Social Media and e-Land Governance: An Expert-based Evaluation Model

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Abstract

Social media may be seen as the future of ICT tools; its popularity has sparked a demand for new forms of e-land governance through the context of location-based social media and offers great opportunities for reinforcement of the two-ways communication and citizens' participation in location-based decision making processes. However, social media tools for land e- governance are still at a rudimentary stage of development and their usage in land related issues is challenged. Which is the experience gained so far? Does the degree of usage of social media associate with wider land policy issues? Which are the potential risks and barriers which arise when using social media for land management and administration activities? Which are the benefits and the motivations for incorporating social media in spatial decision making?

In order to investigate the aforementioned considerations in a systematic way, a prototype web questionnaire was administered to land experts and 32 responses were finally obtained.. The next step comprised the development of a multi-criteria expert choice model to analyze and prioritize the potential, benefits, barriers, risks, challenges and limitations of social media and its effects on land administration and management, according to the above expert's opinions and their stated preferences. This paper presents the basic methodological steps and the findings of this research through a variety of advanced statistical approaches.

1. Introduction and Research Background

The potential benefits of the participatory management, especially in natural resources and land management have been emphasized many times in literature. The most common ones refer to the greater public acceptance of agency programs, the increased trust with the stakeholders, the transparency in decision making and the opportunity for mutual learning (Brown and Squirell, 2010; Selin et al., 2007). There are some risks however relating to the outcomes of the participatory process due to the heterogeneity of participants and its level of familiarity with land data. Moreover, different goals, expectations and social standings of the participants, are additional constraints for the combination process of their attitudes and opinions. Thus, a major aspect of the participatory techniques evolvement is the improvement of the information flow between the different audiences. The Web is part of this evolution and consists the platform for improvement of complex information exchange among various stakeholders.

1.1 Public Participation and Spatial Info

Kelly et al. (2012) highlighted three main areas where the internet can improve collaboration for land and natural resources management. The first is the very common mode dubbed e-Governance which refers to the information delivery to the public, giving the opportunity to interested stakeholders to participate in planning processes (e.g. comments on on-line documents). A second area is the opportunity for online dialoging and discussion boarding, utilizing the benefits of the Web 2.0 platform. The rise of the web-based social tools and services (like social media) has made participation in on-line discussion accessible to wider number of people. These social platforms are very effective in incorporating viewpoints of large heterogeneous populations and can be useful for targeted feedback. Finally, the third related area incorporates the spatial dimension through the Geographical Information Systems (GIS) and the various on-line spatial decision support tools. Generally speaking, GIS does a better job of sharing data and information than knowledge, which is more difficult to detach from the owner while solves the ancient problem of combining general scientific knowledge with specific information giving practical value to both (Longley et al., 2005). If GIS tools made available to public administration would enforce good governance realisation (Caiaffa, 2003).

Information and communication technologies (ICTs) are considered as a powerful means to promote transparency and participation approaches to improve traditional land administration and management systems. These technologies may provide to all levels of users, timely access to spatial information for making informed decisions. According to McLaren and Stanley (2011), the geospatial information improvement worldwide, consists of three core ICT technologies for land, which can be capable to handle them in the most effective way: 1) The Internet, 2) The Global Navigation Satellite Systems (GNSS), and 3) The Geographical Information Systems (GIS). Regarding the internet ICT technology, the ideological and technological foundations of Web 2.0, nowadays, allow users to effectively utilize the World Wide Web, by having the opportunity to modify its content in a participatory and

collaborative way (Kaplan and Haenlein, 2010). Therefore, the advent of the "participatory web" and the more recent development of location based social networking, mainly represented by Web 2.0, provide users with real-time, dynamic geospatial information and location-based information services. However, in order to improve public participation, it makes more sense the stakeholders involvement in a very early stage of planning, where the participation instruments (e.g. workshops) might well supplemented by geo-ICT tools (Knapp et al., 2007). Kaplan and Haenlein (2010) argued that Web 2.0 is the platform for the evolution of Social Media. Given the explosive growth of social media, Kietzmann et al. (2012) pointed out that we are also in the midst of an altogether new communication landscape.

1.2 Social Media: State of the Art

Porter (2008) argued that social media relies on any content that has been created by end users (users-generated content-UGC) and unlike the traditional media (e.g. books, radio, television) which are primarily designed to be a broadcast platform (one-to-many), social media are designed to promote the dialogue and the "many-to-many" interaction. Expanding this argument, Hansen et al., (2011) pointed out that the social media consist of a conglomeration of web-based technologies and services which differ in their scope, the pace of interaction, the type of content being shared (e.g., videos, images, text), the types of connections between users and items, and data retention policies. Some authors have attempted to classify social media types. For example, Kaplan and Haenlein (2010) organize them into six types: 1) collaborative projects, 2) blogs, 3) content communities, 4) social networking sites, 5) virtual game worlds and 6) virtual social worlds. Hansen et al., (2011), organize them into five main categories: 1) blogs-microblogs, 2) based on social sharing services, 3) based on collaborative editing tools, 4) virtual worlds and 5) based on social networking services. Furthermore, Fotis et al., (2010) organize social media into four domains: 1) expressing, 2) networking, 3) sharing and 4) gaming, while Bonson et al. (2012) organize social media under the terms of social networking into 3 main groups: 1) those for general purpose (e.g. Facebook, MySpace), 2) professional platforms (e.g. LinkedIn) and 3) those with specific functionality (e.g. Digg, Delicious etc.).

Lange and Elliot (2012) had stated that social media have become the *modus operandi* of the 21st century. Nowadays, "Facebook", "Twitter", "YouTube", "Flickr" and "MySpace" are the most common social media which are used by internet users. To illustrate, by early 2012, Facebook has more than 845 million of active users, Twitter was generating an estimated 55 million tweets a day, Flickr was amassing more than 600 photos each minute and YouTube was accumulating over 60 hours of video per minute (Kavanaugh et al., 2012). But, despite this massive employment of the social media by the majority of internet users, there is still an ongoing confusion among researchers on what exactly should be included under the term of social media and on what exactly shapes the difference between social media, Web 2.0 and UGC. For the time being, the term of social media is used to describe a tool or a service that utilizes the Web 2.0 platform and the aspects of the UCG for social

interaction. A very realistic approach was given by Kaplan and Haenlein (2010) who define social media as "*a group of internet-based applications that build on the ideological and technological foundations of Web 2.0 and that allow the creation and exchange of user-generated content*".

A very promising aspect of social media is the overall opportunities derived from its utilization by the government or by the public sector in general. Many researchers argued that in the government level, social media consists the communication channels with citizens, facilitating openness, transparency and democratization, noting the emerging opportunity for governments to reinvent their relationship with citizens (Picazo-Vela et al., 2012; Kietzmann et al., 2012; Lathrop and Ruma, 2010; Noveck, 2009). In particular, Bonson et al., (2012) has mentioned the positive impact of Web 2.0 tools (including social media) on the public sector which can be seen in four areas: 1) improvement of public sector transparency, 2) improvement of policy making, 3) improvement of public services and 4) improvement of knowledge management and cross-agency cooperation. In addition, unlike the traditional communication methods, by adopting social media applications, governments can save money and other vital sources or, even better, the social media could be very effective in early event spotting, the research time of which can be even faster than official sources (Kavanaugh et al., 2012). Despite the aforementioned benefits, the adoption of social media by the governments poses a number of potential risks and barriers related to records management, privacy and security issues, accuracy and administration-specific requirements. Especially for the latter, the lack of resources and procedures could undermine the accuracy of the information posted on social media (Picazo-Vela et al., 2012).

On the other hand, due to the fact that these kinds of technologies are very recent, research about the social computing on the public sector is still highly tentative and exploratory. However, according to the results of Bonsons et al. (2012), regarding the level of use of social media and Web 2.0 tools by the EU local governments, show that the development of these kind of technologies does not depend on citizen demand and neither does the public administration style (Anglo-Saxon, Nordic, Germanic and Southern European counties) influence the level of development of these tools. Moreover, they conclude that unlike the fact that most local governments are using Web 2.0 and social media tools to enhance transparency, the concept of corporate dialog and the use of Web 2.0 to promote e-participation are still in their infancy at the local level and much remains to be done by European local governments. By contrast, U.S. is much more ahead of Europe on using social media tools and this widespread adoption has been emphasized in a number of different White House reports (e.g. the 2009 report entitled "Open Government: A Progress Report to the American People"). Much U.S. government activity is now focused on social media, becoming a central component of e-government in a very short period of time and agencies are increasing their use of social media technologies as a way to extend government services (Bertot et al., 2012).

1.3 Land Governance and Social Media

Dimopoulou and Tolidis (2012) have highlighted 8 main points regarding the use of social media in land governance:

- The concept of citizen's involvement in spatial decision making apart from the view of distribution and exchange of proper spatial data and information should also be regarded as the basis for promoting participatory spatial planning which is an implicit but essential component.
- ICT tools are crucial for improving the citizen's involvement by providing the ability for sufficient and robust procedures of spatial data handling.
- Land administration[1] and land management are interdependent land related activities while effective land administration systems are crucial for land management systems.
- The land management activities are related to spatial decision problems which are often multidimensional, have goals and objectives that are not completely defined, and have a large number of alternative solutions.
- User-Generated Content is the core function of social media tools and services and provides the basis for new expansions to the concept of "User-geographical generated content".
- e-Land governance[2] should be regarded as an evolving definition. There could be different views on this term, but the utilization of social media tools are essential and provide the basis for added value services improving both the land administration and management systems.
- By incorporating social media tools into land management procedures, a targeted feedback could be expected, while by performing social network analysis (SNA), the degree of influence by specific stakeholder's groups could be identified.
- The social media should also be regarded as think tanks. Under this term, are potential quantitative and qualitative research platforms which can improve spatial decision making procedures in a more systematic way.

All the aforementioned lead us to a new reality regarding the way that social media platforms can be used for land management and administration procedures. Thus, it is strongly believed that, open-source technologies, object relational database management systems, multi-criteria analysis techniques

[1] According to Enemark et al., (2005) "… *Land management encompasses all activities associated with the management of land and natural resources that are required to achieve sustainable development.*." and *".. the land administration functions are based on and are facilitated by appropriate land information infrastructures that include cadastral and topographic datasets and provide access to complete and up-to-date information about the built and natural environment..".*

[2] According to Ciborra and Navarra (2013) E-government intersperses various internet based ICTs aiming to 1) connect government agencies and institutions 2) shift the delivery of government services over the Internet through its reorganization of information flows and functions.

and an integrated user friendly interface, are the main components of a proposed geo-ICT social media tool. Figure 1 illustrates the architecture of a proposed map-centered communication tool through social media platforms. System's architecture consists of 3 basic sub-systems: 1) The Data base management system (DBMS), 2) The multi-criteria model methodologies base and its Model Base Management System (MBMS) and 3) the Application Programming Interface (API) of a Web GIS application through the social media platform. To achieve a high efficiency level the functions and interrelations of these subsystems must rely on GIS standards as defined by the OGC's (Open Geospatial Consortium).

The DBMS type is object relational (ORDBMS) which support object-oriented design and complex spatial and non-spatial data types. Furthermore ORDBMS, search, access and manipulate complex data types in the database with standard (SQL3), without breaking the rules of the relational data model.

The API of the public Web GIS comprises functions related to map processing and analysis using JavaScripts tools and multi-criteria techniques which are supported through the MBMS. The basic idea of this map-centered communication API tool is to incorporate a web-based argumentation map and a discussion forum in single social media user interface. Keßler's Argumap Prototype source code (Keßler et al., 2005) seems to meet these requirements. It is a web-based open-source code which is adaptable to different use cases and does not require the purchase of any other piece of software (Sildar and Rinner, 2007).

The output data from to this approach consists of both quantitative and qualitative types, which are related to spatial context and text data (from discussion forum) respectively. These result data should be properly stored in a base which must be further associated with the initial Spatial Database through Geography Markup Language (GML). GML serves as a modeling language for geographic systems as well as an open interchange format for geographic transactions on the Internet. It can be used both to represent and model geographic objects and it serves as the foundation for all manner of geographic web services (Lake, 2005).

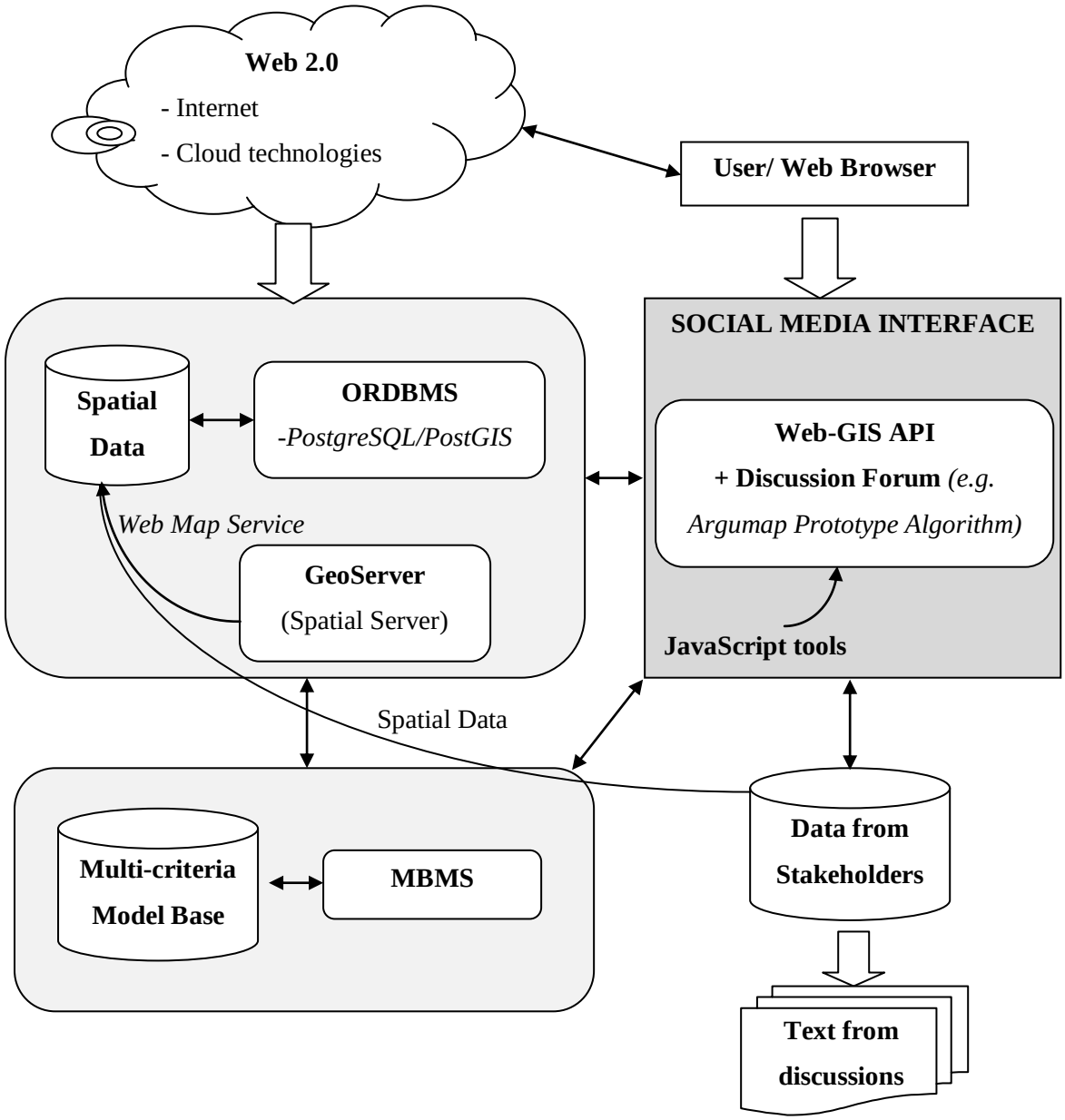


Figure 1: *Architecture of Web-GIS API in Social Media (Edited by Authors)*

2. Call for Research: Conceptual Framework

2.1 Research Questions and Hypotheses

There are many definitions regarding the nature and the exact meaning of the term "hypothesis". A very comprehensive definition is provided by Sarantakos (2005). According to the author "a hypothesis can be defined as a tentative explanation of the research problem, a possible outcome of the research, or an educated guess about the research outcome." In other words a hypothesis is a formal statement that presents the expected relationship between an independent and dependent variable (Creswell, 1994). However, hypotheses and research questions are not independent concepts because. In the matter of fact, a research question is essentially a hypothesis asked in the form of a question.

The research conceptual framework has been planned based on specific research questions and associated hypotheses. More specifically, 11 research questions and 6 working hypotheses taken into account, which are also associated with the main objective and the sub objective of the research (Table 1-2).

Table 1: *Research Objectives and Questions*

Main Objective: To define and evaluate the potential impacts of social media (SM) tools on land management and administration activities.	
Sub-Objectives (SOn)	**Associated Research Questions**
SO1: Usage profile of SM both for general professional use and especially in land-related activities	**1.1** How the utilization degree varies among the different employment sectors?
	1.2 What are the main motivations of use and what are the main reasons of not use?
	1.3 What kind of SM (categories) are the most commonly used?
	1.4 What is the duration and frequency of use?
SO2: Attitudes to reinforcement of e-governance	**2.1** To what extend SM tools improves the two-way communication between public and private sector?
SO3: Attitudes to key success factors	**3.1** What factors and to what extent they contribute to the success and efficiency of SM tools when used in land related activities?
SO4: Attitudes to significance level of use by different types of organizations (including professionals)	**4.1** How important is the use of SM tools by different types of public and private organizations (including individual professionals)?
SO5: Geo-ICT tools and functionalities	**5.1** What Geo-ICT tools and functionalities are the most common used? For what purpose?
SO6: Willingness for future use of SM	**6.1** What is the willingness of use of SM in 5 years from now?
SO7: Classification of potential impact factors in terms of potential benefits, risks and opportunities.	**7.1** What are the main potential benefits, risks and opportunities derived from the utilization of SM tools on land management and administration activities?
	7.2 How important is each potential impact factor?

Table 2: *Research Hypotheses*

H1: Utilization of SM in land management (LM) and administration (LA) activities is independent of the type of employment sector (public or private).
H2: It is more likely SM tools to be used in LA and LM related activities if there is an already familiarity level with these tools.
H3: SM utilization profile influences the attitudes regarding the improvement degree of SM in e-governance.
H4: SM utilization profile, influences the attitudes and the evaluation degree of potential impacts importance.
H5: The kind of employment sector (public or private) influences the evaluation degree of potential impacts importance.
H6: The evaluation degree of potential impacts importance is influenced by the kind of occupational profile (work in land administrations or management tasks).

2.2 Methodological Approach

2.2.1 Research Characteristics and Research Instrument

Regarding the main objective, the sub-objectives and the hypotheses of the research, there is an imperative need for data collection. A mixed methodological approach combining qualitative and quantitative data collection has been adopted as the most appropriate to achieve the aforementioned objectives taking into account the following reasons:

- Integration: Enrichment of the quantitative results with qualitative data.
- Critical data: Capturing of critical un-measured data and arguments/attitudes regarding the potential impacts importance of SM in land management and administration.
- Bias: The combination of quantitative and qualitative information analysis mitigates the subjectivity of the conclusions.

Data were collected through web-based questionnaire (online survey) using mail invitations, on mixed sample of "land experts" inside and outside EU. Online surveys comprise several benefits such as (Ahern, 2005; Boyer, et al., 2010; Israel, 2011):

- Low cost,
- Wide availability of survey design and implementation tools,
- Ability to reach larger population,
- Ease of completion by participants,
- Ease of implementation including reminders,
- Built-in features that facilitate data cleaning and improve the survey experience for respondents and researchers,
- Interactive nature of Web,
- Methodological rigor.

Despite all the above very promising features of online surveys, one major concern is online survey's typically low response rates. Petchenik & Watermolen (2011) defined an average response rate of 11% below mail and phone surveys. Extremely low response rates (around 2%) have also reported (Wiseman, 2003).

The web-based questionnaire (See Appendix) comprises a logical sequence of 4 sections of 17 prototype conditional questions[3], in total. An introductory note also included, which refers to the objective of the research, the estimated turnaround time and the researchers' contact details. In section 1, entitled "Personal Information", the corresponding questions, deals with the demographic and occupational profile of the respondent while in section 2, entitled "Introduction", the questions deals with the usage level of social media. Moreover, this section aims to collect answers which are

[3] There are subsets of questions which depend on the answer given to the main question.

associated with the respondents' attitudes: 1) to predefined success factors at SM in LM/LA related activities and to 2) the significance level of SM utilization, by different types of organizations.

In Section 3, entitled "State of the art" the corresponding questions, deals with the variety of Geo-ICT tools and functionalities that are utilized in LA and LM activities (if applicable). Moreover, this section comprises a question regarding the possible reasons that discourages the use of SM so far and a question regarding the willingness for future use of SM in LA and LM activities.

Section 4 entitled "Evaluation/Rating", consist the core of the web questionnaire which is divided into two sub-sections: 4.1) Respondents' attitudes on pre-defined potential impacts of SM tools on LA/LM related procedures (in terms of "benefits", "risks" and "opportunities") and 4.2) Evaluation of impacts' importance. The former sub-section, aims to collect qualitative data while in the latter the respondents asked to perform additional quantitative pair wise comparisons among the potential impacts. For brevity reasons, in this sub-section (4.2), the predefined impacts of every general group (benefits, risks, opportunities) were merged into three homogeneous sub-groups respectively[4].

All questions are prototype and based on the literature review findings. Regarding the questions' type, are divided into 3 main types[5]: 1) Dichotomous questions (Yes/No), 2) Multiple-choice questions (MCQs) and 3) Scale/rating questions based on Likert's 5-point scale (Likert, 1932) (Strongly Disagree-Strongly Agree/ Least Important-More Important scales) except from the section 4.2 where we used Saaty's 9-point linear scale (Saaty, 1977) for quantitative pair wise comparisons (See § 2.2.3 for further analysis).

2.2.2 Sample and Response Rates

As it has already been mentioned, the target group of respondents consists of land experts. As "land experts" were defined the professionals, either of private or public sector, where its work tasks are associated with land management and/or administration activities. In order to invite land experts to participate in the research by completing the online questionnaire, an e-mailing list of 140 potential participants was created. The greater proportion of the list (64%) concerned colleagues of the International Federation de Surveyors (FIG) and other land experts' consortiums (e.g. from INSPIRE program). Apart from the predefined e-mailing list, members of land experts groups in social networks (e.g. Linkedin) were also invited to participate in this research. Considering the fact that the members of the land experts population are very difficult to locate, the "snowball" non-probability sampling technique has been adopted, in both cases, by asking respondents to give referrals to other possible respondents.

[4] See Appendix
[5] Apart from the close-ended questions, open-ended questions were also included.

The research was conducted from 7 to 22 April 2013 with an intermediate reminding at April 15th. In a total of 230 experts who viewed the questionnaire (by clicking the link), the final response rates have been calculated (Table 3), according to the following formulas:

1. **Started rate (S.R.)** = [Number of experts that started dealing with the survey / Total experts that viewed the survey] x 100.
2. **Completion rate (C.R.) =** [Total experts that submitted their answers/ Total experts that started the survey] x 100.
3. **Response rate (R.R.)** = [Number of experts that started dealing with the survey / Total experts that submitted their answers] x 100.

Table 3: *Response Rates*

Indicator	Rate
S.R.	50,8%
C.R.	27,3%
R.R.	14% (n=32)

These low response rates are in compliance with the literature's findings. However, after the intermediate reminder, the response rate doubled (32 experts submitted their answers) in four days.

2.2.3. Social Media in LA/LM: A Multicriteria Expert-based Evaluation Model

A specific analytical methodological approach has been adopted to assess the impact of social media on land management and administration systems, utilizing the multi-criteria technique of AHP (Analytical Hierarchy Process) in a modified SWOT analysis (by performing pair-wise comparisons from land experts, between impact factors and analyzing them by means of eigenvalue technique as applied in AHP (Saaty, 1977). The hybrid model of AHP-SWOT analysis was initially introduced from Kurtilla et al., (2000) to systematically qualify SWOT factors, to equate their intensities and to support a more quantitative basis in the strategic planning. Since then, this initial methodology has been applied and studied in miscellaneous areas in order to support various decision making problems (e.g. Gorener et al., 2012; Seker and Ozgurler, 2012; Lee et al., 2011).

In this research, the application of the modified SWOT-AHP assessment model has been adopted to classify the potential impacts (positive or negative) derived from utilizing social media on land management and administration systems in terms of benefits, risks and opportunities[6]. Using this methodology the social media are evaluated comprehensively as a potential strategic choice for improving the concept of e-land governance.

AHP is an effective decision making method especially when subjectivity exists and it is very suitable to solve problems where the decision criteria can be organized in a hierarchical way into sub-criteria.

[6] The "Strength" equals to "Benefits", the "Weakness" and the "Threats" group equals to the merged group of "Risks/ Barries" and the "Opportunities" group equals to "Opportunities".

The pairwise comparison, concerning the relative importance of the two factors involved in determining the suitability for the stated objective, is the basic measurement mode employed in the AHP process. Saaty (1977) suggested a scale of values from 1 to 9 which describe the intensity of importance (preference/dominance). A value of 1 expresses "equal importance", whereas a value of 9 is given for those factors having an "extreme importance" over another factor.

The process has been clearly described by Gorener et al., (2012): If C = $\{C_j|j = 1,2\ldots,n\}$ consists the set of criteria, then the result of the pair-wise comparison of n criteria can be summarized in an (nxn) evaluation matrix A in which every element a_{ij} (i,j = 1,2,…., n) is the quotient of weights of the criteria. The pairwise comparison can be shown by a square and reciprocal matrix (A). Finally, each matrix is normalized and the relative weights can be found. These relative weights are given by the eigenvector (w) corresponding to the largest eigenvalue λmax, as $A_w = \lambda max\ W$. If the pairwise comparisons are completely consistent, the matrix A has rank 1 and λmax = n. The output of the AHP is related to the consistency of the pairwise comparison judgments. The consistency is defined by the relation between the entries of A: $a_{ij} x a_{jk} = a_{ik}$. The Consistency Index (CI) can be evaluated using the equation $CI = (\lambda_{max}-n)/(n-1)$. Furthermore, using the CR indicator can conclude whether the evaluations are sufficiently consistent. The CR indicator can be calculated through the formula CR = CI/RI. As a rule of thumb, a CR value of 10% or less is considered to be acceptable. If the CR > 10% the evaluation process has to be repeated for consistency improvement.

The hierarchy structure of the decision problem regarding the strategic utilization of social media on land administration and management tasks and systems, is illustrated in the following figure (Fig.2).

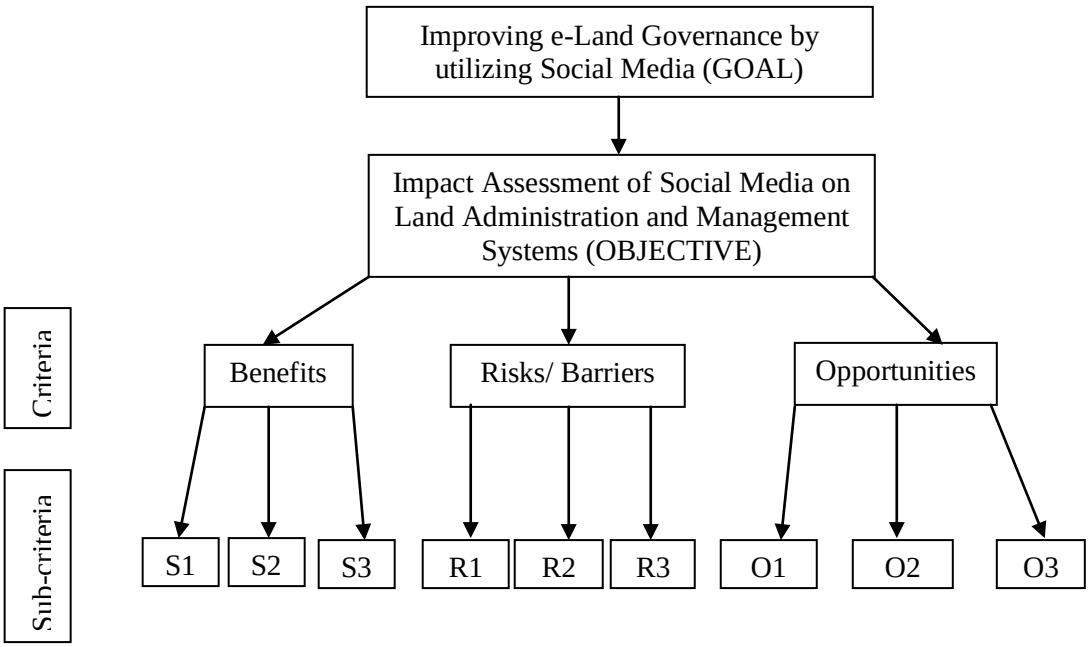
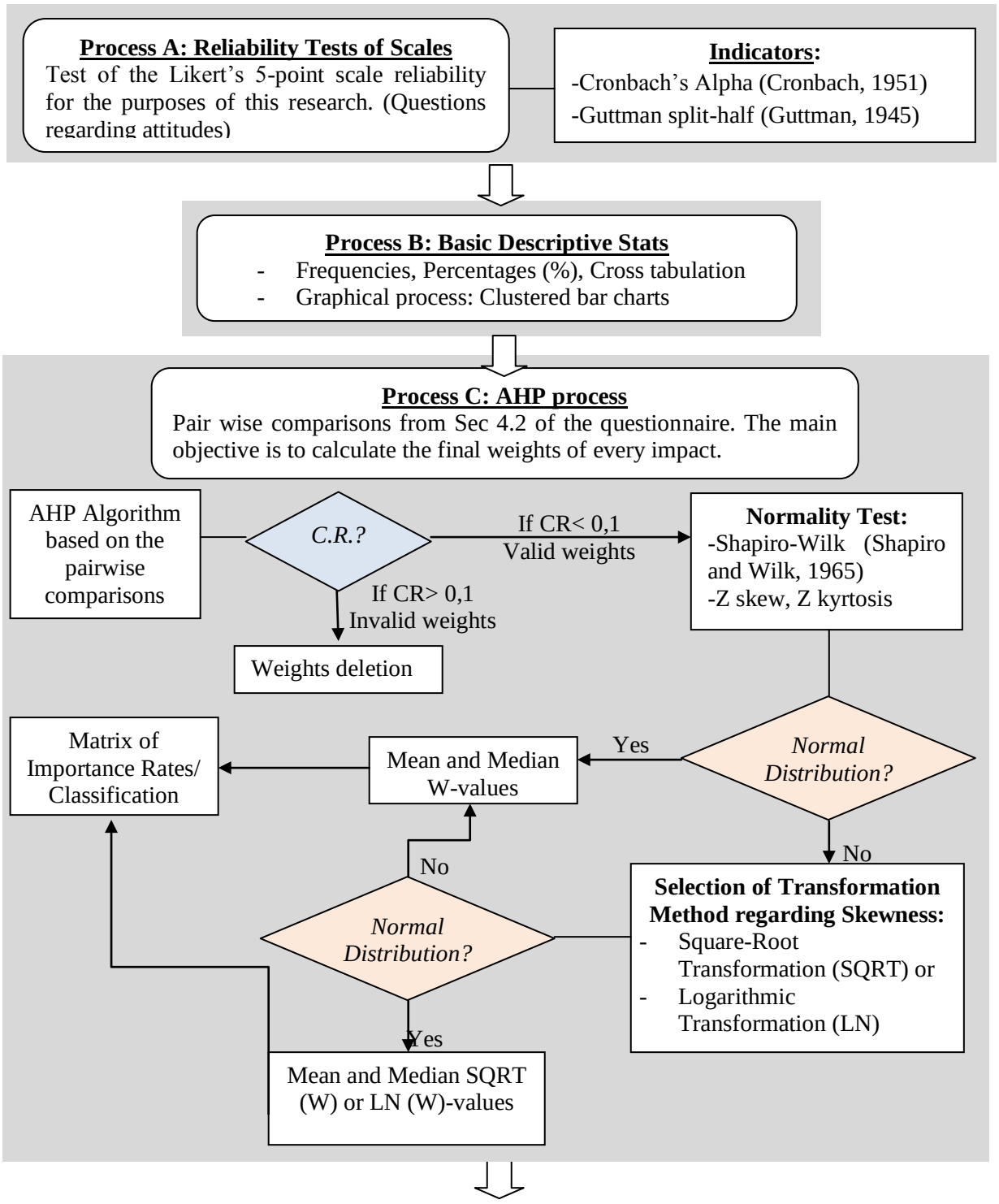


Figure 2: *Hierarchy Structure (Adapted from Dimopoulou and Tolidis, 2012)*

3. Analysis and Results

3.1 Work plan Flowchart

All the analyses were performed using the statistical package of SPSS v.17. Due to the complexity of the research and the variety of the questions, a specific four-step work plan has been adopted in order to perform the statistical analyses in a more systematic way (figure 3).



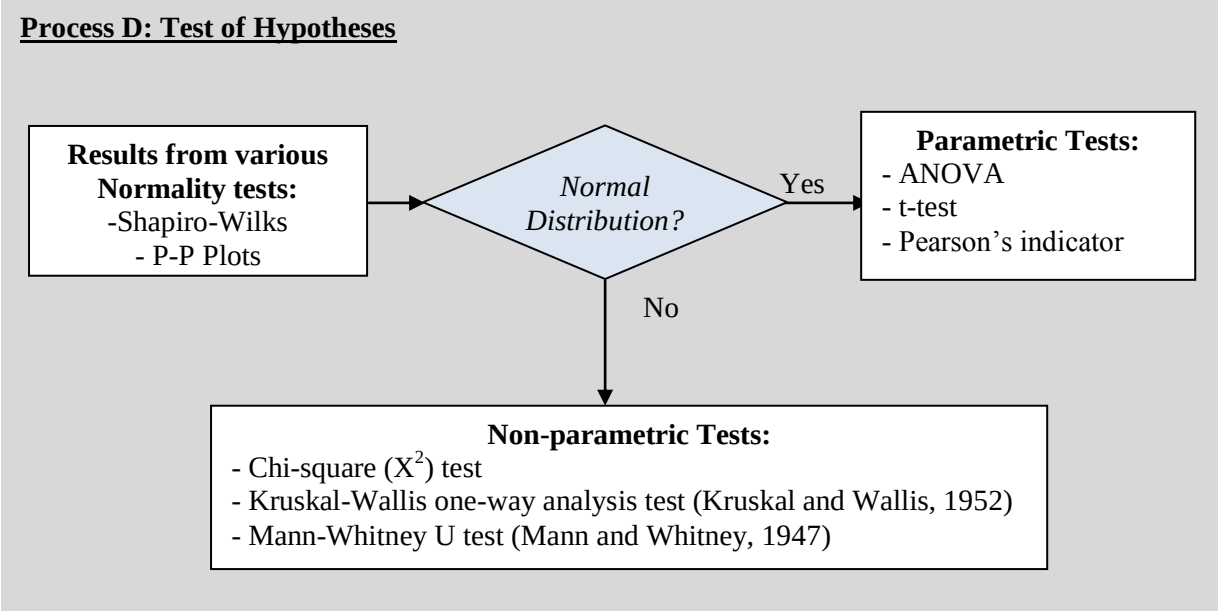


Figure 3: *Decision Work Plan Flowchart for Statistical Analyses*

3.2 Results of Reliability Test

The Cronbach's Alpha and Guttman's Split-half models were adopted, in a preliminary stage of the analyses, to assess the reliability of the 5-point attitudes scales of the research instrument (questionnaire). Cronbach's alpha and Guttman's split-half is a measure of internal consistency that is, how closely related a set of items are as a group. A "high" value of alpha is often used (along with substantive arguments and possibly other statistical measures) as evidence that the items measure an underlying (or latent) construct. The higher the score, the more reliable the generated Likert-type scale is. Nunnaly (1978) has indicated 0.7 to be an acceptable reliability coefficient but lower thresholds are sometimes used in the literature (Santos, 1999).

According to the results, (table 4) the Likert-type 5-point scale, seems to be a very reliable scale for the purposes of "measuring" the experts' attitudes regarding: 1) the success factors of SM utilization to land tasks, 2) the significance level of use of SM by different types of organizations and 3) the predefined impact factors which are divided into the general benefit, risks and opportunities groups.

Table 4: *Results of Reliability Test*

Related Question	Overall Cronbach's Aplha	Guttman's Split-half
Success Factors (Q.2.3)	0,890	0,877
Significance level of use of SM (Q.24)	0,790	0,702
Predefined Impact factors (Sec.4.1)	0,884 (Benefits: 0,864; Risks: 0,752; Opportunities: 0,825)	0,853 (Benefits: 0,879; Risks: 0,706; Opportunities: 0,848)

3.3 Descriptive Analysis

3.3.1. Experts' Profile

According to the results, the great majority of the respondents is located inside EU (68%) and belongs to the public employment sector (66%). In most of cases the public employment sector's experts, are occupied in universities (38%) as researchers and academic personnel (20%), while a proportion of 40%, of this employment sector, occupied in Ministries (20%) and regional administration agencies (20%) mainly as Head of departments (29%) and directors/managers (20%). By contrast, the private employment sector's professionals are employed in the constructions/engineering industry (38%) as CEOs (27%) or freelance professionals (25%). The great majority of sample is experts both in land management and administration (56%). Land managers, in most of cases, deal with spatial decision making and land use or management tasks, while land administrators deal with property records management and digitization of spatial data and map productions. Finally, land professionals both in land management and administration deal with tasks related to land value and taxation.

3.3.2. Usage Profile of Social Media: General Attitudes

Social media are used for general professional purposes (not for land related activities) by the 47% either of the respondents or its organization. Social networks (e.g. facebook, tweeter, linkedin) and blog, consist the most popular kinds of social media (45% and 28% of positive answers), while by contrast, mass media (e.g. Youtube) consist the least popular (10%) (Figure 4) .

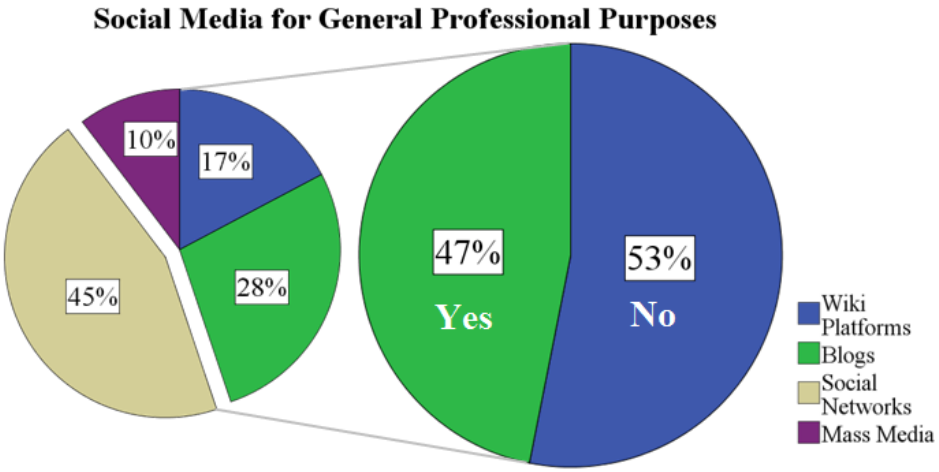


Figure 4: *Usage Degree and Kind of Social Media*

Regarding the total time of use and the usage frequency in a weekly basis, social media for general professional purposes is used mainly during the last three years (66%), with an average usage time of 12 hours per week.

Experts from the private sector of employment tend to use more social media (55% of the total group's answers were positive) unlike those from the public sector (43% of the total responses) of employment. Among others, land managers also tends to use more the social media tools for general professional purposes (62,5% of the group's total responses) unlike experts in land administration (33% of the group's total responses) and experts in both fields (approximately 45 % of the group's total responses). In general, "*dissemination of information*" consist the major motivation for using social media among the groups of experts, while the motivations regarding "*transparency, customer attraction/advertising"* and *"two communication/ views composition"* are of equal significance by all the groups of experts.

3.3.3. Attitudes to e-Governance, Success Factors and Significance for Organizations

The great majority of land experts (72%) believe that social media tools can significantly improve the communication between the public and private sector by promoting transparency, democracy and e-government. However, there is also a significant group of experts (20%) that are undecided (Figure 5).

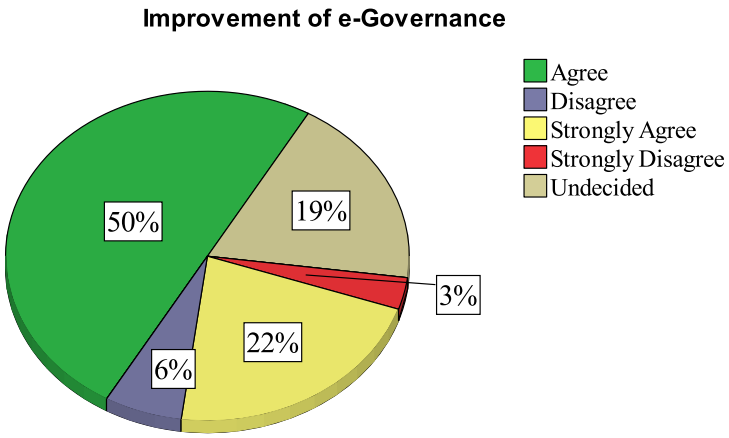


Figure 5: *Attitudes to e-Governance Improvement*

Land experts were asked to evaluate eight (8) predefined factors that might contribute to the success and efficiency of SM tools, when used in land related activities. Unsurprisingly, the factors of: "*user-friendly interface*" (rated as very important by the 66% of the respondents), "*function for comments submitting*" (rated as very important by the 47%) and "*reliable online help-desk*" (rated as very important by the 50%), were rated as the most important. Finally, the utilization of social media was assessed as significant for all the different kinds of organizations, since the positive responses (agree and strongly agree) fluctuated between 53% and 87% of the total responses. However, in the case of "*Finance institutions*", the experts' attitudes were more moderate, since that approximately 25% and 22% of the total responses were either "undecided" or negative (sum of "strongly disagree" and "disagree" groups).

3.3.4. Social Media in LA/LM: State of the Art

Social media tools are incorporated in land management or administration procedures by the 38% of the total respondents. However, it is very or completely likely to be utilized in 5 years from now, by the half of the "negative" respondents (45%). The most frequently stated reason is related with the lack of an integrated policy regarding the social media utilization.

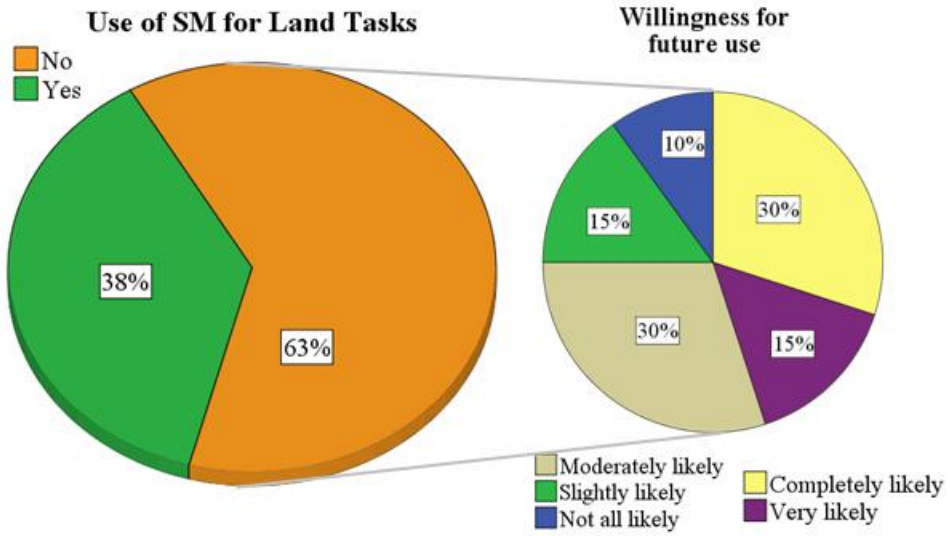


Figure 6: *Utilization of Social Media in LA/LM*

Google Earth and commercial or open source GIS platforms are the most frequent geo-ICT tools in land management applications, in combination with social media tools. Furthermore, custom APIs (e.g. Mashups), Javascript open layers and GPS-location based social media, are the less frequent used geo-ICT tools or not applicable in land management/administration. The aforementioned geo-ICT tools are focused mainly at visualization (including layers management) and map navigation (2D or 3D) through web or mobile applications. Participatory planning and spatiotemporal analysis functions are not applicable in most of cases.

3.3.5. Potential Benefits Risks and Opportunities

Impacts of social media in land management/administration procedures have been approached in terms of benefits, risks and opportunities. Thus, experts were asked to express their opinions regarding twenty-five (25) predefined sub-factors, using Likert's 5-point scale (Strongly Disagree to Strongly Agree). The results are illustrated in figure 7, regarding the positive answers (Summarize of "Agree" and "Strongly Agree" responses).

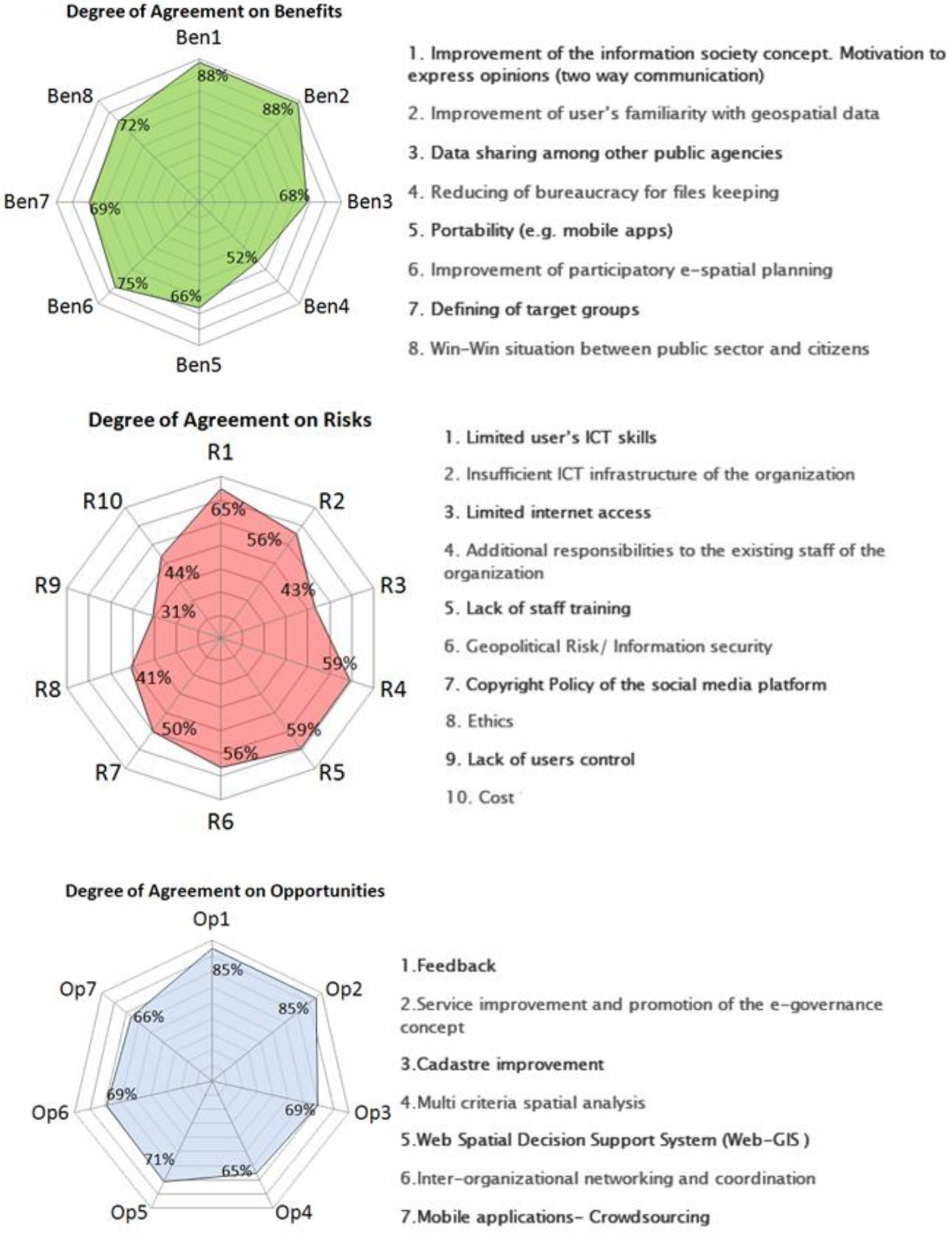


Figure 7: *Degree of Agreement on Potential Benefits Risks and Opportunities*

The majority of experts agrees or strongly agrees with the benefits and opportunities derived from the utilization of social media on land management/administration procedures. However, there is a confusion regarding the risks. The sub-factors of "limited internet access-R3", "copyright policy of the social media platform-R7", "Ethics-R8", "Lack of users' control-R9" and "Cost-R10" are of the lowest agreement rates. More specifically, experts disagree with the R3 and R9 risk factors (44% and 38% respectively) and they are undecided for the R8 and R10 risk factors (34% and 31% respectively).

3.4 AHP Results

In the 34% of cases, the evaluations were sufficiently inconsistent (C.R.>0,1) and the calculated weights, were not taken into account. For the valid weights (C.R. < 0,1), several normality tests were performed to identify if the variables of weights were normally distributed. Besides, it is commonly accepted that the major use of normal distribution is the crucial role it plays in statistical inference. If the weights (W_n) data were not normally distributed, data transformations were performed, as a remedy for outliers and for failures of normality, linearity, and homoscedasticity (Howell, 2007). Among others, Tabachnick and Fidell (2007) suggest various transformation methods regarding the data distribution profile. In this research, because of the substantially positive skewness of the data distribution of weights, the logarithmic transformation has been adopted [NewX=Ln(X), where X= W_n] as the best data optimization method. After the data transformations, extra normality tests were performed to the new Ln(X) values, to ensure that the new data were normally distributed. Finally, the mean weight values were calculated and the overall importance of each impact sub factor (sub-criteria) was calculated by multiplying the score of every group factor with the overall score of its group (criteria). Results are illustrated in table 5.

Table 5: *Overall Rates of Importance of Impacts*

General Group	Group Importance (Wj)	Impact Factor	Factor Importance (Wji)	Overall Importance (Wj X Wji)
Benefits	0,482	Improvement of the information society concept and data sharing	0,460	**0,221**
		Improvement of user's familiarity with geospatial data/target groups/ win-win situation	0,238	0,115
		Reducing of bureaucracy/ Portability/Flexibility	0,167	0,080
Risks/Barriers	0,187	Lack of: user's ICT skills /degree of user's online access /users' online management	0,403	**0,070**
		Lack of ICT infrastructure of the organization/ Additional responsibilities to the existing staff of the organization and lack of training	0,333	0,060

		Geopolitical risk and information security / Copyrights / Ethics	0,191	0,030
Opportunities	0,203	Improvement of e-governance /Inter-organizational networking and coordination	0,444	**0,090**
		Cadastre improvement -Mobile and internet applications (Crowdsourcing) - Web GIS applications	0,330	0,070
		Multi-criteria spatial analysis	0,178	0,040

Experts have defined the "*improvement of the information society and data sharing*" as the most important positive impact of the social media utilization in LA/LM procedures (W=0,221). By contrast, the group of risks has been evaluated as the least important general group of impacts (W=0,187). More specifically, the "*lack of users' ICT skills/degree of users' online access/users' online management*", have been also evaluated as the overall least important impact factor (W=0,070), compared with the importance of the other impact factors. Regarding all the aforementioned results, unlike the several predefined risks, experts highlighted the positive side of the social media utilization in land related activities. Thus, the importance rate of the "Risks" group was the lowest, compared with the "Benefits" (0,482) and "Opportunities" (0,203) group of impact factors.

3.5 Test of Hypotheses

Taking into account the data distribution of the responses in each question, three kinds of non-parametric tests has been adopted to test the initial stated hypotheses (table 6).

Table 6: *Results of Hypotheses' Tests*

Hyp.	Chi-square test (X^2)	Kruskal-Wallis test	Mann-Whitney U test	Results
H1	**X**	-	-	***p=0,02<0,05** False*
H2	**X**	-	-	***p=0,00<0,05** True*
H3	**X**	-	-	***p=0,02<0,05** True*
H4	**X** (for attitudes)	**X (**for the evaluation degree)	**X (**for the evaluation degree)	$\bar{p} > 0,05$ *False for attitudes. True for the evaluation degree of Op3 impact factor (**p=0,03<0,05**).*
H5	-	**X**	**X**	*True for the evaluation degree of Risk 1 and Risk 3 impact factors (**p=0,02<0,05**)*
H6	-	**X**	**X**	$\bar{p} > 0,05$ *False*

According to the Chi-square tests, there is a significant difference between the data sets of hypotheses "H2" and "H3" that cannot be due to chance alone. In particular, there is a significant difference between the utilization of social media tools for general purposes (dataset 1) and for land related activities (dataset 2). Thus, it is more likely the SM tools to be used in LA and LM related activities if there is an already familiarity level with these tools. Furthermore, there is a significant difference

between the SM utilization profile (whether are used or not in land related activities) (dataset 1) and the degree of agreement regarding the improvement degree of SM in e-governance (dataset 2). According to the Kruskal-Wallis test, there is also a partial significant difference between the datasets of H4 and H5. In particular, the experts from public sector tend to rate the risk factor of "*Limited user's ICT skills*" (R1), less than those from private sector. In reverse, the experts from public sector tend to rate the risk factor of "*Limited internet access*" (R3) more than those from private sector of employment. Finally, those who use social media for general professional purposes tend to rate the opportunity factor of "*Cadastre Improvement*" (Op3) less than those who do not use social media (Figure 8).

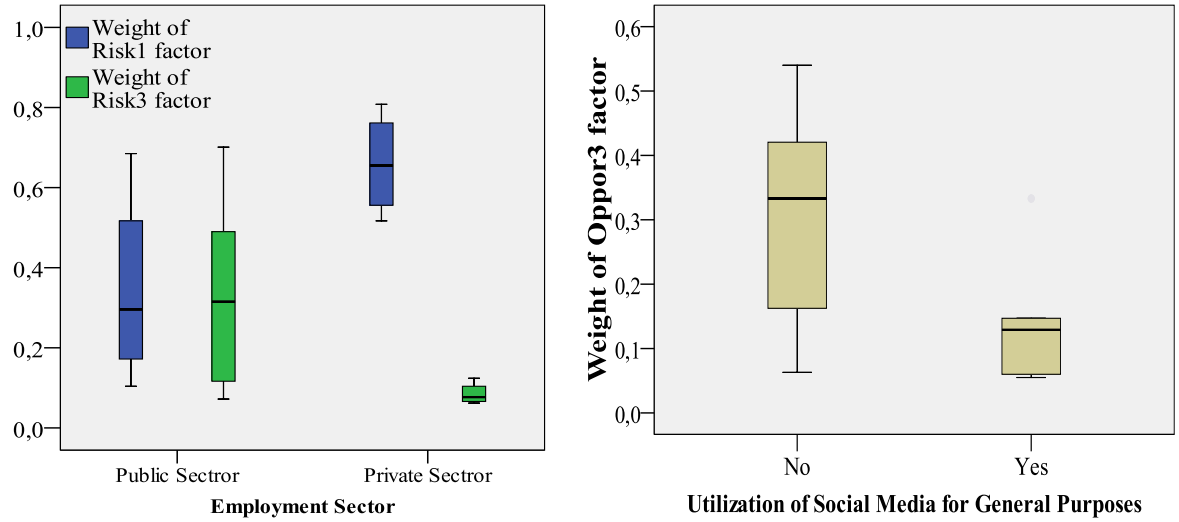


Figure 8: *Box-Plots Showing Differences Between Distributions*

4. Summary, Lessons Learned and Future Research

The paper comprised a proposed methodological approach for the evaluation of social media when utilized on land related activities. The conceptual framework of this research relied on an expert-based multi-criteria evaluation model, through web survey, where the main objective was to define and evaluate the potential impacts of social media (SM) tools on land management and administration activities. Moreover, an initial goal was to delineate the state of the art concerning the utilization of SM tools on "e-land governance", both in public and private sector of employment. Thus, experts were asked to answer to a variety of questions, through a prototype web-based questionnaire, aiming to collect both quantitative and qualitative data.

According to the results obtained, most of experts use social media tools, mainly for dissemination of information. However, the utilization level of social media tools on land related activities, is rather limited (38%), due to the lack of an integrated policy regarding social media utilization. There is no doubt that future policies are needed to focus on both the organization's and citizens' needs aiming to improve the transparency and the public participation concept. Therefore, in a very early stage, public or private land related organizations, must delineate their goals and the expected results of using social

media tools on land activities. Furthermore, a specific monitoring plan of goals' achievement and future needs it's crucial to ensure system's accuracy and efficiency.

The most frequently used geo-ICT tools are Google Earth© and GIS platforms while the most frequent options offered to users are related to map visualization and navigation. However, spatial processing and participatory planning options (e.g. argument-based map) are very limited. Finally, according to the responses, the key success factors for utilizing social media in e-land activities are related to the user-friendly interface and the comments' submitting function. These results, demonstrate the ever-growing need of effective interaction between the geo-ICT tools and the web users, through user-friendly interfaces and options for spatial analyses or visualization. As a matter of fact, the e-land governance concept can be promoted by incorporating a web-based argumentation map and a discussion forum in single social media user interface.

Most of experts has recognized and evaluated the potential positive impacts (benefits and opportunities) of social media in e-land governance, which outweigh the potential risks and barriers. On the other hand, experts have also indicated that, there are significant potential risks related with the users' ICT skills and infrastructure of the organization, which need to be taken under consideration in future policies.

Considering the fact that, there is a very limited amount of research papers in this scientific field, the contribution of this research has an added value and important lessons have been learned. However, it is in a very early stage and as in any research, there are limitations related to the research design and implementation. In particular, they are related to the online surveys and especially to the online surveys' typically low response rates. Despite the fact that several techniques are proposed in literature that can boost the response rates, in our case, an intermediate reminder doubled the response rates. Furthermore, the personalized reminders might further increase the response rates, if time is available and the mailing list accurate. In this research, the "snowball" non-probability sampling technique has been adopted by asking respondents to give referrals to other possible respondents. But, in case of online surveys, the technique's effectiveness can only be tested through an exploratory question (e.g. "*How did you hear about this survey?*").

In this kind of research (evaluation), the Likert's type scale (5-point) proved to be a very reliable scale for attitudes assessment (according to Cronbach's Alpha test). However, in the future, its reliability should be also evaluated for larger samples of land experts.

Finally, we used the AHP method for the evaluation of the potential impacts of social media in land activities, with good results. We believe that the key factors that affect the success of these kind of online surveys, which incorporate mutli-criteria evaluation techniques through pair wise comparisons, are: 1) the number of factors in pairwise comparisons (the less the better), 2) the quality of instructions for pair wise comparisons and 3) the user-friendly interface of the questionnaire. The present analysis does not exhaust the impact spectrum of social media on land related activities, since further specialized research has to be undertaken. Since the use of social media is constantly evolving and

great opportunities have been emerged for improvement of e-land governance, our intention is to conduct a similar survey in future, capitalizing the experience gained from this research. A good idea might be to be conducted in two separate steps: 1) Identification of the potential impacts through in depth structured interviews or questionnaires and then 2) Impacts evaluation using a multi-criteria approach like AHP. Furthermore, the utilization of social media tools in land activities for public participation purposes need to also be evaluated from a simple user's perspective. The aggregation of both sides' opinions could provide valuable information about their special needs and the areas of focus.

Finally, despite the fact that the research has only scratched the surface of social media utilization in land related activities, the proposed methodological approach consists a very promising tool and could be very effective in supporting participatory decision making processes regarding social media strategies on land related activities.

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Appendix: The Questionnaire

Questions marked with an * are required

| Impacts of Social Media on Land Management/Administration |

You are invited to participate in our survey entitled "Impacts of Social Media on Land Management/Administration". In this survey, experts asked to complete a questionnaire until 15/4/2013 that asks questions about the level of use and the degree of importance of social media applications on the above areas. It will take approximately 10 minutes to complete the questionnaire.

Your participation in this study is completely voluntary. There are no foreseeable risks associated with this project. However, if you feel uncomfortable answering any questions, you can withdraw from the survey at any point. However, it is very important for us to learn your opinions in order to make a step forward to this scientific area!

Your survey responses will be strictly confidential and data from this research will be reported only in the aggregate. Your information will be coded and will remain confidential. If you have questions at any time about the survey or the procedures, you may contact to Professor Efi Dimopoulou or Mr. Konstantinos Tolidis by email at any of the email addresses specified below.

Thank you very much for your time and support. Please start with the survey now by clicking on the Next button below.

1. Personal Information

1.1 Please select your country: *

-- Select --

1.2 Please define your employment sector: *

- Public sector
- Private sector (including freelance)

1.2.1a. Please define the type of the public organization where you work: *

- International/EU Institution
- Ministry
- Regional Administration
- Local Administration
- Public company
- University
- Other

- Team supervisor
- Director/manager
- Employee
- Other

1.2.2a. Which of the following categories best describes the industry you work in? *

- Real Estate brokerage
- Development consultant
- Financial Institution (e.g. Bank)

- Constructions / Engineering
- ICT / High Technology
- Research and Development (R&D)
- Legal Services
- Other

1.2.2b.What is your current position? *

- Office employee
- General Manager/Director
- Project Manager/Coordinator
- CEO
- Freelance
- Other

1.3 How long did you hold this position (years)? *

CLICK ME FOR HELP!

1.4 Which of the following categories best describes the tasks of your work? *

- Land Administration
- Land Management
- Both

1.5 Please, choose the sub-tasks of your work (you can choose more than one): *

- Digitization of map data-map production
- Property records management
- Land use management
- Land value
- Spatial/Urban decision making
- Other (please define):
- Real estate
- Management and protection of natural resources
- Legal issues related to land
- Land value Tax
- Rural planning

2. Introduction

2.1. Did you or your organization utilizes social media tools or services for professional use? *

- Yes
- No

2.1a. How long did you use social media tools in your work? *

- <1 year
- >1 year
- >2 years
- 3-5 years
- >5 years

2.1b. Which of the following categories best describes the kind of social media that you use? (you can choose more than one) *

- Wiki platforms

- [ ] Blogs
- [ ] Social Networks
- [ ] Mass Media
- [ ] Other (feel free to describe):

2.1c. Which is the average usage time (hours) of these tools in weekly basis? *

2.1d. Could you please define the main motivations for the adoption, by you or by your organization where you work, of social media tools (you can choose more than one): *

- [ ] Transparency/ democracy/ e-government
- [ ] Dissemination of information
- [ ] Advertisement/ customer attraction
- [ ] Two way communication/ Views composition
- [ ] Other (please define):

2.2 To what extend do you agree with the following statement?

"The social media tools (eg Blogs, social networks, wikis etc) can significantly improve the communication between the public and private sector by promoting transparency, democracy and e-government"

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
*	○	○	○	○	○

2.3 According to your opinion, to what extent the following factors contribute to the success and overall performance of social media tools when are utilized in land management/administration related activities?

	Less Importnant 0	1	2	3	Very Important 4
User friendly interface-Easy to use *	○	○	○	○	○
Functions for two way communication / comments submitting *	○	○	○	○	○
Map quality (e.g. spatial data, scale, visualization) *	○	○	○	○	○
Functions for spatial processing by the user *	○	○	○	○	○
Ownership information and boundaries *	○	○	○	○	○
Land Value information *	○	○	○	○	○
Online Help-desk *	○	○	○	○	○
Functions for temporal analysis of changes related to land *	○	○	○	○	○

2.4 For which of the following organizations do you believe that the utilization of social media it's crucial regarding land management/administration related activities;

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	N/A
Ministries *	○	○	○	○	○	○
Regional administration *	○	○	○	○	○	○
Local administration (municipalities, local communities etc.) *	○	○	○	○	○	○
Independent public agencies related to land policy *	○	○	○	○	○	○
Universities *	○	○	○	○	○	○
NGOs *	○	○	○	○	○	○
Think Tanks *	○	○	○	○	○	○
Professionals in the sector of decision making *	○	○	○	○	○	○
Real estate professionals *	○	○	○	○	○	○
Finance institutions (e.g. banks) *	○	○	○	○	○	○

3. State of the Art

3.1 Do you or your organization, utilize social media tools or services related to land management/administration activities; *

- ◯ Yes
- ◯ No

3.1.1y. Which of the following geo ICTs are used respectively (you can choose more than one)?

	Land Administration	Land Management	Not Applicable
Commercial Web GIS platforms (e.g. ESRI ArcGIS server)	☐	☐	☐
Google Earth–Google maps API	☐	☐	☐
Open Source GIS platforms (e.g. GeoServer)	☐	☐	☐
Custom APIs (e.g. Mashups)	☐	☐	☐
JavaScript Open Layers	☐	☐	☐
Cloud technologies	☐	☐	☐
GPS–location based social media	☐	☐	☐

Comments:

3.1.2y What options are offered to the users through these social media geo–tools? *

- ☐ Visualization and map navigation
- ☐ Layers management
- ☐ Map extraction
- ☐ Participatory planning / spatial decision making processes
- ☐ 3D visualizations
- ☐ Other (please define):
- ☐ Spatial processing
- ☐ Mobile applications
- ☐ Sharing and Bookmarking
- ☐ Land Information submitting
- ☐ Spatiotemporal analysis

3.1.1n. Which of the following reasons have discourage you to utilize social media tools in land management/administration related activities? (you can choose more than one) *

- ☐ Technological barriers
- ☐ Lack of expertise
- ☐ Information security risk
- ☐ Ignorance about the potential benefits or the way that can be utilized
- ☐ Lack of policy measures regarding the social media utilization
- ☐ Other (Please define):

3.1.2n. How likely is in the next 5 years, to utilize social media tools for land management/administration related activities as a part of your work ?

	Not at all likely	Slightly likely	Moderately likely	Very likely	Completely likely
*	○	○	○	○	○

Many thanks for your support so far. Your opinions are valuable for us!

You are kindly requested to proceed to the final section of this survey by clicking the "Next" Button.

Enjoy!

4. Evaluation/Rating Section

Do you agree/disagree with the following benefits, risks/barriers and opportunities that can potentially arise by the utilization of social media applications in land management /administration procedures ?

Potential Benefits:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1. Improvement of the information society concept. Motivation to express opinions (two way communication) *					
2. Improvement of user's familiarity with geospatial data *					
3. Data sharing among other public agencies *					
4. Reducing of bureaucracy for files keeping *					
5. Portability (e.g. mobile apps) *					
6. Improvement of participatory e-spatial planning *					
7. Defining of target groups *					
8. Win-Win situation between public sector and citizens *					

Could you suggest any other benefits? (optional):

Potential Risks/Barriers:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1. Limited user's ICT skills *					
2. Insufficient ICT infrastructure of the organization *					
3. Limited internet access *					
4. Additional responsibilities to the existing staff of the organization *					
5. Lack of staff training *					
6. Geopolitical Risk/ Information security *					
7. Copyright Policy of the social media platform *					
8. Ethics *					
9. Lack of users control *					
10. Cost *					

Potential Opportunities:

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1.Feedback *					
2.Service improvement and promotion of the e-governance concept *					
3.Cadastre improvement *					
4.Multi criteria spatial analysis *					
5.Web Spatial Decision Support System (Web-GIS) *					
6.Inter-organizational networking and coordination *					
7.Mobile applications- Crowdsourcing *					

Other opportunities? (optional):

According to your experience and your personal attitudes, please proceed to the evaluation of the importance degree among the potential benefits, risks/barriers and opportunities regarding the utilization/adoption of social media tools in land management/administration procedures.

You are kindly requested to follow the instructions:

1. Each time, you should rate the left factor over the right factor (not the opposite) using the nine-point scale.
2. A value of 1 expresses "equal importance", whereas a value of 9 is given for those factors (on the left) having an "extreme importance" over another factor (on the right). Use Reciprocals for Inverse Comparisons (1/2, 1/3...1/9).
3. All the comparisons will be performed pairwise (VS). In the 1st part you will perform pair wise comparisons between the general groups (benefits, risks/barriers and opportunities) and in the 2nd part you will perform pair wise comparisons between the factors of every group.

You are not required to use all the rates of the scale, but only those that better describe your preferences regarding the degree of importance.

1st Part: Comparisons between the general groups (Use the dropdown list)

Benefits VS Risks/Barriers: *

-- Select --

Benefits VS Opportunities: *

-- Select --

Risks/Barriers VS Opportunities: *

-- Select --

2nd Part: Comparisons between the factors of every group:

REMEMBER!!

A value of 1 expresses "equal importance", whereas a value of 9 is given for those factors (on the left) having an "extreme importance" over another factor (on the right). Use Reciprocals for Inverse Comparisons (1/2, 1/3...1/9).

Potential Benefits Group:

Improvement of the information society concept and data sharing VS Improvement of user's familiarity with geospatial data / Target groups/ Win-Win situation.

*

-- Select --

Improvement of the information society concept and data sharing VS Reducing of bureaucracy/ Portability/Flexibility

*

-- Select --

Improvement of user's familiarity with geospatial data / Target groups/ Win-Win situation VS Reducing of bureaucracy/Portability/Flexibility

*

-- Select --

Potential Risks/Barries Group:

Lack of: user's ICT skills /degree of user's online access /user's online management VS Lack of ICT infrastructure of the organization/ Additional responsibilities to the existing staff of the organization and lack of training

*

-- Select --

Lack of: user's ICT skills /degree of user's online access /user's online management VS Geopolitical risk and information security / Copyrights / Ethics

*

-- Select --

Lack of ICT infrastructure of the organization/ Additional responsibilities to the existing staff of the organization and lack of training VS Geopolitical risk and information security / Copyrights / Ethics

*

-- Select --

Potential Opportunities Group:

Improvement of e-governance /Inter-organizational networking and coordination VS Cadastre improvement - Mobile and internet applications (Crowdsourcing) - Web GIS applications

*

-- Select --

Improvement of e-governance /Inter-organizational networking and coordination VS Multi-criteria spatial analysis *

-- Select --

Cadastre improvement - Mobile and internet applications (Crowdsourcing) - Web GIS applications VS Multi-criteria spatial analysis

*

-- Select --

Please feel free to submit your suggestions regarding the utilization of social media as supportive tools in land management/administration activities.

Indicatively (but not exhaustively), you can express your personal attitudes regarding the following questions:

What kind of Geo-ICTs do you believe that should be used?

What capabilities should be offered to the users?

Which are the user's future needs that should be covered?

Which other alternative applications (apart from social media), do you suggest for the improvement of the e-participation in land related activities; (applications-procedures-policy measures etc.).

Which are the economic benefits derived from the utilization of social media in land related activities?

Any other comments/suggestions?

Please enter a valid email address to send you a copy of the final results (optional):