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DEVELOPING A MANAGEMENT FRAMEWORK FOR COMMUNITY RECOVERY FOLLOWING EXTREME EVENTS

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ABSTRACT

This research reports on efforts to develop a management framework to enhance the ability of local governments, in particular, to more holistically manage recovery following extreme events. The framework considers the evolving theory on disaster recovery, including disaster recovery management and planning, as well as models and methods for measuring recovery outcomes. A series of recovery restoration and resilience indicators were developed based upon an extensive review of the disaster recovery research literature and studies. Decentralized management models – such as the Incident Command System (ICS) management model (a national standard for emergency response) – are recommended to be used in recovery, as a way of providing organizational principles for recovery management of all levels of government and providing flexible and forward-thinking management approaches. Within this management structure, seven strategic management practices are also proposed to enhance the effectiveness of local governments in recovery after major disasters.

Introduction

While leadership and management of response-related activities are fairly well defined in the U.S., Canada, Japan, and many other countries, government's role in disaster recovery is less clear. There is not, as of yet, a profession of disaster recovery managers in the U.S. or elsewhere. Instead, the management of recovery tasks typically comes from several different parts of government. For many involved, it is an extension of the chaos of disaster response.

"Disaster recovery" is a complex process that encompasses both short-term and long-term activities and involves all elements of modern urban settings (i.e. physical, social, economic and institutional). The process works to achieve a stable state across all these elements, and is never a return to the status quo ex ante – or the conditions as they were before the event – especially in the context of modern urban settings that are constantly changing with or without disasters (Daniels, Kettl, and Kunreuther 2006; Olshansky, Johnson, and Topping 2006; Alesch 2005). Catastrophes, in particular, tend to offer significant opportunities for large-scale redevelopment and for mitigation – thereby helping to break the cycle (William Spangle and Associates 1991; Arnold 1993; Berke, Kartez, and Wenger 1993; Eadie and Johnson 1997; Schwab 1998; Mileti 1999; Smith and Wenger 2007). Also, recovery does not have a clear end point. At some point, the majority of urban activity is less likely associated with the disaster and more likely to be part of the more routine urban activities.

Recovery and its management processes occur in an extreme environment where time is compressed due to the pressures to restore normalcy (Johnson 2009; Olshansky and Chang 2009). The urban setting which might have taken decades or more to construct, must, post-

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disaster, be repaired or rebuilt in a much shorter time; and decisionmaking must go faster than information, knowledge, and planning generally flows. Yet, rebuilding needs time to be accomplished thoughtfully and to allow for proper deliberation and public discourse on how to achieve risk reduction and betterments, such as improved efficiency, equity or amenity as part of the process. Citizen participation is essential, to determine vision, provide communication, and ensure community support (Olshansky, Johnson, and Topping 2006).

Disaster recovery also requires some portion of the total funds spent over decades or longer to construct urban environments. However, post-disaster, the amount and flow of money needs to match the compressed pace of recovery. Knowing how much money is needed and where it is needed are major challenges in a post-disaster environment; but, getting it from the source to the "need" also has many challenges (i.e. distribution, accountability, capacity). Setting priorities for use of limited funds is also a major recovery challenge, and the process is not usually a rational one.

Constructing Theories on Disaster Recovery and Disaster Recovery Management

October 2009 marked the 20th anniversary of the M6.9 Loma Prieta earthquake that struck Northern California in 1989, taking 63 lives and causing up to $10 billion in property losses (USGS 2009). Heavy damage in Santa Cruz County and the cities of Santa Cruz and Watsonville, as well as neighborhoods and major transportation projects in San Francisco and Oakland, required redevelopment plans and sustained financial and public intervention for many years for a return to normalcy to be fully realized. But, at the time, disaster recovery was a poorly understood and one of the least researched areas of disaster management. There had been little study of the long-term management of recovery activities following disasters, and even fewer that involved modern, urban settings. There was also only a limited amount of learning from really large, urban disasters, and many of the studies were inconsistent in their temporal coverage or limited in their technical focus.

Over the past 20 years, researchers have developed a more multi-disciplinary understanding of the disaster recovery process; yet, disaster recovery is still a relatively new field of research and there are still many challenges in constructing theories of recovery and recovery management, as well as models and measures of the process and outcomes. Research following the 1994 Northridge and 1995 Kobe earthquakes has been critical to advancing the field. Still, none of the major earthquake megacity scenarios that we have been planning for have yet happened, such as Beijing, Cairo, Kathmandu, Los Angeles, Mexico City, San Francisco/Oakland, Taipei, Tehran, and Tokyo.

In January 2005, the 1st International Conference on Urban Disaster Reduction, held in Kobe, Japan, designated an entire conference track to the development of a "Theory of Disaster Recovery." The session participants concurred that, as of yet, there is no theory or even consensus definitions about what "recovery" means, how it should be modeled or measured, or what constitutes "successful" or "effective" recovery (Olshansky and Murao 2005). As one participant put it (Alesch 2005): "Few things are as practical as good theory; few activities are as risky as implementing policies or taking irrevocable actions on the basis of faulty or nonexistent theory."

One of the difficulties in producing a comprehensive theory of disaster recovery is that "it must integrate current findings with theoretical concepts" that bridge across levels of social units (e.g. households, neighborhoods, community, region, and society) (Smith and Wenger 2007). While there have been a few quantitative attempts at modeling the recovery process and measuring its outcomes, the vast majority of recovery-related research has been mostly qualitative in nature; and qualitative recovery research is subject to both factual and perceptual errors or variations (Rubin 1985; Alesch and Holly 2007). Comparable disaster situations are infrequent happenings; post-disaster decisions and actions are occurring in many instances under duress; documentation is sometimes limited; and, with the passage of time, perceptions and recollections change. There are still formidable challenges that theoretical development efforts have to overcome.

Johnson (2009) proposes a decision-based theory of recovery and recovery management. The "disaster recovery process happens with the many decisions made, and resulting actions taken, by individuals, businesses and institutions, both directly and indirectly impacted, as they determine whether to do nothing, essentially restore what was lost, or try to improve beyond what existed before the disaster" (Johnson 2009). "Disaster recovery management is also a decision process that involves planning, organizing, leading and controlling a comprehensive recovery vision, and influencing the many simultaneous decision-actions required to achieve it as effectively and efficiently as possible" (Johnson 2009). Key influences are vision – often in the form of leadership and plans – and resources, most importantly money (Rubin 1985; Johnson 2009). But, without a comprehensive understanding of the needs or a recovery vision, bureaucratic management approaches tend to be reactive, inflexible, and inefficient.

Developing a Model for Local Recovery Management

Along with better theory, researchers also acknowledge the need for better models and measures of disaster recovery and recovery management processes, as well as consistent methods to track and record recovery and develop recovery archives over time (Olshansky and Murao 2005; Smith and Wenger 2007; Olshansky and Chang 2009). With infrequent disaster events, there has been an inherent lack of systematic study to develop quantitative data as well as qualitative indicators of recovery, such as plans, processes, key actors and institutions (Miles and Chang 2006). Researchers are challenged to "overcome the tendency to build up knowledge one disaster at a time and focus more on what disasters… of all types have in common with respect to origins, dynamics, and outcomes" (Tierney 2007, 520).

Community Recovery was the first U.S. study that carefully examined governmental organization and recovery processes at a community-level (Rubin 1985). This study looked at 14 disasters throughout the U.S caused by an array of agents. Along with many other studies around this time, they also attempted to model the recovery process, but were unable to determine how to measure "effective recovery" and outcomes (Rubin 1985, 12-13). Instead, they proposed a series of characteristics and actions found in the recovery processes, organized around 3 elements – personal leadership, ability to act, and knowledge of what to do; furthermore, they found that leadership is the most critical of these elements (Rubin 1985, 37).

While Haas, Spangle and others have agreed that recovery and reconstruction can take up to 10 years to complete, we still lack an understanding of how to define and describe recovery across multiple sectors, the endpoint of recovery, what has been achieved with recovery. As Comerio succinctly summarized, the degree of success in recovery will depend upon the measures made at (Comerio 2005):

- At the different scales (e.g. individual, household, neighborhood, community, city or region)
- Over what length of time (e.g. days, months, years, or decades)
- From the perspective of the evaluator (e.g. individual recipient of assistance, local community, funding provider, independent evaluator).

Even the field of disaster recovery research still lacks a robust set of qualitative descriptors, and even much less quantitative measures of recovery progress and outcomes. Some researchers have proposed some guiding principles to manage complexities of recovery and help reduce disaster-related costs and repetitive losses. Some of the most widely cited are (Sternberg and Tierney 1998; Bruneau et al. 2003; Natural Hazards Center 2005; Vale and Campanella 2005; Daniels, Kettl, and Kunreuther 2006; Olshansky, Johnson, and Topping 2006; Alesch and Holly 2007; Smith and Wenger 2007):

- *Vision:* "Common goals about reconstruction" reached quickly.
- *Robustness:* "Ability to learn quickly, keep options open, and respond flexibly."
- *Sustainability*: "Desirable state or set of conditions that persists over time." Concept increasingly part of U.S. urban planning policy.
- *Resilience*: "Decentralized and adaptive capacity" to effectively "contain the effects of disasters when they occur" and manage the recovery process, as well as an "ability to minimize social disruption and mitigate the effects of future disasters."

By distilling the disaster recovery research literature and studies, Johnson (2009) derived a set of 38 qualitative descriptors of physical, social, economic, and institutional outcomes that can be used to assess the outcomes of recovery from multiple perspectives; see Table 1. All items suggested by the literature were included; with a total of only 38 it shows that there is remarkable consistency as to what the performance measures should be. A portion are defined as "restoration" indicators since they are more related to direct products or outcomes of the process of recovery (i.e. numbers of houses repaired or rebuilt). Also, indicators of "resilience" are also defined to describe how future disruption has been minimized, flexibility and adaptability have been added, and other improvements have been made as part of the recovery process (Bruneau et al. 2003; Vale and Campanella 2005; Smith and Wenger 2007). Johnson (2009) proposes that these indicators can be used to develop a more holistic recovery policy and also track and measure its post-disaster effectiveness.

In normal conditions, the practice and theory of government management revolves around leadership (R. Cox in Newell 2004, 1). Many government managers use total quality management (TQM) approaches to lead the organization, and create a work environment focused on results and the continuous evaluation of product and service quality and delivery (Newell 2004, 161). But, when disasters strike, government managers must balance the extreme environment created by disasters with business as usual. Also, as first noted by Rubin, the ability of recovery managers to make the tradeoff between *speed* and *quality* – both strategically and

purposefully – is rare (Rubin 1985, 42).

Table 1. Compilation of Restoration and Resilience Indicators Derived from Disaster Recovery Research Literature and Studies (Source: Johnson 2009).

	Propose Recovery Indicators	
Elements	**Restoration**	**Resilience**
Physical	Rebuilt damaged residential units Rebuilt damaged commercial/industrial properties Utilities restored and rebuilt infrastructure Rebuilt public facilities Visual evidence of disaster gone	Mitigation improvements to residential units Mitigation improvements to commercial/industrial units Mitigation improvements to public facilities and infrastructure Environmental recovery/improvements
Social	Population and resident retention/growth Schools resumed and educational opportunities Satisfaction of basic human needs and daily life Mental and physical health maintained/ restored	Affordable and ample residential housing supply Neighborhood condition improvements Social and geographic equity Social networks resilience and self-reliance
Economic	Jobs resumed and retention Business resumption and retention Cultural/historical/recreation/tourist amenities restored	Affordable and ample supply of commercial/ industry space Economic diversity and business/market/job growth Wealth recovery/sustainability/improvement
Institutional	Timely recovery action and reconstruction completion Leadership, innovation, creativity and vision Use high-quality information with agreed meanings in decisionmaking Robust stakeholder representation and decision agreement Ample resources and able to leverage them to meet needs Intergovernmental collaboration and institutional equity	Institutionalized routines, redundancy, sustainable capacity Institutionalized, strengthened and sustainable planning Fiscal recovery/sustainability/improvement Political recovery/sustainability/improvement Resident and business satisfaction with institutions/outcomes Positive external reputation/perception Post-disaster risk management/preparedness commitment

To deal with the complexities and the unexpected nature of response and recovery, Rubin (1985) and many subsequent scholars have proposed a host of organizational management approaches and strategies that include: redevelopment, leadership models, collaborative and incident command styles of management, organizational adaptation, innovation, capacity building techniques, and sequential, spatial and systems management (Rubin 1985; Innes and Booher 2002; Spangle Associates 2002; Steele and Verma 2006; Kendra and Wachtendorf 2007; Murosaki 2007). But, local managers who have had responsibility for post-disaster recovery caution that there may not be one systematic or rational approach to recovery management (Johnson 1999). As Olshansky and Chang (2009) ask: On what basis do we know which (recovery management approaches and strategies) to emphasize and in which situations?

Arguably, the broad goal of disaster recovery is to "facilitate the recovery of affected individuals, communities and infrastructure as quickly and practicably as possible" (Emergency Management Australia 1996). Most local government managers break this goal into two parts:

"recovery of the municipal enterprise and helping the community systems to recover" (Alesch and Holly 2007, 99). But, in practice, recovery management tools and training tend to emphasize the delivery and management of federal and state assistance programs from a top-down perspective, rather than a more bottom-up view of communities as a key "client." There is a post-disaster mismatch of work requirements and expertise. Federal agencies have expertise in the Stafford post-disaster assistance programs but not in local risk management and long-term recovery tools, such as land use, zoning, redevelopment, housing and business reconstruction financing, capital improvements, and building code enforcement. Likewise, local government generally lack disaster experience and can become overwhelmed with the responsibilities of managing post-disaster recovery in conjunction with non-disaster operations.

Of the 3 primary levels of governance in the U.S. – local, state, and national, individual local governments face the greatest public pressure to provide a quick return to normalcy, while also having potentially one of the most opportune times, post-disaster, to rebuild stronger, change land use patterns, reduce development in hazardous areas, and also reshape social, political and economic pre-existing conditions. The desire to return to normalcy also competes with the value choices to 'reduce future community vulnerability' or 'seize opportunities for community betterment,' such as improved efficiency, equity or amenity.

Johnson (2009) proposes that flexible and forward-thinking approaches – similar to decentralized models used in crisis management – can provide the capacity needed, particularly at the local level, needed to influence these "decision-actions" while also keeping pace with the compressed timeframes of recovery (Johnson 2009). Developed in the 1970s to coordinate wildfire resource mobilization in the U.S., the Incident Command System (ICS) management model – adopted by the U.S. national government as the National Incident Management System (NIMS) – is designed to help create a common operational picture across multiple organizations, standardizing organizational template and creating a "unified command" in crisis. It helps maximize organizational capacity and mutual aid with standardized functions, processes and protocols.

In the basic organizational structure under ICS, there are five main functional areas – command, operations, planning, logistics, and finance/administration. Command develops a "common operational picture," sets goals, objectives and priorities, and manages internal and external communications. The other 4 functions work in support of command. Operations implement the priority actions. Planning facilitates creation of "common operational picture" and action planning to set priorities, objectives, strategies, and tactics. Logistics provides resources (e.g. personnel, facilities, supplies), including mutual aid, to fulfill operations. Finance and administration track costs and manages reimbursements for operations.

While it is intended for all phases of incident management, NIMS is mostly used in emergency response. Johnson (2009) proposes that NIMS should be continued into recovery and that its management structure can provide important organizational guidance for recovery management of all levels of government. It would allow for decentralization while also providing accountability and improving multi-level coordination. As the transition to recovery continues, the organizations operating within the ICS/NIMS structure can be modified and staffed by those agencies and departments with key recovery responsibilities, such as city

planning, redevelopment, state recovery authorities, FEMA and HUD.

Johnson (2009) hypothesized that a management framework for local disaster recovery could be developed, helping to standardize, and improve the effectiveness of local governments in, urban disaster recovery management. Furthermore, it also proposed that seven strategic management practices – developed, in large part, from this author's combination of professional experience and research – could serve as the basis for such a potential management framework to enhance the effectiveness of local governments in recovery after major disasters. These seven practices are briefly described as follows (Johnson 2009):

- *Creating a recovery management organization,* based upon the Incident Command System (ICS) model.
- *Multi-tier governmental coordination* to help reduce common recovery obstacles associated with funding, reimbursements, application review and regulatory compliance, and also to bring the additional expertise from state and federal agencies to enhance local capacity and effectiveness in recovery.
- *Recovery communications and public participation* to reach residents, community interest groups, and governmental and non-governmental organizations throughout recovery.
- *Planning for post-disaster recovery management* to establish critical priorities and objectives, traceable milestones, essential leadership, and community commitment for recovery. Recovery plans should address both the desired physical outcomes of a city's recovery as well as the management structure, policies and procedures that a city wants to put in place.
- *Post-disaster damage and economic assessments* should work to quantify the damage (i.e. physical property losses), as well as the resources available for recovery, and the potential unmet needs.
- *Development of a citywide recovery financing plan,* considering sources of recovery funds and gaps in funding for the city's entire urban setting.
- *Outside technical assistance* (with disaster experience) to augment local staff, especially when staff are unfamiliar with disasters and disaster regulatory compliance.
- *Disaster management information systems*, particularly databases, interdepartmental networking, and geographic information systems (GIS) for local recovery planning and decision-making.

The validity of these seven practices was evaluated in a series of interviews with the managers of the cities of Watsonville and Oakland on the lessons of local recovery management ten years after the Loma Prieta Earthquake (Johnson 1999) and again in considering New Orleans recovery planning processes (Johnson 2007). The practices are consistent with the factors that (Haas, Kates, and Bowden 1977) recommended to increase the speed of reconstruction; specific recommendations made by Sternberg and Tierney (1998) to improve the recovery management process; the 10-step process for holistic disaster recovery proposed by the Natural Hazards Center (2005); the factors that facilitated post-earthquake recovery in Los Angeles and Kobe (Olshansky, Johnson, and Topping 2006); and, the mix of institutional strategies that Smith and Wenger (2007) suggest to promote sustainable community recovery.

Johnson (2009) proposes that combining the ICS/NIMS organizational management and these strategic management practices will provide the internal organizing structure necessary to more comprehensively understand damages and losses, as well as the needed resources and gaps, and to formulate the vision and strategies for dealing with these recovery issues.

Conclusions

This research reports on efforts to develop a management framework to enhance the ability of local governments to manage recovery following extreme events. The framework considers the evolving theory on disaster recovery, mostly from the U.S. and Japan, including disaster recovery management and planning, as well as models and methods for measuring recovery outcomes. A series of recovery restoration and resilience indicators were developed based upon an extensive review of the disaster recovery research literature and studies. These indicators can be used to develop a comprehensive vision of desired, post-disaster recovery outcomes and also to measure recovery management effectiveness. The research also proposes that flexible and forward-thinking approaches – similar to decentralized models used in crisis management – can provide the capacity needed, particularly at the local level, needed to influence the many "decision-actions" that characterize the disaster recovery process, while also keeping pace with the compressed timeframes of recovery. Decentralized management models – such as the Incident Command System (ICS) management model (a national standard for emergency response) – are recommended to used be used in recovery, as a way of providing organizational principles for recovery management of all levels of government. Within this management structure, seven strategic management practices are also proposed to enhance the effectiveness of local governments in recovery after major disasters. Development of this framework comes from the author's systematic examination of the post-disaster strategies and approaches taken by 3 local governments in the U.S. that have faced large-scale urban disasters (Los Angeles, California following the 1994 Northridge earthquake; Grand Forks, North Dakota following the 1997 Red River flood; and New Orleans, Louisiana following 2005 Hurricane Katrina) as well as the author's 20 years of observation and participation in the response and recovery of cities following major disasters, including cities in the San Francisco Bay Area following the 1989 Loma Prieta earthquake, and Kobe, Japan following the 1995 earthquake.

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