

Information Technology Firms Respond to the Immediate Aftermath of the September 11th Terrorist Attacks

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Introduction

If communication is the lifeblood of disaster recovery, information technology firms provide the arteries through which communication flows. Relief coordination is increasingly underpinned by information technology (McEntire, 1998) that speeds the delivery of known knowledge (Bukowitz and Williams, 1999). How quickly decision makers know what is happening and help can be summoned and organized bears directly and significantly on the success of recovery.

The synchronized explosions of September 11, 2001, caused the greatest-ever loss of human life from terrorism on U.S. soil. People throughout the country and the world recognized the symbolism of attacking the Pentagon and the World Trade Center. The economic consequences reverberate internationally.

In our knowledge-based economy, a key concern is the disruption in information flows. Arguably, at the time of the September 11th explosions, the World Trade Center housed the densest fiber-optic network in the world (Hall and Mearian, 2001). The immediate aftermath of September 11th highlighted the vital role of information technology.

This paper reports on exploratory, quick response research that sought to understand how selected information technology firms contributed to recovery immediately after the attacks of September 11th. How did they contribute to recovery from the disaster? How did firms decide what to do?

The next section identifies the gaps in the hazards literature that this research begins to fill by addressing the above questions. The research approach is described next. After that, the findings are discussed under three

themes; disaster relief assistance provided, how firms decided what to do, and how offers of assistance were made known to potential users. Based on the findings, the nature of corporate disaster assistance is considered and suggestions are made for future research to inform practice. In closing, the contribution of this research is considered.

Related Hazards Literature

Traditionally, research on organizations providing disaster recovery assistance has focused on the responses, roles, and contributions of government agencies, such as the Federal Emergency Management Agency (FEMA), (U.S. General Accounting Office, 1993) and nonprofit groups, such as the Red Cross (Cohn et al., 2000), that have primary responsibility for providing emergency assistance.

In the past, when hazards researchers have investigated businesses, it has been in terms of vulnerability, preparedness, or how businesses impacted by disasters have recovered or failed to recover. Research has been done on business vulnerability to disasters (Tierney, 1994), and on business disruption, preparedness, and recovery (Alesch et al., 2001; Webb et al., 2000; Tierney and Dahlhamer, 1998; Alesch and Holly, 1997). Guidebooks have been written on business continuity planning and recovery (Fulmer, 1999; Bell, 2000; Stringfield, 2000).

Recently, corporate social responsibility in disaster reduction has emerged as an important theme (Twigg, 2001; Ariyabandu and Hulangamuwa, 2002; Sharma et al., 2002). While this body of literature emphasizes mitigation, it does consider the contribution of business post-disaster. Weber et al. (2002) describe various roles corporations play in emergency management and suggest there is a scarcity of research on private sector performance in this field.

The impact and increasing ramifications of information technology on disaster response have been acknowledged in the hazards literature (Stephenson and Anderson, 1997; Chartrand and Punaro, 1985; Fischer, 1999; National Research Council, 1996; Quarantelli, 1999). For example, Grant (1996) examined the impact of information technology on organizational relationships within the first ten days of flooding in 1996 in Allegheny County, Pennsylvania. She focused on onsite assistance by traditional emergency responders, such as the Red Cross, the Salvation Army, and FEMA. Other than the media, she did not single out participants in the for-profit sector in the list of organizations participating in the response to the floods. The same pattern of spotlighting the work of the public and nonprofit sectors can be seen outside the United States. For example, Comfort (2000), when she studied the use of information technology in the on-site interorganizational response to the August 17, 1999, Marmara, Turkey,

earthquake, interviewed government officials and representatives of nonprofit groups, such as the Turkish Radio Amateur Club and AKUT, a volunteer search and rescue team. The decisions and actions of firms that normally provide information technology and related services have not been considered extensively in the immediate post-disaster phase.

The centrality of information technology to business recovery has been recognized (Toigo, 1989), as has the role of networks, telecommunications, and data communications (Bates, 1992). Ensuring business continuity and viability is absolutely critical. Yet little attention has been paid in the hazards literature to the role of information technology firms in providing disaster assistance to make this happen.

Research Approach

Recurring features of qualitative research true of this project are that the researcher attempts to gain an overview of the context under study and to capture the perception of insiders. The primary task is to understand how people in particular circumstances take action and manage specific situations (Miles and Huberman, 1994). While many actors were engaged in numerous situations immediately after the September 11th terrorist attacks, this research focuses solely on the contribution to recovery made by a few information technology firms.

Qualitative interviewing was desirable because it generated information that was not feasibly available in any other form (Mason, 1996). Qualitative interviews enabled the researcher to capture the thinking behind the genesis and evolution of decision making that business executives are unlikely to document. It was important to find out how decisions were made while the experiences were fresh in people's minds. Speaking to interviewees soon after September 11th increased the likelihood that they could remember in detail what prompted their firms' actions and why they chose to respond the way they did.

The firms contacted were either ones with which the researcher had pre-existing contacts and/or were identified in news reports or advertisements from *Computerworld*, *Silicon Alley Daily*, and the *New York Times*. Electronic media reports were an essential means of identifying firms that are response innovators. Since electronic media reports are not necessarily well archived, it was essential to review electronic publications as they were posted.

While there was urgency in collecting the needed information, there was no need to go to the physically impacted sites. The web sites needed for review are equally accessible from anywhere with an internet connection. The in-depth, elite interviews were conducted by telephone since one respondent was based in Europe while the others were based across the United States. Interviews were conducted as guided conversations (Rubin and Rubin, 1995).

Ten individuals from nine firms were interviewed between September 18 and October 4, 2001. Seven interviewees were in management positions. Two had responsibilities related to technology, three to marketing, and two to corporate social responsibility, including humanitarian relief. To varying degrees, all were involved in deciding how their firms would respond to the immediate aftermath of the September 11th terrorist attacks. Three interviewees worked in communications and routinely acted as spokespeople for their large firms. Immediately after the World Trade Center collapse, two of them had been charged with liaising with the media about their companies' response activities.

Nine interviewees talked about the immediate post-event contributions of their firms. The firms contacted are engaged in different aspects of information technology. The majority of interviewees who talked about their firms insisted on anonymity for themselves and for their firms. They were concerned about potential breaches of security and about their competitive positions within their industry. These interviewees made it clear that they did not want the nature of their businesses portrayed with any degree of specificity, lest a reader be able to identify particular firms. Some firms provide communication services, such as web hosting, web design, voice mail, e-mail, long distance voice, data, and video. Others manage specialized information or provide infrastructure, technology, and software for telecommunications companies.

Karl F. Rauscher, Director of Network Reliability at Lucent Technologies, was interviewed not about his firm's response, but about the Wireless Emergency Response Team (WERT) he founded on the evening of September 11th. WERT's mission was to provide coordinated wireless industry mutual aid support for search and rescue efforts at the World Trade Center. In reviewing its endeavor, in October 2001, WERT concluded that its efforts had provided value in the following ways.

- WERT helped keep rescue teams from being exposed unnecessarily to physical danger by quickly discrediting false reports that there might be survivors with cell phones in the rubble.
- WERT was able to confirm that individuals thought to be missing were safe.
- The team was able to help family members achieve closure on the death of loved ones by dispelling rumors that cell phone calls had been made when they hadn't.
- WERT assured the public both domestically and internationally that all known technological approaches were being used to listen for any cellular or pager communication emanating from the collapsed World Trade Center towers.

- To enhance capability to respond to future events, WERT documented lessons learned and made recommendations in a final report made available on the web (Wireless Emergency Response Team (WERT) 2001). WERT's intent was to operate as an ad hoc group in future emergencies (Wirbel, 2001).

No survivors were found as a result of WERT's efforts. Thirty-three organizations participated (see Appendix A). Over 250 industry subject matter experts participated in WERT's efforts. One hundred and twenty reports of cell phone or pager use from the rubble were investigated. The WERT Public Call Center received 5,039 calls. The Center was set up to record information from people who had received contact from a missing person via an electronic device, from people with electronic devices trapped in the collapse of the World Trade Center, and from people who were aware of any electronic devices associated with a missing person at the World Trade Center. Approximately 500 Bell South employees volunteered as operators at the public call center (WERT, 2001).

Findings

The results of the interviews are organized under three complementary themes. The first involves what and how firms provided disaster assistance. The second is how firms decided what to do, to whom to provide assistance, and for how long. The third is how offers of assistance were made known to potential beneficiaries.

Disaster Assistance Provided

Firms provided help to businesses as well as giving aid to support rescue and community response. Much of what firms provided was either part of normal everyday business or an extension of it. Some firms provided technical services free to those directly impacted by the events of September 11th. These included normally fee-based services, such as web and telephone hosting. Assisting firms increased the amount of client support they supplied and undertook activities that clients normally performed. Donating firms provided telecommunication networking expertise, rerouted phone systems, provided answering services, undertook data center recovery and call center recovery, and contributed logistical support.

The flexibility of communication systems and the ability to scale up means that firms providing communication services have the capacity to take on new business at short notice. At least initially, these firms were not limited in what they could provide by available infrastructure.

Firms did provide assistance close to Ground Zero at the World Trade Center. Corporate disaster relief teams were activated and provided

humanitarian assistance. The services they performed were a function of what they were asked to do and what they volunteered in light of the needs they saw. Free telephone access was made available temporarily at the impact site and at airports. Prepaid telephone cards were distributed at some locations. WERT aided search and rescue efforts by monitoring cellular networks and detecting signals from wireless devices carried by those caught in the collapse of the towers. Firms provided access to their facilities. One respondent described how one of her firm's buildings, which was near the World Trade Center, was used as a staging area for rescue operations. The catering services run for employees in that building were made available to relief workers.

In addition to services, firms donated supplies they either had in-house or to which they had ready access. Supplies that were donated included telecommunication devices, such as cell phones and two-way pagers, as well as general hazard response supplies, such as suits, gloves, and eyewash used in hazardous materials incidents. One firm provided approximately 7,000 cell phones. Another firm supplied a self-contained, fully functional portable telecommunications site that provided high quality cellular transmission.

Financial assistance for humanitarian relief efforts included corporate donations and facilitating employee donations. The latter included, at least for one firm, the corporation's matching the employee contributions, up to a set maximum. The money was given to established nonprofit groups, such as the Red Cross, or to newly created funds dedicated to disbursing assistance to those directly impacted, such as the Twin Towers Fund set up by Mayor Rudolph W. Giuliani to help the families of police and fire personnel killed or injured responding to the World Trade Center explosions.

Employee contributions were not only monetary. In at least one firm, staff donated blood, and employees could use eight hours of work for volunteer activities.

Employees expressed enormous pride in their companies' responses. Unprompted, three respondents said they were proud to be part of their firms, given how their firms had responded to the events of September 11th. Each noted the speed with which the right things got done.

How Assistance was Provided

Firms provided help by supporting the work of traditional emergency responders and by assisting impacted businesses in recovery. Direct assistance to business was more prevalent than working through industry associations or groups formed in the immediate aftermath of September 11th.

Contributing to traditional emergency responders—Firms used pre-established, formal channels to offer assistance. For example, more than one firm volunteered help to the Red Cross through existing connections

with that nonprofit. Firms already had links to the Red Cross either because the Red Cross was a client, through the firm's charitable foundation, and/or through its disaster response team. In addition, individuals were familiar with the Red Cross. The Red Cross was seen as the lead nonprofit responder and as such the initial organization to contribute resources, particularly financial aid.

Two respondents expressed qualified frustration in dealing with traditional emergency response organizations. The concerns focused on the lack of prompt adaptiveness. One respondent described how his firm offered to fly federal agency personnel for free on planes the firm had chartered. By the time the offer was processed through the bureaucracy, the planes had flown without government personnel on board. The individual had found it difficult to work through public channels to identify a decision maker who could expedite consideration of his firm's offer. Another respondent described how nonprofit organizations were unable to act as brokers for businesses offering assistance. The respondent thought there was a potential role for a nonprofit known for its response work to take on this function. Her rationale was that it would occur to those in need to seek help through such an organization. She asked if there was a way for nonprofits to determine how business could fit into their approach to disaster response.

Providing business-to-business assistance—The primary form of business-to-business assistance was meeting the needs of existing clients. All other forms of help were in addition to this. As one interviewee explained, customers are not sacrificed, the number one priority is to focus on customers and ensure that they have adequate resources. Service subscribers are taken care of first. As one interviewee explained, the reason firms subscribe to contingency services is to guarantee availability of resources. Non-customers are helped within reason.

Firms continued to provide the same services after the disaster that they had provided to clients before September 11th. Firms delivered on post-disaster services contracted for before the disaster, such as providing back-up data support centers, or supplementary assistance. For a number of firms, what they did after the event built upon the disaster recovery planning they had done for their clients. Assisting firms took on functions clients were not able to perform, such as systems monitoring or providing call center capability.

Some firms made available one or more of their services for free temporarily, such as web hosting or phone service. Such offers were extended to those who had not been clients of the firms.

Providing assistance through existing industry associations and outlets

—Industry associations and outlets were not the primary vehicles through which firms provided post-disaster assistance. An interviewee described how there was a national gathering in Washington, D.C. on September 11th, of one of the main industry associations to which his firm belongs. The association coordinated getting people back home from Washington, D.C. While his firm offered assistance to the association in doing so, its help was not needed. One interviewee spoke about being in contact with industry associations in the New York City area to keep them informed about his firm's activities and to learn what other firms were doing. WERT was created as a new organization drawing on the contacts established through existing associations.

Providing assistance through groups created in the aftermath of the disaster

—WERT was the only example interviewees provided of a new group that was a focal point for participatory, technical disaster assistance. One interviewee described an example of opportunistic post-disaster assistance provided by her firm. On learning of a September 21 telethon, her firm volunteered to use its telemarketing capability and call centers, enabling employee volunteers to answer the phones. Financial contributions were made to funds created after the event to help those most affected by the disaster.

How Firms Decided What to Do

Interviewees described how they wanted to do something to aid in the recovery from the terrorist attacks. Watching events on television was a powerful prompt to action. On September 11th, the founder of WERT saw on television how cell phones had been used by individuals in the World Trade Center rubble. He realized that his industry colleagues understood the technology of how to monitor signals from cell phones and pagers. That evening he got on the phone to them and began to organize the Wireless Emergency Response Team (WERT).

For firms that did not have a disaster response orientation before September 11th, a powerful motivation was the sense of kinship and affinity with New Yorkers. People knew people in New York who were relatives, friends, and colleagues.

Interviewees described how initiatives to assist others were taken at different levels and in different divisions within the company. One respondent explained how disasters create opportunities for those not in executive positions to demonstrate leadership. Another respondent was careful to note that offers of assistance, within her firm, were undertaken in consultation with

supervisors and management. One interviewee described how the firm pulled together its top talent to address the question of how they could help those in need.

Non-routine assistance to other businesses and to charities was the result of thought-through business decisions. One respondent described how his firm did the numbers and calculated how long they could provide a resource-intensive service free without really hurting the business. As a for-profit business, the firm gave what it could afford to and consequently, “were not going to provide everything for free.” The firm felt that was the best they could offer. The same interviewee explained that donating money only goes so far, providing a service is providing what those in the firm know best and so that is why they provided it. Another respondent described how the process of deciding what to contribute on September 11th was infused with the urgency of the circumstances. She described how there was a sense that what they, as business leaders, might do may not be perfect, that they may not have thought it through completely, but that the firm had to get something out there or time would pass.

In contrast to developing a new initiative, one interviewee described how providing technical assistance was straightforward—where systems were not working, technicians and equipment were sent in. He regarded it as part of customer support and relations. That work gets done and then you see who pays for it.

Precedence for Action

How those in the corporate sphere understood and responded to the events of September 11th was shaped by their previous exposure and participation in responding to disasters.

Two respondents with experience of disasters worldwide put September 11th in a broad context. They talked about disasters that had claimed more lives than the September 11th terrorist attacks and described situations where people had fewer pre- and post-event resources than those directly affected by the September 11th event. These two respondents pointed out that private enterprise was often at the disaster site sooner than government or international relief providers. They described how private firms with their technical expertise and prompt arrival at the disaster site rebuilt the infrastructure governments and international donors then used to provide their assistance.

Four of the respondents explained there was no precedence for their actions. Six respondents acknowledged that experience in previous disasters influenced their firms’ decision making. Experiences mentioned included recent earthquakes in Washington State and India, hurricanes in Florida, and the Oklahoma City bombing. Of those who acknowledged precedents for action, four respondents emphasized that the scale of this event and its novelty

required their firms to do things they had not done before, such as making arrangements to get key personnel home from off-site locations. One respondent stressed that developing and promoting a culture of service is the only answer for providing appropriate and timely response.

Respondents noted that an important way in which this disaster differed from previous disasters in the United States was loss of access by air, not only to the impact site but also to places not directly affected. The assumption that a firm could immediately fly staff and materials wherever they were needed did not hold for this event.

Disaster Recovery Plan in Place

All of the respondents described how their firms had plans in place for what to do if struck by a disaster. A number emphasized that it was essential because they were in the business of protecting their clients' information assets. One respondent explained that it is normal for telecommunication firms to want to keep networks up so that they do have disaster recovery procedures that get activated readily when networks fail. Another respondent described how in his firm's line of work system failure was not an option. In firms with well-developed disaster response plans not all actions taken stemmed from the plans.

Disaster Assistance Plan in Place

Although all respondents described how their firms had corporate disaster recovery plans in place, not all had a plan for helping others impacted by a disaster. Five respondents explained how the assistance they provided to others after September 11th was developed after the synchronized explosions. For example, before this event there was no plan for coordinated emergency wireless response. The two firms with disaster assistance teams and another firm that had a long history of providing disaster assistance had pre-existing strategies for helping. Firms with pre-existing strategies complemented what they had in place with activities tailor-made to the unique circumstances stemming from September 11th.

Deciding to Whom to Provide Assistance

Aiding current customers was the number-one priority in providing business-to-business assistance. Businesses checked with current customers to find out if they needed help. One respondent described how the firm inventoried customer needs, prioritized them, and went from there. Firms that provide highly specialized infrastructure and support were not likely to be approached by non-customers for technical assistance.

Firms that made known through the media what services they had to offer were willing to provide those services to whomever responded. For example,

WERT tried to track down all the leads they received about signals from wireless devices.

Respondents declined to name or describe those to whom they had provided business assistance. Firms that offered one or more of their usual services for free to those directly impacted by September 11th were unwilling to say how many firms or individuals had used those services. The reasons given for not divulging details of beneficiaries were either proprietary or security related or because firms hadn't tracked information about recipients of the assistance they provided.

Firms used different screens in deciding which charitable organizations would be given money. Firms considered which group was providing the most fundamental assistance, who would benefit the most from what a firm could provide, or which groups were perceived to be not receiving their fair share, or the areas of interest to the donating firm.

Corporate disaster response teams initially offered their services to whomever was in charge. By doing so, they tapped into a well-defined interjurisdictional incident command structure.

Anticipated Length of Providing Assistance

The nature of the assistance determined whether respondents knew of an end date and, if so, when that date would be. For example, while it was not clear at the time of the interview how long free local telephone service in the affected area would go on, the provision of free airport phone service ended September 21, 2001.

Technical support was to be provided for as long as needed. One respondent explained that by the time of the interview, his firm was no longer providing extra customer support. Other respondents noted that technical support would not be needed for long since the peak usage of phone service occurred immediately after the synchronized explosions on September 11th.

One respondent didn't know when his firm would stop providing free technical service, another said that based on market research his firm would provide such help for three months, and a third explained it depended on individual situations. The third firm initially offered assistance through the end of September, then extended it to the end of October.

One respondent explained, "You make a charitable donation for x amount and then stop." Financial contributions are capped.

One respondent explained that corporate programs of social responsibility must build up credibility by coming when asked and working closely with others in all situations. If firms get into the business of providing post-disaster humanitarian assistance they can't stop simply because they have had enough. If they do, they lose more than they gain by exiting the scene. Another respondent estimated that his firm's humanitarian assistance might well go on for a year or two with a reduced intensity after the massive first response.

How Offers of Assistance Were Made Known to Potential Beneficiaries

Making potential users aware of what is available is a critical step in getting offered services used. In the immediate aftermath of September 11th, firms used their pre-existing connections, the contact network of employees, and media releases to make people aware of what they were offering.

Individuals within firms used their own network of contacts in other firms and in nonprofits to offer their services. Employees in sales and marketing, engineering, and security were instrumental in making direct contact through e-mail and by phone.

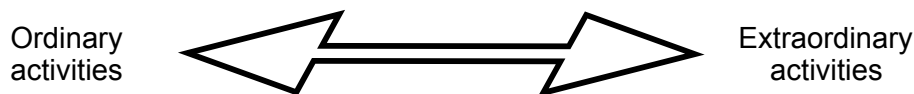
Media press releases were important means for letting potential users know about services being offered. One firm ran an ad in a daily electronic news journal geared to the information technology industry. WERT issued press releases to explain where people should call to provide phone or page numbers of individuals missing in the World Trade Center.

For those firms that had not previously offered post-disaster assistance, the biggest challenge was getting businesses and individuals to know what was being offered. More than one respondent described surfing the web to try to locate intermediaries to publicize services offered.

One respondent emphasized that most of his efforts to let firms know about disaster response and mitigation options came through the conversations he had with companies, cities, and agencies before September 11th. He had met with decision makers, such as executives or elected officials, to discuss risk by facility or organization since his firm provides preparedness planning and can be hired on retainer for disaster response.

Discussion—the Nature of Corporate Disaster Assistance

One way to think about the nature of disaster recovery assistance from business is on a continuum from ordinary activities to extraordinary activities.



Ordinary activities refer to the set of actions firms take as part of doing business. This involves providing a particular service, such as web hosting. It also involves activities to which firms have an ongoing commitment based on corporate social responsibility, such as supporting disaster assistance teams. At the ordinary-activities end of the continuum are those actions that firms undertake regularly. Extraordinary activities refer to those actions that are not

routine to a firm, such as making travel arrangements for government officials. At the extraordinary-activities end of the continuum are actions that are novel and exceptional. Closer to the middle may be activities the firm does on a less-routine basis. These are logical extensions of normal activities, such as making available for free services that companies usually charge for, such as phone calls.

One measure of a firm’s resilience is the ease with which it can move along the continuum. Locating a firm’s actions on the continuum provides a snapshot of a particular time frame. An extraordinary activity for a firm at one time may become part of the firm’s suite of ordinary activities.

Another way to think specifically about business-to-business assistance after a disaster is according to beneficiaries targeted and services provided (Table 1). This perspective highlights the extent to which providing disaster assistance is part of doing business. Making sure that current clients have functional operations is vital.

Table 1. Providing existing and new services to existing and prospective clients.

	Existing services	New services
Existing clients	Customer support	Development, marketing
Prospective clients	Outreach marketing	Development, outreach marketing

Disasters may lead to an increase in business. Existing clients may opt to purchase new services, new clients may opt to purchase existing services. Existing and prospective clients may purchase new services. On September 19, 2001, one firm launched a new service that in light of September 11th would be appealing to existing and prospective clients.

Firms do not only provide assistance by meeting the needs of existing and prospective clients. Firms contribute monetarily to traditional disaster assistance providers. In addition, humanitarian assistance is provided directly and on an extended basis through disaster response teams. One simple way to consider the full range of types of business disaster assistance is by disaster recovery phase (Table 2).

Table 2. Business contribution to phases of response and economic recovery.

Phase	Business contribution
Rescue	Disaster response teams, financial contributions
Taking care of life essential needs of impacted people	Disaster response teams, financial contributions
Restoring shared infrastructure	Ordinary activity, extraordinary activity
Economic rehabilitation	Ordinary activity, extraordinary activity
Economic advancement	Ordinary activity

Evolution of Corporate Disaster Assistance as a Function of Technology

How the information technology component of the private sector provides post-disaster assistance is evolving as a direct function of improving and expanding technology. For example, WERT's contribution to search and rescue deployed advanced network monitoring techniques to track signals from wireless devices that have become widely used only in the last five years.

Technology enabled firms to provide spatially unrestrained assistance. Firms were not tied to equipment in one location. Remote sites were used to handle back up data. New York-based firms were provided with Los Angeles-based phone numbers by a company physically based in a third city.

Two way paging turned out to be one of the most effective, reliable, and secure mechanisms for contact among emergency response personnel, including those in the Mayor's office and Governor's office. The system had few users compared to cellular phones. Particularly popular were the BlackBerry Wireless Email Solution devices that firms put into the hands of response personnel. These wireless e-mail devices are sufficiently intuitive that novice users working in stressful situations were readily able to communicate using them.

One respondent explained that the potential of emerging technology for disaster recovery has yet to be tapped. He said that since September 11th it will be easier to promote the development and application of these technologies for disaster relief than it was before, when no one could see the business case for applying emerging technology in non-commercial settings. The respondent provided two illustrations of the use of emerging technology in disaster settings. First, cellular broadcasting from a central switch to all users in an area could be deployed. In a particular area, cell phone users could be asked to turn off these devices, if they are making nonessential calls, to enable emergency workers to get through. Second, through cellular systems, mobile positioning systems could be used to locate signals from phones and pagers. He suggested this would not be difficult to develop. WERT is the first generation of sophisticated initiatives to attempt to do so to enhance rescue operations. It demonstrates some of the potential of coordinated wireless industry mutual aid. Consequently, it is not unreasonable to consider the emergence of other sophisticated initiatives either during crises or, ideally, in advance of them.

Recommendations for Research to Inform Practice

This exploratory research suggests the value of investigating systematically how and why the for-profit domain participates in providing assistance after a disaster. It would be particularly valuable to investigate thoroughly the assistance offered by information technology firms. Such a study would provide a picture of how an economic sector that has redefined modern life shapes such a time-sensitive and communication-dependent function as disaster recovery.

Exploring the interface between businesses offering technical disaster assistance for the first time and traditional governmental and not-for-profit disaster responders would be valuable. A related need is to identify constructive avenues for businesses offering assistance to let potential beneficiaries know what help is available. Such efforts would help groups such as the American Red Cross that are trying to devise ways to better harness offers of volunteer help from individuals with highly specialized skills (Clizbe, 2002).

It is important to learn more about how being in a particular sector—be it for-profit, nonprofit, or government—shapes the nature of the assistance provided, how it is provided, and the spin-offs garnered from providing assistance. How applicable to the for-profit sector are the models of disaster assistance developed from examining governmental and nonprofit operations? Preliminary evidence suggests that this question would be worth pursuing. McEntire (1998) developed a model of coordination among nonprofit groups.

He noted that pre-disaster links among non-governmental humanitarian groups increase coordination during disaster relief operations. Before September 11th, linkages among businesses made the quick formation and activation of WERT possible.

Contribution

This research focuses on information technology firms as assistance providers in the immediate aftermath of a disaster. Thus it extends our understanding of the network of disaster response beyond the traditional organizational emphasis on the public and nonprofit sectors. At the same time, it expands the research agenda on the private sector during response to include the decision making of intact firms. In the past there has been an understandable preoccupation with the recovery of impacted firms.

By focusing on the decision making of firms normally engaged in information technology and allied services in the immediate aftermath of a disaster, this research provides a different perspective on the impacts and ramifications of information technology in disaster response. Past investigations have emphasized the use of information technology by traditional emergency responders. This work highlights how firms adapt and extend their normal business practices to extraordinary circumstances.

Examining the business contribution to disaster assistance, specifically from the information technology sector, provides new insights into what constitutes disaster assistance and how it is delivered. Firms can provide expertise and technical resources not necessarily available in the public and nonprofit sectors. At the same time, individual businesses can respond nimbly with tailor-made contributions.

This research highlights that disaster assistance is not necessarily delivered at ground zero and that providers and recipients do not need to be in close physical proximity. Non-spatially restricted assistance is a function of the information technology revolution. Firms providing some forms of telecommunications relief, such as web hosting, could do so without having employees travel to the disaster site. This was particularly important given the ban on commercial and general aviation precisely when the need for telecommunications was at its peak—right after the attacks of September 11th. For example, AT&T Wireless reported its highest calling volume ever on that day (Barnes, 2001).

Since information technology firms transacted assistance from around the country, the author did not conduct the investigation in Washington, D.C. or New York City. In the past, it has been a given that research into response decision making requires investigators to be physically present at the disaster site. Of course, for the majority of quick response research on decision making in the aftermath of an event, the need to travel to the disaster site will

remain. Still, as the nature of urgent post-disaster assistance evolves, how quick response research is conducted will reflect such change.

Conclusion

In providing assistance in the immediate aftermath of the September 11th terrorist attack, information technology firms undertook ordinary and extraordinary activities. Firms combined prior disaster experience, pre-existing disaster response plans, and post-event ingenuity to deliver previously contracted services, to provide new business related services, and to donate humanitarian aid. Considering the contribution of information technology firms both reinforces the value of traditional emergency response and expands what constitutes post-disaster assistance and how it is delivered.

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Appendix A

Organizations Participating in the
Wireless Emergency Response Team
(WERT 2001, p. 2)

Arch Wireless
Argonne National Laboratory
AT&T
AT&T Wireless
BellSouth
Cellular Telecommunications and Internet Association (CTIA)
Cingular Interactive
EDO Corporation
Ericsson
Federal Communications Commission (FCC)
Lucent Technologies
Metrocall
Motorola
National Communications System (NCS)
National Coordinating Center for Telecommunications (NCC)
Network Reliability Steering Committee (NRSC)
Network Reliability and Interoperability Council (NRIC) V
Nextel
New York City Police Department (NYPD)
New York City Mayor's Office
Nortel Networks
Personal Communications Industry Association (PCIA)
U.S. Secret Service
SkyTel
Sprint PCS
Telcordia Technologies
TruePosition
U.S. Department of Energy
U.S. Marshals Service, Electronic Surveillance Unit
Verizon
Verizon Wireless
VoiceStream
Wheat International
