

Social Media Use in Emergencies of Citizens in the United Kingdom

Thomas Spielhofer & Anna Sophie Hahne

The Tavistock Institute, London

T.Spielhofer@TavInstitute.org, A.Hahne@TavInstitute.org

Christian Reuter¹ & Marc-André Kaufhold^{1,2} & Stefka Schmid¹

Science and Technology for Peace and Security (PEASEC), TU Darmstadt¹

Institute for Information Systems, University of Siegen²

reuter@peasec.tu-darmstadt.de; kaufhold@peasec.tu-darmstadt.de

ABSTRACT

People use social media in various ways including looking for or sharing information during crises or emergencies (e.g. floods, storms, terrorist attacks). Few studies have focused on European citizens' perceptions, and just one has deployed a representative sample to examine this. This article presents the results of one of the first representative studies on this topic conducted in the United Kingdom. The study shows that around a third (34%) have used social media during an emergency and that such use is more widespread among younger people. In contrast, the main reasons for not using social media in an emergency include technological concerns and that the trustworthiness of social media content is doubtful. However, there is a growing trend towards increased use. The article deduces and explores implications of these findings, including problems potentially arising with more citizens sharing information on social media during emergencies and expecting a response.

Keywords

Emergencies; social media; Twitter; Facebook; representative study

1 INTRODUCTION

Interactive technologies play a major role in the context of peace and security (Reuter, 2019; Reuter et al., 2018b). This becomes obvious, recognising that social media is not only part of everyday life but is also increasingly used during emergencies or crisis situations (Reuter et al., 2018a; Reuter & Kaufhold, 2018). Our work tries to grasp exactly this specific scenario of social media usage, thereby following studies examining frequency of use of social media in situations of emergency. Relying on survey participants' answers, we chose to prioritise subjective perceptions of usage over numerical measuring of, for example, Tweets referring to a specific disaster. At the same time, focusing on subjective statements allows for an analysis of frequency and diversity of use, taking into account various sociodemographic factors. Furthermore, our study offers the possibility to establish an overview of the subjects' different reasons for social media use in emergencies.

Looking at the respondents' patterns of social media use in crises, we are also interested in their respective attitudes, not least with regards to their readiness to share data with emergency services or their assessment of social media as an effective means to look for and share information before, during, or after an emergency. Our research project EMERGENT, funded by the European Commission, involved conducting representative online surveys of citizens in the UK, Germany, the Netherlands and Italy. Here, presenting our case study, we focus solely on the results of British respondents. The case of the UK stands out because of its relative low frequency and diversity of use. This is not surprising because of the UK's image of an active emergency management and social media-friendly culture (Government, 2018; We Are Social, 2016). At the same time, the island is, like Italy and its history of earthquakes, rather prone to natural disasters (Lo & Chan, 2017; Salvati et al., 2014). Thus, we aim for a thorough understanding of the perceived behaviour of the British population, ground for action, and their subjective parameters for assessment of social media use in emergencies and emergency services' roles. As we are interested in the use and perception of social media determining factors, we looked for potential relationships between sociodemographic factors (age, gender, social grade) and ordinary social media use taking into account British respondents' perceptions on social media use in emergencies. In this article, we present the results of a

survey, involving 2,000 citizens living in the UK, conducted in October 2016. It is assumed that this allows for a more effective usage of social media and emergency applications during emergencies. We first aim for an understanding of different attitudes regarding social media usage in daily life, followed by focusing on individuals' assessment of use of respective channels in the context of emergency events. Third, we dedicate attention to use and evaluation of emergency apps, thereby assuming perceptions of such applications to be closely related to perceptions of social media use in times of emergencies. The presentation of results is succeeded by a discussion and concluding remarks.

2 BACKGROUND

During the last years, many studies on approaches for ICT in safety-critical environments, such as emergencies, have been published (Hendela et al., 2017; Hiltz & Plotnick, 2013; Starbird, 2017). They cover potentials of new technologies for safety-critical work (Norros et al., 2011), including the risk of information systems failures (Beynon-Davies, 1999). They also include approaches for coordination among emergency management units (Chen et al., 2008; Hill, 2010), support of awareness and team work (Carroll et al., 2006) and distributed collaborative situation-map making (Gunawan et al., 2011; Kogan et al., 2016). Other areas of research cover the design of emergency medical services (Kristensen et al., 2006), electronic documentation in medical settings (Sarcevic & Ferraro, 2017), and concerns against sensor-enhanced medical systems (Dahl et al., 2016). Newer approaches in emergency management work include the use and analysis of social media (Stieglitz et al., 2014). A review of the literature suggests that while there have been some quantitative studies exploring the attitudes of emergency services and citizens towards the use of social media in emergencies, there are only a few publications using representative samples to provide accurate estimates.

There are a few quantitative studies on authorities' perception of social media, and most are from North America. This includes one study (San et al., 2013) that analysed the results of a survey conducted in 2012 by the American National Emergency Management Association (NEMA). This survey asked staff members of emergency services from all 50 federal states of the US about social media use in emergency management. It found that most emergency services used social media to 'push information out to the community' during crises while lacking the skills and work force to access and analyse information shared by citizens on social media during such events. Additionally, mistrust of such information and lack of dedicated personnel to access such data were perceived as main barriers to more dedicated use of social media data. More recently, Plotnick et al. (2015) conducted a survey of 241 US emergency managers at county level in 2014 about usage patterns, barriers, and improvement recommendations for the use of social media during emergencies. It found that by 2014 only about half of these agencies used social media in any way and most did not have any formal policies to guide their use. Once again, the main barrier was found to be the lack of dedicated staff. Another survey that was conducted with English respondents further indicated a greater importance of political and organisational constraints (Shan et al., 2017). In contrast, the annual survey of the use of social media by IACP (International Association of Chiefs of Police, 2015) encompassing 553 law enforcement agencies, representing 44 states, found that 96.4% of agencies surveyed used social media in some capacity and that a very high proportion (85.5%) had used data from social media to solve crimes in their area. This could suggest either that social media use among emergency service is increasing or that police services place a much greater emphasis on it than other emergency services. Gray et al. (2017) examined Tweets in the context of three UK storms, and highlighted the importance of reducing information overload during multi-hazardous events, as well as demonstrating that sociodemographic factors could potentially influence social media usage during disasters.

There has only been one similar study conducted in Europe to date (Reuter et al., 2016), based on a survey of 2014 of 761 emergency service staff across European countries. It showed that in 2014 very few emergency services in Europe were using social media extensively; in particular, it was hardly ever used to receive information from the public. Thus, only 4% of survey participants indicated that they often receive messages from the public via social media during a crisis. While only 23% reported that they often use social media to gain situational awareness during emergencies, 46% said that they did at least occasionally.

Similarly, there are very few quantitative and recently published studies exploring citizens' attitudes towards using social media in emergencies. This includes a comparative study with over 1,000 participants conducted by the Canadian Red Cross (2012) and a similar survey by the American Red Cross (2012) involving 1,017 online and 1,018 telephone survey respondents. The latter found, for example, that around one-in-ten of the general population had used social media to find out or share information during an emergency. Furthermore, Flizikowski et al. (2014) conducted a survey with European citizens and public protection and disaster relief organisations (PPDRs) about perceptions and use of social media. Unfortunately, this was not based on a representative sample.

Reuter and Spielhofer (2017) conducted a similar survey, involving 1,034 citizens of the European Union. It found that while around two-in-five citizens had used social media to search for information in an emergency (43%),

only just around a quarter had used it to share information (27%). The survey also showed that 42% of citizens indicated that they would expect a response within an hour if they posted a request for help on an emergency service social media site and that 69% believed that emergency services should regularly monitor their social media channels to be able to respond immediately to such requests. An even more recent study, in 2016, was conducted by Reuter et al. (2017) in Germany. This representative study involved 1,069 citizens using an online-survey with similar questions regarding frequency and diversity of usage. The survey showed that nearly half (45%) of the respondents had used social media to share and/or look for information during an emergency, but only 16% had downloaded an emergency app. In contrast to these results, British and Northern Irish respondents showed lower percentages with respect to both questions.

However, apart from the survey conducted in Germany, there is a gap both in representative studies from across Europe (the study by Reuter and Spielhofer (2017) was based on an opportunity sample) and with respect to the UK and other European countries. In this paper, we focus on the UK as it poses an interesting case of relatively low frequency and interest of social media use during emergencies while it is suggested that ordinary social media use is comparatively at a medium level (We Are Social, 2016). There are various studies focusing on sociodemographic factors like age or gender with respect to social media use (Barker, 2009; Correa et al., 2010; Lin et al., 2014). Yet, our paper presents a first attempt to bring these variables together with ordinary social media use (Lev-On & Uziel, 2018), thereby trying to offer a bigger societal picture with respect to this specific scenario of social media usage.

3 RESEARCH DESIGN

The findings reported in this article are based on an online survey conducted by Opinium Research between 8th and 9th October 2016, with the research agency generating a diverse sample from a pool of volunteers. Respondents were offered a small allowance. The main goals of the survey were to explore UK adult citizens' (aged 18 or above) attitudes towards the use of social media for private, everyday life purposes and in emergency situations. It was conducted as part of a European project study. It consisted of nine sets of questions, most of them in closed-answer format, except for the last, open-ended, question. Questions addressed: (1) information about gender, age, social grade, working status and geographical location (UK region) of participants; (2) citizens' frequency of social media use; (3) their previous use of social media in emergencies to share or look for information; (4) if applicable, the types of information shared; (5) the expected responsiveness of emergency services to answer to messages posted via social media; (6) opinions about discouraging factors for using social media in emergencies; (7) the extent to which they had previously downloaded any smartphone app to be used in emergencies and, if so, what apps they had downloaded; (8) their expectations regarding the use of such apps in the future; (9) an open-ended question, asking them to provide further details about experiences with social media in emergencies.

A total of 2,000 UK citizens completed the survey, including 1,118 women (55.9%) and 882 men (44.1%). Most respondents (91.2%) were between 25 and 74 years old. Around two thirds of the respondents (66.6%) were in the social grade ABC1 and around one third (33.4%) in the social grade C2DE. These social grades refer to the classification system based on occupation and developed by the National Reader Survey (2019). Social grades A, B, and C1 are combined to represent middle and upper class, which therefore can be distinguished from C2, D, and E, representing working and lower class (Dobson, 2016). A large proportion of citizens (39.6%) were working full time and 25.3% were retired. Most respondents (83.1%) lived in England, especially in the South and East of England (33%). As there were significant differences between the respondents and population statistics, the sample was weighted to be representative of the population for the gender, age, social grade, working status and home region of respondents. This was done using the most recent population statistics (Office for National Statistics, 2017). The analysis is based on this weighted sample.

For the quantitative analysis, survey data was extracted and analysed using IBM SPSS Statistics 23. Microsoft Excel was used for the design of the displayed figures. The analysis consisted of three key steps: (1) preparing the data, including assignment of missing values and data values, and combination of categories of demographic background variables; (2) exploring basic frequencies for each question; (3) using cross-tabulations with chi-squared tests to explore any significant differences for different types of respondents in relation to gender, age, social class, region and working status. In addition to that, Mann-Whitney U Tests were used for ordinal variables and Kendall's Tau was used to determine correlations between ordinal items. Test results including effect sizes are displayed in brackets. Conventions for Cramer's V depend on the degrees of freedom (*df*). According to Cohen (1992), Cramer's V of .1 is regarded as small, Cramer's V of .3 as medium and Cramer's V of .5 as large, if *df*=1. For higher degrees of freedom, the required Cramer's V for the interpretation of small, medium and large effect sizes is smaller.

For the qualitative analysis, open responses from 1,958 respondents were coded using Microsoft Excel. This

involved thorough reading of all responses of the open-ended question and generating and validating key themes. These were then used to define categories and the open responses were repeatedly analysed collectively and assigned to one of the categories. Six categories were defined, encompassing scepticism, conditions, range of applications, productivity, inexperience, information flow. These were further categorised into assessed barriers (scepticism, conditions), advantages (productivity, information flow), and experience (range of applications, inexperience) regarding social media use in emergencies. The literature review and the quantitative analysis that was done beforehand helped to increase ‘theoretical sensitivity’ (Strauss, 1987) and establish the context of the qualitative analysis.

It also needs to be noted that the questionnaire did not define an emergency concept or situation, mainly to find patterns and similarities within individuals’ own perceptions towards emergency situations. Situations of emergencies were thus defined by the individuals themselves.

Contrasting prior work focusing on bigger disasters (UN Office for Disaster Risk Reduction, 2016; Whittaker et al., 2015), we choose a broader definition (Haddow et al., 2002) of emergencies, referring not only to academically conceptualised emergencies and disasters but also emergency situations in which only a few individuals may be affected and call upon emergency services’ standard procedures for help (e.g. burglary). This allows a glance at individual perceptions of incidents disrupting their everyday lives while otherwise not reaching the categorical threshold of an emergency with collective impact. Communication via social media may prove to be effective in each scenario. Aware that individual incidents differ in scope and individuals may pursue actions via social media differently, citizens may want to contact emergency services or have high expectations towards authorities independent from the type of emergency. We assume that a broad understanding of an emergency takes into consideration that various participants define emergencies based on their own experiences and conventional usage of the term, the common understanding forming the basis of individual action and defining circumstances at which social media may aim. In contrast to other studies focusing, e.g. only on perceptions of directly involved individuals, we defined individuals to use social media during emergencies even when they were not directly involved as primary sources of information as this may show interesting results as well.

4 FINDINGS

In the following, we present our results regarding ordinary social media and smartphone use, social media use in emergencies and the use of emergency applications. At the same time, we report correlations between sociodemographic factors and ordinary social media use, respectively, and the use of social media in crisis situations, potentially yielding both theoretical and practical implications.

4.1 Use of Smartphones and Social Media

The survey confirmed findings from other recent research in the UK (We Are Social, 2016) regarding the use of smartphones and social media usage. Table 1 below sets out the main findings from the UK survey carried out in October 2016.

Activity	Hourly	Daily	At least once a week but less than daily	Less than once a week	Never
Use a smartphone	30%	43%	6%	2%	19%
Use Facebook	11%	48%	12%	7%	21%
Use Twitter	4%	14%	9%	11%	62%
Use other types of SM	5%	19%	19%	18%	39%
Post messages on SM	3%	14%	21%	28%	34%

Table 1: Proportion of regular smartphone and social media users (N=2000)

It shows that over four-in-five adults in the UK currently use a smartphone at least occasionally while 19% never use one. Looking at these 19% more closely, it shows that they are most likely to be older and/or in the lowest social grade of the population. More specifically, those reporting not to use a smartphone are most likely to be:

- aged 75 or older: 49% of this age group do not use a smartphone, compared with 3% of 18-24-year-olds; among those aged 65 to 74, it is 37% ($\chi^2(6, N=1999) = 232.97, p < .001$, Cramer’s V = .34).
- in the lowest social grade (E) of which 32% never use a smartphone; in contrast only 10% of those in the highest social grade (A) do not use one ($\chi^2(5, N=2001) = 57.78, p < .001$, Cramer’s V = .17).

There was no difference depending on gender.

The analysis also shows that a very similar overall proportion of citizens use Facebook as there are smartphone users. But even though there is clearly some overlap of non-Facebook users with those who use a smartphone. Around half of those not using a smartphone still use Facebook. In total, around 9% of citizens neither use a smartphone nor Facebook.

Interestingly, even though young people are far more likely to be Facebook users, relatively high proportions of older people use it too ($\chi^2(12, N=2000) = 138.03, p < .001$, Cramer's $V = .26$). While 93% of 18-24-year-olds use it at least sometimes and 76% of those in this age category use it daily, 58% of those aged 75 or above use it occasionally or more and 39% on a daily basis. One other noticeable pattern is that there is virtually no difference between 18-24- and 25-34-year-olds in the proportion that uses Facebook on a daily basis.

The survey also showed that there is a significant difference in the use of Facebook depending on gender ($\chi^2(2, N=2001) = 34.13, p < .001$, Cramer's $V = .13$). Thus, 65% of women use Facebook on a daily basis, compared with 53% of men. Similarly, while 82% of women use Facebook at least sometimes, it is only just above three-quarters of men who do so. Adult citizens in social grades ABC1 were also slightly more likely to use Facebook (81%), compared with those in lower social grades C2DE (77%) ($\chi^2(1, N=2000) = 4.73, p < .05$, Cramer's $V = .049$). However, this could reflect the fact that 31% of those in the social grades C2DE are retired, compared with 21% of those in ABC1, potentially reflecting the older age group of those in the lower social grades above anything else.

Twitter is used by fewer people than Facebook in the UK. Thus, around one-in-five (18%) use it daily and 38% use it at least occasionally (less than once a week or more often). Once again, Twitter users are most likely to be young citizens: Fifty-three per cent of under 50 years use Twitter at least sometimes, compared with only 22% of those aged 50 or above ($\chi^2(2, N=2000) = 224.94, p < .001$, Cramer's $V = .34$). Daily Twitter use is at a peak among 18-24-year-olds (37%) and falls to just one per cent among those aged 75+ ($\chi^2(12, N=1999) = 257.09, p < .001$, Cramer's $V = .36$).

Looking at respondents who use Twitter on an hourly basis, the proportion is only relatively high (11%) among both 18-24- and 25-34-year-olds. For all other age groups, it is at three per cent (35-44-year-olds) or below. Another significant difference is that regular Twitter users are most likely to come from social grades ABC1 ($\chi^2(2, N=2000) = 51.55, p < .001$, Cramer's $V = .16$): Two-thirds (67%) of those who use Twitter daily are in these social grades. Thus, is that almost twice as many citizens in social grades ABC1 (23%) use Twitter on a daily basis, compared with those in social grades C2DE (13%).

Moreover, men are significantly more likely to use it on a daily basis (22%, including 6% using it on an hourly basis) than women (15%, including 2% using it hourly) ($\chi^2(2, N=2000) = 19.30, p < .001$, Cramer's $V = .098$).

4.2 Use of Social Media in Emergencies

While the majority of UK citizens (85%) use some form of social media at least occasionally, considerably fewer citizens have used social media during an emergency. More specifically, around one third of the survey sample (34%) indicated to have used some form of social media in the past to look for or share information during an emergency, such as an accident, power cut, severe weather, flood or earthquake (**Error! No se encuentra el origen de la referencia.**). This includes 21% who used it to share information and 13% who used social media to find information only. It is worth noting that those participants that have not used it may not have had the need to do so as they may not have experienced an emergency.

These results are reflected in responses to an open-ended question in the survey, asking participants to provide fuller details about their use of social media in emergencies. This included respondents who stated that they either do not use social media at all or have never used it during an emergency. Others highlighted the way social media was a useful tool to send and receive up-to-date information very quickly:

'Social media is often the most effective way of finding out about incidents quickly'.

'It's a very easy and convenient way to reach a lot of people all at once! Information spreads quickly on social media and is more likely to be seen by a large audience. If there was a national or even worldwide emergency, it would be one of the best ways of quickly sharing important information with everyone.'

Specific uses of social media included looking for information shared by emergency services or news agencies, using it to share or look for transport disruption details, and for sharing information about the emergency, or that you are safe, with friends and family:

'When being stranded in Europe due to ash cloud I have shared pictures of queues at airport on Facebook.'

Used Twitter feed for latest information on closures and shared my location with colleagues also trying to get home.'

'It's good to warn friends of things or to let people know you are safe without contacting each one individually.'

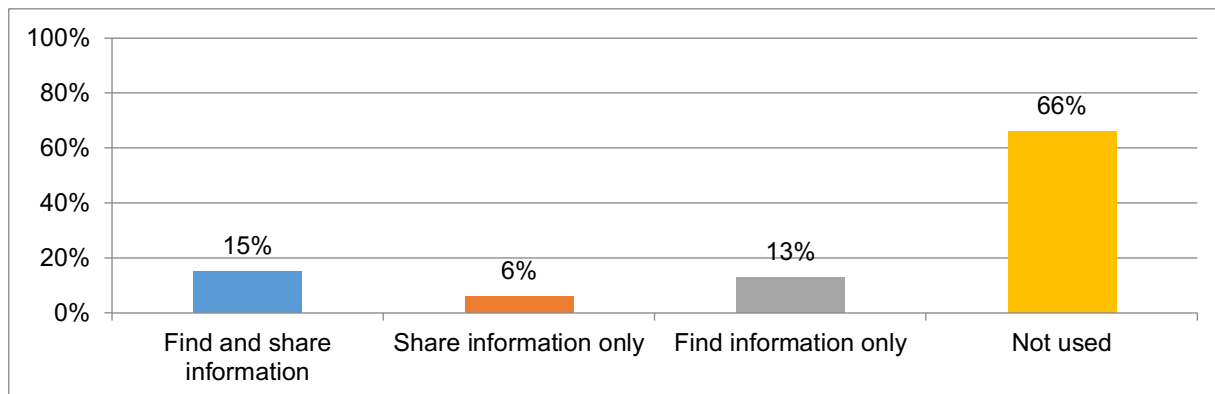


Figure 1: Use of social media (Facebook, Twitter, Instagram etc.) during an emergency (N=2000)

The survey indicated noticeable differences in the characteristics of those who have/would and have/would not used/use social media during an emergency, relative to their age, gender and social grade. In particular, respondents most likely to use it were young people, women and those in social grades ABC1. Figure 2 presents the levels of social media use in emergencies by age of participants, categorised into seven age bands. It shows that those in the youngest age band are most likely to have used it ($\chi^2(6, N=1999) = 254.56, p < .001$, Cramer's $V = .36$), although the levels of use are quite similar for those aged 25-34 and 35-44. As Figure 2 shows, there is a noticeable drop in use for those aged 45 or above – suggesting a 'digital divide' between younger and older citizens in the UK.

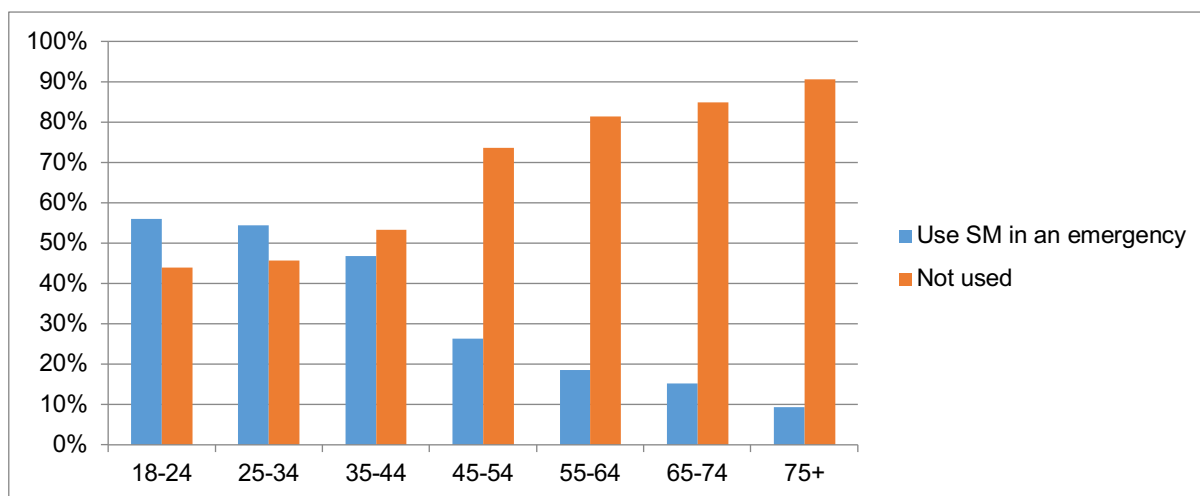


Figure 2: Use of social media in an emergency by age (N=2000)

Analysis of the data also showed that those in the youngest age group are more likely to have used social media to look for information, while those in the 25-34 age group are more likely to have used it to share information.

Age group	Use SM to look for info only	Use SM to share info	Total use
18-24	40%	16%	56%
25-34	19%	36%	54%

Table 2: Ways of using social media in emergencies by age group (N=575)

Women are also significantly more likely to have used social media in an emergency (37%) than men (31%) ($\chi^2(1, N=1999) = 7.52, p < .01$, Cramer's $V = .061$). In particular, women are more likely to use social media to share information in an emergency (23%) than men (18%) ($\chi^2(2, N=1999) = 8.01, p < .05$, Cramer's $V = .063$), while similar proportions have used it to look for information (14% of women and 13% of men, respectively). Similarly, 38% of those in the social grades ABC1 have used social media in an emergency, compared with 29% of those in

social grades C2DE ($\chi^2(1, N=2000) = 18.65, p < .001, \text{Cramer's } V = .097$).

While a third of respondents in the UK (34%) has used social media in an emergency, two-thirds (66%) have not done so. Asking for reasons behind not using social media in emergencies, responses (see Figure 3) suggest that citizens are mostly concerned about the trustworthiness of information on social media, that information shared on social media is not reliable (60%) and that there are many false rumours on social media (64%). These concerns were reflected in many responses to the open-ended question:

'I have never used social media in any emergency and would be hesitant in doing so as you could have anyone turning up and taking advantage of the situation.'

'I wouldn't use social media in an emergency - far too unreliable and prone to rumour'

Furthermore, people have technical concerns. More than half (62%) state that they are concerned about mobile phones and social media not working properly in a serious emergency and that this would (definitely) put them off using social media. Lack of confidence in using social media was only a reason for around a third (28%) of citizens.

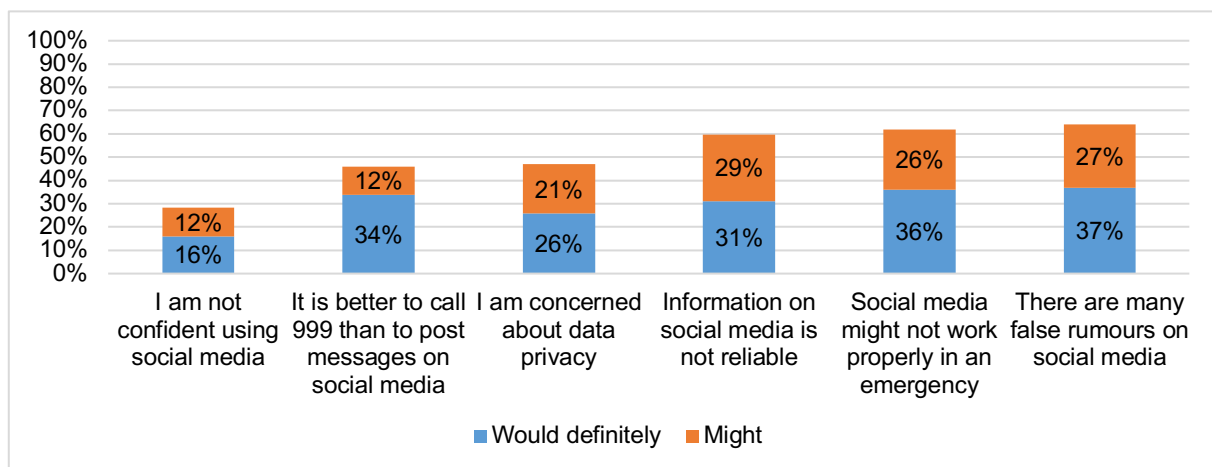


Figure 3: Reasons for not using social media during an emergency (N=2000)

In contrast, several respondents indicated several factors that would make them more likely to use social media in the future to look for or share information. Among these are information accuracy and data security as well as having assured that emergency services are actually known to look for and act on any information shared.

'I have never used social media in an emergency. I would need to be reassured about its reliability and that it was monitored.'

'I suppose I might be likely to use it if I found that the emergency services WANTED to be contacted that way and would respond quickly'

The 432 citizens who have already used social media to share information during an emergency were most likely to have done so to share weather conditions or warnings (43%) and road or traffic conditions (42%). A further 31% have shared their own feelings or emotions about the event (see Figure 4). However, some significant differences were revealed depending once again on gender, age and social class of citizens. The most noticeable of these were that women were significantly more likely to have shared their feelings or emotions via social media (35%) than men (25%; $\chi^2(1, N=412) = 4.15, p < .05, \text{Cramer's } V = .10$), while men were more likely to have shared advice on what to do to stay safe than women (23% versus 15%; $\chi^2(1, N=412) = 3.89, p < .05, \text{Cramer's } V = .097$). Regarding age, 18- to 34-year-olds were more likely to share eyewitness photos than citizens in older age groups (13%; $\chi^2(2, N=411) = 7.38, p < .05, \text{Cramer's } V = .13$). In contrast, those aged 55 or older were more likely to have shared weather conditions or warnings (59%) and road or traffic conditions (58%) than younger citizens ($\chi^2(2, N=412) = 10.36, p < .01, \text{Cramer's } V = .16$ and $\chi^2(2, N=413) = 12.42, p < .01, \text{Cramer's } V = .17$, respectively).

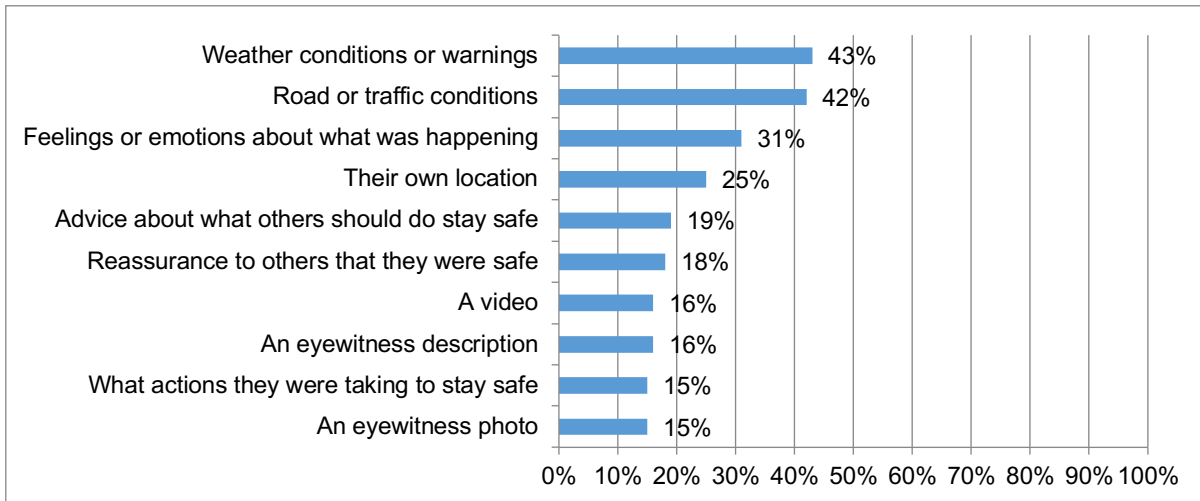


Figure 4: Types of information shared during an emergency (N=432)

Considering that a respectable proportion of respondents (21%) said to have shared information via social media and our research interest of deriving useful practical insights with respect to potentially influencing factors, we asked participants what online responses they expect from emergency services. Figure 5 shows that the majority of UK participants do not expect emergency services to respond to messages posted to them on social media during an emergency or to monitor social media. Thus, only around a third (30%) of citizens agreed or strongly agreed with the statement that they would expect to get a response to such a message within an hour. The main reason for this appears to be that more than 60% of citizens think that emergency services are too busy during an emergency to monitor social media. Indeed, medium correlations were found between thinking that emergency services are too busy and expecting emergency services to monitor social media ($r_t = -.235, p < .001$) and expecting emergency services to respond within an hour ($r_t = -.246, p < .001$), respectively.

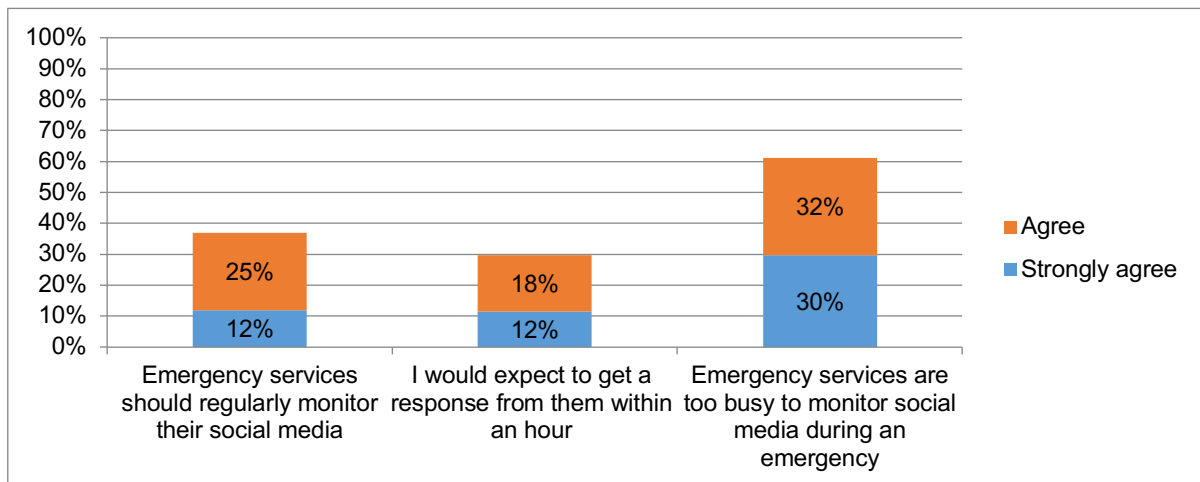


Figure 5: Expected responsiveness of emergency services to messages posted via social media (N=2000)

Despite this overall low expectation of emergency services to monitor their social media accounts and to respond to messages sent via social media, there are subgroups of citizens with higher expectations. Younger people ($r_t = .152, p < .001$) and people using smartphones in their daily life ($U = 307901.5, p < .001$) tend to have higher expectations. Thus, for example, almost half of those aged 18-34 (48%) think that emergency services should regularly monitor their social media, compared with only 27% of those aged 55 or older and 38% of those aged 35-54. Similarly, 41% of smartphone users agreed with this statement, compared with 22% of those at the time of conducting the survey not using a smartphone.

4.3 Use of Emergency Apps

Instead of using common social media platforms, specific smartphone apps are available that could help in a disaster or emergency. Currently, such apps are not widely used in the UK. Indeed, only 7% of survey participants reported to have downloaded such an emergency app. Even when excluding those 376 participants who currently do not use a smartphone, the proportion increases only slightly to 8%. Thus, this group is likely to represent a

unique group of citizens with a particular interest in emergency response or in smartphone applications. When looking at the characteristics of this group, significant relationships were found between having downloaded an emergency app and gender, age, social grade as well as Twitter use. Firstly, 65% of those who have downloaded an emergency app were male ($\chi^2(1, N=1913) = 15.15, p < .001, \text{Cramer's } V = .089$) and 59% were between 25 and 34 years old ($\chi^2(6, N=1911) = 116.54, p < .001, \text{Cramer's } V = .247$) while 23% of the survey sample falls in this age bracket. Secondly, 80% belonged to the social grade ABC1, with only 54% of the survey sample falling in this social grade ($\chi^2(1, N=1913) = 38.92, p < .001, \text{Cramer's } V = .14$). Lastly, 28% of this group of respondents use Twitter hourly while there are only 4% hourly Twitter users in the sample overall ($\chi^2(4, N=1913) = 261.46, p < .001, \text{Cramer's } V = .37$).

Of all citizens that had downloaded an app ($n=135$), the most downloaded app was a weather app (44%), followed by a first-aid app (42%). A warning or alert app was downloaded by 36% and an emergency call app was only downloaded by 28%. Ten respondents indicated that they had downloaded another app that did not fall into these four broad categories including a power cut notification and a missing child alert, thus, exemplifying the potential diversity of emergency applications use. Although the vast majority of citizens (93%) have not yet downloaded an emergency app, a large proportion of respondents indicated that they were likely to use apps in the future for various reasons. It shows that citizens are generally most likely to use apps to receive information during emergencies rather than to share information (Figure 6). Around 40% thought it was at least quite likely they would use an app to find out information about an emergency while only 21% thought they would use it to contact an emergency service instead of making a 999 call. Perhaps unsurprisingly, those who had downloaded an app in the past were significantly more likely to think that it was very likely they would use an app for all of these purposes in future ($U=68535.0, p < .001; U=61724.0, p < .001; U=70002.0, p < .001; U=67244.0, p < .001; U=67244.0, p < .001; U=62576.0, p < .001$, respectively).

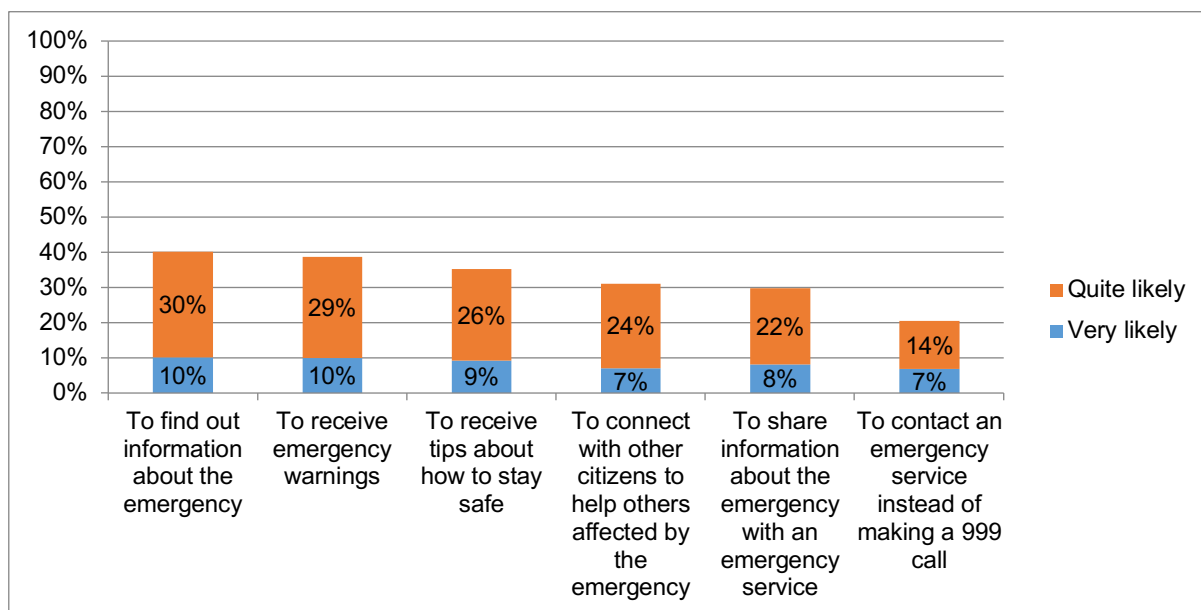


Figure 6: Likelihood of using an app in future for different purposes (N=2000)

The general trend that citizens would use such apps to receive information but not so much to share information was also found within the open question responses. For example:

'I would use it for additional advice/guidance but never as an alternative method to contact an emergency service.'

Respondents further provided suggestions of additional emergency apps that they would use if they were available. Examples include: A 'check in' app which sends out text messages to let friends and family know the person is fine, a real-time time connection with emergency authorities, an app for emergencies at sea or in the mountains to locate the person, an app providing status updates.

5 DISCUSSION AND CONCLUSION

The use of social media in the UK is widespread and growing. Services such as Facebook and Twitter are still used by considerable proportions of citizens among the older generations, even though older people are significantly less likely to use them. The findings of the survey with over half (58%) of those aged 75 or above using Facebook may be surprising to some who believe that social media is predominantly used by adolescents.

Furthermore, research elaborated on potentials of new technologies for safety-critical work or, more specifically, emergency response (Norros et al., 2011). Compared with the general levels of social media usage, much lower proportions of citizens have used social media in an emergency to look for or share information. This could reflect a reluctance to do so given the perceived dangers highlighted in this survey of false rumours circulating on social media during recent crises. Yet, at the same time, it could also reflect a lack of perceived need. In particular, some people may still rely on traditional media or online news sites to provide them with information in such instances, while others may not have been in a situation where they have needed to do so.

Context, i.e. time and place, may influence social media usage as well. Thus, it is worth considering that the recent terrorist attacks carried out in the UK in 2017, including the Westminster attack on 22nd March and the Manchester bombing on 22nd May, which happened after the survey was conducted, may have increased people's use of social media in the UK during emergencies. Indeed, as reports following these attacks showed, social media was used extensively by emergency services and citizens during these events.

At present, only a relatively low proportion, around a third, of citizens in the UK expect emergency services to monitor social media and to respond to messages posted on social media. At the same time, the expectation is much greater among younger citizens and those using social media actively. This suggests that, in the coming years, more and more citizens will expect emergency services to monitor and respond to such messages. If emergency services monitor, respond to messages on social media and citizens perceive this shift in crisis communication, more and more people may start using it as a form of sharing and looking for information in cases of emergency. However, this raises some potential issues. First, as the survey has shown, social media is used the least by older, socio-economically disadvantaged citizens. This could mean that in an emergency, such as a flood or large-scale fire, emergency services are not alerted to the needs of those not using social media. Then, we could envisage a scenario in which emergency services commit increased resources to support citizens in areas with higher proportions of young and affluent social media users to the detriment of those living in areas with a poorer and older age profile. Habitual use of social media is reflected by the younger generation of 'digital natives', most open to share eyewitness pictures and most strongly expecting other entities (like emergency services) to integrate social media into their working procedures.

If organisations take this interpretation into account, social media usage might increase during emergency events. The risk of such increased use of social media during crises is that emergency services could be swamped by the information published from the civilians. Already today, emergencies are accompanied by enormous amounts of social media messages. The Brussels bombing in 2016 (McMahon et al., 2016), for example, prompted a large volume of social media traffic in the hours and days following the events, with over 2 million messages posted on Twitter. Other research has shown that during major events such as terrorist attacks, emergency services are often overwhelmed with information – including calls to emergency helplines or 999 calls – which means it could limit their ability to access or identify additional data from social media (Plotnick et al., 2015). At present, there are some social media analytics tools like AIDR or Dataminr used for event detection (Imran et al., 2014; Miller, 2017). Yet, further effort is necessary to be able to compress streams of data into manageable chunks of information.

By testing for correlations between extraordinary social media behaviour in times of crises and ordinary use, our study sheds light on specific usage patterns regarding certain social media platforms. Ensuring successful crisis communication requires emergency services to monitor and respond on various platforms simultaneously to not discriminate against socially potentially more disadvantaged individuals. At the same time, multimodal communication channels among authorities responsible for social media content, providers of news websites or of TV or radio news could prove to be helpful in spreading information to non-users of smartphones or online social media. Furthermore, our study highlighted differences in the behaviour of men and women in relation to social media. Here, UK participants' statements reflect rather conventional gender roles with advising male respondents (Janković et al., 2017), indicating the necessity of sensitive communication.

This study has strengthened findings from previous qualitative and quantitative studies of the use and impact of social media during emergencies. In particular, it has highlighted the extent to which the use of social media is widespread among citizens in the UK and that they are increasingly using it to look for and share information during emergencies. There is also a growing trend towards sharing information, photos and videos with others and directly with emergency services – and as the latter become more responsive, this diversification of use is likely to grow. Thus, it can be said that civilians show a growing interest of using social media in any kind of

emergency, while requiring assurance by emergency services.

However, further qualitative and quantitative research is needed to explore the extent to which specific events of emergencies like recent terrorist attacks in the UK and other parts of Europe have changed citizens' attitudes towards using social media or settings in which they would use social media. This includes that there is also a need to further examine ways in which emergency services can deal with additional data in crisis situations and what tools are best suited to help them to do so.

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