The Use of Information Technology by Government in Combatting Disasters: Lessons from Katrina

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ABSTRACT

In August, 2005, Hurricane Katrina caused a massive loss of life and destruction of property on the Gulf Coast of the United States. This paper examines the role Information Technology can play in predicting disasters, and in mitigating the impacts of those that do occur. The analysis indicates that available IT resources were not used to their fullest potential in the case of Hurricane Katrina.

Keywords: Crisis Management, Information Technology, Post 9/11.

INTRODUCTION: USING TECHNOLOGY TO COMBAT DISASTERS

The Post 9/11 environment has been characterized by an increased emphasis on disaster planning on the part of national and local governments. Government funding for new technologies aimed at combating terrorist attacks has resulted in a wide range of new initiatives. Additionally, there has been an increased public awareness of the potential for disasters, not only from terrorist attacks, but from accidental failures such as blackouts, and natural disasters such as hurricanes. This paper will argue that many of the evolving technologies for countering terrorism can also be used to help inform and protect citizens from large scale accidents and natural disasters as well. Information technology can provide governments with a means of: 1) educating their citizens about the likelihood of the occurrence of a potential disaster, 2) disseminating up to the minute information about any disasters that are immediately threatening, 3) mitigating the impact of disasters through evacuation planning, health care availability, and emergency food and water supplies and 4) recovering from and rebuilding after the disaster has happened.

In August 2005, Hurricane Katrina hit the Gulf Coast of the United States, causing over 1500 lives to be lost and irreparable damage to many homes, businesses, and unique historical landmarks. This paper will provide an analysis of this devastating event and analyze how information technology could have been used to mitigate the impact of this disaster, and to prevent future hurricanes from having as severe an impact. A disturbing revelation in the aftermath of Katrina was that many of the IT based strategies that were available were not used, or were used and the results not acted upon. Local, state and federal government did not respond as citizens of a highly technologically advanced society would have expected them to.

The results of the analysis will indicate IT based strategies for predicting future natural disasters, informing the public about their likelihood and the most appropriate response, mitigating their impact, and helping urban environments recover and rebuild.

LEARNING FROM HURRICANE PAM

Unlike terrorist attacks, which rely on surprise, hurricanes and most natural disasters can be predicted before they occur and tracked with enough lead time to allow evacuation. In the case of terrorist plots, information gathering on suspects must be balanced against civil rights violations. Natural disasters do not need their privacy protected. Therefore, IT based information gathering can be used to the fullest extent possible. IT based radar systems can illuminate developing storms, and IT based simulation models can give managers and government leaders experience with "virtual disasters" that can help them prepare for real ones. Evacuation routines can be designed to ensure that everyone has the time and means to reach safety. Supply chain management systems can be tailored to help relief agencies provide emergency assistance. Supply chain alliances with private sector organizations and individuals to provide emergency relief can be established before emergencies occur.

In the case of New Orleans, simulation models had already predicted that the levees protecting the city would not withstand a Class 3 hurricane and weather experts had predicted that a hurricane of such force was well within the realm of possibility. National Geographic magazine in October, 2004 published an article called, "Gone with the Water," which included the following warning (Bourne, 2004, p. 100):

...The doomsday scenario is not far-fetched. The Federal Emergency Management Agency lists a hurricane strike on New Orleans as one of the most dire threats to the nation, up there with a large earthquake in California or a terrorist attack in New York City. Even the Red Cross no longer opens hurricane shelters in the city, claiming the risk to its workers is too great.

Also in 2004, a computer simulation of a hurricane, called Hurricane Pam, was developed as an exercise for dealing with a major hurricane in New Orleans. The result was widespread devastation (Brinkley, 2005, p. 18):

270 officials from all levels of government did participate in a FEMA-funded week long simulation of a Category 3 Hurricane striking New Orleans, a fake but very realistic storm called Hurricane Pam based on extensive models developed at Louisiana State University. The primary assumption of the Hurricane Pam exercise was that "Greater New Orleans is inundated with ten feet of water within the levee systems as a result of a Category 3 or greater hurricane." The attendees learned that it would not be just water, in fact, but a "HAZMAT gumbo." They heard that the total number of people left stranded in the toxic water "may approach 500,000" if residents didn't evacuate. And they were further informed that a monstrous storm such as Pam would leave 30 million cubic yards of debris—not counting human remains—spread out over 13 parishes in Southern Louisiana.

Local government leaders and relief agencies were told to prepare accordingly, but the recommendations resulting from the model were not implemented. "Having lived through Pam for a week, the 270 officials just went home (Brinkley, 2005, p. 19).

For three days prior to Katrina reaching New Orleans, radar models showed the storm approaching and measured its strength. "Surge warriors," such as Ivor van Heerden, had developed sophisticated ADCIRC (advanced circulation) computer models to predict the impact of hurricanes in the gulf. Thirty hours before landfall, experts predicted that there was a strong likelihood of a major disaster, yet a mandatory evacuation was not called for. When major flooding was indicated, van Heerden "forwarded the results to every official at every level of government I could think of " saying a worst case scenario had developed and that mandatory evacuation was necessary (van Heerden, 2006, 41). Only a voluntary evacuation was called for. By the time the evacuation was mandated a day later, there was not enough time to have it implemented.

PREPARE RELIEF EFFORTS BEFORE THE DISASTER OCCURS

On the positive side, private sector organizations, such as Wal-Mart, predicted the seriousness of the storm and began planning the delivery of emergency supplies to areas they feared would suffer the greatest damage. After the initial hit of Katrina, Wal-Mart provided the greatest share of water, food and equipment to stricken areas (Brinkley, 2006, p. 251).

Wal-Mart, the world's largest retailer and America's biggest private employer, stepped up to the plate by offering vast warehouses full of essential supplies to those stricken by the Great Deluge. Under the lighting quick leadership of CEO Lee Scott, Wal-Mart used its muscle to meet the needs of the victims in the three ravaged Gulf States, donating emergency supplies ranging from Strawberry Pop Tarts to Hanes underwear…"Wal-Mart was our FEMA," said Warren Riley of the New Orleans Police department.

Partnerships between local governments and private sector organizations that specialize in supplying customers with the necessities, should be forged before emergencies occur. Supply chain management software, widely used by these large chains, could be modified to help streamline relief efforts should an emergency occur. Volunteering to assist in local emergencies should win large chain stores a great deal of good public relations in their surrounding communities.

Likewise, a number of heroic individuals emerged from Katrina. Individuals within New Orleans with private boats rescued their neighbors. "Far flung American communities galloped to do all they could (Brinkley, 2006, p. 250)", but FEMA denied permission to enter until a chain of command could be established. A database of certified volunteer first responders should be developed so that these individuals can be contacted, transported to disaster areas, and deployed effectively. Good Samaritan legislation needs to be developed to protect volunteers from lawsuits, should their best attempts have negative consequences.

Additionally, private sector initiatives from Amtrak, Marriott, Continental Airlines, and a number of faith based groups were also refused or delayed. Offers of medical support from Cuba, airdropped military rations from Germany, and cash and oil supplies from Kuwait were also refused. Even FEMA subcontractors were put on hold (Brinkley, 2006, p. 250).

Cool Express, an ice company in Blue River, Wisconsin had a standing contract for ice deliveries in disaster situations. Yet the company didn't receive permission to send trucks to the region until 4 p.m. on Monday. By that time, the ice wouldn't even reach the staging area in Dallas until late Tuesday. After that, it would be another eight-hour drive to southern Louisiana.

Disaster recovery alliances with the private sector other countries need to be developed and designed before hand. Simulation modeling of future disasters should include members of these alternative sources of relief.

BECOME FAMILIAR WITH THE LOCAL ENVIRONMENT AND LOCAL CUSTOMS

Rescue efforts in New Orleans were also hindered because rescuers were not familiar with local street names or the location of key relief centers (Brinkley, 2006, p. 258).

The problem the U.S. Coastguard had with FEMA was that FEMA didn't know the local geography or place names or wards of New Orleans. They couldn't pronounce Tchoupitoulas (choppa-too-liss) Street, let alone spell it. They couldn't cross over the Crescent City Connection bridge because they thought it was a shuttle service to Houston.

GPS systems should be developed and used before a disaster to help relief workers navigate an area and reach important destinations effectively. Alternative routes can also be developed if part of an area is under water, or otherwise inaccessible. Simulation models need to be tailored to the social and cultural environment of the disaster.

An enhanced knowledge of local customs and language would also aid rescue workers. An economically and culturally diverse urban area, such as New Orleans or New York consists of a number of different subcultures. Differences in language and attitudes toward authority figures such as police and government officials made rescue efforts in New Orleans more difficult. Government officials need to be aware of the various languages spoken in an urban area so that warnings can be issued in appropriate languages. Internet access must be available to all citizens so that emerging threats can be delivered on a timely basis. Rescuers need to be aware of social customs regarding approaching strangers in a non-threatening manner. Language translation software and simulation modeling of social interactions developed for soldiers in Iraq, needs to be tailored for first responders confronting diverse social groups in their own country.

DIRECTIONS FOR FUTURE RESEARCH

This analysis will be extended and enhanced by including a wider range of sources about the disaster, and more concrete descriptions of IT based tools that can be used to predict, prevent and prevail over future disasters. Post Katrina initiatives will also be examined and evaluated.

REFERENCES

References upon request.

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