

Emergency-response organization utilization of social media during a disaster: A case study of the 2013 Seoul floods

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A growing number of studies have examined the relevance and impact of social media in building organizational resilience, which is the ability to recover from a crisis, in the field of emergency management. However, few studies have assessed how these emergency response organizations perceive their own use of social media in crisis situations. In attempting to fill this gap, this study conducted a structured survey with emergency-response organization representatives in Seoul, South Korea, to examine how such organizations evaluate their utilization of social media in an urban emergency situation and how their social media uses are related to promoting organizational resilience during adverse events such as a flood. Overall, the findings imply that organizations are not yet taking full advantage of social media. Respondent evaluations of their own social media use in all three assessment areas—information provision, information dissemination, and emotional messages—were not satisfactory. However, their perceptions of how well they utilize social media were positively related to how they view their organizational resilience. Therefore, it may be that these organizations realize the powerful role of social media in building organizational resilience but lack the knowledge and experience to make the best use of social media services.

Keywords: crisis communication, social media, emergency response organizations, organizational resilience, urban emergency management

Introduction

Traditionally, emergency response organizations have experienced difficulty in communicating information through mass media in times of crises. These difficulties often derived from the high cost of communication, relatively slow speed of information dissemination, and even misinformation and/or disinformation (e.g., propaganda) in mass media (Park, Choi, & Park, 2011; White, 2011). Therefore, organizations have continuously searched for more efficient communication technologies to disseminate information, better coordinate recovery activities, and support

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the public (White, 2011). In order to overcome the shortcomings of mass media communication, organizations have adopted the Internet as a supplementary, rather than alternative, communication channel. Specifically, emergency management scholars argue that social networking services (SNS), also referred to as social media, have become key technologies in times of crises (White, 2011; Yates & Paquette, 2011).

In recent years, disaster response organizations have determined how to successfully use SNSs in dealing with disasters and crisis situations (Liu, Iacucci, & Meier, 2010; Palen, Vieweg, Liu, & Hughes, 2009; White, 2011). Consequently, researchers have begun to empirically examine the relevance and role of social media uses in the process of building organizational resilience, which is defined as the ability of organizations to recover from setbacks encountered in dealing with crises such as natural disasters. Yet, within the scope of social media emergency-management literature, few studies address how emergency response organizers evaluate their own effectiveness in using social media. However, effective use of social media during emergencies is the direct responsibility of these organizers. Thus, it is critical that we examine how emergency response organizers themselves evaluate their own uses of social media to manage crises, specifically when building organizational resilience.

To help fill this gap in the literature, this study examines the different patterns of social media uses in urban emergency-management networks and explains how social media contribute to enhancing organizational resilience during catastrophic events, such as floods. By using the 2013 Urban Emergency Management Survey conducted in Seoul, South Korea, this study assesses three types of the social media use in building organizational resilience: information provision, information dissemination, and emotional support for the public as well as victims.

THE SEOUL FLOODS OF 2013

Only two years after floods inundated the central downtown and flood zones of Seoul, the city endured floods in the same areas again in 2013. Repetitive flooding risks within a densely populated city make it all the more critical to study how people reconstruct a metropolis after such disasters. This is why this study selected the 2013 Seoul floods: they represent the common urban risks that citizens in large cities face.

In the case of the 2013 floods, both local and national agencies responded. The Seoul metropolitan government took control locally with the support of the Seoul Emergency Operation Center (SEOC) and the Seoul Metropolitan Fire and Disaster Headquarters. The national-level response was administered through the National Emergency Management Agency (NEMA) and the Ministry of Safety and Public Administration (MOSPA).

Currently in Seoul, 25 district governments are organized to efficiently respond to disasters at the front lines. While the Disaster and Public Safety Act respects the autonomous authority of local governments, municipal ordinances also support public organizations, such as fire stations and police stations, which exercise some control during crisis situations (MOSPA, 2010). Municipal ordinances strongly endorse collaboration among local governments and other public organizations such as non-governmental organizations (NGOs).

In addition to the formation of emergency response organizations and agencies, Seoul is attempting to apply new information and communication technology, called ‘smart technology,’ in disaster management processes (Liu, 2012). Smart technology includes mobile devices and social media. Recently, there have been several occasions where social media contributed to raising organizational resilience in Seoul (Liu, 2012). In fact, efforts to adopt and incorporate social

media into the field of emergency management have rapidly increased during the last few years (Harman, 2011; Liu, 2012; White, 2011; Yates & Paquette, 2011).

SOCIAL MEDIA USE IN EMERGENCY MANAGEMENT

Recent studies indicate that an increasing number of people utilize social media in order to obtain information during times of crises (Harman, 2011). Particularly, young and college-educated individuals are likely to use social media to seek out disaster-related news (Smith, 2010). With increasing access to social media via smartphones, social media are now especially useful during and after disasters when other communication media are often unavailable (Mäkinen & Kuira, 2008; Silverman, 2010; White, 2011). While many individuals still rely on traditional media to learn about emergency situations, social media have become important supplementary, if not primary, communication channels for others (Sorensen & Sorensen, 2006).

During a crisis, the public should be well informed about safety protocols; and even before a crisis occurs, people should know how to prepare for disasters. Instruction about courses of action during emergencies should be provided while information is being continuously updated and corrected. The public should also be informed about how to recover from the damages. Therefore, it is key to have accurate, fast, and sufficient information in crisis communications.

Several instances of social media use during times of crises illustrate the advantages of social media in providing information to the public (American Red Cross, 2011; Hermida, 2010; Pew Research Center, 2011; Ungerleider, 2011). These instances have also demonstrated the advantage of social media in quickly providing information, often before mainstream media sources report the same facts (American Red Cross, 2011; Hermida, 2010; Pew Research Center, 2011; Ungerleider, 2011). The speed of information delivery is critical since decision-making is bound by time urgency and information can become outdated as situations change (Majchrzak, Jarvenpaa, & Hollingshead, 2007; Hale, 1997). In these ways, social media are playing a significant role in emergency management processes.

In addition to quickly providing general information about a crisis, social media allow organizations to effectively create messages for specific victims according to their needs (Sutton, Palen & Shklovski, 2008; Yates & Paquette, 2011). In a study conducted by Hughes and his colleagues, the authors point out that individuals have different informational needs during a crisis or disaster (Hughes, Palen, Sutton, Liu & Vieweg, 2008). The researchers also emphasized the necessity of creating a variety of messages to communicate to various individuals and groups of people according to their needs (Hughes et al., 2008). Therefore, social media, which allow for instant and continuous multi-way communications, are the most suitable media to customize emergency messages for various communities and individuals in the most efficient way possible (Yates & Paquette, 2011). Social media's flexibility, adaptability, usability, and customizability allow information to be quickly adapted for specific needs and reused for new response efforts to advance organizational resilience. While social media may have the power to advance organizational resilience, it is worthless if emergency response organizations do not make use of it. Research question 1a is intended to discover how emergency-response organization representatives evaluate their utilization of social media to deliver information:

RQ1a: How do emergency-response organization representatives evaluate their utilization of social media to provide information?

Traditionally, emergency response organizations have experienced difficulty in communicating via conventional media because of its high costs, slow speed of message transmission, and even misinformation and/or disinformation (Park et al., 2011; White, 2011). Moreover, indirect communication via mass media has limited the scope and the amount of information that can reach the public (Park et al., 2011; Tierney, Lindell, & Perry, 2001; White, 2011). In contrast, social media have the advantage in their ability to disseminate general information from official and informal sources to a broader community during a crisis (Lindsay, 2011). With the help of existing networks in social media, news and information from various sources can reach a broad population at extraordinary speed (Sutton, Palen, & Shklovski, 2008). Some researchers suggest that social media, “. . . support the creation of informal users’ networks facilitating the flow of ideas and knowledge by allowing the efficient generation, dissemination, sharing and editing/refining of informational content.” (Constantinides & Fountain, 2008, p. 231). Yet, there has been little research regarding how emergency response organizations evaluate their own utilization of social media for specifically sharing information amongst the organizations and the public. Therefore, the following research question is posed:

RQ1b: How do emergency-response organization representatives evaluate their utilization of social media to disseminate information?

Scholars are realizing the importance of psychological recovery from crises. Studies show that community resilience can be augmented when people receive psychological first aid (PFA) from their community and/or emergency response organizations (Mel, Garrett, Gwyneth, & Beverley, 2012; Palen, Vieweg, Liu, & Huges, 2009; Taylor et al., 2012). Mel and his colleagues (2012) further found that social media have a significant role in promoting psychological first aid, and the authors also discovered that emotional messages written on social media sites help people feel connected, have hope for the future, and feel encouraged by the support. Due to the growing significance of psychological recovery from disasters, scholars have begun to empirically examine its effects (Met et al., 2012). Based on this discussion, the following research question is formed:

RQ1c: How do emergency-response organization representatives evaluate their utilization of social media to offer emotional support for the public?

Ultimately, social media uses should contribute to improving organizational resilience, otherwise the advantage of incorporating social media into emergency management systems becomes less valuable. Indeed, some studies have shown a close positive association between social media and organizational resilience (Mel et al., 2012; Yates & Paquette, 2011). However, no empirical study, to the best of our knowledge, has examined this relationship within a Korean context. Thus, it is important to ask whether these social media uses are related to the organizational resilience within different environmental conditions, and if so, how. Therefore, the following research question is presented:

RQ2: How are various types of social media uses related to organizational resilience?

METHODS

Sample

Global Research (a Korean survey research institute) conducted a structured survey via phone to examine how different organizations use social media to manage emergencies in Seoul. All emergency-management organization representatives in the Seoul metropolitan area were surveyed. In total, the following associations were contacted: 94 organizations, 25 district governments, 25 fire stations, and 25 police stations at the local level; 9 organizations at the metropolitan level (i.e. Seoul city government, SEOC, Seoul Metropolitan Fire & Disaster Headquarters, and Seoul police station); and 10 NGOs in Seoul. Afterwards, snowball sampling was used to conduct the survey. The actual survey spanned 10 days—from October 15, 2013 to October 25, 2013. Survey respondents were asked to answer questions about their most recent experiences related to emergency-management activities related to the 2013 Seoul flood. In total, 82 organization representatives finished the survey (25 district governments, 23 fire stations, 21 police stations, 9 NGOs, and 4 other organizations).

Measurements

Information Provision. A four-item measure assessed the level of organizational uses of social media in information provision ($\alpha=.965$) by asking respondents to rate their evaluations on a five-point Likert scale from “very poor” [1] to “very good” [5]. The four items asked participants to rate how well their organization used social media to: (1) provide general information, (2) share breaking or developing news, (3) customize information for specific groups, and (4) respond to questions from the public.

Information Dissemination. A four-item measure assessed the level of organizational uses of social media in disseminating information ($\alpha=.947$) by asking respondents to rate their level of evaluation on a five-point Likert scale from “very poor ” [1] to “very good ” [5]. The four items asked participants to rate how well their organizations used social media to: (1) pass along news or information from national-level organizations, (2) pass along news or information from metro-level organizations, (3) pass along news or information from local-level organizations, and (4) provide informational links.

Emotional Support. A four-item measure assessed the level of organizational uses of social media in providing emotional support ($\alpha=.986$) by asking respondents to rate their level of evaluation on a five-point Likert scale from “very poor ” [1] to “very good ” [5]. The four items asked participants to rate how well their organizations used social media to: (1) leave messages of support in terms of preparing and responding to disasters, (2) leave messages of sympathy in terms of difficulties related to coping with disasters, (3) leave messages of condolences in terms of damaged property and victims, and (4) satisfy the needs and preferences of the public in terms of preparing and responding to disasters.

Organizational resilience. A four-item measure assessed the level of organizational resilience ($\alpha=.789$) by asking respondents to rate their level of agreement on a five-point Likert scale from “strongly disagree” [1] to “strongly agree” [5]. The four items read as follows: (1) Do you agree that your organization has the ABILITY to overcome operational disruptions immediately caused by a disaster? (2) Do you agree that your organization is RESOURCEFUL in order to meet the needs of disaster victims and their communities? (3) Do you agree that your organization has the ABILITY to carry out routine tasks and, at the same time, help victims and their

communities cope with disasters?, and (4) How would you rank the RAPIDITY of providing assistant to disaster victims with resources that you have?

RESULTS

Different statistical tests (i.e., frequency, ANOVA, and correlation) were used to examine how organizers evaluate their own utilization of social media for emergency management. Specifically, the information provision, information dissemination, and emotional messages of social media were investigated. An analysis was also conducted to determine how different types of information uses are related to overall organizational resilience.

Social Media Informational Uses

Information provision. Answers to four questions were analyzed to answer RQ1a, which asked how well organizations utilize social media to provide information to the public. Overall, the responses were negative. In response to every question, approximately half of the respondents answered negatively (see Table 1). The responses were particularly negative about customizing information for specific groups of victims. Despite the high rate of negative self-evaluations, about 30% of the participants self-evaluated their use of social media positively (see Table 1). Overall, there seems to be a polarizing tendency in the self-evaluations towards either “very poor” or “very good.”

Table 1: Frequency of self-evaluation scores on providing information via social media

	1	2	3	4	5	Total
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	
General Information	0 (0)	47 (57.3)	6 (7.3)	16 (19.5)	13 (15.9)	82
Sharing breaking or developing news	0 (0)	47 (57.3)	5 (6.1)	10 (12.2)	20 (24.4)	82
Customizing information for specific groups	0 (0)	51 (62.2)	4 (4.9)	9 (11)	18 (22)	82
Responding to questions	0 (0)	46 (56.1)	4 (4.9)	9 (11)	23 (28)	82

Note. Responses were rated on a five-point Likert scale from “very poor” [1] to “very good” [5].

Information dissemination. Answers to four different questions were analyzed to answer RQ1b, which asked how well organizations utilize social media to disseminate information to the public. Similar to the information provision results, the responses were negative. Again, in response to each question, approximately half of the respondents (50%) answered negatively (see Table 2). However, about 30% of respondents from the national and metro-level organizations highly evaluated their uses of social media to disseminate information. Thus, in the case of information dissemination, the information source was critical in motivating emergency response organizations to pass along the information actively.

Table 2: Frequency of self-evaluation scores on disseminating information via social media

	1 No. (%)	2 No. (%)	3 No. (%)	4 No. (%)	5 No. (%)	Total
Passing along the news or information from national-level organizations	0(0)	48 (58.5)	2 (2.4)	5 (6.1)	27 (32.9)	82
Passing along the news or information from metro-level organizations	0 (0)	46 (56.1)	4 (4.9)	4 (4.9)	28 (34.1)	82
Passing along the news or information from local-level organizations	0 (0)	51 (62.2)	10 (12.2)	7 (8.5)	14 (17.1)	82
Providing the links of which the information is offered	0 (0)	50 (61)	11 (13.4)	8 (9.8)	13 (15.9)	82

Note. Responses were rated on a five-point Likert scale from “very poor” [1] to “very good” [5].

Emotional Messages. Answers to four different questions were analyzed to answer RQ1c, which asked how well organizations use social media to provide emotional support to the public through messages. Out of the three types of social media uses (i.e., information provision, dissemination, and emotional support), this use received the most negative evaluations. On each question, approximately 50% of respondents considered their utilization of social media for this purpose not satisfactory.

Table 3: Frequency of self-evaluation scores on providing emotional support via social media

	1 No. (%)	2 No. (%)	3 No. (%)	4 No. (%)	5 No. (%)	Total
Leaving messages of support in terms of preparing and responding to disasters	0 (0)	53 (64.6)	7 (8.5)	9 (11)	13 (15.9)	82
Leaving messages of sympathy in terms of difficulties for coping with disasters	0 (0)	49 (59.8)	10 (12.2)	9 (11)	14 (17.1)	82
Leaving messages of condolences in terms of damaged property and victims	0 (0)	49 (59.8)	11 (13.4)	9 (11)	13 (15.9)	82
Finding the need and preference of the public in terms of preparing and responding to disasters	0 (0)	48 (58.5)	10(12.2)	10(12.2)	14 (17.1)	82

Note. Responses were rated on a five-point Likert scale from “very poor” [1] to “very good” [5].

Self-Evaluation Differences between Organizations

Analysis of variance (ANOVA) was used to analyze whether each type of emergency response organization evaluated itself differently in respect to the three types of social media uses when dealing with emergencies. In total, 5 groups were used in this analysis: 1) 25 local governments (Group 1), 23 fire stations (Group 2), 21 police stations (Group 3), 9 NGOs (Group 4), 5 other organizations (Group 5). The results of ANOVA indicated a significant difference between the groups: (1) information provision [$F(4,77) = 7.417, p < .001$], (2) information dissemination [$F(4,77) = 6.516, p < .001$], and (3) emotional support [$F(4,77) = 5.734, p < .001$]. Due to the group size differences, no further post-hoc tests were conducted. Nevertheless, the results of the ANOVA test imply that different organizations are proficient in different areas of social media utilization.

Social Media Uses and Organizational Resilience

Bivariate correlation tests were used to examine the final research question (RQ2), which asked about the relationship between each type of social media use and organizational resilience. The results of the correlation tests showed strong positive relationships among all three social media uses: (1) information provision ($\beta = .477, p < .001$), (2) information dissemination ($\beta = .417, p < .01$), and (3) emotional support ($\beta = .365, p < .01$). Taken together, the results indicate that the higher representatives rate their organizational use of social media for all three purposes, the better they evaluate their organizational resilience.

DISCUSSION

This study set out to explore emergency response organizations' social media uses when dealing with emergency situations and how their social media uses are related to their perception of organizational resilience. Specifically, this study employed a survey among the emergency response organizations right after the 2013 Seoul flood took place in order to remind their own uses of social media in times of crises. Moreover, the researchers attempted to examine the organizations' efforts to respond to not only physical damage but also psychological damage through social media messages.

Overall, frequency analyses showed that emergency-response organization representatives negatively evaluate their own utilization of social media to manage crisis situations. The negative tones of their evaluations were prevalent across all three types of uses: information provision, information dissemination, and emotional messages. Broadly speaking, emergency-response organization representatives evaluated themselves better in providing general information than in specifically designing messages for particular groups of audiences. This is a rather disappointing finding given one of the biggest advantages that social media provides: being able to design and provide messages that are targeted for specific groups of people, unlike traditional media whose purpose is to deliver general messages to reach a broad audience. It is also unfortunate that emergency-response organizations were more likely to care about disseminating information from national and metropolitan-level organizations than from local and regional information sources, where a crisis is likely to be observed and experienced most directly and intimately. Finally, the majority of respondents' negative self-evaluations in relation to their uses of emotional messages show that there may not be enough awareness about psychological recovery in general. Overall, the results of the analyses imply that organizations are not yet taking full advantage of social media. Perhaps encouraging social media use or offering instruction programs

on how to effectively utilize such technologies would help to build stronger organizational resilience.

Another noteworthy finding is that there was a polarizing tendency when emergency response organizations evaluated their social media utilization. While the majority gave negative self-evaluations, a large number of respondents highly evaluated themselves in providing and disseminating information via social media. This is an interesting finding as it may indicate that a “social media divide” may exist, similar to the “digital divide” of the Internet when it was new to the public. At the same time, this further indicates that various emergency-response organization representatives’ expectations or standards for social media uses may be extremely different from each other. Further research should explore what causes such polarizing effects in self-evaluations on social media uses with specific regard to respondents’ standards and expectations for social media uses within emergency management processes.

Additional results of ANOVA further supported the presumption that different standards and expectations of social media uses may be a primary factor in polarizing self-evaluations. The results of ANOVA show there were significant differences across different emergency response organizations when they self-evaluated their utilization of social media during times of crisis management. Although no further analyses were administered to specifically identify where the differences were coming from, the results suggest the possibility that different organizations have different standards and expectations related to their uses of social media. The results also provide evidence that organizations may have different levels of social media usage when managing crises.

Finally, the strong positive associations found between social media uses and organizational resilience illustrates the significance of social media uses in emergency management processes. In addition to being an information management tool, the strong positive relationship with emotional-support message usage suggests that emergency response organizations recognize their importance in helping an area recover from a crisis. With the increasing number of people using social media to search for and share information, even stronger positive relationships are expected to occur in the future. Taking this into consideration, it may be that these organizations realize the powerful role of social media in building organizational resilience but lack the knowledge and experience to make the best use of this relatively new medium.

As many previous studies that used specific cases such as this one have pointed out, these findings cannot and should not be universally generalized beyond the context in which they occurred. In this case, it is very likely that the findings may have been influenced by the socio-technological context of South Korea. Moreover, the study is limited in the sense that the sample is relatively small compared to other survey studies. Although the number of respondents is not large, this study attempted to overcome its shortcoming by having the sample include almost every emergency response organization functioning in Seoul. Nevertheless, it is necessary to point out that the study was not randomly sampled and is, therefore, not generalizable.

Despite the limitations of the study, its findings have various implications for scholars as well as society. Academically, this study has much to contribute to the current understanding of how emergency response organizations view their own social media utilization during times of crises. In this respect, this study’s value lies within the observations it makes about the actual practices of the organizations included in the sample. On a societal level, the study functions as a way for emergency response organizations to analyze how they are using social media and whether they need to make greater efforts to implement such technologies. After all, it provides empirical data where it is still rarely collected.

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