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Emergency services' attitudes towards social media: A quantitative and qualitative survey across Europe

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ABSTRACT

Various studies show that social media is used in emergencies – and that in spite of possible challenges for emergency services, beneficial use cases can be identified. However, relatively little empirical data is available regarding the attitudes of emergency services towards social media, and almost none of a comparative nature. This article summarizes the findings of a survey conducted of the EU project 'EmerGent' with 761 emergency service staff across 32 European countries from September to December 2014. The main aims of the survey were to explore the attitudes expressed by emergency service staff towards social media for private and organizational use as well as the levels and main factors influencing the current and likely future use of social media in their organizations. Based on our results, we discuss possible enhancements of the emergency management cycle using social media.

1. Introduction

Social media can be defined 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" (Kaplan and Haenlein, 2010). User-generated content refers to "the sum of all ways in which people make use of social media" and describes "the various forms of media content that are publicly available and created by end-users" (Kaplan and Haenlein, 2010). The most common players are Facebook with about 1.36 billion active users monthly or the microblogging platform, Twitter, counting approximately 284 million active users monthly. YouTube (1 billion),[1] WhatsApp (600 million), Google+ (343 million), Instagram (300 million) and Tumblr (230 million) (Statista, 2015) also all have more than 100 million active users monthly and are widely distributed.

For almost 15 years social media has been used in crisis management: After the terrorist attacks of 9/11 2001, for instance, wikis, created by ordinary citizens, were already being used to collect information about missing people (Palen and Liu, 2007). At the same time, the various different conditions under which the monitoring of, and intervention in, rapidly changing events takes place are not always fully recognized. The terms "disaster, crisis, catastrophe, and emergency management are sometimes used synonymously and sometimes with slight differences, by scholars and practitioners", as Hiltz et al. (2011) suggest. In recent years the use of social media has increased and at the same time the nature of that use has shifted towards a more collaborative model. Recent examples of such collaborative coping can be found, among others, in the 2013 European floods (Kaufhold and Reuter, 2014), the 2013 Colorado floods (St. Denis et al., 2014) or the 2012 hurricane Sandy (Hughes et al., 2014).

Across various studies of emergencies, or disaster events, numerous positive and negative aspects of social media have been identified. However, existing studies either focus only on citizens, only the emergency services in the US, or only on one particular emergency service. An open question still remains concerning the perception of different emergency services in Europe towards the use of social media. We assumed that different cultural – even within Europe – as well as legal backgrounds will have a significant influence on the emergency services' opinions and attitudes, and the survey we describe below tests that hypothesis. Additionally, different countries in Europe have been affected by different types of crisis ranging from natural disasters, e.g. the 2013 European floods in the central and eastern countries to terrorist attacks, e.g. the 2005 suicide bomb attacks in England or the

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[1] http://www.businessinsider.com/the-worlds-largest-social-networks-2013-12#ixzz30MjZz5TK.

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2004 train bombings in Spain, which may lead to different types of experiences and attitudes.

Within this article we sought to explore the attitudes of European emergency service staff towards social media for private and organizational use as well as the levels and main factors influencing their current and likely future use in their organizations. With regard to the examination of related work (Section 2), we describe the methodology of our survey (Section 3) and present its quantitative as well as qualitative results (Section 4). Afterwards the findings are discussed with regard to an extension of the emergency management cycle, leading to a final conclusion (Section 5).

2. Related work

This section summarizes literature findings on the use of social media in emergencies. We will first present some fundamentals (Section 2.1). We will then highlight emergency services' work practices (Section 2.2) and later their perception of social media (Section 2.3). Finally, we present the results of surveys which have already been conducted (Section 2.4) to clarify the research gap this study aimed to fill (Section 2.5).

2.1. Social media in emergencies

Almost a decade ago, Palen and Liu (2007) described the emergence of social media in emergencies in these terms: "the role held by members of the public in disasters […] is becoming more visible, active, and in possession of greater reach than ever seen before". In the same year they asserted that "the availability of mobile, networked information communication technology (ICT) in the hands of ordinary people makes information exchange increasingly potent" (Palen et al., 2007). Nowadays, the broad acceptance of social media has widened the possibility for crisis communication in a variety of different scenarios (Reuter et al., 2012), such as from authorities to citizens (A2C), from citizen to authorities (C2A) (Kaufhold and Reuter, 2016) as well as the coordination of voluntary activities among citizens (C2C) and by emergency services (Ludwig et al., 2015b). Reuter et al. (2013) suggest distinguishing between the real activities of "emergent groups" (Stallings and Quarantelli, 1985), which usually act in the form of neighborly help and on-site work, and virtual activities of "digital volunteers" (Starbird and Palen, 2011), which originate on the Internet and work online. These groups naturally partially overlap, and both intersect with emergency services at various points. The term "Crisis informatics" covers all of this. It "views emergency response as an expanded social system where information is disseminated within and between official and public channels and entities. Crisis informatics wrestles with methodological concerns as it strives to develop new theory and support sociologically informed development of both ICT and policy" (Palen et al., 2009).

2.2. Emergency services' use of social media

Alongside the use of social media for communication among citizens (C2C), the role of authorities as producer (A2C) or consumer (C2A) of information has also been studied. Some years ago, many emergency managers and agencies adopted social media in some way, and people increasingly expect agencies to use social media to meet their informational needs (Lindsay, 2011). The 2009 study of public information officers of the Los Angeles fire department highlights the importance of the information evangelist: a person who promotes the use of new forms of media and technology within authorities to achieve an effective organizational utilization of social media (Latonero and Shklovski, 2011). Authorities already experiment with the use of different tools, although the current study reports a lack of a clear understanding of what tool to use or which tool is better in different situations, as detected in an interview study in 7 European countries (Reuter et al., 2015a). Based on interviews with representatives from large international disaster response organizations, Tapia and Moore (2014) point out that "emergency responders already operate with less than reliable, or 'good enough', information in offline practice, and that social media data are useful to responders, but only in specific crisis situations". A study of the response after the 2012 hurricane Sandy shows that communication differed between different types of organizations and across various types of media (Hughes et al., 2014). Accordingly, Twitter tends to be used for real-time notification, and Facebook for community engagement (St. Denis et al., 2014). However, some scenarios require cross-platform collaboration of relief activities (Reuter et al., 2015b). A comparative study of the police in the 2011 London riots observed communication approaches through Twitter (Denef et al., 2013) and classified them into an 'instrumental', formal, depersonalized style of communication that emphasized the gap between the police and the public as well as an 'expressive', highly personalized, informal style that allowed direct interaction with individual followers, required high maintenance and had issues on easily overstepping boundaries like auditing the legality of information publication and learning when to engage and how to resource it. Reuter and Schröter (2015) revealed pragmatic (linguistic) barriers resulting from irony, wordplay, and ambiguity; Ludwig et al. (2015a) reveal challenges regarding information quality of citizen generated content.

In summary it can be stated that the "landscape of the use of social media data in crisis response is varied, with pockets of use and acceptance among organizations" (Tapia and Moore, 2014).

2.3. Emergency services' perception of social media

Some studies claim that "additional information provided by volunteers can improve the work of emergency services" (Reuter et al., 2013) and that "volunteered individual reports, especially pictures, are of particular value" (Ludwig et al., 2015b). These claims are based on qualitative data concerning the perception of volunteer activities by emergency services. A recent contribution on the 2013 European flood moreover confirms the potential of Twitter as a distributed 'social sensor', but at the same time highlights some caveats in interpreting immediate results (Fuchs et al., 2013).

Volunteer activism – also in social media – may result in negative impacts; for instance, by increasing the emergency services' pressure to act (Perng et al., 2012). Therefore, in several past cases, such as the 2011 Shadow Lake Fire, volunteers are actively deployed as "trusted volunteers" – a virtual team designed to manage and monitor social media communications in support of emergency incident response. A study of the 2011 Thailand flooding disaster highlights the authorities' actions taken to correct the mistakes caused by the "emerging risks of the chaotic use of social media" (Kaewikitipong et al., 2012).

Group interviews with 24 county officials about government officials' social media use in Virginia in 2010, led to the identification of challenges, such as the overwhelming amount of data and the recognition of relevant and timely information (Kavanaugh et al., 2011). Hughes and Palen (2012) described the burden on emergency responders to receive and filter a substantial amount of incoming information. Limited resources that hamper the collaboration of humanitarian aid organizations and Volunteer and Technical Communities (V&TCs) – technically trained volunteers – using social media (Gorp, 2014) have also been commented on.

According to a study comprising eleven semi-structured interviews with US public sector emergency managers, the major barriers are mainly organizational rather than technical (Hiltz et al., 2014). Most reported statements concern the lack of personnel or time to work with social media, the lack of policies and guidelines as well as official prohibitions for its use. They therefore reference a structured approach for designing social media policies (Hrdinová et al., 2010). Further responses identify a lack of appropriate technology and training and issues of trustworthiness. Hiltz et al. (2014) suggest that interviewees were "enthusiastic" about the potential usefulness of affordances from current research systems, which have already been summarized in a small number of research and commercial approaches under different scopes (Pohl, 2013; Reuter et al., 2015b).

In summary, the overall picture suggests a degree of ambivalence concerning social media use, with some potential identified (additional information, pictures, social sensor), but also some risks and barriers (pressure to act, chaotic use, overwhelming amount, limited resources, appropriate technology, trustworthiness).

2.4. Previous research on social media use among citizens and emergency services

Several surveys on the possible use of social media already exist: With over 1000 participants, a comparative study of the Canadian Red Cross (2012) aimed to explore the extent Canadian citizens use social media and mobile devices in crisis communication and what they expect from the emergency services both currently and in the future. This study emphasizes the requirement of trained social media personnel and the credibility issues of citizen-generated content but also shows the benefits of reassurance for citizens, providing situational information and monitoring. Social media were seen as a support for existing channels, but not as a replacement for them. It is noteworthy that the Canadian Red Cross employs "trusted volunteers" to support official response via social media.

The American Red Cross (2012) also studied citizens' use of social media during emergencies, with 1.017 online and 1.018 telephone survey respondents. According to the study, 12% of the general public, and respectively 22% of high school graduates, have used social media to share or obtain information during emergencies and disasters or in severe weather conditions. Users were most likely to seek information about weather, traffic, damage caused and information on how other people were coping. Beyond that, users shared not only weather information, safety reassurances and their feelings about the emergency but also their location, and eyewitness information. In terms of trustworthiness, friends, family, news media (or reporters) and local emergency officials were the most trusted sources, while unknown people in the general vicinity of the emergency were the least trusted.

Another comparative study published by the American National Emergency Management Association (NEMA) contains the results of a survey conducted in 2012 among members of emergency services from all 50 Federal States of the US (San et al., 2013). The survey, which involved 505 respondents, focused on the current degree of use of social media in crisis situations by emergency services and the future development of the organizations in respect of possible use. Additional questions were also asked regarding general opinions of social media and the trustworthiness of citizen-generated information. Although the respondents indicated a positive attitude towards social media in general and valued its suitability for information dissemination, 75% of them mentioned the requirement of verifying citizen-generated content, and otherwise questioned its credibility. However, the main barrier identified was the lack of personnel, experience and knowledge to take on additional responsibilities, although the "largely untapped resource" of digital volunteers could "help to alleviate some personnel issues". The study also revealed that 85% of US authorities already use social media.

A further survey of 241 US emergency managers at the county level in 2014 shows that only about half of these agencies use social media (Plotnick et al., 2015). Most of them also do not have any formal policies to guide their use. Of those that do have formal policies, about one quarter actually forbid the use of social media. A lack of staff, guidance and skills have been identified as the main barriers for A2C; the main barriers for C2A are lack of staff, trustworthiness and information overload. The authors conclude that "the agencies and their representatives are not yet ready to embrace SM and use it to its fullest potential. For the most part, current SM use is for dissemination of information, not the collection of it". Furthermore "in addition to technological advances, policy and management changes are needed as well, to remove the "red tape" (lack of guidelines or even prohibitions against use) that impedes the effective use" of social media (Plotnick et al., 2015).

The International Association of Chiefs of Police (IACP) conducts an annual quantitative survey about law enforcement's use of social media to report on "the current state of practice and the issues agencies are facing in regard to social media" (International Association of Chiefs of Police, 2015). With over 500 participating law enforcement agencies across the United States each year, the survey provides comparable results on how attitudes and adoption rates gradually shifted in the recent six years. Comparing the first (International Association of Chiefs of Police, 2010) and last surveys, the agencies' use of social media increased from 81% (77% Facebook, 37% Twitter, 16% YouTube) to 96% (94% Facebook, 71% Twitter, 40% YouTube) and the number of social media policies increased from 35% to 78%. The 2015 survey also highlights that 74% of responding agencies that are not currently using social media are considering its adoption, 86% report that social media helped to solve crimes and 84% state that social media has improved police-community relations in their jurisdiction. Furthermore, some aspects agencies are "very concerned" regarding social media use are: Online radicalization and violent extremism (26%), criminal use of social media (25%), fake accounts targeting law enforcement (25%), privacy (22%), employee safety (21%), and keeping informed of changes in technology (20,9%).

Finally, Flizikowski et al. (2014) present the only recent survey within Europe, conducted among citizens (317 respondents) and emergency services (130 respondents plus 33 interviews from Finland, France, Portugal, Norway, Ireland, Great Britain and Poland). The study focuses on the identification of user needs concerning crisis management with the support of social media and mobile devices. The main goal of the study was to identify possibilities and challenges of social media integration into crisis response management. Generally, the participants had a positive attitude towards social media. During the study, both citizens and emergency services identified the same challenges, such as a lack of knowledge, trained personnel, uniform terms of use, credibility of citizen-generated content, and accessibility for older generations.

2.5. Research gap

It has been shown that social media is used "with pockets of use and acceptance among organizations" (Tapia and Moore, 2014). Benefits - such as additional information, or pictures that are of particular value; and challenges, such as the pressure to act, chaotic use, overwhelming amount, limited resources, appropriate technology and trustworthiness – have been summarized. Findings regarding the perception of emergency services are often based on small numbers of qualitative interviews (Hiltz et al., 2014; Kavanaugh et al., 2011; Tapia and Moore, 2014).

A few quantitative studies concerning social media and emergency services already exist. Surveys with several hundred responses often focus on citizens' perception (American Red Cross, 2012; Canadian Red Cross, 2012). Just four of the studies focus on the attitudes of the emergency services: The first one is an annual survey conducted in the US since 2010 (International Association of Chiefs of Police, 2015); the second one builds on a survey conducted in the US in 2012 (San et al., 2013); the third was conducted in the US as well in 2014 (Plotnick et al., 2015), and only the fourth was conducted in Europe (Flizikowski et al., 2014). All studies attest a positive attitude towards social media and all identify challenges in terms of credibility, knowledge and personnel. San et al. (2013) furthermore reference the knowledge required to take on additional responsibilities, and Flizikowski et al. (2014) acknowledge a lack of uniform terms of use. However, there is clearly a lack of recent strong evidence of attitudes towards social media usage in Europe, with most of the evidence coming from the US.

While the study by Flizikowski et al. (2014) imparts insights about social media use and challenges across multiple European countries utilizing mainly qualitative survey questions (open questions, the main intention of which is to identify respondents' ideas and opinions on how social media can be used in crisis response efforts), our study seeks additionally to build on this by providing a combined analysis of qualitative and quantitative survey questions as well as shifting the focus to private and organizational attitudes because we assume that differences exist between acting as a private person and acting as an emergency service unit. We also use methods of utilization with regard to both private and organizational social media usage in the present and in the future. With this study we therefore provide a recent insight into the attitudes towards the current and future social media usage during emergencies from the perspective of European emergency services.

3. Methodology

Based on our goal to produce a comparative analysis of emergency services' attitudes towards social media across several European countries, we decided to conduct an online survey with closed (quantitative) as well as open-ended (qualitative) questions. The survey have been conducted as part of the EU funded project "EmerGent". This section presents the methodology of our study, whereby we will first present the survey design (Section 3.1), including questions, technical realization and channels of distribution. Then we will present a characterization of our participants (Section 3.2) followed by a description of our quantitative (Section 3.3) and qualitative (Section 3.4) analysis design.

3.1. Survey design

Our survey aimed to identify the attitudes of emergency services, both as a whole as well as individual staff, towards their own and their organization's current and future use of social media. The survey was designed with the aim of collecting a mixture of quantitative and qualitative evidence. It consisted of four parts (see Appendix I for details), as follows:

1. Part I: Demographic details of survey participants (age, gender, country of origin, role, type of organization) to explore any differences in responses depending on the characteristics of participants.
2. Part II: Attitudes towards social media – a combination of closed questions (eight-point Likert scale (Likert, 1932) asking participants to rate on a scale of 1–5 how much they agree with a series of statements) and open-ended questions.
3. Part III: Use of social media by one's own organization – three sets of closed questions to gauge current usage, what information is seen as useful and the main factors to ensure the use of social media by the organization. This was supplemented by two open-ended questions to provide further details.
4. Part IV: A series of closed questions and one open-ended question to explore expected changes in the future use of social media.

We designed the survey based on a strategy aimed at triangulation of micro- (referring to individual perceptions) and macro- level (referring to organizational responses) attitudes. This methodological triangulation involved a combination of questions that focus on more qualitative aspects of the emergency services' intentions towards social media and their usage before, during and after an emergency at a micro-level as well as more quantitative aspects to obtain a comprehensive picture of emergency services' attitudes towards social media within emergencies at a macro-level.

The survey was created using the open-source survey application LimeSurvey (⟨http://www.limesurvey.org⟩). In early September 2014, we sent out the link to the online survey to different networks of emergency services as well as to different national/international mailing lists, like the Federation of the European Union Fire Officer Associations, various Fire and Rescue Units (e.g. Fire Brigade Ljubljana and also Dortmund), Firefighters 112 Social Network, EENA Emergency Services Staff Network (ESSN) and Norwegian regional authorities, the civil defense department at the County Government and others (see Acknowledgments).

3.2. Characteristics of survey participants

We received 761 survey responses from emergency service staff across 32 countries. It is important to emphasize that the sample of emergency service staff responding to this survey represents an opportunity sample and, as such, provides a heuristic device for exploring some questions which are relevant to this study. The largest number of respondents came from Germany (269) followed by Slovenia (134), Poland (117), Denmark (65), Finland (28), Norway (28), Belgium (23), Italy (17), the Netherlands (11) and other countries (70) (Fig. 1). 310 participants (40%) also answered at least one of the qualitative free-text fields. The large majority of respondents (92%) were male, although the survey did include 54 female emergency service staff (8%). The largest proportion of respondents was aged 30–39 years old (29%) and the smallest aged less than 20 years old (6%), although, overall responses were fairly well distributed across age groups, with similar proportions of responses (around 20%) received from those aged 20–29, 40–49 and 50 years or older (Fig. 2).

The majority of survey participants were full-time employees in Fire Departments (39%), Volunteer Fire Brigades (23%) or the German Federal Agency for Technical Relief ('Technisches Hilfswerk') (23%). The remaining 16% of participants included a relatively small number of staff working at Public Service Answering Points (PSAPs), for Emergency Medical Services, the Police and other relevant organizations (Fig. 3). The largest proportion of

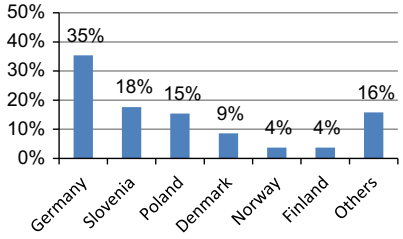


Fig. 1. Country (Q8).

respondents described themselves as 'members of the crew' (31%), while 23% were Heads/Supervisors of their particular emergency service. This, as well as the average experience (Fig. 4), suggests that the survey achieved a good cross-section of senior as well as more junior and supervisory-level staff (Fig. 5).

3.3. Quantitative analysis

For the quantitative analysis, the survey data was extracted and analyzed using Excel, a free software environment for statistical computing and graphics called "R" (http://www.r-project.org) as well as Statistical Package for the Social Sciences (SPSS), a software package for analyzing quantitative data (IBM, 2014). The analysis consisted of three key steps:

1. *Exploring basic frequencies* for each question and *using cross-tabulations* to explore any significant differences across different types of respondents.

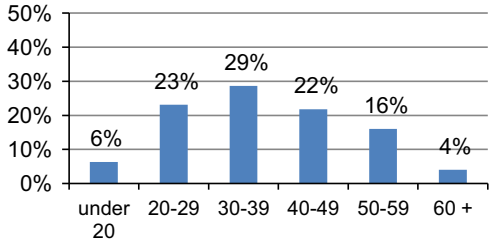


Fig. 2. Age (Q6).

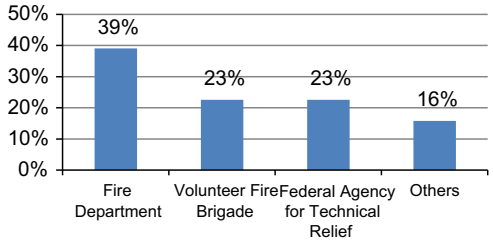


Fig. 3. Organizations (Q1).

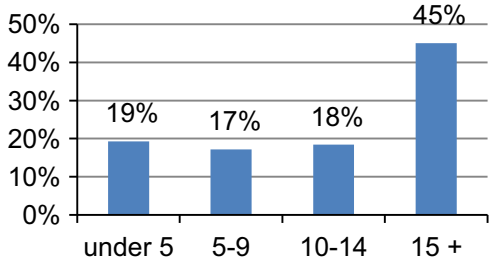


Fig. 4. Experience (Q5).

2. *Factor-analysis of the eight Likert scale questions* (see above) on participants' attitudes towards social media. To measure respondents' attitudes towards the use of social media for both private and organizational purposes, we used the statistical technique of factor analysis. Factor analysis is a technique used in research to identify groups or clusters of variables, which, taken together, represent an underlying construct or variable of interest in the study (Field, 2009). The analysis showed that the factor, consisting of the eight questionnaire items, had high reliability with a Cronbach alpha score $\alpha = 0.774$ (Cronbach, 1951), which is used to indicate reliability of the scale used.
3. *One-way Analysis of Variance - ANOVA* (Field, 2009) was then used to measure any significant differences between the types of respondent in relation to this factor.

3.4. Qualitative analysis

The analysis of our free-text survey questions was based on the inductive approach of *grounded theory* (Strauss, 1987). We used *open coding* associated with grounded theory to derive categories from the more qualitative free-text answers by careful reading and the aggregation of categories.

The first step was to extract the entire dataset from the survey platform into an Excel (*.xls) output file. Accordingly, a second sheet was added which contained only the qualitative results including the response identifier and original language identifier. As the survey had been distributed all across Europe, responses made by the emergency service staff were in different languages wherefore there was a need for translation. For each question, two columns for translation and categorization were added. Thereafter each response was read manually and translated into English, if required. The translation was performed by native speakers of the respective languages. Easy translations were performed by translation services, such as Google Translate and supplemented with dictionaries, if single words could not be translated automatically or the translations needed manual adjustment for better intelligibility. These translations have later on been checked by a native speaker.

To use the grounded theory-oriented method, the open-ended questions were coded openly and participants' statements were divided into categories. Each response was then assigned one or multiple categories to achieve a quick overview of the interesting and relevant topics. The previously acquired knowledge from the literature review and quantitative analysis was used to increase theoretical sensitivity. Within the next section we only present those responses that show both positive and negative perceptions of social media and its use by emergency services from an organizational as well as individual perspective. Each quotation is referenced with the participants' response identifier (e.g. R391). Several similar answers are indicated with a number (e.g. 12).

4. Empirical results

In the following sections we present the results of our survey. First we present results regarding personal attitudes towards the

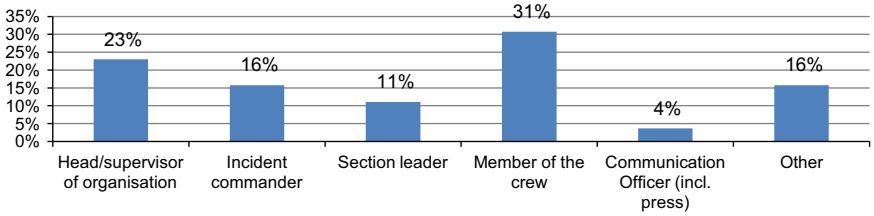


Fig. 5. Role (Q2).

use of social media (Section 4.1), then on the current organizational use (Section 4.2), types of information (Section 4.3), important factors (Section 4.4), and insights about the future use of social media (Section 4.5).

4.1. Attitudes towards the use of social media (Q7)

Following our questions focusing on the characteristics of the participants themselves (Section 3.2), the second step was to obtain insights into their attitudes towards the use of social media for private purposes. We asked them to rate their agreement or disagreement on a scale from 1 to 5 to a series of statements. Fig. 6 shows, for example, that almost two-thirds (66%; 27% strongly agreed and 39% agreed) of respondents stated that they used social media very often in their private life. As described in Section 3.3 above, eight of these statements were combined using factor analysis to provide an overall factor score for each respondent on their attitudes towards the use of social media for both private and organizational purposes.

We identified significant differences between different types of emergency service staff in their attitudes towards the use of social media for private purposes (as measured by this 'factor'). We found out that female emergency service staff are much more open-minded and have a more positive attitude towards social media than their male counterparts ($p < 0.05$). The significance of the statement, however, is mitigated by the low number of female participants (8%). In addition to gender, it is unsurprising that the age of the participants has an impact on the attitudes concerning social media usage. As Fig. 7 shows younger emergency service staff are more positive towards using social media than older staff members ($p < 0.01$) – this difference was particularly significant when comparing those aged less than 20 years with those aged 50 or over. Emergency service staff in countries with high levels of social media use[2] were, on average, more positive than those living in countries with lower levels of use ($p < 0.001$, Kruskal–Wallis test; see Field (2009) as well as Kruskal and Wallis (1952)).

Almost 60% of all emergency service staff think that social media is important for their organization (Fig. 8). They thought that potential use cases could be sharing information with citizens (83%), keeping in touch with citizens (67%) and improving the overview of a situation and therefore raising situational awareness (66%). However, 44% state information is not reliable and 27% thought that emergency services are in general too busy to use social media data (Fig. 8).

When we asked for further comments to explain the participants' attitude (either positive or negative) towards the use of social media for private purposes, most of them answered this question from the point of view of their professional role of their particular emergency service unit. There were no significant differences in attitude depending on the staff role of the respondents, although, unsurprisingly, communications officers appeared to have a more positive attitude than other staff members – although the sample only included 28 staff working as press or communication officers.

4.1.1. Additional comments on the participants' attitude towards social media (Q8)

The open-ended responses asking participants to provide additional comments about their attitude showed that, for some emergency service staff, social media provides the opportunity for organizational self-presentation ($n = 10$), such that citizens can better appreciate the work of the emergency services (R130), have

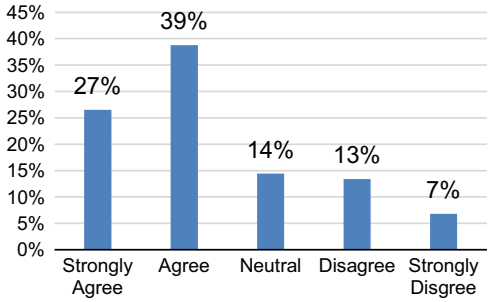


Fig. 6. In my private life, I use social media very often (Q7).

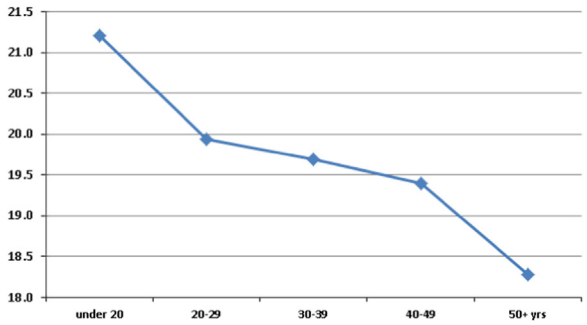


Fig. 7. Attitudes of emergency service staff (Q7) depending on their age (Q4).

a closer relationship with emergency services (R127), and potentially develop a more positive attitude towards institutional emergency service activities:

> "A safe community must communicate! It's our job to stay in touch with those we serve each and every day, proving ourselves to be a reliable service for prevention and also to overcome challenges and crises. We have the knowhow, it's worth sharing. Save lives and spare suffering, at almost no cost. To make sure the public trusts us and to maintain their confidence we have to communicate with them wherever they are 24/7!" (R1901).

While one participant pointed out that "these days, radio and television are no longer sufficient" as "more and more people use social media" (R391), another argued that social media need to be used to deliver information and save lives:

> "Social media is a valuable part of an emergency organization […] because it is quite useful to deliver information to the population as well as providing them with a wider view of the situation. We need to integrate this channel because it helps to save lives and it is a very valuable tool for civil protection, given the citizens' tools to protect themselves before, after, during and in the aftermath of a disaster" (R632).

In Germany in particular, the fire services mainly rely on volunteers. On the one hand, it is usually difficult for them to assign additional personnel to deal with social media (R2101). Often, this is the result of a lack of time and required expertize among staff (R3164). On the other hand, social media offers an "important medium to recruit voluntary helpers" (R2708). However, the survey participants mentioned some caveats regarding data quality as well as privacy and issues of social media adoption. In some instances, it cannot be guaranteed that the data is correct as the individuals' perception may complicate the situation:

> "How useful data in social networks is depends on who gives this information to the public. It also depends on the very technical possibilities of information transfer and public access

[2] http://www.slideshare.net/fullscreen/wearesocialsg/social-digital-mobile-in-europe/.

to this data on social networks. So, information […] is always provided by very different people […]. It can happen that the information is inaccurate, accidents exaggerated or data is incorrect […]" (R327).

The information provided by unauthorized people or unofficial sources might be unreliable (R848, R1733) and could mislead organizations ($n=33$). Therefore, "emergency services must be very careful about using information received on social media during emergencies" and "information may be inaccurate and may not provide a sufficient overview of what is actually happening" (R562). Another challenge is the issue of privacy ($n=6$), "because information is disseminated within seconds and also victims have a right to privacy" (R1028) and organizations possibly "have no experience in media ethics" (R1246). For instance, "the right of control over a picture of your own body could be compromised" (R1041). To overcome some issues, participants argued for the standardization of information processing ($n=6$):

"There is a need for standards. The use could be very reliable and important but it must be very well organized" (R635).

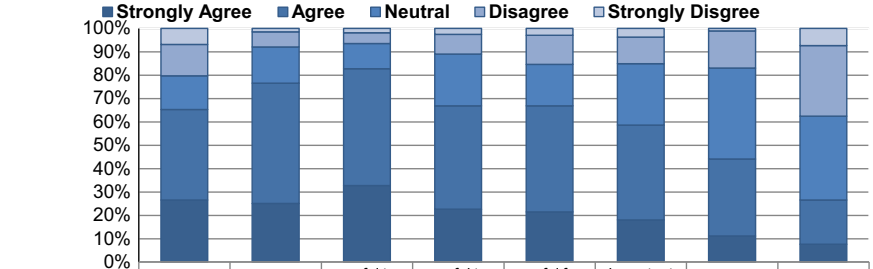
Moreover, other participants argued that the wider adoption of social media by emergency services is likely to take time (R861) and secondly, that "communication concerning major events is reserved for state authorities" and "it is unlikely they will give it up and we are not certain of being competent" (R654). Further participants appraise social media as a useful technology that they "inevitably […] have to deal with" (R885), without mentioning a precise idea of its use ($n=18$):

"It is really hard to ignore the impact social media has on the way we communicate today; it can be a powerful tool in shaping the way we want to be perceived and the relationships we have with others" (R884).

4.2. Current organizational use (Q9)

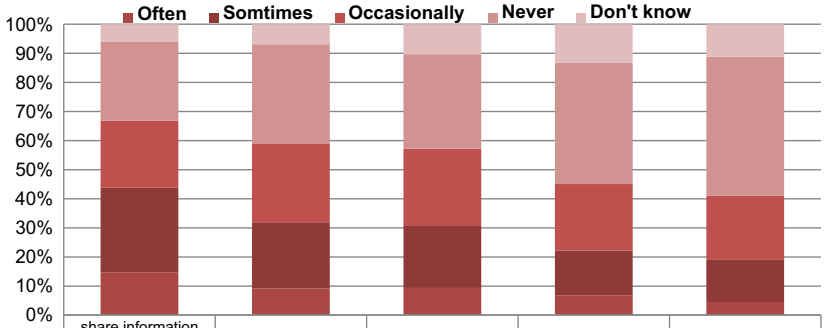
In contrast to the general positive attitudes towards social media, the actual organizational use paints a different picture and it has been shown that only a relatively small proportion of respondents utilized such data frequently, particularly during an emergency. As Fig. 9 shows, almost half share (A2C) information with the public 'sometimes' or 'often' before an emergency occurs (44%); most organizations have never actually shared any information with the public during emergencies (34%) and 83% (Q7) of emergency services staff nevertheless think sharing information with citizens is an important use case.

The survey also showed that 19% of the respondents said that social media was used 'sometimes' or 'often' for receiving



	use in private live	used by friends	useful to share information	useful to keep in touch	useful for situational awareness	important for own organization	information not reliable	emergency services are too busy
Strongly Disgree	7%	1%	2%	2%	3%	4%	1%	7%
Disagree	13%	6%	5%	8%	12%	11%	16%	30%
Neutral	14%	16%	11%	22%	18%	26%	39%	36%
Agree	39%	52%	50%	44%	45%	41%	33%	19%
Strongly Agree	27%	25%	33%	23%	21%	18%	11%	8%

Fig. 8. Attitudes towards social media (Q7).



	share information with the public about how to avoid accidents or emergencies	share information with the public about how to behave	two-way communication with the public	search social media sites to gain situational awareness	receive messages from the public
Don't know	6%	7%	10%	13%	11%
Never	27%	34%	33%	42%	48%
Occasionally	23%	27%	26%	23%	22%
Somtimes	29%	23%	22%	16%	15%
Often	15%	9%	9%	7%	4%

Fig. 9. Current use of social media by emergency services (Q9).

messages from the public during emergencies (C2A) and only 4% said this happened often in their organizations. This is also the case for situational awareness. Although 66% (Q7) of emergency services think social media can be used to obtain an overview of the situation and to raise situational awareness, actually only 23% have often or sometimes used social media sites for this purpose. Such results clearly show that there is a huge gap between rhetoric and reality in the use of social media by emergency services within emergency management.

However, at the same time, analysis of the data suggested that overall those emergency service staff already using social media frequently in their organizations were significantly more likely to indicate that they expected their organizations to increase their use of social media than other respondents. For example, of 112 emergency service staff who said they were already using social media to share information with the public about how to avoid accidents or emergencies, 109 (97%) said they thought that their organizations were likely to increase their use of social media for this purpose in the future. In contrast, among the 206 who said their organization currently never did this, only 95 (46%) thought their organization would do so in future. This contrast was even more striking concerning messages received from the public during emergencies: 94% of the 34 who said they received messages from the public often thought their organization would increasingly do so in future, compared with only 37% of the 364 who said this was not currently their practice.

The qualitative analysis revealed that 18% (26 of 138) of those who answered the question about personal attitudes towards the use of social media in emergencies have concrete concerns regarding the credibility of citizen-generated content. Simultaneously, 21% (29 of 138) argued in favor of one-way communication towards citizens. There was little overlap between the two groups (only 5 individuals belonged to both groups), implying that overall levels of concern were appreciably higher than might be apparent at first glance.

4.2.1. Examples of the use of social media (Q10)

As part of the survey, participants were asked to provide concrete examples of some of the ways in which their own organizations had recently used social media during the emergency management cycle. Overall, their comments suggested that such use most commonly included: (a) providing warnings, advice and guidance to citizens on how to cope with or prevent emergencies or disasters; (b) disseminating hints and advice on how to behave during an emergency as well as coordinating the help of volunteers, and (c) sharing summary information or reports with citizens after the emergency, and coordinating clean-up activities.

While most participants named several activities their organization had undertaken generally or explicitly before ($n=37$), during ($n=64$) or after ($n=62$) an emergency, others either reported that their organization did not use social media ($n=25$), did not specify the use ($n=11$) or answered with "do not know" ($n=5$). Although partially covered by the quantitative questions, many participants mentioned the dissemination of preventive measures (R560) and, respectively, general behavioral advice ($n=12$), information (R688) or warnings ($n=13$), and media, like videos (R146) before an emergency. One participant said that their organization used Virtual Operations Support Teams (VOST) which "provide recommendations about how to act before a disaster strikes (for instance, what to do in case of floods or heavy rain)" (R632).

During an emergency, information about the forwarding of units (R280), status updates on the current state of emergency (R2647) on the one hand ($n=16$), or general tips (R560) relating to different kinds of safety advice (R2102) and recommendations regarding citizens' behavior on the other hand ($n=10$) were disseminated. One participant also mentioned "early warning of upcoming hazards" and using social media to refer "spontaneous volunteers to existing coordination initiatives" (R688), thereby providing an example of how volunteers could be integrated into relief efforts. Further important tasks were seen to be countering criticism and providing trusted information to citizens:

> "The most important task is countering criticism during a disaster *[for instance during a forest fire]*, so as to provide trusted information and avoid the collapse of motorways or hospitals, which should be available for the emergency services" (R632).

For the purpose of information, documentation or posting of equipment, participants' organizations shared photos ($n=12$): "Updated information on the transportability of the main roads during the flood (approx. 15 minute interval). Documented with photographs. The response was excellent" (R1522).

A widespread use of social media was the publication of a report ($n=45$) – sometimes supplemented with pictures ($n=11$) – after the emergency; for example, press releases that recap the emergency to "avoid countless questions about what happened" (R146). Moreover, clean-up activities were part of the effort, for instance "after storms when power lines are down and roads are closed" to locate "fallen trees in a large area" (R1072) or to provide guidance in terms of reconstruction:

> "After an emergency, we share information. If recovery and rebuilding is necessary, we provide information on damage assessment, how citizens can indicate their losses to the authorities, what the official procedures are, where and how donations can be made and what kind of help is needed, and so on" (R1733).

Furthermore, from a more general perspective, some participants reported to represent the organizations' work practices (R173) or to get information by reading feeds from other authorities (R912). Also, the use of social media was said to serve as an additional channel supporting internal organizational communication (R2911); for instance, to exchange experiences of former similar cases prior to an emergency (R2573).

To prepare for a possible electricity shortage in Belgium, an organization processed social media data:

> "Extracted the useful data gained from monitoring social media, and converted it into information to communicate advice at the federal crisis center" (R547).

Although not specified in detail, one participant mentioned the way social media could be used to control the spread of rumors (R891) to diminish the dissemination of misinformation. Other participants simply gave examples of recent incidents in which they had used social media, including wildfires, floods, pier or city fires, freezing rain, traffic management during incidents and rescue efforts. However, some participants reported the use of specific social media (Facebook ($n=23$), Twitter ($n=11$), YouTube ($n=2$), and WhatsApp ($n=2$)). Although the sets are rather small, Facebook was used to provide information and updates ($n=5$), disseminate articles or reports ($n=3$), and to seek or monitor information ($n=4$): *"When it rains heavily, it is soon reported on Facebook which city has been worst affected and you can see the first images of the actual situation of the people affected"* (R3176). In one case the police asked for information about a car accident via Facebook (R3435). Twitter was mostly used to provide information and updates ($n=6$) and to disseminate alerts ($n=2$).

From a more critical point of view, a participant identified issues concerning the reachability, information reaction and overload:

> "The problem I see with my experience working with poor or lower social classes is that many times they do not have the

chance to access any type of information or technology. At other times they can ignore or over-react to information. I would say that the emergency organizations are overcrowded with useless information and are too close to the sources of information. So we cannot build a system that includes a useful social media tool" (R720).

Among those answering that their organization did not use social media, few mentioned a concrete reason. Either (political) authorities prevent or prohibit the use (R1417) or the perceived unreliability influences them: "Social media is too unreliable as a source of information on the latest threats. In addition, you cannot reach everyone this way" (R3142). 20% of those answering (26 from 130) mentioned barriers in terms of trust in citizen-generated content.

These key issues or attitudes mentioned above might hamper the successful integration of social media into the relief efforts of emergency services; a point to be discussed within the following survey question.

4.3. Types of information (Q11)

Our survey researched what types of information shared on social media by the public would be useful during emergencies (Fig. 10). It reveals, unsurprisingly, that general situational updates on a current emergency are considered to be more useful or very useful (73%) than specific information such as details about injuries or damage to property. Almost two-thirds of the respondents think that both photos (67%) and videos (59%) are the type of information publicly shared on social media which it is very worthwhile to receive during an emergency. However, once again further analysis suggested that all types of information were most likely to be seen as useful by those who already used social media to receive or share information with the public often (or at least sometimes).

4.4. Important enabling conditions (Q12)

Since we assumed a gap between the potential use and the actual current use of social media, we asked which conditions could ensure that social media is widely used by the emergency services within one's own organization (Fig. 11). The analysis suggested that the most important enabling conditions were organizational culture (78%) as well as the skills of staff in using social media (77%). The conditions which were deemed to be less important were the provisions of funding for staff time (56%), and the availability of equipment (68%) or software (68%) to access or analyze the data. Further analysis also suggested that older staff (aged 30 to 49) were significantly more likely to regard the skills of personnel as being important than younger staff (aged 29 or below) in enabling their organizations to use social media – this could reflect the fact that older staff have lower confidence in the use of social media.

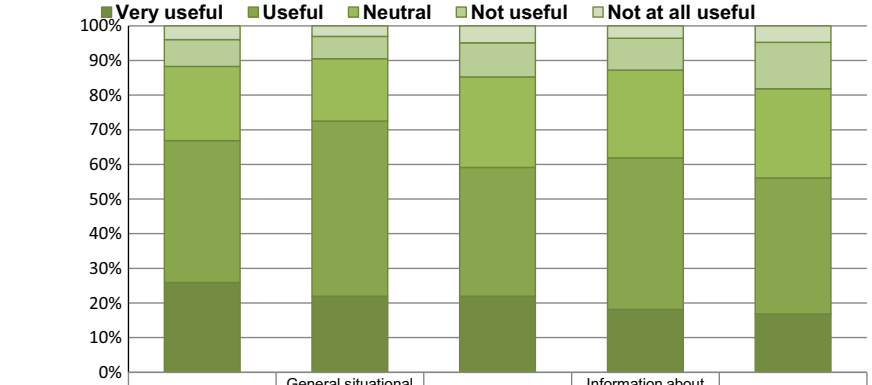
4.4.1. Other important conditions enabling social media use (Q13)

In summary, the open-ended responses largely reflected those of the quantitative survey in that participants emphasized the importance of staff skills and knowledge to ensure that information from social media is accessed and used in their organizations. In addition, qualitative responses highlighted the need for good practice examples and awareness of recent trends and legal frameworks to ensure social media is used effectively by emergency services.

To ensure the wider use of information from social media, participants pointed out the importance of experience, which requires training ($n=9$). They designated personnel ($n=8$) to be responsible for the access of such information. For example, as one participant observed, this could include "a person with knowledge in this field or a responsible member of society (a volunteer in our case) who has the appropriate knowledge and equipment to communicate with the public" (R391), or staff "training and guidance for simple use" (R877) and "online identity, credibility and excellent communication skills" (R635). Concerning technical requirements (10), a reliable Internet infrastructure (R2708) and accessibility to the scene of the incident must be ensured (R2573). In addition, there is the need for software to enable the easy dissemination of messages into multiple social media networks:

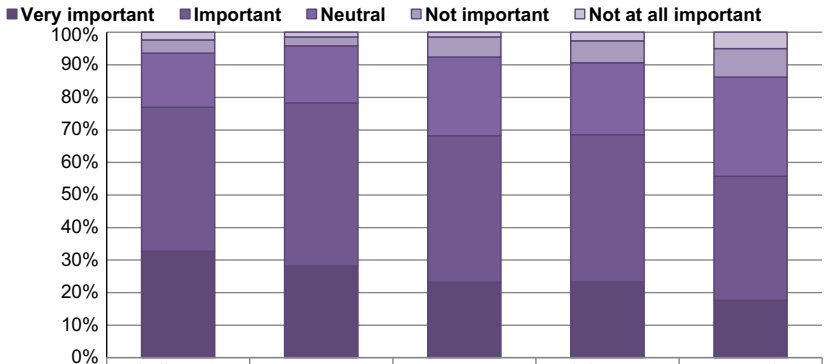
> "Software should be designed to access all selected social media directly whenever it is used, and to enable the one-click dissemination of text into all (selected) networks" (R1414).

Besides those action- and technology-oriented factors, several participants emphasized the importance of the organizational culture ($n=13$); for instance, personnel having a positive attitude (R861) or even enthusiasm (R2102) towards using social media,



	Photos	General situational updates	Videos	Information about the public mood	Specific information
Not at all useful	4%	3%	5%	4%	5%
Not useful	8%	6%	10%	9%	13%
Neutral	21%	18%	26%	25%	26%
Useful	41%	51%	37%	44%	39%
Very useful	26%	22%	22%	18%	17%

Fig. 10. Usefulness of different types of information shared on social media by the public during emergencies (Q11).



	Staff skills to use social media	Organisational culture	Equipment	Software to access social media	Funding for staff time to use social media
Not at all important	2%	1%	1%	3%	5%
Not important	4%	3%	6%	7%	9%
Neutral	17%	17%	24%	22%	30%
Important	44%	50%	45%	45%	38%
Very important	33%	28%	23%	23%	18%

Fig. 11. Main perceived enabling conditions for social media use (Q12).

supplemented by knowledge of "examples of good practice, to encourage the development of using such social networks" (R487). Moreover, a participant quoted the requirement of rethinking emergency management scenarios:

> "Understanding that the rules have changed and we live in a completely new scenario, where citizens expect to receive advice and help through social media and where first responders and authorities listen to what the citizens' share […], because those affected by a disaster are an important source of information. This is a two way channel and it should not be used only to extract information as it has been traditionally done with press, radio and other communications technologies" (R632).

On the other hand, survey participants identified factors that could limit organizational use, including the possibility that interacting with the public through social media might be restricted for legal reasons:

> "A clear allocation and restriction of access to the accounts of the emergency services (is required). It must be clearly defined which employees can and may perform the information disclosure and publication. Free communication between all employees on behalf of the ES is not allowed! Specific information is sometimes very important and sometimes also punishable by law!" (R1034).

In our context, participants also name issues regarding data credibility and protection ($n=5$). Requiring that "the privacy and data protection must be ensured", especially "photos of the danger area (no matter from which side) may constitute a problem" (R2973). Additionally, there are risks that "information is manipulated in social media, or a one-sided depiction takes place" (R2865) and that "few posts in social media are objective and effective" (R3562), which is why "you cannot rely unrestrictedly on them" and "you must also provide your own impression" (R2865). Also, the compliance with the command structure is important; for instance, there must be clear rules regarding whether a WhatsApp message constitutes an official order or not (R2215). A participant furthermore emphasized the complexity of the information space with its dimensions and possible risks, whose questions must be answered with maximum importance (R1075):

> "When we talk about social media and players, we're not talking about people, information, explanation, mediation, reality. The timing of the information may not match reality […]. Also we may believe that we are delivering great information and often we forget the other side (recipient) of the information […]." (R1075).

In any case, a "backup plan" was always said to be required in case the internet infrastructure or social media communication failed (R2215).

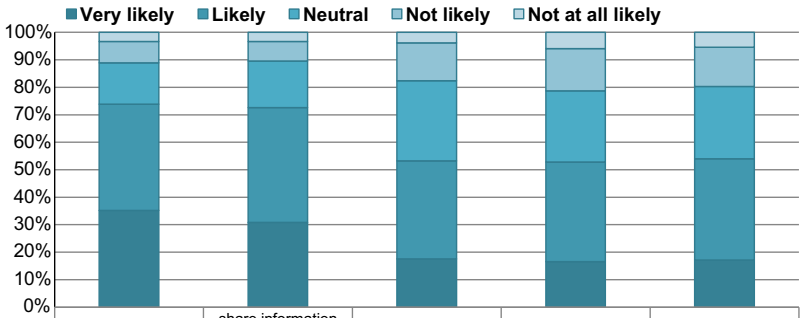
4.5. Future use of social media (Q14)

The majority of emergency service staff said they expected their organizations to increase their use of social media in future, particularly in relation to sharing information with the public before and during emergencies (Fig. 12). Thus, around three-quarters of respondents thought that their organization would increase their use of social media to share information with the public about how to avoid accidents (74%) and how to behave during an emergency (73%). A lower proportion, but still more than half (54%), also thought that their organization would be more likely to utilize social media to receive messages from the public during emergencies.

However, at the same time, analysis of the data suggested that overall it was the emergency service staff already using social media often in their organizations who were significantly more likely to indicate that they expected their organizations to increase their use of social media than other respondents. This suggests that although there is a willingness even among those who currently only seldom use social media in the emergency services to expand their use of social media, the growth of this practice and the uptake of more sophisticated systems is likely to be greatest among so called 'early adopters' or 'converts' (Rogers, 2003) – who already use such technology and have the most positive attitudes towards social media.

4.5.1. Comments on the role of social media for organizations in 5–10 Years' time (Q15)

Reflecting the findings of the quantitative survey, most responses to a qualitative open-ended question asking participants to explore the role social media might play for their organizations in a horizon of 5–10 years time, highlighted the way social media was likely to play an increasingly important role. Concrete



	share information with the public about how to avoid accidents or emergencies	share information with the public during emergencies about how to behave	two-way communication with the public	receive messages from the public	search social media sites to gain situational awareness
Not at all likely	3%	3%	4%	6%	5%
Not likely	8%	7%	14%	15%	14%
Neutral	15%	17%	29%	26%	26%
Likely	39%	42%	36%	36%	37%
Very likely	35%	31%	18%	17%	17%

Fig. 12. Expected increase of future use of social media in own organization (Q14).

scenarios of the expanded use of social media in future included using it to recruit employees (R2880) and as the "main communication channel to promote volunteers" (R3021) or to coordinate their involvement during emergencies:

> "The floods in 2013 showed that Facebook and others can reach broad bands of the population, who, however, tried to help spontaneously in quite an uncoordinated way. At this point, control centers and headquarters could intervene to lead such volunteers to some extent or to keep them away from incident scenes in especially dangerous situations […]" (R1414).

Participants also anticipated that "the advent of younger generations" (R280) working for emergency services would inevitably lead to an increasing role for social media. Others emphasized that emergency service staff of all ages needed to keep up with the latest social trends, including the use of social media, to ensure effective emergency management:

> "The public are increasingly using social media and therefore emergency services have to work with this- In the UK, younger people use mobile phones less often to make a person-to-person telephone call, but they make use of a wider number of apps to connect with a large audience. Emergency services need to keep up with developing social trends, to find out how our communities communicate with each other" (R562).

In contrast, the participant also commented on the fact that access to technology is limited in some areas and that social media is not used throughout society, which means that emergency services should not rely solely on information derived from social media when making decisions:

> "However we must remember that not everyone uses social media in the same way and some of the older generation use social media less frequently, if at all. Emergency services need to recognize the diverse communities they serve as well as the technological difficulties in some areas, where mobile phone signals and 3G or 4G is poor" (R562).

Other survey participants indicated that the adoption of social media depends on "…the future decision-makers. Today's generation is denied the current possibilities of active communication with citizens; a short introduction to these information and communication channels is unlikely" (R1034). According to one participant, the process of adoption itself and responsible subsequent use must be planned precisely to ensure social media complements existing practices effectively:

> "Firstly we must create a map of risks on social media. Then we have to draw up a strategy for 15–20 years. We also need to create tactics that correspond to each one of the dangerous situations, disasters or incidents which can arise. Create all the mechanisms for integration into contingency plans, etc." (R1075).

5. Discussion and conclusion

Recently, by using social media, citizens have acquired new means of communication both within their daily lives and as a means of mobilization during emergencies. Emergency services are confronted with the problem of how to integrate such new methods of communication into their work practices. As other studies have already revealed, it is quite obvious from the citizens' point of view that the professional emergency services are expected to recognize citizen-generated content within social media (American Red Cross, 2012; Canadian Red Cross, 2012). As San et al. (2013) have shown, most emergency services within the US (85%) already use social media, compared to approximately 19–44% of emergency service staff (Q9) found in this survey focussing on Europe: 19% often or sometimes receive messages (C2A); 31% do two way communication and 32% share information with the public about how to behave or 44% how to avoid accidents or emergencies.

Thus with regard to attitudes towards social media, the emergency services in the US cannot necessarily be compared to those of Europe. How European emergency services are disposed towards the use of social media for private and organizational use as well as the levels and main factors influencing their current and likely future use of social media in their organizations is therefore still an open question, which we tried to address within this article.

5.1. Main results

Emergency service staff reported that their organizations were currently most likely to use social media to share information with

the public (A2C) about how to avoid accidents or emergencies (Q7). However, only 15% (Q9) of respondents said they did this often. Less than half the respondents said social media was used to receive messages from the public (C2A) at least occasionally and only 5% said this happened often in their organizations (Q9). Nevertheless, the survey - and especially the qualitative answers (Q10)-revealed several organizations already use social media in several phases of the emergency management cycle (Fig. 13):

European emergency service staff uses social media for different purposes within different phases of an emergency: (a) Before, they tend to use it to release preventive information and recommendations; (b) During an emergency, organizations disseminate tips, safety advice, status updates, and warnings, or they monitor social media activity. Moreover, social media is sometimes used for internal communication and sharing experiences; (c) After emergencies, it is used to share reports enriched with multimedia content or to coordinate clean-up activities through social media. Problems discussed here are the unequal reachability of citizens, as lower social classes or older generations potentially have no or only limited access to social media.

The majority of emergency service staff expected their organizations to increase their use of social media in future (Q14), particularly to share information with the public about how to avoid accidents and how to behave during emergencies. However, the emergency service staff already using social media 'often' in their organizations were significantly more likely to indicate that they expected their organizations to increase their use of social media than other respondents. This means that while some emergency services are likely to increase their usage over the coming years, others may not do so at all or only in small incremental ways.

The main factors seen as enabling the use (Q12) of social media by emergency services were seen to be staff skills and an organizational culture open to the use of such information (Fig. 14). The open-ended question (Q13) exposed additional enabling conditions: To ensure wide use, trained personnel, appropriate knowledge and excellent communication skills are required. On the technical side, it demands an available and reliable Internet infrastructure, including software artefacts that support a user in dealing with multiple social networks. A positive attitude and examples of good practice could influence the use of social media positively. Moreover, emergency services must keep up with changing scenarios, trends, and habits of communication in social media. Barriers of usage may result from legal concerns such as data protection, internal organizational compliance issues or mistrust, as well as from the perceived complexity of social media information spaces.

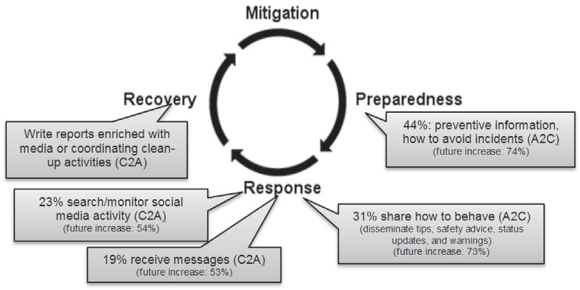


Fig. 13. Emergency Management Cycle enhanced with Social Media (based on Q9 and Q14) (own illustration).

This study also has limitations: We do not differentiate between different social media services. Furthermore, we do not analyze differences between answers from the 32 countries, since the number of participants of each country was not high enough to draw clear conclusions from it. Because participants from certain countries and emergency service roles as well as females were rather underrepresented in this sample, and since we do not distinguish between different social media services, upcoming studies should take these issues into account to be able to compare e.g. culture-, role- and social-media-specific differences. Also, further in-depth research is required to analyze how to overcome negative attitudes towards social media use.

5.2. Relationship with related work

We partly confirmed the results previously obtained by Flizikowski et al. (2014) and extended it in relation to the way in which current usage tended towards one-way communication, i.e. the provision of information (A2C) and the collection of information as part of the monitoring process (C2A). Also, both studies come to the conclusion that the use of social media is generally regarded positively. We also obtained results with regard to the concerns and challenges regarding future use. Challenges for the future use became apparent from the statements expressed by the respondents: In both cases, lack of expertize and human resources as well as uniform usage conditions were expressed. Similarly, a lack of trust in relation to citizen-generated information was mentioned.

A comparison with the study of the Canadian Red Cross (2012) is more difficult, as the geographical and cultural conditions differ from those in Europe. This can lead to different results when evaluating the surveys, particularly as not only natural disasters but also cultural and political events such as riots or attacks are very different from those in Europe. Consequently, the local emergency services and citizens experience such exceptional situations in a very different manner too (Flizikowski et al., 2014, p. 709). Furthermore, both studies differ in that in Canada only citizens were interviewed about their expectations regarding the

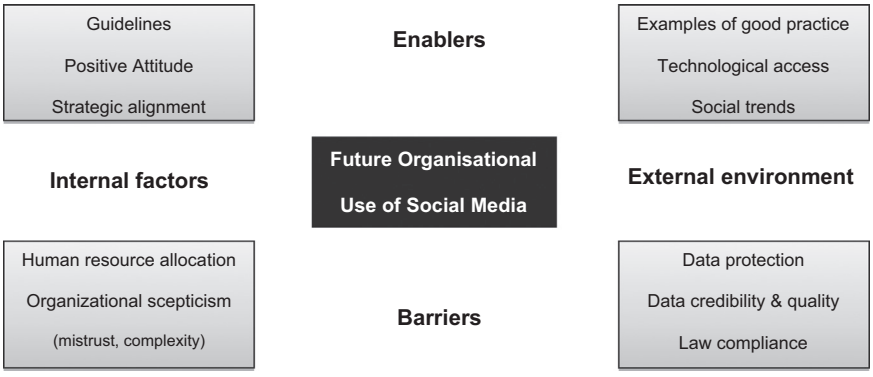


Fig. 14. Internal and external enablers and barriers (own illustration).

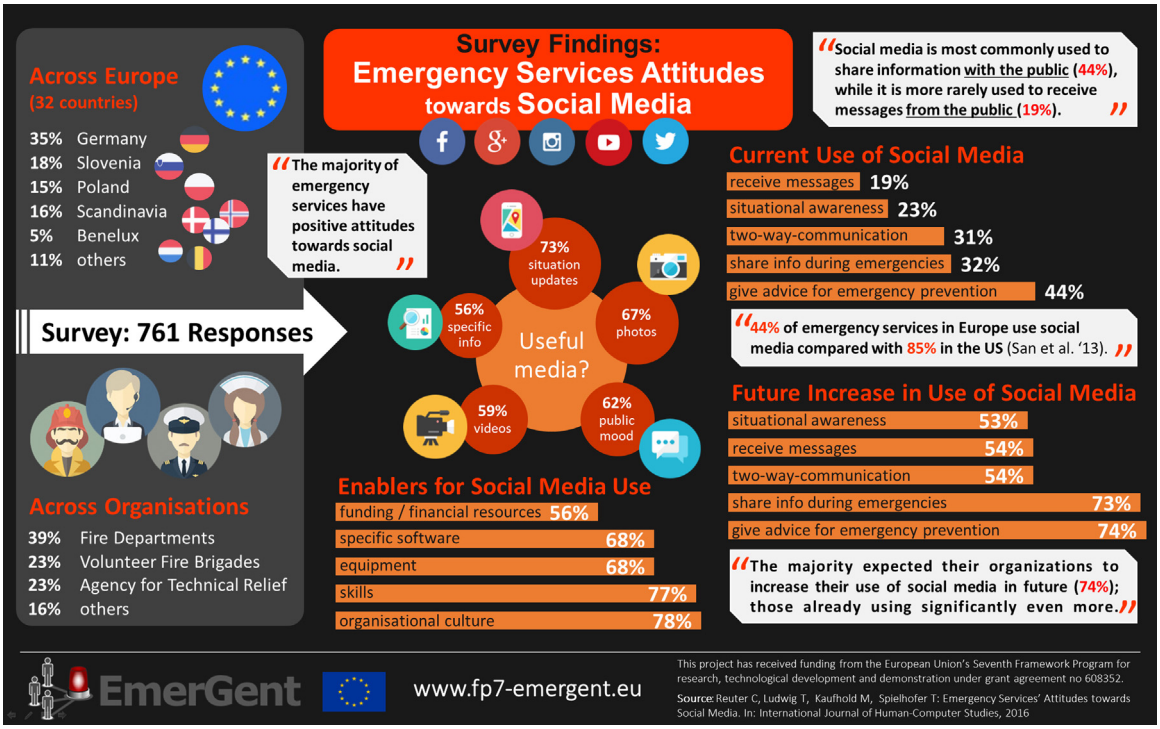


Fig. 15. Infographic of the main results (own illustration).

use of social media in relation to the emergency services. However, the case studies contained in the paper are particularly interesting: They show not only an example of how social media in Canada is already being used, but they draw parallels between the Canadian and European authorities. The police in Toronto trained 300 employees to deal with social media to improve the response to disaster situations in terms of providing situational information (A2C) as well as for monitoring social media (C2A) to respond to emergency calls if necessary or to correct misinformation (two-way-communication). This shows that at least in some Canadian emergency services there is a demand for skills in dealing with social media. Meeting these needs is, according to our study, one of the main prerequisites to enable its future use.

The study published by the American National Emergency Management Association (San et al., 2013) as well as the study on US emergency managers (Plotnick et al., 2015) are geographically and thus also culturally and politically based in the US. However, they are similar in so far as both surveys are addressed towards emergency services and include both quantitative and qualitative questions which have many substantive parallels. When comparing the results of these studies, it becomes apparent that there are many similarities in the use of social media by the emergency services in America and in Europe, despite the varying environmental conditions. Most obvious is the pace - but not the direction - of change and that it varies a great deal as a result of cultural and organizational factors.

Thus, all studies conclude that the setting for the use of social media is generally positive, even if the widespread implementation of their use is often hampered by a lack of resources, experience or lack of knowledge, or is at least limited by these shortcomings. The most important factor is staff time as the monitoring and the active use of social media is time consuming. Organizations, especially in larger or more protracted civil cases, cannot use social media without additional, competent, staff. Similarities can also be found regarding concerns about trust: 75% of respondents wanted to check the messages first before responding (San et al., 2013, p. 50). In our survey, one of the most frequently mentioned concerns was the trustworthiness of social media data.

One major difference was found: While the details of the attitudes of European and US authorities towards social media in disaster situations are mostly similar, the main difference is the extent of their practical implementation: As already stated, within the American study all national and 85% of local authorities reported using social media already (San et al., 2013, p. 2). The regular use rate detected in our study however lies between just 19% and 44% of emergency service staff, depending on the application. The type of use, the authorities are agreed, still resides mainly in the dissemination of information to the population (A2C) (Fig. 15).

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Appendix I. Survey description and questions

See Fig. A1 here.

Fig. A1. Online survey.

The survey aims to find out the attitudes of emergency service staff towards their own and their organization's current and future use of social media. Social media, such as Facebook, Twitter or YouTube, allow people to create, share or exchange information in virtual communities and networks. Such information could be useful to Emergency Services during emergencies.

I agree to complete this questionnaire for the EmerGent project, asking me about my opinions on social media and that my participation is voluntary. The results of this survey will be used for the purpose of research and not for profit; all information gathered in this survey will be retained, accessed and analyzed by the project researchers for the purpose of this project only. My anonymity is guaranteed and I will not be identified in publications or otherwise without my express written consent.

Welcome, the following questions will take only about 5–10 minutes to answer. We thank you in advance for your participation. For the completion of the questionnaire it is mandatory to answer all questions, unless the question specifies otherwise.

Part I: Personal details

1. Q1: *What type of organization do you work for? Fire Department; Volunteer Fire Brigade; Emergency Medical Service; Police PSAP (Public Safety Answering Point); Other type of organization
2. Q2: *What is your main role in this organization – the role you spend most time on each day? (Head/supervisor of organization; Incident commander; Section leader; Communication Officer (incl. press); PSAP Supervisor (public-safety answering point); PSAP Operator (public-safety answering point); Member of the crew; Other)
3. Q3: *How many years have you been working for Emergency Services? (under 5, 5–9, 10–14, 15+)
4. Q4: *What is your age? (under 20; 20–29; 30–39; 40–49; 50–59; 60+)
5. Q5: *What is your gender? (Female; Male)
6. Q6: *What country do you live in?

Part II: Your own attitudes towards social media

1. Q7: *Please indicate how strongly you agree or disagree with the following statements. (Strongly Agree; Agree; Neutral; Disagree; Strongly Disagree)
   - In my private life, I use social media very often.-Most of my friends use social media to keep in touch.-Information provided on social media during an emergency is often not reliable.-It is important for Emergency Services to use social media to keep in touch with the public during emergencies.-Social media are an important tool for Emergency Services like the one I work for.-Social media could be useful for gaining situational awareness information during emergencies.-Social media could be a useful tool for Emergency Services to share information with citizens.-Emergency Services are too busy to use social media.
2. Q8: Add any other comments about your attitude towards social media

Part III: Use of social media by your own organization

1. Q9: *Does your organization use social media? (Often; Sometimes; Occasionally; Never; Don't know)

- To share information with the public about how to avoid accidents or emergencies?-To share information with the public during emergencies about how to behave?-For two-way communication with the public?-To receive messages from the public during emergencies?-To search social media sites to gain situational awareness during emergencies?

1. Q10: Please give an example of the way(s) in which your organization used social media recently before, during or after an emergency or incident?
2. Q11: *Which of the following types of information shared on social media by the public would you find useful to receive during an emergency? (Very useful; Useful; Neutral; Not useful; Not at all useful)
   - General situational updates (relating to the emergency)-Specific information (injuries, damage to property etc.) - Information about the public mood (panic or calm)-Photos of the emergency situation - Videos of the emergency situation
3. Q12: *How important do you think are the following factors to ensure that social media is widely used by Emergency Services like yours? (Very important; Important; Neutral; Not important; Not at all important)
   - Staff skills to use social media - Organizational culture - Funding for staff time to use social media - Equipment - Software to access social media
4. Q13: Are there any other factors that are important?

Part IV: Future use of social media by your own organization

1. Q14: *Please indicate the extent to which you expect your organization to increase its use of social media in future (Very likely; Likely; Neutral; Not likely; Not at all likely)
   - To share information with the public about how to avoid accidents or emergencies?-To share information with the public during emergencies about how to behave?-For two-way communication with the public?-To receive messages from the public during emergencies?-To search social media sites to gain situational awareness during emergencies?
2. Q15: What role do you think social media could play for your organization in 5–10 years' time?
3. Q16: *Are you willing to receive the results of the survey and to take part in a follow-up survey later on in the project? (if yes: e-mail address)

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