# Universal Access to and Use of Information

*Long-term Trends and Drivers and their Implications for Emergency Management*

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**Overview**

In the last decade, technological advances in both computer hardware and software have greatly enhanced people's access to and use of information, particularly via the internet and mobile devices. Based on this capability and access, the following trends and drivers have the potential to impact emergency management activities:

- Internet access expansion
- People as both producers and consumers of information
- Spontaneous reporting
- Crowdsourcing
- Increased emergency management use of the internet and social media

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*This document contains preliminary research conducted on behalf of the Strategic Foresight Initiative (SFI) on the Universal Access to and Use of Information driver. This research is intended to serve as a discussion point for further discussions, and does not represent a forecast by the Federal Emergency Management Agency (FEMA). This paper is a starting point for conversations around a highly complex topic, and SFI encourages feedback about this paper from the emergency management community.*

*SFI is a collaborative effort of the emergency management community that is being facilitated by FEMA. SFI was launched so the emergency management community can seek to understand how the world is changing, and how those changes may affect the future of emergency management. It will do so by encouraging members of the community to think about how the world may look over the next 15 years, and what steps the community should begin taking to thrive in that world. Participants in SFI include emergency managers at the Federal, state, and local level, subject matter experts on relevant topics, and other stakeholders.*

*Anybody who would like more information about SFI should contact the team at FEMA-OPPA-SFI@fema.gov.*

**Key Trends and Drivers**

**Individuals will have more and faster internet access.** When the internet revolution began in the 1990s, public internet access was primarily through desktop computers via dial-up connections, which are limited in speed. The trend shifted to faster connections in the early 2000s. From 2007-2010, global subscriptions to broadband connections, which are faster than the traditional connections like phone lines, increased from 304 million to 438 million.[1] This is expected to rise to 2.6 billion by 2015.[2] The number of public Wi-Fi locations worldwide grew over 200% from 132,080 in 2006 to 414,356 in 2010.[3] If this trend continues, the number of Wi-Fi "hotspots" will grow to over 1 million by 2015.

**Mobile devices are increasingly being used for home computing and connecting to the internet.** Of the total worldwide personal computer (PC) sales (desktop and mobile), the mobile computer portion (e.g. laptops, notebooks, tablets) of the market has grown from 34% of PC sales in 2005 to 59% in 2010, and is projected to be 72% of the market by 2014.[4] Of the 4.6 billion mobile phone subscribers in 2009, 500 million use their device to connect to the internet. Mobile phone subscriptions are expected to rise to 6.9 billion by 2020 while mobile phone internet access is expected to double to one billion subscribers by 2015.[5] By 2020, mobile devices are expected to be a primary connection tool to the internet for most people in the world.[6]

**Internet users increasingly gravitate to sites where they help produce the content, particularly social networking sites.** The use of the internet and internet-related applications for sharing and seeking information, already popular, will likely continue to increase in coming decades. In 2008, social networking and blogging overtook e-mail as the most popular internet communication method.[7] Facebook, the world's most popular social media site, had 500 million subscribers as of September 2010 and predicts it will have 1 billon subscribers by 2012.[8] Twitter currently has 125 million users and is adding an average of 300,000 per day.[9] If this trend continues, Twitter will have over 500 million users by 2015. Internet users are also continuing to use collaboratively developed websites to add and seek information. These sites rely on the user "community" to provide content, check content accuracy, and make corrections. On one of the most popular sites, Wikipedia, users add approximately 500,000 articles per year.[10]

**The rise of spontaneous reporting has permanently changed the media environment.** Using their mobile devices, individuals have the capability to instantly post messages and images on the internet, resulting in "spontaneous reporting" of events as they occur. This enables people to provide eyewitness accounts during national and international events in real time, and media consumers are seeking them out. News organizations use these eyewitness accounts by incorporating them into their own reporting or presenting it to their audience directly.

**Companies, organizations, and individuals are utilizing the internet to "crowdsource" services and tasks.** Crowdsourcing is the act of "obtaining needed services, ideas, or content by soliciting contributions from a large group of people…especially from the online community…."[11] PepsiCo crowdsources advertisements for its Doritos tortilla chips product through its "Crash the Super Bowl" contest. Customers created videos featuring Doritos, and the contest winners' videos were aired during the Super Bowl broadcast. Graphic and website

design companies such as DesignCrowd and crowdSpring submit customer specifications to a variety of artists, illustrators, and website designers. Customers choose their preferred design from the pool of products received from the designers. In response to the Fourmile Canyon wildfire near Boulder, Colorado, residents shared information on the incident by creating a Google map denoting evacuation routes, structure damages, and road closings.[12]

**Emergency managers will expand their use of the internet and social media to meet public expectations.** Many people believe emergency responders already monitor websites and social media for emergency requests. In reality, most emergency response agencies currently do not monitor and are not staffed to monitor these sites.[13] However, this is changing as emergency managers work to meet the public's demands. During 2010 flooding events, the Rhode Island Department of Transportation created a communications team dedicated to using the internet and social media to post road closings and other transportation issues, and to crowdsource information on road conditions from motorists.[14] Many municipalities now offer or plan to offer commercial "Smart911" service at no cost to the public. The service allows individuals to register their telephone number and provide an information profile that will appear to dispatchers if they call 911.[15] On the national level, the Federal Emergency Management Agency is formulating a strategy to leverage the internet and social media to engage in a two-way conversation with the public. This sharing of information between emergency management personnel and the public before, during, and after an incident will improve preparedness, response, and recovery efforts.[16]

**Implications for Emergency Management**

Universal access to and use of information has several implications for emergency management. Due to the growth of and public preference for "anywhere, anytime, and on any device" [17] access to the internet and virtual communities, people will expect government and first responders to communicate with the public through the internet and social media. They also will expect authorities to conduct a dialogue with the public rather than using a traditional top-down information approach (e.g. press releases, public announcements). This may lead to a significant increase in transparency and accountability for government officials, including emergency managers.

Spontaneous reporting assists in the crowdsourcing of information. Emergency responders can use the crowdsourcing concept to enhance situational awareness by integrating official and public information. Recent incidents have demonstrated the usefulness of this concept. In response to the 2010-2011 Haitian, New Zealand, and Japanese earthquakes, and the 2010 Pakistani floods, crowdsourced maps enabled responders in creating an operational picture of the incidents and facilitated the direction and delivery of aid and other resources.[18]

On the other hand, problems can arise as a result of inaccurate and/or unreliable information provided by internet sources. Terrorists or other mischievous individuals may post or send false messages. For example, erroneous media reports of violence delayed assistance reaching earthquake survivors in some Haitian communities.[19] During the March 2011 Japanese earthquake, someone sent a hoax British Broadcasting Corporation text message stating radiation from a damaged nuclear power plant was spreading across Asia. The alarm caused school and

business closings in the Philippines. The Philippine government issued an emergency response bulletin assuring the public that the report was a hoax and asked people not to spread the information.[20]

**Correlation to Other Drivers**

- **Changing Role of the Individual**: Public interest, an expectation of transparency, and constant information access from and about government activities will increase. The public may become more involved in response and recovery efforts as authorities integrate crowdsourced information with official sources to create a collective situational awareness picture. People may seek guidance and assistance from their virtual communities rather than from the government. The public may also become less dependent on government as people turn to their virtual communities for information and assistance.

- **Critical Infrastructure**: Growth and maintenance of electronic infrastructure will become of paramount importance as the public and emergency responders increase reliance on the internet and mobile devices. More effective control and monitoring of both the hardware and software of this "e-infrastructure" will be required to protect the power grids, computer, and mobile networks from cyber attacks and natural disasters.

- **Evolving Terrorist Threat**: Cyber and physical attacks on information technology and communications infrastructure could be employed to hamper response efforts. As reliance on the internet and mobile devices continues to grow, terrorists may conduct denial-of-service attacks to disrupt or take down internet and mobile phone network access.

- **Technological Development and Dependency**: If the present growth rates for sales and use of mobile devices continues, mobile traffic "will more than double every year for the next four years." Strains on cellular networks could cause a "mobile meltdown" by 2020.[21] Slow, strained networks could inhibit spontaneous reporting and crowdsourcing of information. Complete loss of network access will hamper information sharing and emergency response. For example, during the Tohoku earthquake and tsunami in Japan, residents of the affected area lost mobile phone service, landline service, and internet access. Local governments turned to "old media" such as radio, newspapers, and messenger service to deliver emergency information to the public. Many evacuation shelters printed newsletters and mini-newspapers to inform evacuees about shelter and neighborhood events.[22]

**Conclusions & Questions**

- **Public preference for and dependence on the internet and social media will continue to grow.** How will emergency managers address the internet and social media use in their plans, policies and procedures for disaster response? How will emergency managers pay for investments in technology, training, and personnel to meet public expectations and produce operational efficiencies?

- **Spontaneous reporting is now embedded in the media environment.** How will emergency managers determine the validity of information provided by non-official sources? Who will decide when and how to use crowdsourced information? What are best practices for countering the dissemination of false and inaccurate information?

- **Growth, operation, maintenance, and protection of internet and network infrastructure must be factored into government and private sector budgets.** Will governments buck the trend of relatively flat infrastructure spending to support new technologies? How can decision makers in government and the private sector be convinced of the importance of budgeting for these technologies in an age of constrained budgets?

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