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Digital Disaster Assistance: How and Why Selected Information Technology Firms Contributed to Recovery Immediately After the September 11, 2001, Terrorist Attacks

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ABSTRACT

The immediate aftermath of the September 11, 2001, terrorist attacks on the World Trade Center and the Pentagon highlighted the vital role of information technology in disaster response. The current state of information technology enables firms to deliver technical, communications-related disaster assistance without necessarily being in the vicinity of the impacted area. Firms in the information technology sector combined previous disaster experience, disaster response plans and post-event ingenuity to deliver previously contracted services, to provide new services, and to donate humanitarian aid. Businesses providing assistance directly to other businesses was a more prevalent practice according to interviewees than was working through intermediaries, such as business associations or groups formed after the disaster. The biggest challenge for firms offering post disaster technical assistance for the first time was making prospective users aware of the services being offered.

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 11, 2001, explosions, the World Trade Center housed the densest fiber-optic network in the world (Hall and Mearian 2001). The immediate aftermath of September 11, 2001, highlighted the vital role of information technology.

This exploratory, quick response research sought to understand how selected information technology firms contributed to recovery immediately after the attacks of September 11, 2001. How did they contribute to recovery from the disaster? How did firms decide what to do?

The next section of the report lays out the significance of the exploratory research undertaken and then the research approach is described. 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.

SIGNIFICANCE

This quick response report is distinctive because of its focus on information technology firms as providers of assistance in the immediate aftermath of a disaster. Traditionally, research on organizations providing disaster recovery assistance

focused on the responses, roles and contributions of government agencies, such as the Federal Emergency Management Agency, (United States General Accounting Office 1993) and non-profit groups, such as the Red Cross (Cohn et al. 2000), that have primary responsibility for providing emergency assistance. When hazards researchers have examined the private sector in disasters, the emphasis has been on business disruption, preparedness, and recovery of impacted firms (Alesch et al. 2001; Webb et al. 2000; Tierney and Dahlhamer 1998). By exploring disaster assistance provided by one component of the private sector, this research extends our understanding of the network of disaster response.

Examining the business contribution to disaster assistance, specifically from the information technology sector, is important because it 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 non-profit sectors. At the same time, individual businesses can respond nimbly with tailor made contributions.

This research highlights how disaster assistance is not necessarily delivered at ground zero or that providers and recipients 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 11, 2001. 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 researcher did not conduct the investigation in Washington, D.C. and New York City. In the past, it has always been taken as a given that quick response researchers need to be physically present at the disaster site. Of course for the vast majority of quick response research the need to travel to the disaster site will remain. Still, as the nature of immediate post disaster assistance evolves, how quick response research is conducted will reflect such change.

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).

Qualitative interviewing is undertaken when pragmatically it is the only way to obtain the data being sought (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 11, 2001, 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 are engaged in different aspects of information technology. Some firms provide communication services, such as web hosting, web design, voice mail, e-mail, and long distance voice, data and video. Others manage specialized information or provide infrastructure, technology, and software for telecommunications companies.

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. Nine interviewees talked about the immediate post event contributions of their firms. One individual spoke about the Wireless Emergency Response Team (WERT) he helped to create the evening of September 11, 2001. Major communication service providers and suppliers of wireless handsets and equipment participated in WERT, a coordinated effort to identify the sources of distress messages sent via electronic devices, such as cell phones and two-way pagers (Federal Emergency Management Agency 2001).

FINDINGS

The results of the interviews presented in this report 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.

1. 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 for free to those directly impacted by the events of September 11, 2001. These included normally fee-based services, such as web and telephone hosting, and pay phone access. Assisting firms undertook activities that normally clients provide and stepped up client support.

The flexibility of communication systems and the ability to scale up meant that firms providing communication services had 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 requested to do and what they volunteered in light of what needs they saw. 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 World Trade Center. 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 was 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.

Financial assistance for humanitarian relief efforts included corporate donations and facilitating employee donations. The latter included, at least for one firm, corporations matching 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 dedicating 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 work.

Employees expressed enormous pride in their companies' response. Unprompted, three respondents said they were proud to be part of their firms, given how their firms had responded to the events of September 11, 2001. 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 11, 2001.

Contributing to traditional emergency responders. The Red Cross was a focal point for firms offering assistance. The majority of respondents did contact the Red Cross either because the Red Cross was a client—there was an established, corporate connection to provide assistance— or, as individuals, they knew about 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 non-profit organizations were unable to act as brokers for businesses offering assistance. The respondent thought there was a potential role for a non-profit 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 figure out 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 they have adequate resources. Service subscribers are taken care of first. The reason people pay is to guarantee availability of resources. Others are helped within reason.

Firms continued to provide the same services after the disaster that they had provided to clients before September 11, 2001. Firms delivered on post disaster services contracted prior to 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 temporarily one or more of their services for free, 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 primary vehicles through which firms provided post disaster assistance. One interviewee described how there was a national gathering of one of the firm's main associations in Washington, D.C. on September 11, 2001. The association coordinated getting people back home from Washington D.C. While his firm offered assistance to the association in doing so, its participation 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.

2. How Firms Decided What to Do

Interviewees described how they wanted to do something to assist in recovery efforts from the events of September 11, 2001. Watching events on television was a powerful prompt to action. On September 11, 2001, 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 prior to September 11, 2001, 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 for 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 11 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, and that the firm had to get something out there or time will pass.

In contrast to developing a new initiative, one interviewee described how providing technical assistance was straight forward—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 events of September 11, 2001 was shaped by their previous exposure and participation in responding to disasters.

Two respondents with experience of disasters worldwide put what happened September 11, 2001, in a broader context. They talked about disasters that had claimed more lives than the September 11, 2001, terrorist attacks and described situations where people had fewer pre- and post-event resources than those directly impacted by the September 11, 2001, terrorist attacks. 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 the international donors 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 U.S. was loss of access by air, not only to the impact site but also to places not directly impacted. 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 if their firm was struck by a disaster. A number emphasized 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. Firms with well developed disaster response plans noted that all actions taken did not stem from the plans.

Disaster assistance plan in place

While 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 11, 2001, was developed after the synchronized explosions. For example, prior to 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 11, 2001.

How decided 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 what services they had to offer through the media 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 to whom they had provided business assistance. Firms that offered one or more of their usual services for free to those directly impacted by events of September 11, 2001, 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, security related, or because firms had not tracked to whom assistance had been provided.

Firms used different screens in deciding to which charitable organizations to give 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 who 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 effected 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 of September 11, 2001.

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, while a third explained it depended on individual

situations. The offer for the third firm was to stop at the end of September then was extended through 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 cannot 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 relief assistance might well go on for a year or two with a reduced intensity after the initial, massive first response.

3. 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 11, 2001, firms used their pre-existing connections, the contact network of employees, and media releases to make people aware of what they were offering.

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 non-profit. 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.

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 advertisement in a daily, electronic news journal geared to the information technology industry. WERT used media coverage to explain where people who could provide phone or page numbers of individuals missing in the World Trade Center should call.

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 prior to September 11, 2001. 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



Extraordinary activities

Ordinary activities refers 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. Extraordinary activities refer to those actions that are not routine to a firm, such as making available travel arrangements for government officials. At the

ordinary activities end of the continuum are those actions that firms undertake regularly, closer to the middle may be activities the firm does on a less routine basis. At the extraordinary activities end of the continuum are actions that are novel and exceptional. Towards the center are activities that are logistically an extension 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 snap shot 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, and existing and prospective clients may purchase new services. On September 19, one firm launched a new service that in light of events of September 11, 2001, 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 only become widely used 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 email 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 11, 2001, it will be easier to promote the development and application of these technologies for disaster relief than it was before. Prior to September 11, 2001, 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, 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. Second, 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.

FUTURE RESEARCH

This exploratory research suggests the value of investigating systematically how and why the private sector participates in providing assistance after a disaster. A more comprehensive investigation of assistance from the information technology sector after September 11, 2001, is both feasible and worthwhile. 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 non-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.

It is important to learn more how the source sector of assistance shapes the nature of the assistance provided, how it is provided, and the spin offs garnered from providing assistance. How applicable to the private sector are the models of disaster assistance developed from examining governmental and non-profit operations? Preliminary evidence suggests that this question would be worth pursuing. McEntire (1998) developed a model of coordination among non-profit groups. He noted that pre-disaster links among non-governmental humanitarian groups increases coordination during disaster relief operations. Pre September 11, 2001, linkages among businesses made the quick formation and activation of WERT possible.

CONCLUSION

In providing assistance in the immediate aftermath of the September 11, 2001, terrorist explosions, 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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