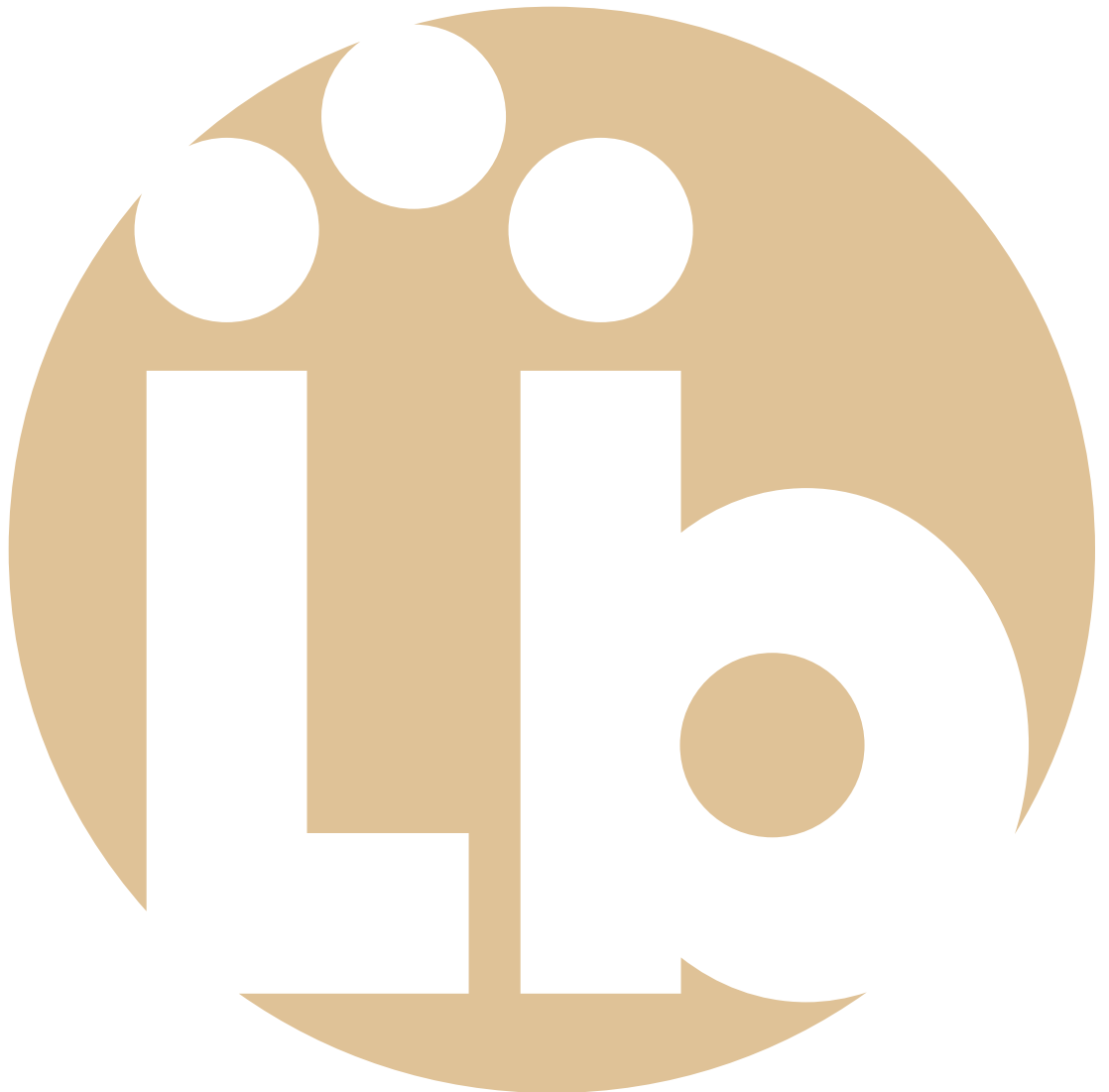




# How New Technologies Impact Aid Coordination

by Robin Schofield and Jennifer Johnson  
with Juliet Sander and Khatuna Giorgadze



## Executive Summary

How do new technologies impact coordination and information management with respect to providing aid in the aftermath of disasters?

International agencies, governments and many NGOs have long enjoyed access to the latest technologies; however, this support has largely allowed for incremental (rather than transformational) improvements in efficacy and impact.

Nevertheless, with the proliferation of new technologies throughout the developed and developing world (especially affordable access to mobile devices), both survivors of disasters and private donors now have access to tools that can improve the effectiveness of coordination and information management—and ultimately, aid delivery.

We see new technologies enabling survivors to move from their current position at the end of an organized assistance supply chain, to a position at the center of a highly dynamic and fluid market system that utilizes mobile device-based electronic commerce whenever possible.

While there will always be a role for rescue, immediate services and direct provisions to the most vulnerable groups that new technologies will impact only marginally, we believe we are in the midst of a sea change in the way humanitarian aid is resourced and distributed.

Several key new technologies are now in the hands of those affected by disasters as well as those seeking to provide aid. We believe it is incumbent upon the international humanitarian community to take advantage of this more balanced distribution of new technologies.

Going forward, the challenge is not one of new technologies simply allowing the aid and development community to do things better. Going forward, the challenge is one of doing things differently.

## Introduction

How do new technologies impact coordination and information management with respect to providing aid in the aftermath of disasters? We will look to answer this and other important questions as we address key trends in new technologies, assess their impact to date and, most importantly, consider their future potential for transformational change in responding to disasters throughout the world, both natural and those arising from political instability and conflict.

At the outset, let us state that our primary interest is not in the technologies themselves. Rather, our focus is on how these technologies can be used in the service of providing humanitarian aid to save lives and improve the distribution of food, shelter materials and other needed resources during and after a disaster.

Further, in terms of coordination we are considering three components:

- The first is gaining a thorough and accurate situational awareness of the state of affairs in the areas affected by the disaster.
- The second is mobilizing the right financial, physical and human resources based upon that awareness.

- And ultimately, coordination involves the most appropriate delivery of those resources (in other words, aid) to those who need it.

Finally, we define impact as the direct or indirect saving of lives, the alleviation of suffering, and it also addresses—in some manner—long-term development goals.

As we look at the potential of new technologies to bring about change and create this impact, we ask ourselves three key questions:

1. What important trends are enabling the introduction of new technologies?
2. How are these new technologies affecting the different elements of coordination (situational awareness, mobilization, aid delivery) and information management?
3. Can the suitable application of new technologies in response to sudden or slow-onset disasters challenge our current notions of coordination and information management?

We will consider each of these questions in turn.

## Important trends enabling the introduction of new technologies

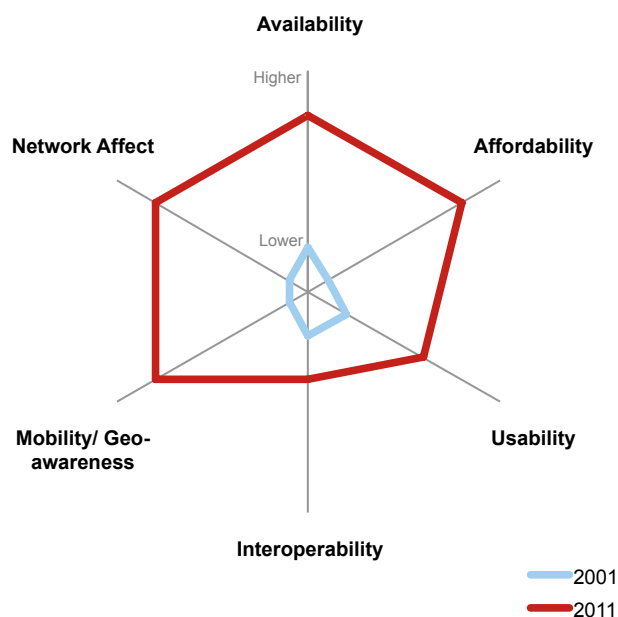
International agencies, governments and many NGOs have long enjoyed access to the latest technologies, from software to satellite-based data communication systems. These technologies have, of course, supported these organizations' efforts to provide disaster relief in many situations; however, this support has largely allowed for incremental (rather than transformational) improvements in efficacy and impact. As such, the coordination and delivery of disaster response has arguably remained largely unchanged by technological innovation over the past 40 years.

The world of 2011 is very different (see Exhibit: *Drivers of New Technologies* below). The democratization and widespread dispersal of new technologies is creating profound cultural, political and humanitarian opportunities around the globe. Consider for a moment:

1. Because of the proliferation of mobile phones and devices throughout the world, these devices are now—often times literally—in-hand before a disaster, and because of this, survivors have unprecedented access to the world outside the disaster area itself. This is due to two key developments:

- **The wide-spread mobile phone infrastructure.** Since providing mobile phone service requires significantly less infrastructure than land lines, mobile phones have penetrated populations that have not previously had any telecommunications.

### Drivers of New Technologies



Source: *Linksbridge, November 2011*

- **Tumbling prices for handsets and other mobile devices.** These critical tools are now becoming more affordable for people throughout the world, greatly aiding in the spread of these new technologies.

2. Because of new technologies, there is now the potential for widespread communications within a disaster area. Even the poorest countries now enjoy acceptable mobile communications infrastructure. No longer is it simply a few, isolated individuals who have a mobile connection that can be leveraged by aid providers, but rather a large section of the affected population. Indeed, according to the International Telecoms Union in 2011, there are now 70 mobile phone subscriptions per 100 people in the developing world. Also, mobile phone infrastructure can be restored faster after an emergency than traditional land lines, meaning that this broad section of the population can access information in a relatively timely manner.
3. Additionally, there are new content and commerce platforms such as social media sites, mobile payment systems (m-payments) and local and international news. These can provide valuable, real-time information and services to survivors, aid organizations and donors throughout the world.

Our opinion is that the most important trend is the mass adoption of ubiquitous, inexpensive and localized mobile devices, especially in the developing world.

Currently there are more than five billion mobile handsets in global circulation—every country in the world now has more affordable mobile phone providers and connections to the Internet.

Cellular networks have proven to be remarkably resilient in the immediate aftermath of disasters, especially in developing countries. For example, after the devastation of the 2010 earthquake in Haiti, mobile phone service was restored within hours of the 7.0 magnitude quake. The reason is simple—most of the cellular infrastructure in Haiti was also powered by generators that were less affected than they would have been if they had been part of a more-developed electrical grid.

Additionally, mobile phone-based money transfer services (similar to M-PESA in Kenya) are now providing reliable, low cost and almost instant financial services. These allow survivors in disaster areas ready access to a type of digital currency that can be used to purchase goods and services that are most appropriate to their respective needs. This empowers these individuals to make decisions based upon their given situation.

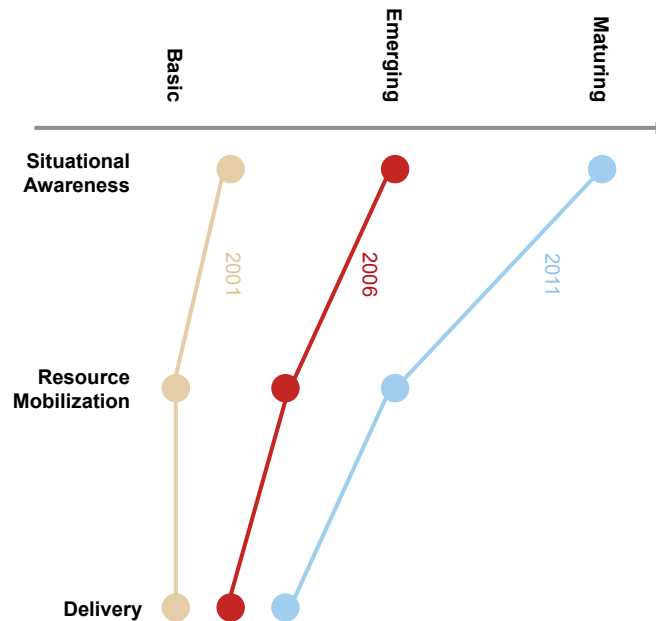
In summation, several key new technologies are now in the hands of those affected by disasters as well as those seeking to provide aid. We believe it is incumbent upon the international humanitarian community to take advantage of this more balanced distribution of new technologies.

## How new technologies impact elements of coordination and information management

By looking at the humanitarian response to recent crises such as Haiti, the Arab Spring and the Horn of Africa, we can see the influence of new technologies on the different aspects of coordination (situational analysis, resource mobilization and delivery). In 2001, these three parts of coordination were minimally influenced by new technologies such as the Internet and mobile devices; however, AlertNet, Humanitarian Information Center (HIC) deployments, the Integrated Regional Information Networks (IRIN), Relief-Web and others pointed the way. Development has progressed, in some cases dramatically. As one might expect, this development has not been evenly distributed between the three components that we believe make up coordination.

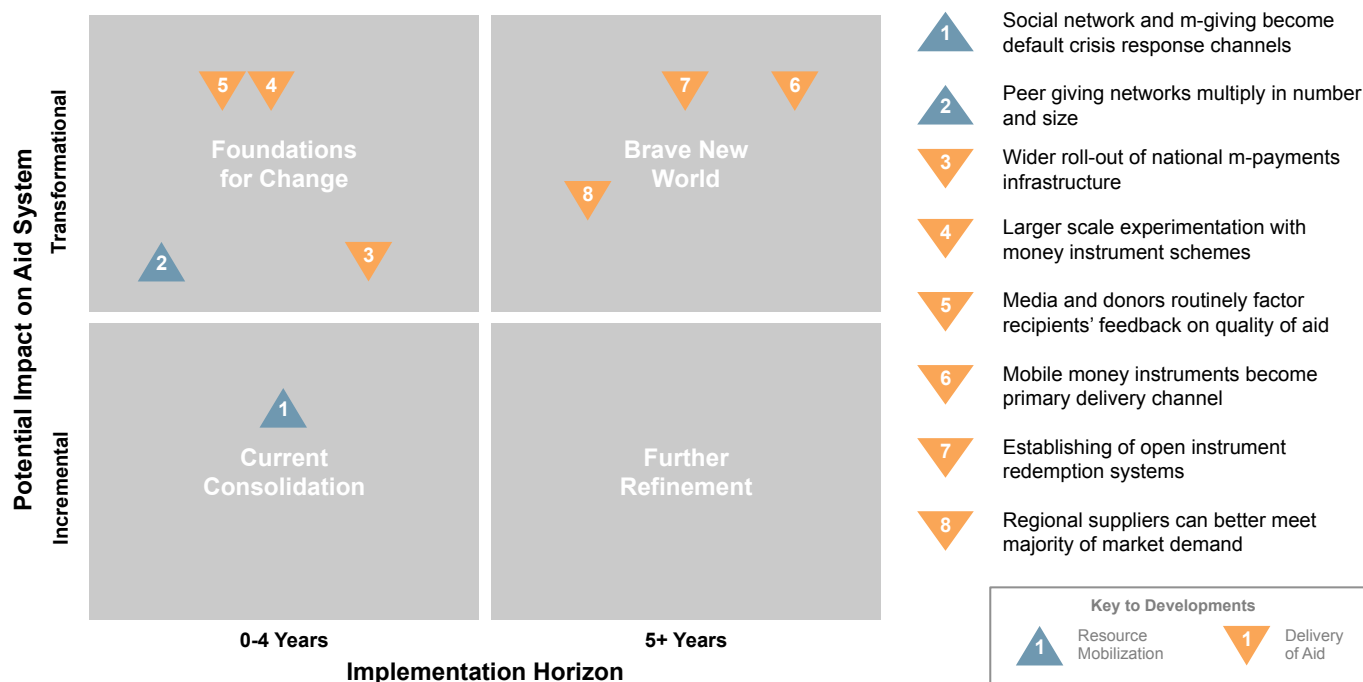
In general terms, new technologies have provided the most impact upon situational analysis and understanding, followed by resource mobilization and finally the delivery of those resources (see Exhibit: *Impact of New Technologies on Coordination* below, which shows the development and impact of new technologies on coordination elements).

### Impact of New Technologies on Coordination



Source: *Linksbridge, November 2011*

## Emerging Impact of New Technologies on Resource Mobilization and Delivery



Source: Linksbriidge, November 2011

Over the past decade, great strides have been made in developing real-time situational awareness after a disaster. The current situation in Libya provides an excellent example of this development, where information on the ground is captured by mobile devices and rapidly disseminated as data moves along a highly connected, borderless network of computers and mobile phones. As it happens in Benghazi and Tripoli, it is seen in London, Delhi and Washington.

Resource mobilization is another area where new technologies have had a significant influence. A mere 72 hours after the earthquake in Haiti, the American Red Cross successfully raised over 8 million dollars as people used mobile phones to text donations to the organization. These donors were largely mobilized through social networking sites (such as Facebook). Seeing others give, coupled with the ability to donate easily using text messaging, greatly increased the efficacy of this program.

Unfortunately, the impact of new technologies on actual aid delivery has lagged behind both situational awareness and resource mobilization. There have been small-scale experiments using electronic payments and mobile phone-based money transfer services. However, in this current lack of utilization, we see both a challenge and huge opportunity for positive growth in the near future.

In fact, we firmly believe resource mobilization and delivery have every potential to catch up to situational awareness. We see several key developments in terms of resource mobilization and delivery that will happen over both a short-term (0 to 4 years) and longer-term (5+ years) basis (see Exhibit: *Emerging Impact of New Technologies on Resource Mobilization and Delivery* above, which shows the distribution of key developments in the near and longer-term that influence resource mobilization and delivery).

In the short-term with respect to resource mobilization:

1. Social network and mobile giving (similar to the Red Cross example mentioned above) will become increasingly important crisis response channels.
2. Giving networks will multiply in both number and size. These will be based on a peer-to-peer model.

In the short-term with respect to the delivery of aid:

3. There will be a wider roll-out of national mobile payments infrastructures.
4. There will be larger scale experimentation with different money instrument formats that utilize new technologies to facilitate the exchange of currency.

5. Donors will be better able to gather feedback from recipients on the quality of aid, and they will be able to use this feedback to make better and more informed decisions about giving.

In the longer-term with respect to the delivery of aid:

6. Mobile money instruments will become the primary delivery channel of aid.
7. Open instrument redemption systems will be established. These will allow survivors to use currency-like instruments to purchase goods and services from almost any provider as markets become more open and dynamic.

8. Emergency supplies and services will still be needed in the immediate aftermath of a disaster. However, regional suppliers will be better able to meet the majority of market demand beyond first response.

Some of these changes will be incremental in nature, but we also believe that many of them (such as mobile money instruments becoming a primary delivery channel of aid) will be transformational when one considers the real-world impact they will provide.



## How suitable application of new technologies in response to disasters will challenge current notions of coordination and information management

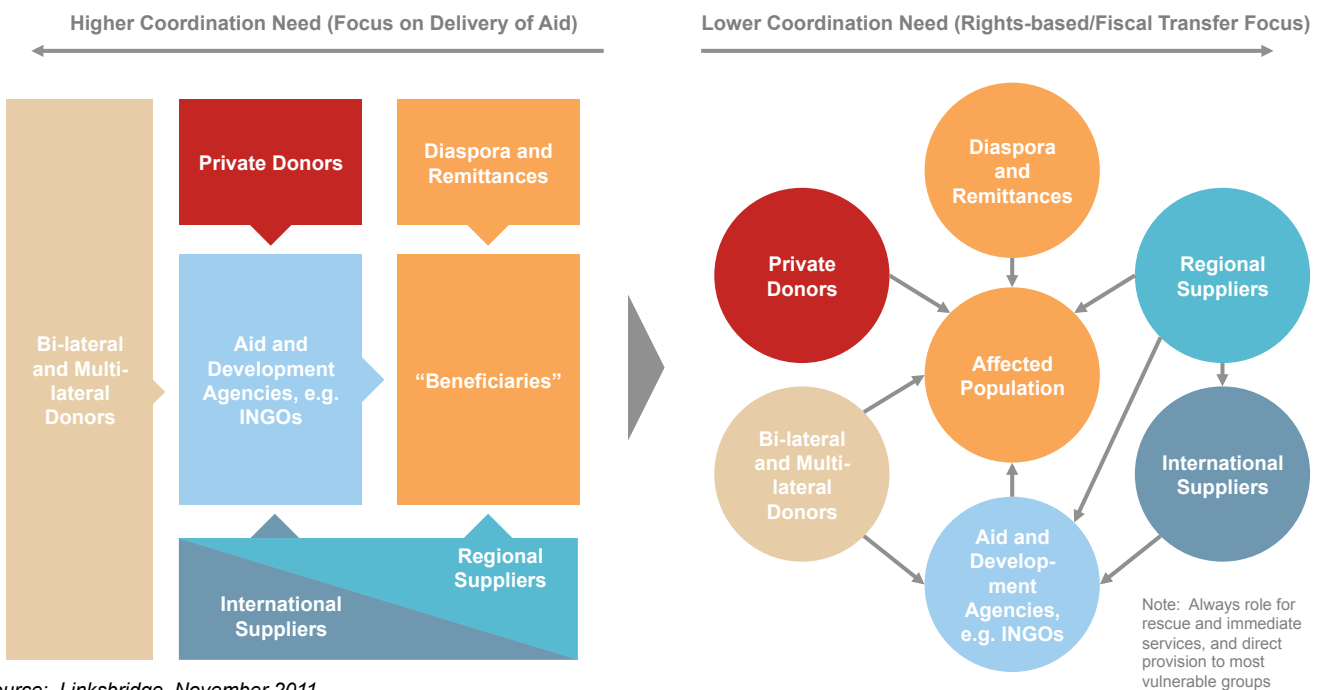
In the past, disaster coordination and information management have been highly coordinated efforts involving multiple actors ranging from the United Nations to individual governments to select NGOs. From a technologies perspective, they have been dominated by an imbalance in the distribution of costly technological resources in favor of those providing the humanitarian assistance. Much effort is put into maintaining the organization and structures of the system itself as aid flows to survivors.

However, with the proliferation of new technologies throughout the developed and developing world (especially affordable access to mobile devices), both survivors of disasters and private donors now have access to tools that can improve the efficiency and effectiveness of situational awareness, resource mobilization and ultimately, aid delivery.

So what might the aid architecture of the future look like?

Rather than being at the end of a long chain starting with situational analysis and ending with the dispersal of aid, we see survivors of a disaster at the center of a highly dynamic and fluid market-based system, enabled by these new technologies. Economic resources, in the form of mobile money instruments, will be provided to survivors, and those affected by a disaster will be empowered to make decisions that best reflect their immediate needs. They will be able to purchase the goods and services required and the market itself will respond to their demands. Thus, the system becomes self-organizing (see Exhibit: *Potential Business Model Changes [Part-enabled by New Technologies]* below).

### Potential Business Model Changes (Part-enabled by New Technologies)



Source: Linksbridge, November 2011

While there will always be a role for rescue, immediate services and direct provisions to the most vulnerable groups that new technologies will impact only marginally, we believe we are in the midst of a sea change in the way international humanitarian aid is resourced and distributed. This change has the potential to go far beyond one of mere incremental improvement. This change can be transformational.

Going forward, the challenge is not one of new technologies simply enabling the aid and development community to do things better. Going forward, the challenge is one of new technologies enabling the community to do things differently.

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Harvard Humanitarian Initiative. 2011. *Disaster Relief 2.0: The Future of Information Sharing in Humanitarian Emergencies*. Washington, D.C. and Berkshire, UK: UN Foundation and Vodafone Foundation Technology Partnership. <http://www.unfoundation.org/news-and-media/publications-and-speeches/disaster-relief-2-report.html>. Accessed 15 September 2011. The report analyzes how the humanitarian community and the emerging volunteer and technical communities worked together in the aftermath of the 2010 earthquake in Haiti, and recommends ways to improve coordination between these two groups in future emergencies.

Yang, C., Yang, J., Luo, X. and Peng Gong. 2009. "Use of Mobile Phones in an Emergency Reporting System for Infectious Disease Surveillance after the Sichuan Earthquake in China." *Bulletin World Health Organization* 87:619–623. <http://www.who.int/bulletin/volumes/87/8/08-060905.pdf>. Accessed 15 September 2011. This report details the impact of the Chinese Center for Disease Control and Prevention's mobile phone emergency reporting system in the preventing outbreaks of infectious diseases after the Sichuan earthquake.

Enlightenment Economics. 2005. "The Role of Mobiles in Disasters and Emergencies." [http://www.dinkom.no/FILES/gsm\\_disaster\\_relief\\_report.pdf](http://www.dinkom.no/FILES/gsm_disaster_relief_report.pdf). Accessed 15 September 2011. This report assesses the impact that the widespread availability of mobile phones has had on the recovery from specific disasters and atrocities, such as the Indian Ocean tsunami, Hurricane Katrina, the summer floods in Central Europe, and terrorist attacks in Istanbul and London.

Meier, Patrick and Jennifer Leaning. 2009. "Applying Technology to Crisis Mapping and Early Warning in Humanitarian Settings: Crisis Mapping." Harvard Humanitarian Initiative Working Paper Series I of III, September. [http://www.hhi.harvard.edu/images/resources/reports/whitepapers\\_f\\_11.pdf](http://www.hhi.harvard.edu/images/resources/reports/whitepapers_f_11.pdf). The paper analyzes the impact of ICT on conflict early warning, crisis mapping, and humanitarian response.

Coyle, Diane and Patrick Meier. 2009. *New Technologies in Emergencies and Conflicts: The Role of Information and Social Networks*. Washington, D.C. and London, UK: UN Foundation-Vodafone Foundation Partnership. [http://www.globalproblems-globalsolutions-files.org/pdf/UNF\\_tech/emergency\\_tech\\_report2009/Tech\\_EmergencyTechReport\\_full.pdf](http://www.globalproblems-globalsolutions-files.org/pdf/UNF_tech/emergency_tech_report2009/Tech_EmergencyTechReport_full.pdf). Accessed 15 September 2011. The report examines how authorities and humanitarian and aid organizations can best balance the opportunities and challenges of exploiting different technologies at the key stages on the timeline of crisis—early warning and preparedness, immediate humanitarian relief, and reconstruction and long-term development.

Bengtsson, L., Lu, X., Thorson, A., Garfield R. and Johan von Schreeb. 2011. "Improved Response to Disasters and Outbreaks by Tracking Population Movements with Mobile Phone Network Data: A Post-Earthquake Geospatial Study in Haiti." *PLoS Medicine* 8 (8), August. [http://reliefweb.int/sites/reliefweb.int/files/resources/Full%20Report\\_193.pdf](http://reliefweb.int/sites/reliefweb.int/files/resources/Full%20Report_193.pdf). Accessed 15 September 2011. The report concludes that the estimates of population movements during disasters and outbreaks can be delivered rapidly and with potentially high validity in areas with high mobile phone use.

Hattotuwa, Sanjana and Daniel Stauffacher. 2010. "Haiti and beyond: Getting it Right in Crisis Information Management." ICT for Peace Foundation, March.

<http://ict4peace.org/pubs/Haiti%20and%20beyond-%20Getting%20it%20right%20in%20Crisis%20Information%20Management.pdf>. Accessed 15 September 2011. This is a brief overview of the existing Internet and mobile technologies, enduring challenges, and lessons learnt in disaster preparedness and crisis information management.

### **Early Warning**

Klein, Paul. 2007. "Cell Broadcast Technology for Emergency Alert Notifications: Reach Many or Millions. It's About Time." CellCastTechnologies. White Paper. <http://transition.fcc.gov/pshs/docs/advisory/cmsaac/pdf/CellCastComment070307.pdf>. Accessed 15 September 2011. The paper discusses advantages and misconceptions about cell broadcast technologies for emergency alert notifications.

Samarajiva, Rohan and Nuwan Waidyanatha. 2009. "Two Complementary Mobile Technologies for Disaster Warning", info 11(2), pp.58 – 65. <http://www.emeraldinsight.com/journals.htm?articleid=1775808&show=pdf>. Accessed 15 September 2011. The evaluation process concluded mobile phones as the reliable, effective, and affordable solutions for alerting last-mile communities. Coordination within government, including communication to first responders responsible for evacuation and localized warnings, and communication to mass media who serve a critical function in public warning, can be achieved through the use of an SMS engine supplemented as necessary by an informative and robust website.

Schermer, Tobias and Lothar Fritsch. 2005. "Notifying Civilians in Time - Disaster Warning Systems Based on a Multilaterally Secure, Economic, and Mobile Infrastructure." University of Frankfurt, Proceedings of the Eleventh Americas Conference on Information Systems, Omaha, NE, USA August 11th-14th. [www.iscram.org/dmdocuments/schermer\\_fritsch.pdf](http://www.iscram.org/dmdocuments/schermer_fritsch.pdf). Accessed 15 September 2011. The authors propose a solution for building a privacy-friendly, multilaterally secure disaster management infrastructure based on robust mobile phone infrastructures with high reachability of citizens. The authors suggest that it is possible to reach a large number of persons, avoid insurance damage, and save costs in disaster warning systems.

Boakye, Kojo, Scott, Nigel and Claire Smyth. 2010. "Case Study: Mobiles for Development." UNICEF, October. <http://www.cto.int/Portals/0/docs/research/mobiles4dev/Final%20Mobiles4Dev%20Case%20Studies%20-%20for%20Dessemination.pdf>. This report presents the key findings of the Mobiles for Development project, a global research study commissioned by UNICEF. The role of mobile technologies in Disaster and Emergency Warning Network is discussed on pages 10-14.

### **Citizen Media and Conflict Reporting**

Melvin, Neil and Tolkun Umaraliev. 2011. "New Social Media and Conflict in Kyrgistan." SIPRI Insights on Peace and Security No. 01. [http://reliefweb.int/sites/reliefweb.int/files/resources/Full\\_Report\\_2206.pdf](http://reliefweb.int/sites/reliefweb.int/files/resources/Full_Report_2206.pdf). Accessed 15 September 2011. The report discusses the use of a variety of new social media—mobile phone text messaging, emailing, photo sharing, social networking, video hosting, and the like in conflict reporting.

"Case Study: Text Messaging as a Violence-Prevention Tool (Kenya)" in *Wireless Technology for Social Change: Trends in Mobile Use by NGO*, pp. 38-42. [http://www.globalproblems-globalsolutions-files.org/unf\\_website/PDF/vodafone/tech\\_social\\_change/Humanitarian\\_Assistance\\_case3.pdf](http://www.globalproblems-globalsolutions-files.org/unf_website/PDF/vodafone/tech_social_change/Humanitarian_Assistance_case3.pdf). Accessed 15 September 2011. The case study illustrates how mobile communications were used to connect with the communities and avert crisis in post-election Kenya.

Yusuf, Huma. 2008. "Old and New Media: Converging During the Pakistan Emergency (March 2007-February 2008)." The Center for Future Civic Media. <http://civic.mit.edu/sites/civic.mit.edu/files/Old%20and%20New%20Media%20Pakistan%20Emergency.pdf>. Accessed 15 September 2011. It is a must-read document for anyone interested in citizen media, particularly in times of political turmoil, for the wealth of insights it provides on the current uses of digital media and the opportunities for future work in this area.

A joint UNICEF-SIPA Initiative. 2010. "Voices of the Vulnerable: Research Project on New Methods for Information Collection, Analysis and Use. Case Studies: Iraq and Uganda." <http://www.unglobalpulse.org/sites/all/files/reports/Global-Pulse-SIPA-Capstone-Report.pdf>. Accessed 15 September 2011. The report analyzes backgrounds and implementation of UNICEF's two pilot projects in Iraq and Uganda, using mobile technology to collect real-time information and utilize it to better inform policy and programmatic decisions.

Zuckerman, Ethan. 2007. Ethan's blog "My Heart's in Accra." <http://www.mobile-active.org/mobile-phones-and-social-activism-ethan-zuckerman-white-paper>. Accessed 15 September 2011. The blog post provides a solid overview of mobile phones usage in international activism.

Himelfarb, Sheldon with contributions from Cecilia Paradi-Guilford. 2010. "Can You Help Me Now: Mobile Phones and Peacebuilding in Afghanistan." United States Institute of Peace, Special Report 259, November. [http://reliefweb.int/sites/reliefweb.int/files/resources/59E2FDE7AA49D505492577DE00224D23-Full\\_Report.pdf](http://reliefweb.int/sites/reliefweb.int/files/resources/59E2FDE7AA49D505492577DE00224D23-Full_Report.pdf). Accessed 15 September 2011. The report discusses the use of mobile phones for social change in support of peacebuilding, as it has been the focus of numerous pilot application programs conducted by the government, non-governmental organizations, and the private sector.

### **Mobile Applications/Communications Infrastructure**

Bowman, Michael. 2008. "Advanced Mobile Communications for Emergency Management and Crisis Response." Proceedings of the 2008 IAJC-IJME International Conference. [http://www.ijme.us/cd\\_08/PDF/124%20IT%20304.pdf](http://www.ijme.us/cd_08/PDF/124%20IT%20304.pdf). Accessed 15 September 2011. The research team from Murray State University has developed a system called the Man-portable and Interoperable, Tactical-Operations-Center (MITOC). MITOC is a suite of mobile communications gear that upon arrival at an emergency is quickly transfigured into a robust communications infrastructure including satellite communications, wireless LANs, Internet access, radio interoperability, VoIP, and other services essential for organizing and executing crisis response.

Fajardo, Jovilyn Therese B. and Carlos M. Oppus. 2009. "A Mobile Disaster Management System Using the Android Technology." International Journal of Communications 3 (3). <http://www.naun.org/journals/communications/19-280.pdf>. Accessed 15 September 2011. The article discusses how the Android application, MyDisasterDroid, can be used in the disaster management on the example of the Philippines.

### **M-payment and Fundraising**

M+R Strategic Services and MobileActive.org. 2011. "2010 Nonprofit Text Messaging Benchmarks: An Analysis of Mobile Advocacy and Mobile Fundraising Metrics for Nonprofit Organizations." [http://labs.mrss.com/.wordpress/wp-content/uploads/2011/06/Nonprofit\\_Text\\_Messaging\\_Benchmarks\\_Study\\_2010.pdf](http://labs.mrss.com/.wordpress/wp-content/uploads/2011/06/Nonprofit_Text_Messaging_Benchmarks_Study_2010.pdf). Accessed 15 September 2011. The aim of this study is two-fold: 1) To provide benchmarks and metrics by which nonprofit organizations can measure their success with text messaging; and 2) to illustrate the various ways in which organizations are using text messaging including fundraising messaging.

Neustar, Inc. 2010. "Mobile Outreach: How Nonprofit Organizations Can Use Common Short Codes to Mobilize Millions of Volunteers, Dollars and Supporters." <http://www.neustar.biz/insights-resources/white-papers> . Accessed 15 September 2011. This is a white paper on the benefits of text messaging for nonprofit organizations in their communication with potential supporter; it includes various examples of fundraising messaging.

### **Mobile Abuse**

Lindsay, Bruce R. 2011. "Social Media and Disasters: Current Uses, Future Options, and Policy Considerations." Congressional Research Service, September. <http://www.fas.org/sgp/crs/homesecc/R41987.pdf> Accessed 15 September 2011. The report highlights dangers in using social media for emergency response including deliberately providing inaccurate information. Social media is often accessed through mobile phones.

SaferMobile. 2011. "Mobile Security Risks: A Primer for Activists, Journalists and Rights Defenders." <http://www.mobileactive.org/howtos/mobile-security-risks>. Accessed 15 September 2011. This is a primer for mobile security risks for activists, rights defenders, and journalists; the document includes tips on how to protect yourself.



Business Consulting  
Research and Analytics  
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## About Linksbridge

More than a business consultancy, more than a research firm, and more than a creative agency – Linksbridge combines excellence in each of these professional services with a passion for effecting change.

Linksbridge provides experienced teams and individuals to support executives in businesses and non-profit organizations. We help our clients to solve their most demanding and urgent challenges, effectively communicate their plans, and implement change. We have particular expertise in successfully delivering business analysis and strategy projects, in planning and managing complex programs, and in organizational design and development.

Linksbridge offers the highest quality consulting, research and analytics, and creative services. Our people have served at senior levels in top tier business strategy firms, are well known in their industries, or represent exceptional writing, design and visual media talent. We provide extraordinary value compared to our established competitors and offer greater flexibility in using resources to complete projects at a pace that is right for our clients.

Linksbridge brings ideas on how our clients' industries are developing, and how they can run their business better. We maintain our own analytical frameworks and diagnostic tools based on our experience at other clients, and use external quality standards where they are applicable.

We work in the hi-tech industry, in international aid and development, in human rights, and in retail.

We subsidize our non-profit projects to make them affordable to lower or no-income groups that request our expertise.

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