitation by government agencies has emerged, which focuses on the collection and exploitation of policy-related content created by citizens beyond their own social media accounts, in various political forums, blogs, news websites, and also in various 'external' Twitter, Facebook, etc. accounts, through SMM.

SMM, defined as 'the continuous systematic observation and analysis of social media networks and social communities' (Fensel et al., 2012), as mentioned in the Introduction, has been initially used by private sector firms, in order to address their fundamental need for listening to their existing and potential customers (in a better and more efficient way than the traditional methods used for this purpose, such as questionnaire surveys), as well as to harness and exploit the wealth of user-generated content available online (Croll & Power, 2009; Sen, 2011; Kasper & Kett, 2011; Fensel et al, 2012; Stavrakantonakis et al., 2012). This is usually conducted through specialised ICT platforms, which enable listening to social media users, and accessing real customers' opinions, complaints and questions, at real time in a highly scalable way, and then measuring and analysing their activities and content concerning a specific brand, or an enterprise, or specific products and services, and processing this information; this leads to valuable insights from the side of enterprises regarding how customers view them, their services and solutions, and also their competitors, and provides support for the design of relevant strategies.

However, there is a lack of frameworks for the multi-dimensional evaluation of SMM platforms, practices and approaches in general, which would allow assessing various aspects of them, and identifying their strengths and weaknesses; this would be very useful for the wider diffusion of SMM, as it would provide evidence for the value and benefits it can offer, and at the same time support for its its improvement. There is only a framework for evaluating SMM tools proposed by Stavrakantonakis et al. (2012), which comprises a set of evaluation criteria that can be used to analyze and assess the functionality of social monitoring ICT tools from three perspectives: the concepts they implement and support (data capture and analysis, workflow, engagement – reaction to posts, and identification of influencers), the technologies used (listening grid adjustment, near real-time processing, integration with third party applications, sentiment analysis, historical data) and the user interface they provide (dashboard, results' export).

Quite limited is the previous literature concerning the use of SMM by government agencies. Bekkers et al. (2013) investigate the practices of SMM in four Dutch public organizations (the Ministry of Education, Culture, and Science, the Ministry of Infrastructure and Environment, the Dutch Tax and Customs Administration, and the Employee Insurances Agency). They examine the goals of SMM (fine-

tuning existing policies, on-line reputation management and prevention of resistances, policies co-production), the way of its operation and its effects. Also, they discriminate between four types of monitored citizens' electronic discussion media based on two criteria: the level of perceived privacy (low or high), and the type of issues discussed (personal or societal); they recommend that more ethical questions arise, so government agencies should be more careful and also transparent, if the citizens' electronic discussion media monitored are characterised by higher perceived privacy and host discussions on more personal issues. Therefore further research is required towards the evaluation of the use of SMM by government agencies from various perspectives; also, there is a lack of a frameworks for this purpose. Our research contributes to filling these research gaps.

2.2 Wicked Social Problems Theory

Previous literature has analysed the inherent high complexity of the problems of modern societies that have to be addressed by government agencies through appropriate public policies. In a highly influential paper Rittel and Weber (1973) theorize that social problems have become after the end of the second world war 'wicked', as they lack clear and widely agreed definition and objectives. Because our societies have become more heterogeneous and pluralistic in terms of culture, values, concerns and lifestyles, social problems have many stakeholder groups with different and heterogeneous problem views, perceived issues and problems, concerns and expectations, so there is a lack of clear and widely agreed problems' definitions and objectives, and also quite different attitudes to existing policies or proposed policy options.

This increases significantly the difficulty and complexity of public policy formulation, as the responsible for them government agencies have to collect a variety of issues perceived by different stakeholder groups with respect to a policy under discussion, and also their different concerns, expectations and attitudes, and then try to have consultations and negotiations with them in order to achieve some degree of synthesis and consensus. These can be greatly supported through the use of appropriate information systems, referred to as 'issue-based information systems' (IBIS), which allow the collection of the multiple issues and problems perceived by various stakeholder groups, and also their heterogeneous concerns, expectations and attitudes (Kunz and Rittel 1979; Conklin and Begeman 1989; Conclin 2003).

Therefore it is important to evaluate the use of SMM by government agencies from this public policy perspective, and assess to what extent it can be useful for addressing the abovementioned inherent complexity of the formulation of public policies for the highly complex wicked problems of modern societies.

3   An Evaluation Framework

Based on the background presented in the previous section a framework has been developed for evaluating the use of SMM in government for supporting public policy formulation. Our framework is at a higher level than the one of Stavrakantonakis et al. (2012), which has been briefly described in section 2.1; while the latter focuses on the provided functionality and user interface by SMM tools, and the technology used, we are focusing mainly on the final outcome of them: the support they finally provide for public policy formulation, addressing its inherent difficulties discussed in section 2.2 (Rittel and Weber, 1973; Kunz and Rittel 1979; Conklin and Begeman 1989; Conclin 2003), and also the effort required for using them and extracting this support.

In particular, according to the technology acceptance research the intention to use a new technology, and also its actual use, are determined mainly by 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) (Davis, 1989; Venkatesh and Davis, 2000; Schepers and Wetzels, 2007; Hsiao and Yang, 2011). However, relevant literature has stressed that each of these two factors, and especially the latter, should be further elabo-

rated and focused on the particular objectives and specificities of each particular type of information systems (IS) we study. So for developing our evaluation framework we elaborate these two evaluation perspectives based on the particular characteristics of SMM in government. The basic structure of it is shown in Figure 1.

In particular, our first evaluation perspective is (as usual in most IS evaluation frameworks) the ease of use of SMM, assessing both the general ease of use of it, and also the ease of use of its two main components (as described in more detail in the following section 4): the modelling one (enabling the development of a model of the main terms of the specific policy domain, and also the specific public policy, we want to collect relevant content about in the monitored social media), and the results' visualisation one (= how clear and easy to understand are the visualisations of the results).
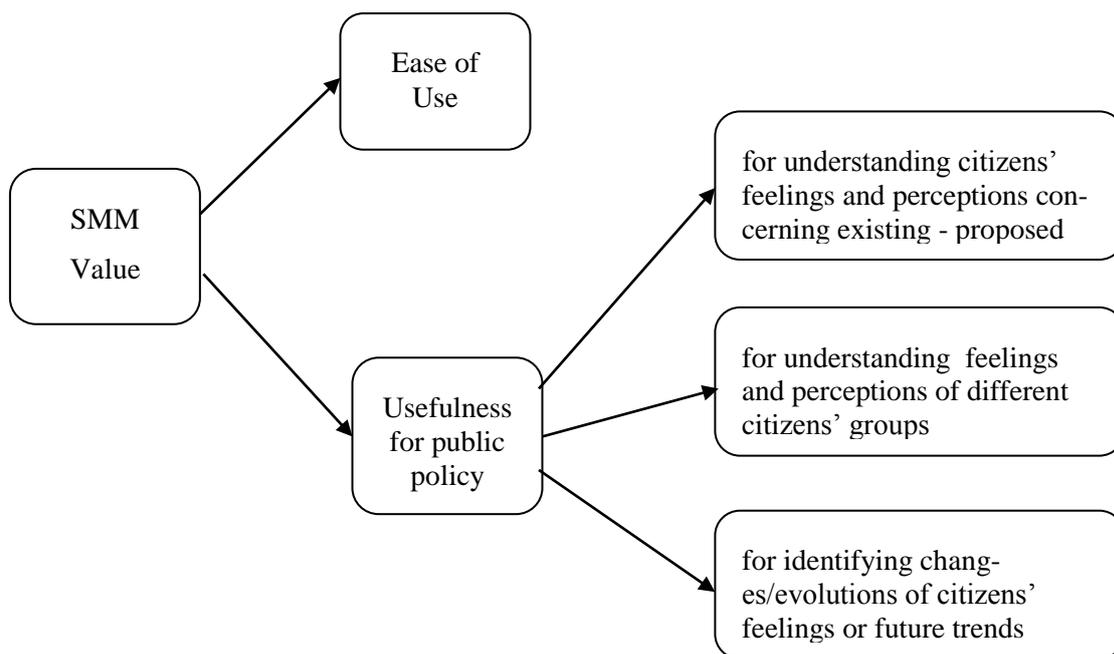

Figure 1.   Basic structure of the proposed framework for evaluating SMM use in government

Our second evaluation perspective is the public policy one, assessing to what extent the particular method of SMM in government is useful for the formulation of public policy, and for addressing the inherent complexity of the formulation of public policies for the highly complex wicked problems of the modern highly heterogeneous societies; its theoretical foundation is the wicked social problems theory outlined in the previous section (Rittel and Weber, 1973; Kunz and Rittel 1979; Conklin and Begeman 1989; Conclin 2003). It examines the support provided by SMM for understanding the feelings and perceptions concerning various existing or proposed policies of citizens in general, and also of particular citizens groups (which might differ significantly due to the heterogeneity of modern societies as mentioned above); also, since these are often dynamic, we also examine the support provided by SMM for identifying changes/evolutions in these feelings and perceptions of citizens and relevant future trends. This is associated with the 'dynamic capabilities' (Teece, 2007) of government agencies (concerning their 'sensing' related component). In particular, this evaluation perspective assesses to what extent SMM is useful for the evaluation of citizen's feelings against a prospective or existing policy, or a legislation amendment, and also, going into more detail, of the position of the general public towards different aspects of a suggested policy; furthermore, for evaluating the attitudes of different citizens' groups against a prospective policy, and for the identification of digital opinion leaders (probably associated with important policy stakeholders); and finally, for understanding the timewise

evolution of the public attitude-sentiment against a policy issue/topic, and for the identification of emerging new relevant issues/topics or tendencies in the society. In the following Table 1 the whole evaluation framework is shown.

Ease of Use Perspective
• How easy it is to use this method of SMM in government in general?   • How easy it is to use the modelling component ?   • How clear and easy to understand are the visualisations of the results ?
Public Policy Perspective
To what extent this method of SMM in government is useful/beneficial for …   • the evaluation of citizens' feelings against a prospective or existing policy ?   • the evaluation of citizens' feelings against a legislation amendment ?   • the evaluation of the position of the general public towards specific aspects of a suggested policy?   • the evaluation of the attitudes of different citizens' groups against a prospective policy ?   • the identification of digital opinion leaders ?   • understanding the timewise evolution of the public attitude-sentiment against a policy issue/topic?   • the identification of emerging new relevant issues/topics in the society ?   • the identification of emerging new relevant tendencies in the society ?

Table 1.   A Framework for the Evaluation of SMM Use in Government

4   An Evaluation Framework

A method of SMM use by government agencies, and other public policy stakeholders as well, in order to support the formulation of public policy has been developed as part of the abovementioned European research project NOMAD (Charalabidis et al., 2014; Loukis and Charalabidis, 2014). A brief description of it is provided in this section. It consists of four steps:

i) The first step is to build the 'domain model', which is an ontology-based representation of the objects of the "world" (domain) we intend to intervene in through a policy (e.g. energy domain, education domain, health domain). The main entities-terms of its are inserted, as well as relations among them, in a tree structure, using a graphical modelling tool.

ii) Then the second step is to build the 'policy model', which is a representation of the public policy we want to collect relevant content about in the social media; it consists of a number of 'policy statements' associated with one or more nodes of the policy model, and also for each of them some positive or negative 'arguments'. A policy model is inserted on a policy model (used as a basis for it) using the above graphical modelling tool.

iii) Upon the completion of the models, the user provides a list of social media sources (e.g. blogs, news websites, and also Twitter, Facebook, etc. accounts) which are going to be crawled, in order to find relevant content about the public policy of interest (= places on the web that according to previous knowledge might contain relevant user-generated content, i.e. citizens are likely to have expressed opinions and suggestions, or relevant needs and problems, concerning this policy topic there).

iv) The defined sources (in step iii) are searched against the above domain and policy models (defined in steps i and ii respectively), and the collected content undergoes sophisticated processing using opinion mining techniques: initially opinions and arguments are extracted, and then sentiment analysis of them is performed (the processing is described in more detail in Charalabidis et al. (2014)). The results are presented to the user in visualised form; a typical results' visualisation screen (see Figure 2) includes:

o In the upper left part of the screen is shown an estimation of the volume of discussion and the cumulative sentiment for all the elements of the domain or policy model (according to the selections made just above it), the former being visualised through the height of the corresponding rectangle, and the latter through its colour (with the green colour denoting positive sentiment, and the orange negative sentiment).

o For the above model, or for a selected element of it, below (in the lower left part of the screen) is shown the distribution of the volume of discussion over time and also across age groups,

o while in the upper right part is shown a word cloud depicting the most frequent terms-topics discussed online (coloured according to the corresponding sentiment),

o and in the lower left part we can see a list of text excerpts from the sources with relevant content (concerning the selected model or element of it).

Also an 'audience comparative view' can be provided, which shows differences among selected different age, gender or education groups, or differences over time, in the discussed topics (volumes of discussion and sentiment.

Figure 2.   A typical results' visualisation screen

5   Research Method

Three pilot applications of the above method of SMM use in government have been conducted as part of the NOMAD project, and evaluated using the multi-perspective evaluation framework presented above. Since this SMM method, as mentioned in the previous section, is intended to be used not only by government agencies, but also by other public policy stakeholders (who want to know citizens'

opinions, sentiments/attitudes and suggestions concerning various policy related topics before submitting relevant policy proposals to government) as well, two of these pilots were carried out by government organizations: the Greek and the Austrian Parliament; the third one was conducted by an important policy stakeholder in the health domain: the European Academy of Allergy and Clinical Immunology. A detailed scenario has been designed for each pilot, which describes how this SMM method will be used for supporting their policy formulation objectives (focusing on topics reflecting important current debates).

The first pilot application was conducted by the Greek Parliament, and concerns the regulatory and legal framework on energy management, i.e. the "Greek strategy for energy planning" (in compliance with the respective EU Directive 2009/28 EC). The objective of the pilot application was to assess public opinion and attitude/sentiment against this prospective legislation, and based on the collected information through SMM to propose possible amendments. The second pilot application was conducted by the Austrian Parliament, and aimed to monitor the ongoing public debate on the legal basis for "open government information in Austria" and the open government data policies at large. The third pilot application was oriented towards a more scientific policy topic: it was conducted in collaboration with the European Academy of Allergy and Clinical Immunology (EAACI) in order to assist it in discovering the public stance against "allergy diseases and immunotherapy", and based on this knowledge to design policies for raising awareness in this area, and also to formulate relevant policy proposals.

In particular, for each pilot the following process was followed:

A. At first, the detailed SMM use scenarios in the selected thematic domain have been defined in co-operation with the 'owners' of the pilot, and then the domain and policy models required for data crawling were created by them, and finally a list of targeted social media sources (which, according to previous knowledge of the pilot owners, might contain relevant user-generated content) has been specified.

B. After the above preparation, the owners initiated the process of crawling the specified sources against the corresponding domain and policy models, and then processing the collected content, through the ICT infrastructure that supports the application of this SMM method.

C. Then the personnel of the owner organization who participated in this pilot inspected the results, understood them in detail, assisted by members of our research team, and used them in order to draw conclusions about citizens' opinions, sentiments/attitudes and suggestions concerning the topic of each pilot.

D. Finally, for each pilot an evaluation focus group discussion was organised, which attended by personnel of the owner organization who were involved in this pilot in this pilot, and also other invited persons who had relevant knowledge and experience (e.g. for the pilots of the Greek and Austrian Parliament were invited advisors and assistants of Members of the Parliament, journalists specialise in the corresponding domain; for the EACCI pilot were invited doctors, experts and journalists specialised in allergy and clinical immunology). During this focus group discussion the proposed SMM method was introduced to the audience, together with the supporting ICT infrastructure, and particular applications with their results was showcased. Then the attendees had the opportunity to interact with the ICT platform, performing some predefined tasks, under the observation of organizers' staff, who supported them in completing these tasks, and recorded any comments or difficulties.

In order to collect evaluation data from the attendees of these focus group discussions we used a combination of both qualitative and quantitative techniques. Qualitative techniques allow a more in-depth examination of about a phenomenon of interest, and therefore the generation of a deeped knowledge about it, not limited to a predefined number of variables, enabling a better and richer understanding of 'why' and 'how' things happened; on the contrary, quantitative techniques enable condensing and summarizing a large quantity of evidence in a few numbers, which makes it easier to draw conclusions (Maylor and Blackmon, 2005; Ragin and Amoroso, 2011; Yin, 2013). For these reasons in each of these focus groups we conducted initially qualitative discussions focused on the questions of our eval-

uation framework (Table 1), in order to gain a deeper and richer understanding of why the attendees perceive a low or high level of value generated along each of these dimensions. Then we ask them to fill an evaluation questionnaire, which has been structured based on the questions of our evaluation framework: these questions were converted to positive statements, and the respondents were asked to provide the degree of their agreement/disagreement with each of them in a five-levels scale (1 = totally disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = totally agree), which condenses/summarizes all positives and negatives along this value dimension. The above qualitative discussions were recorded with the consent of the participants, and then transcribed and coded manually using an open coding approach (Maylor and Blackmon, 2005); the data collected through the questionnaire were processed using Excel.

6   Results

In Table 2 are shown the results from the processing of the data collected through the questionnaire (average ratings for all questions - evaluation metrics).

Ease of Use Perspective	
It is easy to use this method of SMM in government in general	3.02
It is easy to use the modelling component	3.53
It is easy and clear to understand are the visualisations of the results	3.40
Public Policy Perspective	
This method of SMM in government is useful/beneficial for …	
- the evaluation of citizens' feelings against a prospective or existing policy	4.17
- the evaluation of citizens' feelings against a legislation amendment	3.69
- the evaluation of the position of the general public towards specific aspects of a suggested policy	3.94
- the evaluation of the attitudes of different citizens' groups against a prospective policy	3.40
- the identification of digital opinion leaders	3.71
- understanding the timewise evolution of the public attitude-sentiment against a policy issue/topic	4.20
- the identification of emerging new relevant issues/topics in the society	3.74
- the identification of emerging new relevant tendencies in the society	3.83

Table 2.   Average ratings for all evaluation metrics

With respect to the ease of use perspective we can see that though the respondents find that the ease of use of the modelling component and the results' visualizations are moderate to high (average ratings 3.53 and 3.40 respectively), the ease of use of the whole method is moderate (3.02). Therefore the application of this method of SMM in government does not seem to be easy. In the focus group discussions it was mentioned that the main reason for this is the need to build complex models of the specific domain and also the particular policy we are interested in, which requires much time and effort. As a possible solution for this was suggested the use of existing domain ontologies or vocabularies as a basis (and probably add or subtract entities-terms), so the functionality of the ICT platform should be enriched in order to provide such import capabilities. For the results' visualization it was stressed that it is useful for gaining a better understanding of the results, however some improvements are required, such as provision of some additional charts, and improvement of existing ones in order to become more clear and understandable; also it should provide the capability to use some of the results (e.g. terms-topics from the word cloud) in order to improve the domain and policy models. Furthermore, it

was suggested that the visualization tool should be more flexible and adaptable to user's preferences. Another issue raised was that the users cannot understand how the various types of results (e.g. discussion volumes, sentiments, wordclouds) have been produced, and this makes their interpretation difficult; so it would be useful for each chart to provide a basic explanation of how it has been calculated, possibly with links providing more detailed explanations if required by the user (i.e. more results transparency).

With respect to the public policy perspective from Table 2 we can see that the respondents perceive as high to very high the usefulness of this SMM method for evaluating citizens' feelings against a prospective or existing policy in general (4.17), and also between moderate and high (closer to the latter than to the former) its usefulness for making more detailed evaluations of citizens' feelings against a legislation amendment, or of the position of the general public towards more specific aspects of a suggested policy (3.69 and 3.94 respectively). Also, they find moderate to high its usefulness for evaluating of the attitudes of different citizens' groups against a prospective policy, and for identifying digital opinion leaders (which are usually associated with important policy stakeholders) (3.40 and 3.71 respectively). Furthermore, the respondents perceive as high to very high the usefulness of this SMM method for understanding the timewise evolution of the public attitude-sentiment against a policy issue/topic (4.20), and also moderate to high (being closer to the latter than to the former) its usefulness for identifying emerging new relevant issues/topics and emerging tendencies in the society (3.74 and 3.83 respectively).

In the focus group discussions there was an overall agreement that this SMM method provided a time and cost efficient channel to assess citizens' attitudes and feelings on a policy related topic of interest, both from quantity (e.g. the volume of discussion about it) and quality (e.g. the sentiments, the most popular topics within relevant discussions) viewpoint, which is better and less expensive than the traditional citizens' surveys conducted by government agencies. Policy makers or assistants who participated expressed their interest to utilize such SMM results as evidence and documentation for supporting their positions (e.g. on a draft bill, on an existing legislation act, a policy proposal, etc.) "in the parliament or other democratic institutions". Thus, based on their experience in the policy making area the proposed SMM method has the potential to become a "powerful tool for producing new policies", which can be used in all stages of public policies' lifecycle. However, they mentioned the risk of misusing such SMM results for promoting individual interests, by focusing selectively on some of the results that support their own positions, and hiding some others, and possibly misinterpreting them, instead of using these results for really gaining a better understanding of society's opinions, attitudes, sentiments and concerns with respect to an existing policy or a policy under formulation, in order to formulate better, more effective and acceptable policies. Furthermore, they are only to a small to medium extent also mentioned the risk of monitoring citizens' postings perceived by them as private, which would seem to them as an intrusion into their private sphere; even worse would be the use of the results for identifying citizens having political beliefs and orientations different from the ones of government, and for personal monitoring of them. It was generally concluded that the benefits for society from the use of any web-monitoring tool by government depend critically on how this technology is utilised and how its results are exploited.

It has been stressed that one of the most valuable capabilities of this method is the comparative analysis/view it can provide, i.e. present comparisons in the results between demographically different audiences (e.g. in terms of gender, age and education), or different time intervals. The latter comparison between two different time periods enables monitoring the evolution of public stance on a policy related topic, and also measuring the impact and effectiveness of various relevant communication and awareness campaigns or interventions. Participants of the focus groups discussions suggested to include additional location related demographic information, since the geographical dimension is very often important for government decision making, especially for public policies that concern or affect specific regions.

Finally, some of the participants in the focus group discussions mentioned that this SMM method enables to some extent the identification of emerging new relevant issues/topics or tendencies concerning a domain or public policy, however not to the extent they would expect and require. The word cloud does not seem appropriate for the early identification of new issues, topics or tendencies, as it is dominated by the well-established topics-terms (shown with big character sizes, as they are more frequently mentioned by citizens), while the new ones are hardly visible (only some of them are shown with much smaller character sizes, as they are much less frequently mentioned by citizens); new issues, topics or tendencies can be identified mainly by reading the list of text excerpts from the sources with relevant content (lower left part of the typical results' visualisation screen – see Fig.2). In order to have improvement on this two suggestions have been made: a) to add the capability of temporarily removing out of the word cloud the most frequent topics-terms it includes (shown with big size), so that other less frequently mentioned topics-terms become more visible; b) to process further the above text excerpts using various opinion mining techniques, in order to automatically identify new topics-terms.

7 Conclusions

In the previous sections of this paper has been presented initially a framework for the evaluation of the use of SMM by government agencies, from a public policy making perspective (and also from the classical ease of use perspective, which concerns the effort required for its practical application), based on sound theoretical foundations. This framework was then used for the evaluation of three pilot applications of a novel method of SMM by government agencies and other public policy stakeholders, which has been developed as part of the NOMAD European research project.

It has been concluded that such a method of using SMM in government can provide considerable assistance and support for public policy making, as it enables rapid and low cost assessment of citizens' opinions, attitudes and sentiments for a prospective or existing policy, or a legislation amendment; it also allows the identification of differences in the above between different citizens' groups, and also of digital opinion leaders (usually associated with important stakeholders). Furthermore it can provide some assistance and support for understanding the timewise evolution of the public attitude-sentiment against policy issues/topics of interest, and for identifying emerging new relevant issues/topics and tendencies in the society, so it can contribute to improving the 'dynamic capabilities' (Teece, 2007) of government agencies (with respect to their 'sensing' related component). However, this method of SMM does not seem to be easy to use and apply, as it requires building complex models of the specific domain and also the particular policy we are interested in (the use of relevant existing ontologies or vocabularies as a basis for them might reduce the required effort and time for this). Also, the benefits for society from the use of such SMM methods by government depend critically on how and for what purposes they are used, as there are significant risks of misusing them (so transparency in this respect is necessary).

Further research is required concerning the evaluation of SMM in government from multiple perspectives (using different theoretical foundations), and based on a wider range of pilot applications (in various types of government agencies and other policy stakeholders), in order to understand better the value and benefits it can offer to government agencies, and also its weaknesses and critical success factors, so that we can reach higher levels of effectiveness and maturity in this area.

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