Social Media and Disasters: Current Uses, Future Options, and Policy Considerations

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Summary

The development of new technologies that have emerged since the mid-1990s has led to Internet-based applications known as "social media" that enable people to interact and share information through media that were non-existent or widely unavailable 15 years ago. Examples of social media include blogs, chat rooms, discussion forums, wikis, YouTube Channels, LinkedIn, Facebook, and Twitter. Social media can be accessed by computer, tablets, smart and cellular phones, and mobile phone text messaging (SMS).

In the last five years social media have played an increasing role in emergencies and disasters. Social media sites rank as the fourth most popular source to access emergency information. They have been used by individuals and communities to warn others of unsafe areas or situations, inform friends and family that someone is safe, and raise funds for disaster relief. Facebook supports numerous emergency-related organizations, including Information Systems for Crisis Response and Management (ISCRAM), The Humanitarian Free and Open Source Software (FOSS) Project, as well as numerous universities with disaster-related programs.

The use of social media for emergencies and disasters may be conceptualized as two broad categories. First, social media can be used somewhat passively to disseminate information and receive user feedback via incoming messages, wall posts, and polls. To date, this is how most emergency management organizations, including the Federal Emergency Management Agency (FEMA), use social media.

A second approach involves the systematic use of social media as an emergency management tool. Systematic usage might include using the medium to conduct emergency communications and issue warnings; using social media to receive victim requests for assistance; monitoring user activities to establish situational awareness; and using uploaded images to create damage estimates, among others. Many of these applications remain speculative, while other uses are still in their infancy. Consequently, most emergency management organizations have confined their use of social media to the dissemination of information.

However, recent stories and reports describing how a wide range of international, state, and local organizations have successfully used social media during emergencies and disasters have spurred congressional interest and discussion concerning how social media might be used to improve federal response and recovery capabilities.

This report summarizes how social media have been used by emergency management officials and agencies. It also examines the potential benefits, as well as the implications, of using social media in the context of emergencies and disasters.

This report will be updated as events warrant.

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Introduction[1]

The term "social media" refers to Internet-based applications that enable people to communicate and share resources and information. Some examples of social media include blogs, discussion forums, chat rooms, wikis, YouTube Channels, LinkedIn, Facebook, and Twitter. Social media can be accessed by computer, smart and cellular phones, and mobile phone text messaging (SMS). The use of social media is an evolving phenomenon. During the past decade, rapid changes in communication as a result of new technologies have enabled people to interact and share information through media that were non-existent or widely unavailable as recently as 15 years ago.[2]

The use of social media has become widespread and can serve a variety of purposes. Within the last five years social media have played an increasing role in emergencies and disasters. Facebook supports numerous emergency-related organizations, including Information Systems for Crisis Response and Management (ISCRAM), and The Humanitarian Free and Open Source Software (FOSS) Project. Moreover, numerous emergency and disaster-related organizations, including universities, the private and nonprofit sectors, and state and local governments use Facebook to disseminate information, communicate with each other, and coordinate activities such as emergency planning and exercises.[3]

A 2009 study commissioned by the American Red Cross found that social media sites are the fourth most popular source to access emergency information.[4] Social media are also commonly used by individuals and communities to warn others of unsafe areas or situations, inform friends and family that someone is safe, and raise funds for disaster relief.

The use of social media for emergencies and disasters on an organizational level may be conceived of as two broad categories. First, social media can be used somewhat passively to disseminate information and receive user feedback via incoming messages, wall posts, and polls. To date, this is how most emergency management organizations, including the Federal Emergency Management Agency (FEMA), have used social media.

A second approach involves the systematic use of social media as an emergency management tool. Systematic usage might include:

- using the medium to conduct emergency communications and issue warnings;

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[2] CRS Report R41066, *Social Networking and Constituent Communications: Member Use of Twitter During a Two-Month Period in the 111th Congress*, by Matthew Eric Glassman, (name redacted), and (name redacted), p. 1.

[3] Connie White, Linda Plotnik, and Jane Kushma, et al., "An Online Social Network for Emergency Management," *International Journal of Emergency Management*, vol. 6, no. 3/4 (2009), pp. 369-382.

[4] The American Red Cross, *Web Users Increasingly Rely on Social Media to Seek Help in a Disaster*, Press Release, Washington, DC, August 9, 2009, http://www.redcross.org/portal/site/en/menuitem.94aae335470e233f6cf911df43181aa0/?vgnextoid=6bb5a96d0a94a210VgnVCM10000089f0870aRCRD.

Many of these applications remain speculative, while others uses remain in their infancy. Consequently, most emergency management organizations have confined their use of social media to the dissemination of information.

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In May 2011, the Federal Communications Commission (FCC) and FEMA announced the implementation of a Personal Localized Alerting Network known as "PLAN," (technically the Commercial Mobile Alert System, or CMAS). The FCC is expanding the emergency alert system notifications currently sent over TV and radio to include mobile phones. The government will target the alerts in the form of text-like messages to the cell phones of people who need or have requested to be notified in the event of an emergency.[6] PLAN enables government officials to target emergency alerts to specific geographic areas through cell towers, which then push the information to dedicated receivers with PLAN-enabled mobile devices.[7] Mobile devices would not be able to communicate with the network and nothing would be embedded in the phone to track which subscribers received an alert.[8]

Recent congressional and executive branch interest has centered on whether FEMA can move beyond using social media for informational purposes and apply it to improving disaster response and recovery capabilities.[9] On May 5, 2011, Craig Fugate, the FEMA Administrator, testified before the Senate Committee on Homeland Security and Governmental Affairs, Subcommittee on Disaster Recovery and Intergovernmental Affairs that he had met with representatives from Apple, Craigslist, Facebook, Google, Microsoft, and Twitter to discuss how to harness the "capabilities of the digital world to better serve the public."[10] According to Administrator Fugate, possible future applications include using smartphone-friendly mobile versions of FEMA websites to allow users to access information and request assistance, and using social media to

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[5] For example see Leysia Palen, "Online Social Media in Crisis Events," *Educause Quarterly*, vol. 31, no. 3 (July-September 2008), Connie White, Linda Plotnik, and Jane Kushma, et al., "An Online Social Network for Emergency Management," *International Journal of Emergency Management*, vol. 6, no. 3/4 (2009), pp. 369-382, and Adam Acar and Yuya Muraki, *Twitter for Crisis Communication: Lessons Learned from Japan's Tsunami Disaster*, *International Journal of Web Based Communities*, 2011 (forthcoming), p. 5.

[6] CRS Report RL34632, *Text and Multimedia Messaging: Emerging Issues for Congress*, by (name redacted) and (name redacted).

[7] U.S. Federal Communications Commission, Personal Localized Alerting Network (PLAN), at http://www.fcc.gov/guides/personal-localized-alerting-network-plan.

[8] Per telephone conversation on July 8, 2011, with Timothy May, Policy and Licensing Division, Public Safety and Homeland Security Bureau, Federal Communications Commission. The CMAS *Second Report and Orders* sets out the technical parameters for the carriers, at http://fjallfoss.fcc.gov/edocs_public/attachmatch/FCC-08-164A1.pdf The CMAS *Third Report and Order* sets out the rules and regulations for carriers at http://fjallfoss.fcc.gov/edocs_public/attachmatch/FCC-08-164A1.pdf.

[9] For example see U.S. Congress, Senate Committee on Homeland Security and Governmental Affairs, Subcommittee on Disaster Recovery and Intergovernmental Affairs, *Social Media and Disaster Communications*, 112th Cong., 1st sess., May 5, 2011.

[10] U.S. Congress, Senate Committee on Homeland Security and Governmental Affairs, Subcommittee on Disaster Recovery and Intergovernmental Affairs, *Understanding the Power of Social Media as a Communication Tool in the Aftermath of Disasters*, 112th Cong., 1st sess., May 5, 2011.

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facilitate communication between citizens, first responders, volunteer groups, the private sector, and all levels of government.

This report summarizes how social media have been used by emergency management officials and agencies, and examines the potential benefits, as well as the implications, of using social media in the context of emergencies and disasters.

Public Safety and Crisis Information

Social media have been used to disseminate a wide range of public safety information before, during, and after various incidents. Prior to an incident (or in the absence of an incident), many emergency management organizations provide citizens with preparedness and readiness information through social media. Social media are also used for community outreach and customer service purposes by soliciting feedback on public safety-related topics.

Social media also play an informational role during emergency situations. For instance, in 2009 the U.S. Army used its Twitter account to provide news and updates during the Fort Hood shootings; the American Red Cross similarly uses Facebook to issue alerts of potential disasters. However, the main source of information disseminated and sought after is generally posted by citizens, rather than emergency management agencies or organizations. For example, warning messages via the Internet during the Virginia Tech shooting in April 2007 came primarily from students and unofficial sources, and during the 2007 Southern California Wildfires, citizens sought information through social media because they felt media sources were too general or inaccurate.[11]

Notifications

Social media are also used to send out notifications of upcoming training events and exercises.[12] Notifications can also be sent to mobilize first responders. For instance, in 2008 during Hurricane Gustav, a Community Emergency Response Team (CERT) used social media to send mass e-mail notifications to team members through Facebook when its call notification system went down. The CERT group also updated status messages to notify first responders and citizens of developments as the incident unfolded.[13]

Emergency Warnings and Alerts

Although there has been much discussion of using social media to issue emergency warnings that advise citizens to seek shelter, evacuate the area, or take other protective measures, it is unclear whether social media have been used to officially issue emergency warnings.

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[11] Leysia Palen, "Online Social Media in Crisis Events," *Educause Quarterly*, vol. 31, no. 3 (July-September 2008).

[12] Social Media was used to organize "The Great California ShakeOut" earthquake exercise. According to the organizers, nearly 8 million people participated in the event. See http://www.shakeout.org/ for more information on the event.

[13] Status message are short messages typically consisting of one or two sentences announcing what is on a person's mind, or what they are doing at the moment. Some social media applications allow users to send notifications to subscribers when a status message is posted or updated.

FEMA could use social media to send alerts via status or email alerts to warn citizens of potential or imminent threats. There are some indications that using social media for emergency warnings could be successful. A study commissioned by the American Red Cross found that roughly half of the respondents would sign up for emails, text alerts, or other applications for emergency information to help them during an emergency situation.[14]

Emergency information may also help those who are ill-prepared for an incident. According to Administrator Fugate, only half of American households have emergency kits in their home, and only 40% of American households have an emergency plan in place.[15] Although not a substitute for emergency kits or plans, providing lifesaving directives and information at the onset of an incident, or during an incident, could help underprepared citizens.

Currently, FEMA does not provide social media web pages for specific emergencies or disasters. It may be argued that that having a platform for each incident would be advantageous because FEMA could provide a wide range of information relevant to the specific event including evacuation details, food, water, and shelter locations, as well as links to other cites or actual locations where citizens could find and obtain other essential needs. Social Media could also be used to provide timely response and recovery updates to keep citizens informed of developments as the incident unfolds. The same web page could later serve as an information portal for recovery, and ultimately be retained after the recovery and serve as a historical document.

Situational Awareness and Citizen Communications

Social media could be used to alert emergency managers and officials to certain situations by monitoring the flow of information from different sources during an incident. Monitoring information flows could help establish "situational awareness." Situational awareness is the ability to identify, process, and comprehend critical elements of an incident or situation. Obtaining real-time information as an incident unfolds can help officials determine where people are located, assess victim needs, and alert citizens and first responders to changing conditions and new threats. FEMA may also be able to use the information to direct certain resources to reduce damages, loss of life, or both. In some cases it might be possible to obtain this information before first responders reach the disaster area.[16]

Another potential benefit of social media cited by Fugate and others is that it may increase the public's ability to communicate with the government.[17] While current emergency communication systems have largely been centralized via one-way communication—from the agency or organizations to individuals and communities—social media could potentially alter emergency communication because information can flow in multiple directions (known as backchannel

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[14] "Social Media in Disasters and Emergencies," *American Red Cross*, August 5, 2010, p. 6. http://www.redcross.org/www-files/Documents/pdf/other/SocialMediaSlideDeck.pdf

[15] U.S. Congress, House Committee on Transportation and Infrastructure, *Post Katrina: What It Takes to Cut the Bureaucracy and Assure a More Rapid Response After a Catastrophic Disaster*, 111th Cong., 1st sess., July 27, 2009.

[16] For a description of how the American Red Cross uses social media for situation awareness see http://newsroom.redcross.org/2011/08/28/hurricane-irene-and-social-media/.

[17] For information and analysis on constituent use of social media, see CRS Report R41066, *Social Networking and Constituent Communications: Member Use of Twitter During a Two-Month Period in the 111th Congress*, by Matthew Eric Glassman, (name redacted), and (name redacted). In his testimony, Administrator Fugate stated that citizenry input via social media forums can minimize communication gaps that often occur during disasters.

communications). One benefit of two-way communication is helping officials compile lists of the dead and injured, and contact information of victims' friends and family members.

Requests for Assistance

Both FEMA and state and local emergency managers could use social media as a supplement to "911" emergency system lines. Researchers studying the use of Twitter during the March 2011 Japanese earthquake and tsunami found that individuals with Twitter accounts "tweeted"[18] for assistance when they could not use a phone. Requests for assistance in this manner are likely to become more common. According to the study commissioned by the American Red Cross, younger people generally use social media more frequently than older segments of society.[19] They are also more likely to request help through social media, believe agencies should monitor their postings, and have high expectations that agencies will respond quickly to their requests.[20] Additionally, some studies indicate that use of social media by older adults has roughly doubled since 2009.[21] And as more older adults make use of social media, they may develop similar expectations. As a consequence, emergency managers and officials may increasingly believe they need to embrace social media technology in order to be responsive to the public's needs.

Social Media and Recovery Efforts

The use of social media for recovery purposes has generally been limited to providing preparedness and readiness information to individuals and communities. Social media could however, play a role in recovery: if FEMA adopted social media use for recovery, the agency could provide information concerning what types of individual assistance is available to individuals and households, including how to apply for assistance, announcing application deadlines and providing information and links to other agencies and organizations that provide recovery assistance, such as the American Red Cross, or Small Business Administration (SBA) disaster loans for homes and businesses.[22]

FEMA may also be able to use social media to accelerate the damage estimate process by transmitting images of damaged structures such as dams, levees, bridges, and buildings taken from cell phones.[23] For example, in Kansas a smartphone application has been used to help the Army Corps of Engineers identify and report breaches, seepage, overtoppings, and other areas of structural weakness in levees. The application allows Corps engineers to take a photo of problem area and then "geotag" its precise location. According to Corps officials, the application has helped improve the efficiency, speed, and accuracy of detecting and responding to levee failures. In addition, the application has also helped reduce human error by reducing instances of

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[18] Tweets are status messages on Twitter.

[19] "Social Media in Disasters and Disasters," *American Red Cross*, August 5, 2010, p. 15.

[20] Ibid, pp. 13, and 17-18.

[21] Mary Madden, *Older Adults and Social Media*, Pew Research Center, August 27, 2010.

[22] For further analysis on SBA disaster loans see CRS Report R41309, *The SBA Disaster Loan Program: Overview and Possible Issues for Congress*, by (name redacted).

[23] Connie White, Linda Plotnik, and Jane Kushma, et al., "An Online Social Network for Emergency Management," *International Journal of Emergency Management*, vol. 6, no. 3/4 (2009), pp. 369-382.

mislabeling or misreporting problems. However, Corps officials also stated the system can be overloaded when too much information is transmitted through the application.[24]

Lessons Learned and Best Practices

Scholarly studies on the use of social media for emergencies and disasters have identified a number of "lessons learned" and "best practices" when using social media for emergency management objectives. These include the need to:

- identify target audiences for the applications, such as civilians, nongovernmental organizations, volunteers, and participating governments;

- determine appropriate types of information for dissemination;

- disseminate information the public is interested in (e.g. what phase the incident is in, etc.)[25] and

- identify any negative consequences arising from the application—such as the potential spread of faulty information—and work to eliminate or reduce such consequences.

Additional Considerations and Potential Policy Implications

While there may be some potential advantages to using social media for emergencies and disasters, there may also be some potential policy issues and drawbacks associated with its use.

Accurate Information

Instances of inaccurate and false information may be an inherent problem, given the nature of social media platforms and the number of people disseminating information. Studies have found that outdated, inaccurate, or false information has been disseminated via social media forums during disasters.[26] In some cases the location of the hazard or threat was inaccurately reported. In the case of the March 2011 Japanese earthquake and tsunami, tweets for assistance were "retweeted"[27] after the victims had been rescued.[28] On the other hand, some studies have

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[24] "How Smartphones Are Fighting Floods," *Homeland Security Newswire*, August 2, 2011, http://www.homelandsecuritynewswire.com/how-smartphones-are-fighting-floods.

[25] Connie White and Linda Plotnick, "A Framework to Identify Best Practices: Social Media and Web 2.0 Technologies in the Emergency Domain," *International Journal of Information Systems for Crisis Response and Management*, vol. 2, no. 1 (January-March 2010), p. 40.

[26] For example, see Tim Tinker and Elaine Vaughan, *Risk and Crisis Communications: Best Practices for Government Agencies and Non-Profit Organizations*, Booz Allen Hamilton, 2010, p. 30, http://www.boozallen.com/media/file/Risk-and-Crisis-Communications-Guide.pdf.

[27] Retweeting means posting someone else's tweet on their home page.

[28] Adam Acar and Yuya Muraki, *Twitter for Crisis Communication: Lessons Learned from Japan's Tsunami Disaster*, *International Journal of Web Based Communities*, 2011 (forthcoming), p. 5.

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concluded that information gleaned from social media is generally accurate, suggesting that reports about the spread of misinformation during incidents may have been exaggerated.[29]

Information that is false, inaccurate, or outdated could complicate situational awareness of an incident and consequently hinder or slow response efforts. Inaccurate information could also jeopardize the safety of first responders and the community. If the federal government were to adopt social media as a tool for emergency and disaster response, it might also consider doing so within a comprehensive initiative that would include adopting methods and protocols that help officials interpret incoming information and help to eliminate or reduce misinformation.

Malicious Use of Social Media During Disasters

Another concern is that some individuals or organizations might intentionally provide inaccurate information to confuse, disrupt, or otherwise thwart response efforts. Malicious use of social media during an incident could range from mischievous pranks to acts of terrorism. One tactic that has been used by terrorists involves the use of a secondary attack after an initial attack to kill and injure first responders. Social media could be used as a tool for such purposes by issuing calls for assistance to an area, or notifying officials of a false hazard or threat that requires a response. When using social media for situational awareness and response efforts, officials and first responders should be aware it could be used for malicious purposes and develop measures to mitigate those possibilities.

If malicious use of social media during emergencies and disasters becomes problematic, Congress could elect the use of civil or criminal sanctions against individuals and organizations that purposely misuse social media with misleading information.

Technological Limitations

Many residents experienced power outages lasting 48 hours or longer after Hurricane Irene. Yet many smartphones and tablets have battery lives lasting twelve hours or less depending on their use. Although social media may improve some aspects of emergency and disaster response, overreliance on the technology could be problematic under prolonged power outages. Thus emergency managers and officials might consider alternative or backup options during extended power outages, or other occurrences that could prevent the use of social media.

Administrative Cost Considerations

The cost to the federal government to launch and maintain a social media program for emergencies and disasters is unclear. The number of personnel required to monitor multiple social media sources, verify the accuracy of incoming information, and respond to and redirect incoming messages is also uncertain. In the case of feedback and polling, some may question how, and for how long, information would be compiled, stored, and used.

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[29] For example, see Leysia Palen, Sarah Vieweg, and Jeannette Sutton, et al., "Crisis Informatics: Studying Crisis in a Networked World," *connectivIT Lab & the Natural Hazards Center: University of Colorado, Boulder*, p. 2.

In addition, the federal government may experience a large volume of incoming messages from the public during a disaster. Responding to each message in a timely manner could be time consuming and might require an increase in the number of employees responding to incoming messages.

Privacy Issues[30]

Privacy concerns exist about the potential for the collection, retention, and data mining of personal information by the federal government with respect to its use of social media for disaster recovery purposes. Specifically, the use of status alerts and the creation of personal pages to establish situational awareness may raise privacy concerns.[31] Others are concerned how the information might be used. For example, would the federal government compile records after a terrorist attack to help investigate certain individuals?

The E-Government Act of 2002[32] mandates that Federal agencies conduct an assessment of the privacy impact of any substantially revised or new Information Technology System. The document that results from these mandated assessments is called a Privacy Impact Assessment (PIA). Section 208 of the E-Government Act requires federal agencies to complete PIAs prior to: (1) developing or procuring information technologies that collect, maintain, or disseminate personally identifiable information (PII); or (2) initiating, consistent with the Paperwork Reduction Act, a new collection of PII from ten or more individuals in the public.[33] The PIA uses the Fair Information Privacy Principles (FIPPs)[34] to assess and mitigate any impact on an individual's privacy. In March 2011, the Department of Homeland Security (DHS) issued a Privacy Impact Assessment for the Use of Unidirectional Social Media Applications Communications and Outreach.[35] The DHS PIA on the Use of Unidirectional Social Media Applications does not cover users sending content to the Department, but describes the personally identifiable information (PII) and the limited circumstances under which DHS will have access to PII, how it will use the PII, what PII is retained and shared, and how individuals can gain access to their PII. In 2010, DHS published a PIA on the Use of Social Networking Interactions and Applications (Communications/Outreach/Public Dialogue).[36] Neither PIA covers other social

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[30] This section was authored by (name redacted), Legislative Attorney, American Law Division.

[31] Keim ME, Noji E., *Emergent use of social media: a new age of opportunity for disaster resilience*, Am J Disaster Med. 2011 Jan-Feb;6(1):47-54.

[32] 44 U.S.C. 36.

[33] Section 208 (b)(1)(A)(ii) of the E-Government Act requires a privacy impact assessment for the collection of PII from ten or more individuals other than agencies, instrumentalities, or employees of the United States. Federal agencies must obtain OMB approval and publish a notice in the Federal Register to conduct such a collection. In addition, under Section (e)(3) of the Privacy Act, when an individual is asked to supply information, notice is required on the form or on a separate form that can be retained by the individual. Privacy Act of 1974, 5 U.S.C. § 552a(e)(3). The Privacy Act of 1974 (5 U.S.C. sec. 552) imposes certain requirements on federal agencies with respect to personal information maintained within a system of records, and requires the federal government to publish notice of the systems of records creation in the Federal Register.

[34] The Fair Information Privacy Principles governing the use of personally identifiable information (PII) are: Transparency, Individual Participation, Purpose Specification, Data Minimization, Use Limitation, Data Quality and Integrity, Security, and Accountability and Auditing, http://www.dhs.gov/xlibrary/assets/privacy/privacy_policyguide_2008-01.pdf.

[35] http://www.dhs.gov/xlibrary/assets/privacy/privacy_pia_dhswide_unidirectionalsocialmedia.pdf

[36] http://www.dhs.gov/xlibrary/assets/privacy/privacy_pia_dhs_socialnetworkinginteractions.pdf

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media activity such as monitoring initiatives, law enforcement and intelligence activities, and other similar operations.

Concluding Observations

Social media appear to be making inroads into emergency management for a variety of reasons. For one, accurate, reliable, and timely information is vital for public safety before, during, and after an incident. As people continue to embrace new technologies, use of social media will likely increase. Moreover, as its popularity grows, a significant number of people will likely choose social media as their main source of information. They may also increasingly expect that agencies will also use social media to meet their informational needs. Many emergency managers and agencies have already adopted the use of social media to meet this expectation. However, they also started using social media because they believe it provides another tool to disseminate important public safety information.

In addition, beyond informational purposes, the use of social media not only allows people to interact and communicate in ways that are not possible through other media, but in some cases it has allowed response organizations and victims to interact and communicate with each other when traditional media were unavailable. Some would say that social media can be used to improve emergency management capabilities and that the promise of such positive results merit further use of social media for emergencies and disasters. Others might question the administrative costs associated with social media or be concerned about the spread of misinformation or malicious or fraudulent behavior.

Assuming FEMA chooses to use social media, it is unclear what direction its form and development would take. The costs associated with social media are also unknown.[37] For many, however, the greatest concerns are the unanticipated outcomes that might result from its use. It could be argued that the positive results of social media witnessed thus far have been largely anecdotal and that the use of social media is insufficiently developed to draw reliable conclusions on the matter. By this measure, it should therefore be further examined and researched before being adopted and used for emergencies and disasters.

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[37] For further analysis of funding emergency communications see CRS Report R41842, *Funding Emergency Communications: Technology and Policy Considerations*, by (name redacted).

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