

# Social Media in Crisis Management – the iSAR+ Project Survey

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## ABSTRACT

Social media together with still growing social media communities has become a powerful and promising solution in crisis and emergency management. Previous crisis events have proved that social media and mobile technologies used by citizens (widely) and public services (to some extent) have contributed to the post-crisis relief efforts. The iSAR+ EU FP7 project aims at providing solutions empowering citizens and PPDR (Public Protection and Disaster Relief) organizations in online and mobile communications for the purpose of crisis management especially in search and rescue operations. This paper presents the results of survey aiming at identification of preliminary end-user requirements in the close interworking with end-users across Europe.

## Keywords

Social media, crisis management, user requirements, citizens, public protection and disaster relief (PPDR)

## INTRODUCTION

Social media can be characterized as **dynamical and ad hoc changing** communication channel where variety of information is exchanged. Since the 2004 tsunami, the different major crises all over the world (Haiti, Japan earthquakes, Haiyan typhoon) have illustrated a trend towards an increasing use of social media in crisis situations. Citizens have started to use social media for seeking information and communication purposes. Social media are already used to some extent by public authorities – although they face problems such as lack of appropriate procedures, or lack of capabilities for processing high volume of data. The iSAR+ project aims at meeting the emerging trend of the citizens' participation via social media and mobile communications by providing: (a) guidelines and recommendations for citizens and PPDRs how to use social media and mobile technology in crisis situations and (b) a technological platform, integrating ICT (Information and Communication Technology) tools and functionalities, offering additional communication channels and enhanced situational awareness.

## Research Problem

Research presented in this paper is focused on the identification of **end users' needs and expectations for developing (and exploiting) iSAR+ solutions, i.e., guidelines and a technological platform**. Thus the main research problems to be addressed in this paper are: (a) end-users' needs of access to data/information coming from social media channels, (b) features required by the platform and (c) main challenges for integrating social media into response efforts. To address these issues we have designed a survey targeting both citizens and public protection services in different European countries. This process aimed at identifying **preliminary user requirements**, which will be followed by a more comprehensive study in further project stages.

## Related Studies

There are previous studies considering the use of social media, its role and influence on crisis management. Previous studies have highlighted the need of mechanisms for management of information provided through social media (e.g. Facebook and Twitter) during the crisis (Bunker, Ehnis, Seltsikas and Levine, 2013). Analysis of Twitter content presented in (Petrovic, Osborne, McCreadie, Macdonald, Ounis and Shrimpton 2013) shows that “disasters & accidents (including terrorist attacks or shootings)” as a category of events is the second popular after sports events. In the analysed cases news have been reported in Twitter before appearing in traditional media. This proves the potential of social media as communication and information channel during disasters. The multiple approaches targeting the introduction of social media to support crisis management span from (a) purely manual relying on VOST teams (Virtual Operations Support Teams) engaged in the operation through (b) ICT oriented, where aspects of improved information processing or novel applications are of key importance, to the ones that (c) focus solely on the acceptance of technology as well as the legal and ethical issues. The VOST teams applied for processing social portals have been incorporated largely in the past, supporting previous real-world events such as hurricane Irene or hurricane Sandy (St. Denis, Hughes and Palen, 2012; Starbird, and Palen, 2011). Still the capabilities of VOST are very much limited (usually teams of few people need to manually or semi-automatically process vast amounts of data in several social media channels). As an alternative for VOST teams, the iSAR+ project promotes similar ideas by using more automated data/text monitoring and analysis capability in order to utilize effectively all data/information received from social media streams. Examples of the research on information processing (focused mostly on technical aspects of information retrieving) are e.g. Social Sensor project<sup>1</sup>, crowdsourcing and sensing of data from social media (Boulos, Resch, Crowley, Breslin, Sohn, Burtner, Pike, Jezierski and Chuang, 2011) or retrieving geo-location from social media (Schulz, Hadjakos, Paulheim, Nachtwey and Mühlhäuser, 2013). Solutions proposed by iSAR+ **use the innovative THEO** (Technological, Human, Ethical and Legal and Organizational) **analytical framework**, which tackles the objectives of the project by analysing the problem under the above dimensions equally (Teixeira, Manso, Hokkanen, Sihvonen, Delavallade 2013).

## METHODOLOGY

In order to capture a broad range of end-users needs, two questionnaires were defined, i.e., for citizens and PPDRs. Questionnaire for PPDRs mainly consisted of open questions while its main intention was to identify respondents’ **ideas and opinions** on how social media can be used in crisis response efforts. According to (Griffin & Hauser 1993), the minimal number of around 30 questionnaires is sufficient to get valuable qualitative feedback. Regarding the citizens, the minimal size of the representative sample group in the studied area (Finland, Poland and France) has been calculated according to the formula for the size of a representative sample of the finite population defined by Kramer (Kramer, J. 1994). It should be at least  $N=271$ . Overall questionnaires have been distributed among citizens and representatives of 20 organizations with overall 500 respondents from different European countries (Finland, France, Portugal, Norway, Ireland, United Kingdom and Poland). The surveying process included filling in questionnaires and interviews with end users. For the purposes of presented research it was decided that an essential part of surveyed citizens should already possess a background knowledge in the area of crisis management and/or homeland security for better understanding of the challenges and greater potential for valuable suggestions. Thus, the following groups have been identified (a) students of homeland security departments in Poland (b) Finnish student and academic staff from several faculties and (c) French project partner has collected responses from relatives, friends, colleagues. Most of the **survey analysis has been performed for N=317 (citizens) and N=130 (PPDRs)**. Moreover, the overall conclusions have been drawn based on the filled questionnaires, and also on the results of interviews with PPDRs (additional number of 33 representatives), providing a more comprehensive view on the research area.

## RESULTS

The end-users (citizens and PPDRs) were asked about the two key aspects – the perceptions and use of social media as well as the use of **social media for crisis management**. The purpose of questions was to identify (a) social media acceptance and potential for iSAR+ solutions and (b) the needs and problems considering the use of social media during crisis situations. Particular questions led directly (or indirectly) to the requirements, which should be addressed by iSAR+ in order to fulfil end users expectations and support them in the crisis events. Comparison with earlier studies is presented in following, indicating the similarities and differences in

<sup>1</sup> Sensing User Generated Input for Improved Media Discovery and Experience - <http://www.socialsensor.eu/>

results. Then, the most interesting findings of iSAR+ survey are presented.

### Comparison with Earlier Research

Identification of end-users needs and expectations in the light of iSAR+ objectives has been performed through the process of interviewing and surveying end users. Similar research concerning the use of social media for emergency and crisis management purposes has already been performed in the past (American Red Cross survey 2012; Canadian Red Cross survey 2012; Su, Wardell and Thorkildsen 2013). Findings valid for previous studies that have been conducted in the USA and Canada, in one country at a time, are not necessarily valid for PPDRs and citizens across Europe. Different cultural, legal and organizational background may have a great influence on respondents' opinions and beliefs. Moreover, various extreme events have occurred in different countries, because of geographical location (e.g. natural disasters) or of political and cultural aspects (e.g. terrorist attacks), which may lead to different experiences. The previous studies concern respondents separately: only PPDRs (Su et al., 2013) or only citizens (American Red Cross survey 2012; Canadian Red Cross survey 2012). On the contrary, iSAR+ survey process has been performed including both these groups, which makes the research more challenging, but also provides a more comprehensive view. Similar questions with the same objectives have been used for both end-user groups. The novelty of iSAR+ approach is also the use of the four parallel THEO dimensions, which were all addressed in the questions. Moreover, the iSAR+ involved more than one country in the research. The methodologies, research scopes and particular areas of surveys mentioned above are similar, thus surveys results can be compared. The CNA<sup>2</sup> in partnership with the NEMA<sup>3</sup> surveyed state, county and local emergency management and response agencies in 2012 in the USA (Su et al., 2013). Since this survey included USA PPDR respondents while the iSAR+ engaged European ones it is interesting to compare results of these two studies. CNA/NEMA survey included mostly emergency agencies, and only at the local level: local government, fire and police departments were involved. In iSAR+ survey respondents were more diverse – apart from crisis management centres, there were also representatives of fire brigades, gendarmerie, police, civil protection services, public administration, digital media and operators and managers at medical communication centres. The number of respondents of CAN/NEMA survey is higher (500 respondents) than in iSAR+ research (163 PPDR respondents), which can bias the comparison. The majority of American agencies' representatives claimed that they had used social media in response to a real-world events. Among the PPDRs surveyed for iSAR+ almost half indicated that social media is used in their organizations for crisis management purposes (28% of respondents use it themselves and 18% reported social media being used by dedicated personnel). The conclusion is that American respondents are more familiar with social media use for crisis response than European. The primary purpose of using social media is mostly for gathering and provisioning of information and it is mainly used as an additional communication channel. PPDRs in the US and EU are both concerned about the trustworthiness of information provided through social media. Around half of respondents from both surveys would not trust unconditionally information available on social media. Currently, in order to confirm the information before taking actions, PPDRs use multiple sources and validate information by other response organization or trustworthy source. It shows that information reliability should be ensured. Respondents of both CAN/NEMA and iSAR+ surveys have indicated the most important limitations and barriers in using social media for crisis management: the need of dedicated personnel, resources, lack of knowledge and lack of established policies, guidelines and sufficient training. Another concern is the large amount of data coming from social media during disasters. The conclusion from both surveys is that although social media are to some extent used by PPDRs, there is still a need for a more comprehensive approach covering training, policies, organizational processes for social media usage, as well as technical solutions for dealing with large volume of data while providing trustworthiness assessments. The second part of iSAR+ research considering the citizens can be compared with the previous studies presented in (American Red Cross survey 2012) and (Canadian Red Cross survey 2012). The Red Cross surveys reached higher number of respondents (1000 respondents in Canada and 2035 in the USA) than the iSAR+ research (317 citizen respondents). Around 64% of Canadian, 48% of American and 71% of iSAR+ respondents declared the use of social media. This shows that European users represent a larger community, however the iSAR+ respondents include mostly students and people between 21-30 years old, so the results could be different with a wider group of citizens. Besides, iSAR+ survey has been conducted 18 months later, a time period during which social media usage has dramatically increased all over the world. Despite this timing differences, results of all three surveys show that traditional media (TV news, radio and newspapers) are still the most preferable way of receiving information during a crisis situation. Receiving information through the SMS services, social media and e-mail was the second preferable way. This seems to be challenging for solutions involving social media and mobile communication during a crisis, since

<sup>2</sup> Center for Naval Analyses, <http://www.cna.org/>

<sup>3</sup> National Emergency Management Association, <http://www.nemaweb.org/>

there is a risk that only a part of the citizens is able to receive the message or finds it reliable. However, the promising fact is that about half of respondents of iSAR+ and Canadian surveys were willing to sign up for services to receive information about crisis situations. American and EU respondents were asked about the purpose of social media use during a crisis situation (EU survey) and what information they would like to seek on social media during crisis events (US survey). The questions, although a bit different indicate that for both groups the most desirable crisis-related information is the current situation regarding the crisis evolution, all information which can be helpful in coping with the crisis and the purpose of communication with family and friends. The analysis and comparison of results between iSAR+ survey (including both parts for PPDRs and citizens) and earlier studies show that although they have been performed separately and involved different respondents, many similarities can be observed. That proves common trends in the way of thinking of public protection employees, as well as citizens, the same needs, expectations and concerns about social media contributing to crisis response efforts. Besides, although social media usages have dramatically changed in the last two years, with much more people being connected, using various different social media, social media is indeed an important communication channel in crisis but the most preferable one. It would be interesting to have similar studies conducted at the same time in North America and Europe to draw more unbiased conclusions.

### Findings of the iSAR+ Survey

Apart from the highlight of results presented in the previous section, some results of iSAR+ survey can contribute to the overview of the acceptance and usefulness of the social media during the crisis response. As stated in previous section, quite a high share of respondents claim that they use social media and express their willingness to use it for crisis management purposes. Both groups of respondents (PPDRs and citizens) were also asked about the key advantages and disadvantages of using social media during the crisis situation. The results reveal the direct similarities in the answers – both groups consider social media as a **good communication channel both for distributing and receiving information**. Considering the negative aspects, both PPDRs and citizens seem to be aware of limitations of social media such as marginalization of people who don't use social media, reliability of information, lack of control over information-spread and spreading of false information. Important finding from the project objectives' point of view is that PPDRs consider that citizens could support ongoing disaster relief by providing information about the current situation in the forms of photos of the situation, video and audio messages, and information about location of events. On the other hand, citizens are looking forward to having guidelines on how to act in crisis situations and what kind of actions are expected from citizens by PPDRs. Interestingly, many of the respondents among PPDRs mentioned that utilizing social media in their organizations should be done in a **centralized manner** (only certain people responsible for publishing and communication) to avoid confusion and information overload. The iSAR+ approach puts a great emphasis on guidelines/procedures and educational aspects of proposed solutions supporting crisis response by social media. According to surveys' results, 71% of citizens would like to actively participate in any activity (e.g. courses or trainings) raising their level of preparedness in case of crisis. PPDRs indicated that they need education in the aspects such as how to make use of social media (including how to apply it at work), how to communicate in social media and their special features, security and privacy issues. Finally another interesting finding is that the type of PPDR organization had no major influence on the respondents' opinions.

### CHALLENGES

During iSAR+ surveying process some challenges and barriers arose from involving respondents from different European countries. Different organizational and legal regulations may influence the fact how social media are used in crisis situations. However, the purpose of the research was to identify the needs and expectations across the European citizens and PPDRs, in order to develop a solution which could be suitable for different countries and PPDRs organizations. The above mentioned potential barriers were resolved with the involvement of project partners that are familiar with national regulations, language and cultural aspects of particular countries, in adjusting the questionnaire and interpreting the results. Additionally different inclusion of multiple partners into (distributed) analysis of results prevented one sided (biased) conclusions and improved the quality of research. Another challenge was to engage a high amount of respondents and keep within limited resources for the survey (it has to be recalled that the survey was performed in the preliminary phase of the project and further research is still pending). Taking into consideration the low diversity within the surveyed citizens group, results couldn't be compared based on variables such as country, age, gender or education.

### CONCLUSIONS AND FOLLOW UP

This paper presented the results of preliminary survey performed among the PPDRs representatives and citizens

across Europe. The overall process (based on detailed analysis of questionnaire answers) led to the identification of preliminary user requirements, which are described in the internal project document. Survey results provided very interesting insight into the end-users opinions and recommendations about the use of social media for crisis response purposes, the most desired information and capabilities as well as the biggest challenges in this area. Moreover, the comparison of results with recently performed surveys presents many similarities, confirming the accuracy of research and derived conclusions. They have especially showed that additional knowledge, training and guidelines on how to use social media for crisis management are expected by end-users. Moreover, concerns about reliability of information, security and personal data protection have been highlighted. Broader research and surveying process across the Europe, both for citizens and PPDRs, with additional resources are planned for the next stages of the project.

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