

The World Trade Center (WTC) crisis offers important lessons for public officials, civic-minded individuals, and organizational leaders. Throughout the WTC response and recovery, surprising problems and little known capabilities combined to present organizations with both unfamiliar challenges and opportunities for ingenious solutions. This study looked at the World Trade Center response and recovery process through the lenses of information, technology, and the people and organizations who used them to address a massive urban emergency. Twenty-nine in-depth interviews gathered first-person accounts of activities, decisions, problems, and solutions. Those interviewed represented city, state, and federal government agencies, private businesses, and nonprofit service organizations. The main lessons that emerged pertain to the ways in which information needs, resources, technology, and policies interacted with planning, preparedness, coordination, and collaboration among the involved organizations. These lessons apply not only to emergency planning and management agencies. They also suggest ways to achieve better performing governments and stronger communities in normal times. Drawing on the interviews and the public record, this report addresses seven topics.

- Information needs associated with the event and the response and recovery efforts
- The availability, quality, use, and management of information resources
- The nature, strengths, and weaknesses of information technology
- The role and effectiveness of existing plans, programs, and relationships
- Information policy issues
- Methods and effectiveness of communicating with the public
- Recommendations and prospects for long-term improvements in government and community resilience and performance

## Information needs

Information was crucial to every aspect of the World Trade Center crisis. Its existence, availability, quality, and distribution clearly affected, sometimes dramatically, the effectiveness and timeliness of the response and recovery efforts. Different kinds of information were pertinent to different elements of activity and different audiences and users. The main categories of information needs can be classified as preparedness, immediate response, recovery and restoration of services, and advising the public.

## Information resources

Information to support the response was a critical concern. Nearly all of the involved organizations willingly contributed their information and technical and analytical expertise to the response effort. Of the many kinds of data put to use, geographic data and information systems (GIS) emerged as the most versatile analytical resource associated with the response. For all users, information needed to be relevant, sufficient, accurate, timely, and accessible. Information also needed to be usable and constantly updated for first responders who were in extremely hazardous conditions. None of the information resources used in the response and recovery had all of these qualities, and many compensating compromises were made to get information into the hands of those who needed it in a form that would help and not hinder their activities or safety. Available information was often out of date, at an inadequate level of detail, or incomplete. In some cases, needed information existed but was not accessible or in a usable form. In other cases the amount of information was simply inadequate. Very little meta data was available to help analysts and users understand the appropriateness and reliability of data for various uses. Data coordination and integration problems surfaced quickly after the attack, persisted throughout the response, and continue into the present.

## Technology resources

Technology failures, technical experiments and innovations, and technical expertise and ingenuity all played noteworthy roles in the response. The most obvious failure was the unexpected concentration of telecommunications services in the extensively damaged Verizon infrastructure. This caused massive outages throughout the City and surrounding region. In addition, information processing systems in the World Trade Center and vicinity were completely lost or unavailable for long periods of time. Despite the failures, technology was essential to the response efforts. From the beginning, the Internet worked when other networks failed, providing telephone and text messaging service to key City officials, supporting emergency management applications, and keeping citizens informed of progress. Wireless computing and communication capabilities, remote sensing, and mobile technologies played critical specialized roles. In addition, flexible and adaptive use of

existing or emerging applications designed for other purposes allowed quick response to unexpected situations. In terms of technology expertise, IT professionals were widely available and readily deployable. Both government and businesses were quickly able to supply this expertise along with equipment and software, systems design and programming, project management, loaned facilities, and temporary office space.

### Plans, programs, and relationships

The emergency called into action a wide variety of existing plans, programs, procedures, and relationships. In some cases, these served the effort quite well. In others, they revealed historical problems that had never been resolved, or showed how some long-established ways of working need to be revised to enhance performance. There was strong agreement that emergency planning provided participants with the opportunity to detect likely threats, think through their capabilities, identify key resources, explore contingencies, and develop action scenarios. There was equally strong agreement that practice is what made the difference in their ability to act. The event also pointed out executive succession as a critical gap in most emergency plans.

Some of the most successful activities rested on years of relationship and trust building among key individuals. Familiarity and trust in the competence of people who had worked together for many years helped the work move smoothly and quickly in the absence of complete information or formal procedures. For the most part, organizations played their expected roles according to their formal missions. Their organizational structures and processes formed a backdrop of stability and predictability throughout the response and recovery period. Nevertheless, the famous "stovepipe" programs and funding streams of government were very much in evidence. Many of the success stories had to do with efforts to overcome or work around them, at least temporarily.

### Information policy issues

Policies about information sharing, security, and records management influenced the ability of organizations to use information in both routine operations and emergency response. Confidential treatment of personal information was a major issue for both public and nonprofit agencies engaged in serving the families of victims. Information security was sharply highlighted as public officials recognized that the wealth of information on government Web sites could create new threats. New rules and even new agencies were created to deal specifically with these problems. At the same time, across the whole spectrum of organizations, new information sharing and integration goals have emerged. This dual focus on more security and more sharing poses complex information policy problems that are only beginning to be addressed.

### Public communication

A primary concern for public managers in emergencies is to communicate important information to citizens, particularly if that information is intended to influence public behavior. Television, print, and electronic methods were all used extensively, with special efforts to synchronize information through a variety of outlets regarding the status of the quarantined area. The Web was used in a variety of ways with different degrees of success. NYC.gov, the City's Web site, posted regularly updated maps and citizen-oriented status information about the recovery. However, information regarding health and environmental risks was inadequate and caused considerable negative public reaction. Other sites offered information of varying format, content, and utility for public consumption, but no one site could be considered comprehensive or authoritative. Call centers were used by several organizations to help meet the public need for information. Through them, callers could volunteer or donate to the recovery, ask questions, receive referrals to service programs, and obtain general information without going physically to a remote or congested site.

### Prospects and recommendations for the future

Seven areas for future action emerged from this study that can enhance the prospects for long-term learning and improvement in the structures and functions of government, businesses, and civic organizations.

**Build enterprise thinking and action into mainstream programs and systems.** Perhaps no theme is potentially more valuable than the concept of "enterprise," the idea that organizations, levels of government, and economic sectors are deeply interdependent. Many recommendations in this vein had to do with first understanding, and then coordinating and integrating, information and processes across organizational and programmatic boundaries. However, interviewees often cited barriers such as: the lack of a shared vision of how

integrated work flow and information can support public functions; inadequate funding; disincentives to collaborate; and distrust of the motives and abilities of other organizations.

**Invest in information quality and usability.** During the WTC crisis, data issues (such as quality, access, use, sharing, and security) far outweighed technology problems and they were (and remain) harder to solve. Data about all physical and social aspects of society are collected and used by a myriad of public and private organizations. But most of this information is captive within individual programs and held closely within organizational boundaries. It is collected and organized in program-specific ways using different (sometimes idiosyncratic) definitions, formats, and rules. Overall, government needs a high-level overview and understanding of the information needs of various domains. But it lacks even a rudimentary inventory of data resources that would at least reveal overlaps and gaps in needed knowledge.

**Educate policy makers about the limitations and benefits of IT.** According to several interviewees, some policy makers lacked a sophisticated understanding of both the capabilities and limitations of IT. These leaders were therefore surprised by stark lessons about incompatible systems and lack of data and system redundancy. Conversely, the WTC crisis prompted for some a new-found understanding of the benefits that can be derived from more powerful and flexible technologies such as GIS, mobile computing, and wireless communications. Nevertheless, most interviewees cited a continuing failure to carefully assess the risks and benefits of IT and they noted that little change has occurred so far in the broad strategic use of information and technology.

**Plan comprehensively for business continuity.** The results of September 11th have shown organizations of all kinds that contingency planning is not only important, it must involve top leaders and encompass the entire organization. Recommendations include investment in the resiliency and redundancy of key enterprise systems, more detailed information about the resources and capabilities of suppliers and partners, attention to the quality and responsiveness of routine administrative functions, and up-to-date information about the availability, whereabouts, knowledge, and experience of employees.

**Emphasize workforce planning.** Given the essential role of experienced staff in the crisis, the quality and stability of the future public workforce is an important concern. Burgeoning trends toward outsourcing and the wave of retirements now beginning as the Baby Boom generation starts to leave the workforce emphasize the challenges of retaining veteran staff and attracting younger people into public service.

**Make selective investments in quick community mobilization.** Many recommendations were made for "templates" that could be re-used in future emergencies, no matter the cause or location. These recommendations included documentation of what was done in New York in the form of detailed checklists, modular system components, and inventories of public spaces and their latent emergency support capabilities.

**Understand community capacities and limitations.** New York City is blessed with enormous public and private resources that could be brought to bear on the WTC crisis. By contrast, most local governments remain "have-nots" in terms of resources, technology, preparedness, and response and recovery capability. Small businesses and most nonprofit organizations have similar characteristics. The disparate capabilities of larger and smaller organizations and jurisdictions raise public policy concerns about strategies and mechanisms to cushion smaller organizations from the worst effects of extreme crisis.