Management of Emergent Networks during Disasters: A Meta-synthesis

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Abstract: Meta-synthesis is an approach to reviewing qualitative research results. Many research results dealing with improvements to emergency management can be integrated into strategies for network management in emergencies. This meta-synthesis used a keyword search and survey of experts to identify representative studies of emergency response. It then used the reciprocal translation approach to synthesizing the studies. The synthesis is captured in a two-by-two matrix, one axis distinguishing between activity- and network-level interventions and the other between planning and improvisation strategies.

Keywords: meta-synthesis, emergency management, network management strategy, emergent networks

INTRODUCTION

Managing the organizational demands of networks during the early stages of a disaster is critical for a successful response. Quarantelli (2005) wrote, "In disasters, compared to everyday emergencies, organizations have to quickly relate to far more and unfamiliar converging entities." Scholars report that organizations in disasters are a mix of improvised and planned organizations; in most cases, these organizational mixtures can be construed as emergent (new) networks. Researchers and practitioners have been studying this organizational phenomenon in an effort to ensure rapid and effective responses. However, there is a lack of research synthesis regarding insights from various research projects since many of them are presented episodically and are

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not systematically formulated.

Current theory lacks clear answers regarding how public administrators can develop an efficient model for emergent network management. Milward and Provan (2006, 16) agree that only a few insights have been drawn from these unique network phenomena. They provide several insights: "1) expertise is critical, 2) relationships matter, 3) coordination is key, and 4) bold leadership is critical." Kapucu and Van Wart (2006) offer insights similar to those of Milward and Provan and argue that innovative problem solving, horizontal adaptation, collaboration, relationships based on trust, better public sector leadership, decentralized decision making, and intensive human interaction are critical for the success of disaster responses. Comfort and Haase (2006) also observe that effective communication is essential for successful multi-organizational coordination.

Researchers have rarely discussed the importance of inter-organizational coordination based on network theory (Moynihan, 2006). In their study of public-nonprofit partnerships in emergencies, Kapucu and Van Wart (2006) conclude that current theory cannot fully address the dynamic nature of networks in the complex environments of disasters. Only a few researchers have discussed the importance of emergent networks (Drabek, 1981, 1985; Milward & Provan, 2006).

This study aims to integrate insights from the emergency management literature using a network theory perspective. According to Kickert, Klijin, & Koppenjan (1997), network management should deal with the issues of how to initiate and facilitate interaction among actors and how to change and create network arrangements for better coordination (Kickert, et al., 1997). Applying this argument to the field of emergency management, we tried to interpret insights from emergency management studies into strategies for emergent network management.

The term *strategies* as used in this study includes a wide range of organizational phenomena such as leadership, structure, and communication. We think that insights from previous disaster responses can be synthesized as emergent network management strategies. In this regard, the first task of this study is to combine insights from a broad range of studies. The second task is to interpret them from the standpoint of network management. Grounded in the theoretical streams concerned with managing emergent networks, this study will argue that the network perspective should be regarded seriously in the study of emergencies.

THE LOGIC OF SYNTHESIS

Meta-synthesis

Within the field of natural science, accumulation and refinement of knowledge is well established and scientific progress demonstrates sequential and tidy progression. Research activities in social science, however, are disjointed. Gough and Elbourne (2002) argue that traditional literature reviews in social science are not using sufficiently rigorous methodology and, thus, different reviews end up with different conclusions. This is true especially in the cases of qualitative research.

In answer to this problem, scholars have developed a rigorous means of synthesizing qualitative research results: the meta-synthesis. According to Siau and Long (2005, 448), meta-synthesis can be defined as "a research method used to produce interpretive translations, ground narratives or theories by integrating and comparing the findings or metaphors of different qualitative studies." A meta-synthetic approach can advance current knowledge by providing a systematic way of synthesizing and interpreting qualitative research.

One of the most important characteristics of meta-synthesis is that it tries to maintain transparency regarding the inclusion or exclusion of studies to be synthesized. It has been argued that literature reviews in social science are narrative and are likely to reflect the bias of researchers. By documenting how studies are chosen for review, as we have done in this study, a meta-synthesis tries to lessen this bias.

Sandelowski, Docherty, and Emden (1997) pointed out other issues that need to be discussed in conducting a meta-synthesis: (1) determining topical similarity, (2) setting inclusion criteria, (3) determining methodological comparability, and (4) explicating methods and techniques for synthesis. Determining topical similarity is about "deciding which studies are really about the same substantive phenomenon, event, or experience" (Sandelowski et al. 1997, 368). Researchers can locate studies by referring to stated research purposes, research questions asked, and findings produced. Setting inclusion criteria is related to the issue of excluding studies. If there is a need or rationale for excluding some studies from synthesis, a synthesist should explain the reason and apply this criterion coherently and objectively to all studies.

Determining methodological comparability is the process of comparing the conceptual basis of studies. According to Sandelowski et al. (1997), this process includes comparing, for example, the kind of literature reviewed and the research design features of the studies. The synthesis can add a '*gestalt*' of various studies. Explicating methods and techniques for synthesis is the most important part of a meta-synthesis because this is the process of "developing and communicating the techniques used to compare the

findings of each study" (Sandelowski et al. 1997, 369). Technically, one may use diagrams to present the differences and similarities of various studies.

Noblit and Hare (1988) suggest three ways of synthesizing research. The first is reciprocal translation, in which "each study is translated into the terms (metaphor) of the others and vice versa" (Noblit and Hare 1988, 38). The second method is refutational synthesis, which "takes into account the implied relationship between competing explanations" and eventually aims to incorporate research by conducting substantive analysis (Noblit and Hare 1988, 47). The third method is the line-of-argument approach, similar to the theorizing process itself. The main question of this method is, "What can we say of the whole, based on selective studies of the parts?" (Noblit and Hare 1988, 62) For this study, we used the first method, reciprocal translation.

An Integrative Scheme for Synthesis

A researcher or practitioner who reviews disaster literature looking for a monolithic picture of emergency management might be frustrated by the variety of disaster research presented. A framework is needed to integrate the various perspectives and findings in order to provide a coherent and comprehensive perspective. The integration should lead to research informed decision-making for policy and practice in order to avoid building a separating wall between practice and academia. In this study, the network management perspective was chosen for the research synthesis.

Emergency response operations need to manage new networks that emerge in disaster-stricken communities. Stallings (1978) postulates four types of organizing behaviors in disaster response operations: established, extending, expanding, and emergent. From the perspective of network management, those organizing behaviors can be seen as the creation of new networks. They are new in the sense that some organizations in a network will extend or expand their roles and responsibilities, which leads to the formation of new interactions within the network. Also, an established organization has to interact with those organizations and, by so doing, forms a new way of networking.

Thus, the presence of planned response networks, in which established organizations play major roles, does not necessarily mean that networks active in an emergency response always existed before the emergency. Since the networks keep renewing themselves, they can be described as emergent. Many case studies report self-organization in disaster resulting in the formation of emergent organizations that introduce new actors to existing networks. Accordingly, the formation of new networks often takes place during disaster response operations.

Thus, emergency management needs to be viewed as network management, and this should be regarded as the starting point for reciprocal meta-synthesis. If one tries to interpret issues in emergency management from the perspective of network management, terms and concepts need to be recaptured appropriately. For example, coordination can be redefined as the furthering of joint problem-solving through interactions within network.

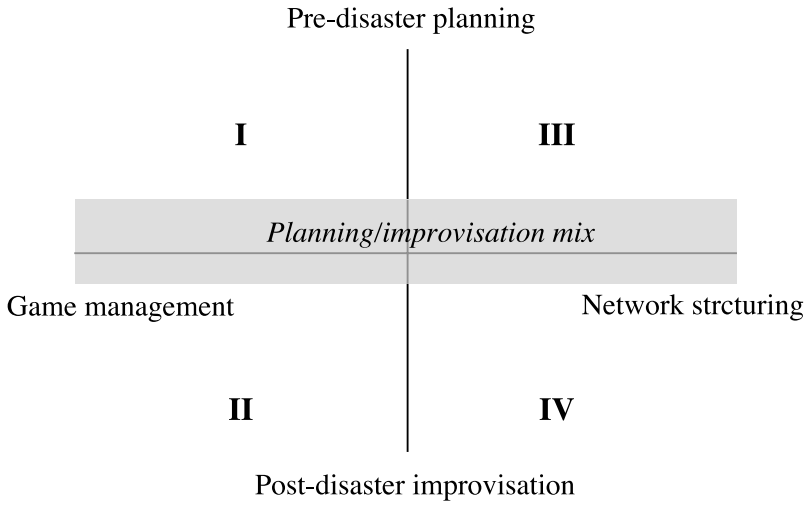
To facilitate this process, we adopt the framework for network management provided by Kickert and Koppenjan (1997), which suggests that there are two points of intervention for network management: "managing interaction within networks, or game management, and building or changing the institutional arrangements that make up the network, network structuring" (Kickert & Koppenjan. 1997, 46-47). *Game management* includes topics such as network activation, arranging interaction, brokerage, facilitation, and mediation or arbitration. Activating networks refers to initiating processes. *Arranging interaction* means establishing ad hoc organizational arrangements to support interaction. *Brokerage* includes activities that bring together problems, solutions, and interested parties. *Facilitation* refers to promoting favorable conditions for joint action. *Mediation and arbitration* are related to conflict management (Kickert & Koppenjan. 1997).

Kickert & Koppenjan (1997) also argue that modifying networks rather than managing interactions might be an alternative if it proves impossible to solve problems within existing networks. This is what they call *network structuring*, including strategies of changing relations, resources, rules, and actors' existing values, norms, and perceptions. We use Kickert & Koppenjan's notions of game management and network structuring to categorize various recommendations from disaster research.

Factors within both game management and network structuring can be divided into pre-disaster activities focusing on planning and post-disaster activities mainly guided by ad-hoc improvisation. In emergency management, there have been continued debates about where to place the priority between planning and improvisation. While accepting a theoretical compromise that good planning is the basis of organizational improvisation in a disaster situation (Wachtendorf & Kendra, 2005; Kreps, 1991), we think that pre-disaster planning and post-disaster improvisation can provide a practical way to assemble previous research results. However, we also adopt a planning-improvisation mix category that has characteristics of both since, in a practical sense, it is hard to draw a clear line between them. However, the scheme of the mapping is still effective because distinguishing the two categories is conceptually possible.

Putting those arguments together, we now have a pre-disaster planning/post-disaster improvisation axis and a game management/network structuring axis. These comprise a two-by-two matrix that can be an integrative scheme for synthesis (figure 1). Quadrant I encompasses strategies such as pre-disaster planning, training, and exercises. Quadrant

Figure 1. Framework for Research Synthesis



II includes ad hoc negotiation of jurisdictional boundaries during the early stages of disaster response. (If negotiation about jurisdictional responsibilities takes place before a disaster, it should be placed in quadrant I.) Quadrant III represents efforts to reform emergency management structures, for example, to make them less hierarchical, and to build strategic partnerships. Only limited activities and strategies may be placed in quadrant IV because there is not enough time to change institutional network arrangements during a disaster response. However, it is possible, for example, that bold leadership may restructure a disaster response network quickly and yield successful results.

THE PROCESS OF SYNTHESIS

This study used three steps for locating previous studies in order to satisfy the rationale of meta-synthesis. First, we conducted a keyword search in the social science databases of CSA Illumina. The second step was identifying important studies through surveys and interviews with experts. Since a keyword search is insufficient at times, this process guards against the omission of seminal studies. The third step was finalizing the selection of studies by integrating the results of the keyword search and expert survey and then choosing the studies most relevant to the focus of the meta-synthesis. To be selected, studies had to (1) deal with the multi-organizational aspects of emergency response and (2) offer lessons learned or recommendations for coordinated responses.

Keyword Search

As a first step in locating relevant studies, we used the social science databases of CSA Illumina.[1] Searches using the keywords "disaster" and "coordination" produced 75 articles. We chose these keywords because the essence of emergent network management is to discover ways of coordinating various organizational entities in disaster situations. We eliminated 50 articles as not relevant for the purpose of this study. Thus, the preliminary review covered 25 articles. Although many of these articles provide some implications for enhanced disaster response that can be translated into network management strategies, some are not as clearly relevant as others for the purpose of this research. Keyword search results were categorized as follows:

- Studies that point to leadership as one of the most important factors for effective disaster response (Couldrey & Morris, 2005; Hicks & Pappas, 2006; Moore, 1956; Wedel & Baker, 1998)
- Studies that emphasize the importance of communication, connectedness, information dissemination, or access to core information (Comfort & Haase, 2006; Kapucu, 2006a; Kettl, 2006; Lanou, 1993; Toulmin, Givans, & Steel, 1989; Harrell & Zakour, 2003; Pijnenburg & Duin, 1990; Comfort, Ko, & Zagorecki, 2004)
- Studies that emphasize the importance of a flexible response and argue that nonstructural factors such as adaptability, improvisation, and creativity are essential for managing complex interactions during disasters (Leavitt & Kiefer, 2006; Harrald, 2006)
- Studies that call for pre-disaster coordination and argue that building strategic partnerships is important for coordinated disaster response (Rudisill, 2006; Dorsett, 2005)
- Studies that emphasize the value of a central coordinating structure for enhanced interactions in disaster situations and consider the management of interlinkage among various converging organizational entities crucial for disaster response (Uys, 2006; Britton & Wettenhall, 1990)
- Study that points out the importance of the integration of assets (Dimas, 2005)
- Study that addresses the issue of hazard perception (Childs, I. R., Hastings, P. A., Carlisle, R. D., & Powell, N., 2002)
- Study that tries to adopt the US Army's synchronization matrix for effective coordination and integration of various activities (Hewett, P. L. Jr., Mitrani, J.

1. The databases included in CSA Illumina are ASSIA (Applied Social Science Index and Abstract, 1987-present), PAIS International (1972-present), Political Science: A SAGE Full-Text Collection (1974-present), Risk Abstracts (1990-present), CSA Sociological Abstracts (1952-present), and CSA Worldwide Political Science Abstracts (1975-present).

E., & Vercellone, J. J., 2001)
- Studies that argue that the jurisdictional boundaries of various organizations cause problems for coordinated responses and that negotiation among organizations is required to resolve these problems (Shechet & Jordan, 1993; Denis, 1995)
- Studies that emphasize coordination itself (Apeland, B., Barry, J., Bovey, R., Grandfield, V.l, Jayasekera, B., Mumukunde, J., and Neacsu, A., 2005; Kettl, 2006; Menghetti & Drumtra, 2004)

Survey and Interviews

A total of 27 scholars and practitioners were selected from the preliminary literature review to be surveyed. Ten experts provided their opinions for a response rate of 37 percent. Five experts participated in an online survey, two gave phone interviews, one gave an in-person interview, and two participated in an e-mail interview. They were asked to name scholars whose work has influenced research on managing networks during disasters as well as influential studies on coordination during disaster response. Table 1 shows their responses.

There were significant differences between the keyword search results and the experts' responses. The only scholars who appeared in both lists were Comfort and Kapucu. This does not necessarily mean that the studies found through the keyword search are less important. Rather, it can be argued that the two lists complement each other and their contents should be pooled as the objects for research synthesis. The keyword search produced a relatively pinpointed list of studies that deal directly with disaster coordination, while many of the experts suggested studies dealing with the social, political, economic, or cultural context of disaster coordination. Some experts reserved their opinions. One expert stated that the reviewer should make the

Table 1. Scholars and Studies Recommended by Survey Participants

Scholars*	L. Comfort (5), T. Drabek (4), R. Dynes (4), J. Kendra (2), G. Kreps (2), E. Quarantelli (2), R. Sylves (2), W. Waugh (2), R. Bea, C. Butts, K. Carley, B. Cigler, S. Cutter, A. Farazmand, D. Gillespie, N. Kapucu, D. Mendonca, D. Mileti, L. Minear, S. Schneider, R. Stallings, K. Tierney, G. Wamsley, T. Weiss, F. Winslow, C. Wise, T. Wachtendorf, G. Webb
Studies	Comfort (1999), Drabek & McEntire (2002), Farazmand (2007), Handbook of Crisis and Emergency Management (2001), Kapucu (2006a, 2006b), Lindell, Prater & Perry (2006), McLoughlin (1985), National Research Council (2006), Rodr?guez, Quarantelli, & Dynes (2006), Scavo, Kearney & Kilroy (2006), Sylves (2006), Tierney, Bevc & Kuligowski (2006), Tierney, Lindell & Perry (2001), University of Colorado at Boulder, Natural Hazards Center (2006), Wachtendorf & Kendra (2004), Waugh (2006), Wise (2006)

* For scholars who received more than one vote, the number of votes is presented in parentheses.

decision about which studies to include. Considering this opinion, we combined the two results.

Final Choice of Studies

The keyword search resulted in 25 articles, and the survey of experts yielded 19 studies and 28 scholars. An important issue was how to locate a representative study by each of the 28 scholars. Another issue was that the size of the pool was still too big, even though it had been significantly narrowed.

For the first task, we referred to the Emergency Management Institute's *2007 Body of Knowledge Report*. Regarding the second issue, we started the selection process by cross-checking the list of studies against the list of scholars. Of the 19 studies, 10 were conducted by scholars on our list. Two of these were eliminated because they were not clearly related to the focus of this research. We also made a minor change in the remaining eight studies (selecting Drabek's *Strategies for Coordinating Disaster Responses* instead of a shorter article by the same author), and added one study to the selection (the National Research Council's Facing Hazards and Disasters), since some experts suggested that the study is important and one chapter is directly related to the focus of this project. Thus, nine studies were selected from the list that the experts recommended:

- *Considering Convergence, Coordination and Social Capital in Disasters* (Wachtendorf & Kendra, 2004)
- *Emergent Phenomena and Multiorganizational Coordination in Disasters: Lessons from the Research Literature* (Drabek & McEntire, 2002)
- *Facing Hazards and Disasters: Understanding Human Dimensions* (National Research Council, 2006)
- *Facing the Unexpected: Disaster Preparedness and Response in the United States* (Tierney, Lindell & Perry, 2001)
- *Organizing for Homeland Security after Katrina: Is Adaptive Management What's Missing?* (Wise, 2006)
- *Public-Nonprofit Partnerships for Collective Action in Dynamic Contexts of Emergencies* (Kapucu, 2006b)
- *Shared Risk: Complex Systems in Seismic Response* (Comfort, 1999)
- *Strategies for Coordinating Disaster Responses* (Drabek, 2003)
- "The Evolution of Emergency Management in America" in *Handbook of Crisis and Emergency Management* (Schroeder, Wamsley, & Ward, 2001)

Of the 19 recommended scholars not yet represented on this list, we selected works by six as being the most clearly related to the focus of this research, based on the

Emergency Management Institute's *2007 Body of Knowledge Report:*

- "Coordinating Community Resources" in *Emergency Management: Principles and Practice for Local Government* (Gillespie, 1991)
- *Disasters by Design: A Reassessment of Natural Disasters in the United States* (Mileti, 1999)
- *Emergency Management: Concepts and Strategies for Effective Program*s (Canton, 2007)
- *Flirting with Disaster: Public Management in Crisis Situations* (Schneider, 1995)
- *Living with Hazards, Dealing with Disasters: An Introduction to Emergency Management* (Waugh, 2000)
- "Organizing for Emergency Management" in *Emergency Management: Principles and Practice for Local Government* (Kreps, 1991)

Finally, keyword search results were also considered in finalizing the selection. Of 25 articles, we chose two for in-depth review. Some works in this category duplicate those recommended by experts, and major arguments from other articles are covered in studies already on the list, so even though only two articles were included from the keyword search, the main arguments of the rest of the articles are considered in the synthesis. The two articles are as follows:

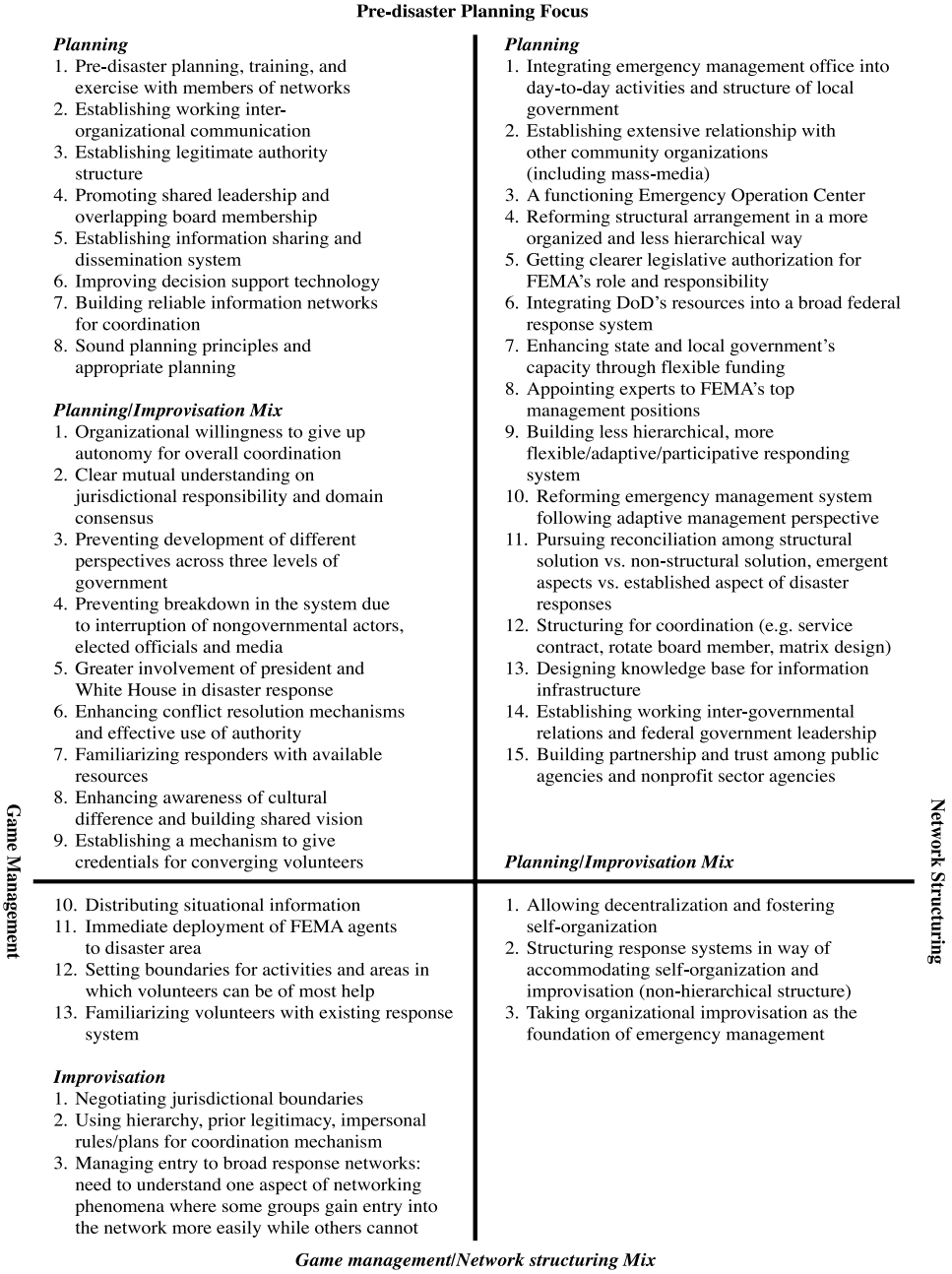
- *Agility and Discipline: Critical Success Factors for Disaster Response* (Harrald, 2006)
- *Coordination in a Governmental Disaster Mega-Organization* (Denis, 1995)

Review of Studies and Mapping of Strategies

The studies selected for meta-synthesis have at least one thing in common every—study deals with recommendations and insights that can be interpreted from a network perspective. Those recommendations and insights can be divided, based on their research orientations and perspectives, into four categories:

1. Studies providing comprehensive review of emergency management—including Drabek and McEntire (2002), Mileti (1999), Tierney, Lindell and Perry (2001), and National Research Council (2006). One of the main objectives of these studies is to aggregate previous research results.
2. Studies providing system- or regime-level perspectives—including Schneider (1995), Schroeder, Wamsley & Ward (2001), Waugh (2000), and Wise (2006).
3. Studies offering practical solutions—including Drabek (2003), Denis (1995),

Figure 2. Mapping Strategies into a Research Synthesis Framework



Harrald (2006), Gillespie (1991), and Canton (2007).

4. Studies emphasizing new perspectives. Kreps (1991) and Wachtendorf and Kendra (2004) focus on organizational improvisation in emergency management. Comfort (1999) frames disaster response systems as socio-technical systems. Kapucu (2006b) deals mainly with public-nonprofit partnership building as a crucial factor in effective emergency management.

In reviewing each study, we categorized recommendations and insights using the two levels of network management presented by Kickert and Koppenjan (1997): game-level strategies that deal with specific interaction processes, and network-structuring strategies that deal with network-level issues. This categorization served as a preliminary process for the mapping of suggested strategies into the research synthesis framework.

Every study reviewed for the synthesis has a different context and a different focus for its recommendations and insights. Thus, we needed integrative terminologies to categorize those recommendations and insights. Figure 2 represents the results of this mapping. We set up planning-improvisation mix as a separate category, since in many cases it was hard to draw a clear line between planning and improvisation. Most game-management strategies fell into this category, while many of the network-structuring strategies fell into the planning category.

RECIPROCAL TRANSLATION OF NETWORK MANAGEMENT STRATEGIES

Reciprocal translation means interpreting each study in the terms (metaphors) of the other studies. We interpreted previous research results by using a network management perspective and mapped insights and recommendations into our research synthesis framework (see figure 2). Even though the mapping result provides a clear and comprehensive understanding of what strategies are available for an effective emergency response, each strategy mapped into the two-by-two framework needs to be translated into a network management strategy.

Interpreting Recommendations as Network Management Strategies

Since many activities in disaster response operations occur in networks (Drabek, 1981), insights and recommendations from previous research need to be viewed as strategies for network management. Insights and recommendations for disaster response can be interpreted as game management strategies as follows:

1. *Selective (de)activation*. This strategy involves choices about the links in a network—who should be involved and who should not. We believe that this is an important issue in disaster response operations. Examples include managing entry to broad response networks (this would fall in the improvisation and game management categories) and establishing mechanisms for credentialing volunteers (this would fall in the planning-improvisation mix and game management categories).
2. *Arranging interaction*. The use of hierarchy, prior legitimacy, and impersonal rules and plans as coordinating mechanisms are examples of this strategy (improvisation/game management). Effective leadership (game management and network structuring) might be another example.
3. *Brokerage*. This involves matching problems to solutions and actors. Becoming familiar with available resources (planning-improvisation mix/game management) is a good example of this strategy.
4. *Facilitating interaction*. This strategy has to do with creating conditions for the favorable development of strategic consensus building. Improved decision support technology and establishing an information sharing system are two examples (planning/game management in both cases).
5. *Mediation and arbitration*. This involves, for example, enhancing conflict resolution mechanisms and ensuring the effective use of authority (planning-improvisation mix/game management).

In the meantime, some insights and recommendations for disaster response can be associated with strategies for network structuring:

1. *Changing relations among actors*. Many recommendations fall under this strategy—for example, integration of the emergency management office into day-to-day activities and structures of local government (planning/network structuring), and building partnerships and trust among public agencies (planning/network structuring).
2. *Influencing distribution of resources among actors*. An example of this strategy is the integration of Department of Defense resources into a broad federal response system (planning/network structuring).
3. *Altering established rules*. Examples include allowing decentralization and fostering self-organization (planning-improvisation mix/network structuring) and reforming the structure in a more organized and less hierarchical way (planning/network structuring).

Framing Conceptual Relations

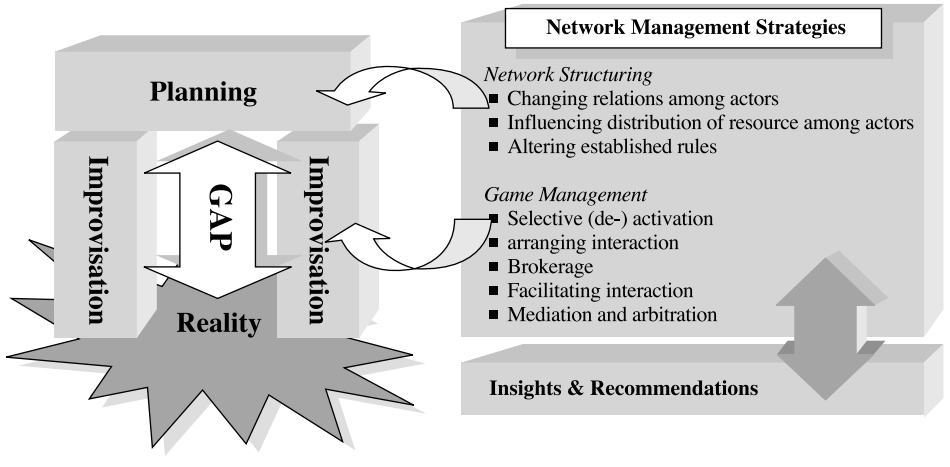
Planning (or preparedness) and improvisation are two foundations of emergency management (Kreps, 1991; Wachtendorf & Kendra, 2004). Kreps (1991, 33) wrote,

"Without improvisation, emergency management loses flexibility in the face of changing conditions. Without preparedness, emergency management loses clarity and efficiency in meeting essential disaster related demands." While reciprocally interpreting emergency response insights and recommendations as network management strategies, it becomes clear that strategies of network management can fall into either the planning or improvisation category. As a result, a conceptual relationship among aggregated insights and recommendations, network management strategies, and planning and improvisation can be framed as follows:

1. Emergency response has to deal with the management of newly emerging networks. Thus, network management strategies can address aggregated insights and recommendations.
2. Planning and improvisation are two foundation of emergency response. Improvisation fills the gap between plans and reality. As a result, network management strategies can be postulated as either planning or improvisation of emergency response.

Figure 3 illustrates this conceptual relationship. It summarizes key information from figure 2, depicts the argument that improvisation can fill the gap between planning and reality, and presents game management and network structuring as two dimensions of network management. We believe it illustrates a new conceptual framework for emergency response.

Figure 3. Conceptual Framework for Emergency Response



CONCLUSION

Providing safety and security for citizens is an inherent governmental responsibility; however, emergency management is a traditionally neglected research area in public administration. Because knowledge has not accumulated systematically in this area, we think that use of the meta-synthetic process needs to be encouraged.

In this study, a two-by-two matrix served as an integrative framework for synthesizing selected research results. The matrix was used as guidance in framing lessons learned in disaster responses and producing an integrated list of research findings. Since the suggested matrix is grounded in network management, an important perspective of public administration and management, this research synthesis might be useful for scholars and practitioners in emergency management. We also incorporated the prevailing perspective of emergency management to public administration by covering representative research on disaster response.

The processes and the results of meta-synthesis have at least two implications. First, the synthesis has contributed to the scholarship of public administration by incorporating major research findings of emergency management for public administration. As mentioned earlier, emergency management has been a neglected area in public administration scholarship until recently. This study can be seen as a response to the need to incorporate research findings from other disciplines.

Second, the contents of the synthesis may contribute to the practices of emergency management. The meta-synthesis results provide valuable guidance to practitioners; they inform us that planning and improvisation are inevitably intertwined. Therefore, practitioners need to conduct post-disaster improvisation as well as pre-disaster planning, which means that we may need to plan for improvisation in some cases. Also, practitioners can use the meta-synthesis results as checklists for preparation and planning, since each item in the two-by-two matrix is a good action agenda. If the synthesized strategies can contribute to a program or policy, it will be a good example of research-informed policy-making.

Public administration is an interdisciplinary field of study. Importing or adopting research findings from other disciplines has been a typical research activity. Thus, it seems that a research synthesis should be regarded seriously among public administration researchers. Also, when it comes to the case of emergency management, we believe that the need for adopting a meta-synthetic approach cannot be over-emphasized.

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