



Collaborative emergency management and national emergency management network

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Abstract

Purpose – The purpose of this paper is to analyze scholarly discussions and findings regarding collaborative emergency management (CEM). Several aspects such as leadership, decision making, intergovernmental and interorganizational relations, technology applications in CEM have been investigated.

Design/methodology/approach – Literature review was conducted using three popular search data bases, Academic Search Premier, Academic OneFile, and Info Track OneFile using the following keywords: CEM, collaborative and emergency and management, collaborative networks, emergency networks, emergency network, interorganizational networks, Interorganizational and networks, intergovernmental and networks, and National Emergency Management Network (NEMN).

Findings – The paper emphasizes that high expectations of public and stakeholders in emergency and disaster management require effective use of resources by collaborative networks.

Practical implications – Emergency and disaster managers should be able to adopt their organization culture, structure and processes to the collaborative nature of emergency management.

Originality/value – The paper focuses on a very important subject in emergency and disaster management using NEMN as example.

Keywords Disasters, Emergency measures, Leadership, Decision making

Paper type Literature review



Introduction

The public increasingly expects better public sector leadership before, during, and after catastrophic disasters (emergencies) and extreme events (crises) than it has seen in the past (Boin *et al.*, 2005; Kapucu and van Wart, 2006). High standards of responsiveness and the ubiquitous media compel political leaders and administrative heads to coordinate resources effectively. The massive numbers of public, nonprofit, and private organizations involved in catastrophic disasters require extensive ability to have horizontal, as well as vertical, communication, and coordination. High performance in managing disasters and emergencies requires an ability to assess and adapt capacity rapidly, restore or enhance disrupted or inadequate communications,

utilize uncharacteristically flexible decision making, and expand coordination and trust of emergency response agencies despite the hurly-burly of the response/recovery efforts. These requirements are superimposed on conventional bureaucratic systems that rely on relatively rigid plans, exact decision protocols, and formal relationships that assume uninterrupted communications. Yet:

[...] in crises circumstances the disparities between demand and supply of public resources are much bigger, the situation remains unclear and volatile, and the time to think, consult, and gain acceptance for decisions is highly restricted (Boin *et al.*, 2005, p. 11).

Scholars of public administration see much utility of network analysis and network theory perspectives in analyzing recent developments in collaborative public management and governance (Bingham and O'Leary, 2008; Fountain, 1994; Kilduff and Tsai, 2005). Fountain (1994, p. 273) specifically states that "the network perspective offers both rich descriptive capacity and rigorous methodologies for study of both micro- and macro-level organizational and interorganizational phenomena of great importance to public management."

The following research questions are examined by the study:

- RQ1. What is collaborative emergency management (CEM)?
- RQ2. What are the benefits of collaborations in managing disasters and emergencies?
- RQ3. Why we need collaboration in managing emergencies and crises?
- RQ4. How do emergency management (EM) networks select objectives and meet the mission of the network?
- RQ5. How are CEM principles applied in National Emergency Management Network (NEMN)?

The research will compile previous research on CEM research, identify widely used cases, identify research questions and common hypotheses tested and their results, and conclude with future research and practical implications. Contributions will be noted to public management networks, specifically to CEM.

Literature review was conducted using three popular search data bases, Academic Search Premier, Academic OneFile, and Info Track OneFile. Key words or phrases selected for search are the following: CEM, collaborative and emergency and management, collaborative networks, emergency networks, emergency network, interorganizational networks, interorganizational and networks, and intergovernmental and networks. Key words or phrases were searched in all text, not limited to title or abstract. Papers found were written on various subjects including but not limited to computer science, business administration, industrial engineering, meteorology, nursing, medical science, and sociology. Then, relevant papers were selected based on the judgment of the researcher. After this selection "snow bowling" technique was used and other relevant sources cited in the papers were reached.

Collaborative emergency management

Bardach (1998, p. 8) defines collaboration as "any joint activity by two or more agencies that is intended to increase public value by their working together rather

than separately.” Communication speaks to how people understand each other and how information (not just “facts,” but policies, prospects, rumors, feelings, failures, and all other human experiences) is transferred in organizations. Coordination, like communication, begins with an assumption of differences (Axelrod and Cohen, 1999). Different persons and different units create overlap, redundancy and/or separation without coordination. Coordination is about efficacy. Cooperation is now a hallmark for not just corporate behavior, but corporate culture. The message is clear: get with the group (Mandell and Keast, 2007):

Coordination is most likely to emerge from crisis-induced chaos when crisis leaders nurture the right conditions. One such condition is that actors should be motivated to share their information with others in the emerging node (Boin *et al.*, 2005, p. 61).

Scholars researched the reasons that have led the formation of networks (Raab, 2002; Khator and Brunson, 1999). In business world, corporations formulate ties in order to eliminate market constraints and gain access to resources (Burt *et al.*, 1980). Common cause may not be sufficient in the formation process of networks; also, willingness of members to collaborate is another must (Walker and Goodyear, 1999).

Interoperability is defined as having two elements, an operational element that involves how resources from different organizations work together, and a technical element that involves how resources from different organizations talk to each other. Interoperability is a critical function during large-scale catastrophic events that require the response of a large number of resources from different organizations. While technology is recognized as a critical element of interoperability, technology only supports operational systems and practices. Technology itself cannot solve the interoperability problem because the core of the problem lies with how people in different organizations choose to work together rather than how they choose to talk to each other. In order to study interoperability from this perspective, we have developed a model of the process of responding to large-scale incidents. In this model, the operational culture of the responding resources has an effect on the level of integration of the organizational structure used to organize resources, and on the decision processes used to decide how those resources will be deployed and what tasks they will be assigned. The level of integration of the incident command structure and the level of coordination in decision making can be measured and used to describe the incident outputs. These outputs are used as indicators for the overall effectiveness of the response.

Partnership in CEM is a vital element. Emergency managers need to reveal the partners that will help them in their job. These partnership is not limited to only one sector, rather includes all sectors, even nonsectoral partners like communities. Main partners in for the emergency managers are public, private, and nonprofit sectors, media, and citizens/communities. The partnerships cannot only be horizontal but also vertical as well. Intergovernmental, interjurisdictional cooperation is an important parameter for emergency managers (Patton, 2007).

Process of CEM networks

The Department of Homeland Security (DHS) and Federal Emergency Management Agency (FEMA) envision partnerships at all levels of government in disaster preparedness and management (Bourne, 2007). Relationships in collaborative networks are based on trust and commitment to ultimate purpose not hierarchical order

(Mandell and Keast, 2007). Raab (2002) argued that hierarchy in governance process prevents goal displacement and keeps decision making on track. According to Waugh (2003) EM networks are built from the bottom up, not imposed by authorities from top down.

Ansell and Gash (2007) identifies several critical variables after reviewing 137 cases of “collaborative governance” from policy sectors that can impact the success of collaboration. These variables include: prior history of conflict or cooperation, the incentives for stakeholders to participate, power and resources imbalances, leadership, institutional design, and a series of factors that are crucial within the collaborative process itself such as face-to-face dialogue, trust building, and the development of commitment and shared understanding.

In Selves’ (2008) terms, EM stands on three important pillars. First, it is not possible to have a successful EM system without integration of efforts of governmental and nongovernmental stakeholders. Second, it is important for emergency managers to enhance collaboration among stakeholders in order to ensure effective integration of efforts. Trust building, reaching consensus, establishing team spirit, improving mutual understanding via effective communication are indispensable parameters in collaboration among actors of EM. Finally, being flexible is necessary for contingencies in emergency situations. Expecting the unexpected, creativity and innovative approach are necessary to handle the chaos of emergency situations with flexibility (Patton, 2007; Kapucu, 2006). Type of information shared and frequency of sharing will determine success of information sharing in CEM (Kumar, 2007).

Perception of cooperation in disasters may vary significantly due to differences in organizational goals, objectives, and cultures. Some organization may perceive it just as informing others about their own operations while the correct perception is to see it as a mutual agreement on who is going to perform effectively (Quarantelli, 1997). In designing emergency response system the issues that policy makers have to pay attention are: creating and disseminating incident situation reports; strategic planning; performance monitoring; prioritizing response efforts; building group consensus and cooperative behavior; information and intelligence analysis, control, sharing and dissemination (Chen *et al.*, 2007).

Private firms such as Wal-Mart and Home Depot were very successful in providing logistics to the affected areas in Hurricane Katrina. Their success is unsurprising since supply chain management is their daily business. Therefore, it could be argued that in EM systems private sector should have more opportunity and responsibility to provide resources for response and recovery operations. In order for the relief efforts to be successful decentralization should be implemented and locals should be supported with cash (Horwitz, 2008). Arrogant attitudes and behaviors among different jurisdictions and different levels of government are probable threats for CEM networks. Members of all agencies should have a mutual respect for each other (Partnership, 2008).

If the federal government achieves the transition from top down approach to collaborative systems that requires participation of all nonfederal actors in facing the challenges of homeland security accomplishing national security goals will be much easier (NEMA, 2008). The success of Coast Guard operations during Hurricane Katrina led some scholars to assert decentralization policies should be formalized and implemented.

Lacking shared common language is a serious threat to CEM networks. This is not the case for just first responders from different jurisdictions and agencies even

for the risk communication. Government Accountability Office (GAO) (2008) reports that there is no common vocabulary that enables government officials to discuss the risk management issues.

Danczyk (2007) investigates the effect of interpersonal interactions, legal structure and personal communication in California emergency management system. Findings reinforce arguments of Patton (2007). Increased frequency of interactions led to increased level of effectiveness in emergency operations. One important aspect of personal interactions is that there is a need to increase opportunities for interaction. Legal policies allowing flexible practices of interaction are preferable. Those interactions which facilitate knowledge and experience sharing strengthen organizational learning. Research of Kumar (2007) also suggests that frequency of information sharing in emergency networks influence the effectiveness of processes of information sharing. Moreover, political, organizational, and technical structures affect frequency and quality of information sharing.

Related to establishing interpersonal communication, building trust among organizations is essential to CEM networks. When trust is lacked, interdependency amongst organizations reinforces the likelihood of successful collaboration. Interdependence is also a factor which positively influences building trust. Face-to-face dialog and incentives for participation increases the likelihood of collaboration (Ansell and Gash, 2007).

Decision making and EM networks

Lanzara (1983) investigates structure and decision-making processes of “ephemeral organizations,” new organizational forms emerging in the aftermath of disasters and extreme events. He calls this structure “heterarchical,” i.e. position and location of control within the structure changes depending on altering environments and operations. Decision-making process is more horizontal because dependence on vertical links would consume much energy. In these type of organizations we cannot even talk about a clear, constant structure since it changes depending on the activities and operations the organization involved.

Distribution of relevant information to the collaborating partners in emergencies is a complicated problem that both practitioners and scholars seek a viable solution. Collaborating organizations and their staff should receive any available information relevant to their task. Netten *et al.* (2006) developed a system called “task-adaptive information distribution (TAID)” method. According to their experiment, TAID was successful in increasing adaptiveness of collaborators in emergencies (Netten *et al.*, 2006). Distribution of information seems to be a problem in collaborating emergency responders. Highly contingent nature of large-scale emergencies requires distribution of necessary and accurate information while it is not possible every time in emergency situations (O’Leary and Bingham, 2007).

Effective response coordination is highly dependent on information sharing. However, rather than the amount of information the quality of information plays an important role in better coordination efforts. Information containing data about time of demand and severity of situation yields better coordination. Therefore, reaching the core information results in better coordination and response (Comfort *et al.*, 2004).

GAO (2008) reports that intergovernmental and public-private partnerships should be strengthened in decision-making systems for risk management

in homeland security. Although public sector does not have flexibility in many areas such as laying off surplus staff, reducing risk through financial tools that private sector enjoys for managing the risk still partnership and established well communication is needed for managing the risk for homeland security issues.

Moynihan (2008) argues that formalization reduces the vulnerability of the networks that faces vulnerability. By studying response structure to exotic Newcastle disease in the State of California he concludes that in high uncertainty circumstances the network structure learns while it is in action. The successful implementation of incident command system (ICS) facilitates this organizational learning in action; therefore, the stress and threats of uncertainty could be reduced via ICS systems. Moynihan (2005) states that though standard operating procedures, chain of command, and formal rules could sometimes be barriers, they are still part of successful emergency response systems. Also he discusses that ICS has enough flexibility to adapt to different kinds of disasters and situations.

In collaborations of EM authority, leadership, and resources are shared among organizations (Mandell and Keast, 2007). The question is whether a pure collaborative structure or a combination of hierarchical command and control systems and collaborative networks should be implemented for effective EM as Moynihan (2008) and Waugh and Streib (2006) offers a combination could be more successful. A praise to bureaucracies comes from McGuire and Agranoff (2007). They argue that although networks mushroom in various areas of public and nonprofit sectors, bureaucratic management is still powerful and inevitable. There is still much to explore about network management. Why they succeed or fail? In which circumstances network systems are applicable. These are the questions waiting to be sufficiently answered by academicians.

For Comfort (2007), Hurricane Katrina exemplifies how a hierarchical command system fails in dynamic environment of catastrophic disasters. She emphasizes the importance of "cognition" and communication in managing disasters. According to her, current hierarchical command structure fails to build a common cognition of disaster situation and risks associated with the situation. Similar to Comfort (2007), Selves (2008) calls for building shared understanding, unity of efforts in integrated EM efforts. Flexibility and innovative thinking and acting require participation of all available actors in the community.

Inflexibility and slowness of adaptation of bureaucracies and hierarchical organizational structures have been criticized by the substantial amount of literature. For Bier (2006) since adaptation speed of hierarchies are slow in rapidly changing environments, the best structures that can cope with uncertainty is decentralized ones. According to her, the failure in response operations in Hurricane Katrina was due to centralized structures. Not only the overall response network structure but also each organization should have decentralized structure for rapid adaptation. Although organizations might have formalized centralized structures during nonemergency times, they should adopt decentralization structures in emergency situations.

Disadvantageous nature of command and control systems could be cured by developing a common cognition of terrorism problem. The approach of building (forcing) networks and partnerships from top down should be changed to bottom up approach. Communities and local governments should not only be involved in operations but also in decision-making structures (Waugh, 2003). There is no perfect

structure capable of solving all problems effectively and efficiently. Every organization joining the network structure increases the capacity but also complexity of the structure (O'Toole, 2003). However, general public expects a strong leadership to fight against manmade threats. Strong leadership has been associated with strong central command structure. World Trade Center attacks strengthen this expectation. Therefore, the formation of DHS has been alike to Department of Defense. A contradictory issue for strong central leadership of DHS has been the problem of resources. Resources and capabilities of DHS could not be enough to protect the whole nation. Local and state partnerships are required for the DHS to attain its goal (Waugh, 2003). Rather than centralized command structures, networks whose members have developed common understanding of the mission and established coordinated decentralized decision-making systems are more likely to be effective. Relationship matters in those networks. Frequent interactions and exercises before the disasters happen strengthen the understanding of capabilities and roles of network players (Patton, 2007).

One can argue that collaborations are not appropriate in situations where rapid decision-making processes are needed like emergencies. However, habits of working together established through social relations can substantially increase the speed of decision making (Ansell and Gash, 2007). Collaboration is a matter of mindset as well as structures. Emergency managers who understand the value and different aspects of collaboration can establish effective collaborative mechanisms. Collaborative emergency managers would seek to foster partnerships in all phases of EM (mitigation, preparedness, response, and recovery) with all levels of public agencies, local, state and federal and also nonprofits; private sector especially media and infrastructure companies (Patton, 2007). Some scholars refer the success of Coast Guards in Hurricane Katrina to the proper understanding and use of hierarchies and networks (Morris *et al.*, 2007). Unlike Department of Defense Coast Guards operations requires well-established coordination adaptable to various hard circumstances. Since Coast Guard is highly dependent and experienced on coordination, it has a collaborative culture. This culture is the reason, why the Coast Guard achieved its mission in Hurricane Katrina (Morris *et al.*, 2002).

Intergovernmental and interorganizational coordination

One layer of interorganizational collaboration lies amongst organizations from different sectors. In CEM any sort of shortage of one sector could be compensated by another sector like in the example of FEMA's inefficiency in distributing supplies compensated by Wal-Mart during Hurricane Katrina (Simo and Bies, 2007). History of inter-sectoral collaboration is very old. Federal government sought assistance from private sector in responding to the flood of 1927 (Farber and Chen, 2006). Another layer lies among organizations from different countries and international organizations. International NGOs are important participants of relief efforts of disasters occurring around the globe (Eikenberry *et al.*, 2007).

According to National Governor's Association's 2006 State Homeland Security Directors Survey, more than 80 percent of the states work together with infrastructure owning businesses on preparation of homeland security plans. Also 90 percent thinks that federal agencies should coordinate with states in preparing and implementing homeland security policies (NGA Center for Best Practices, 2006). Why do we need to include private sector in homeland security and EM? One important reason

is that private sector owns nation's 85 percent of critical infrastructure. This fact necessitates building public-private partnership in prevention/mitigation phase. Hardenbrook (2005) calls for public-private partnership not only to protect critical infrastructure but also to deter attacks and prevent in any kind of disaster. This kind of cooperative approach should include "vulnerability assessment and risk-based mitigation." In this process developing reliable communication and mutual trust is important. Critical infrastructure planning must be regional. Federal government should foster such cooperation through incentives and legal regulations (Hardenbrook, 2005).

Research aiming to examine how perception of the relationship between people and sources of information influence hazard preparedness and how trust in civic emergency planning agencies responsible for risk communication influences preparedness decisions revealed the relationship between people and civic agencies and the information provided must be accommodated in planning risk communication (Paton, 2007). Paton's (2007) research aimed to hypothesize that: familiarity with and information about hazards predicts the relative importance.

CEM and leadership

Leadership in CEM is hard simply because its nature of being network. In this network environment tasks of public managers who are supposed to be leading positions in EM gets tougher. They need to be capable of dealing with various players and be able to understand information coming from sources that use their own jargon generally. Based on this information mixture they need formulize strategies and make quick but vital decisions (Waugh and Streib, 2006; Derthick, 2007).

Lester and Krejci (2007) calls for transformational leadership whose characteristics are: determinism for solving problems through using human relations approach, ability to inspire a sense of common vision and mission, a decentralized approach that engages organizational members, and lastly charisma. Can we learn from the military in disaster response? According to Lester and Krejci (2007) the US military's leadership approach could be effective in disasters due to its centralized command and control, and much emphasis on training and leadership at all levels.

The relationship between politics and leadership in emergencies is bidirectional. Relatively successful response of the US Coast Guard to Hurricane Katrina strengthened its political position in federal level. After Hurricane Katrina, Coast Guard commanders were favored in filling top EM positions (Waugh, 2007). Citizen participation in all phases of EM is important step to more effective and CEM. As leaders of first response activities, local administrators should have basic scientific knowledge of possible disaster that might happen in their region (Col, 2007).

In his analysis of Iran's response to 2004 earthquake Farazmand (2007) praises the central command structure that was able to coordinate networks that are in different levels of government and volunteers. On the other hand, Comfort (2007) calls for decentralization of response efforts claiming that the centralized structure was accountable for most failures in Hurricane Katrina. Choi and Kim (2007) offer a similar approach to Farazmad (2007). They argue that the leadership should be in the center of the network in order process and disseminate relevant information to the parties.

Inter-organizational collaboration is a complicated issue due to the fact that many organizations have differing roles and authorities. Their dyadic relationships are affected by capabilities, roles, and authorities. Although organizations pursue a shared

goal, the differences in resources and authority will complicate the situation (Nightingale, 2004). One of the most important aspects of EM is the interpersonal communication. Collaborative networks require new skills for emergency managers. Mutual understanding, well-established interpersonal relationships amongst staff and managers of collaborating organizations are necessary for the success of collaborations.

Mutual aid agreements such as EM assistance compact are horizontal intergovernmental structures. Unlike vertical relationship among federal, state and local levels, governments at the same level combine and coordinate their capacities to fight against manmade and natural disasters (Sylves, 2004). Although horizontal structures in intergovernmental relations are not evident as vertical ones they are becoming more influential in public sector (O'Toole, 2003).

CEM and information technology (IT)

IT applications can play an important role in CEM. Kapucu (2006) examines the problem of effective interagency communication among organizations and the role of ITs to achieve effective communication and decision-making goals in emergencies. Contributing to the dialogue on the influence of IT on social systems, Knuth (1999) explores:

- the contested role of IT in EM; and
- political and social values emerging from the use of information.

Quarantelli (1997) explains the use of computer-based systems for monitoring, collecting, organizing, processing, analyzing, and disseminating and retrieving data and information that can be used by emergency and disaster planners, managers, and researchers.

State of Oklahoma has considerable expertise in dealing with tornados. In 1996, Oklahoma developed the Oklahoma's first-response information resource system using telecommunications with the aim providing public safety agencies real-time weather information and directions to use that information. It gave its first time major test on May 3, 1999 Tornado and sustained a successful collaboration between emergency response and meteorology organizations (Morris *et al.*, 2002). In EM, Geographic Information Systems technologies have been used extensively to create both digital and paper maps to improve emergency decision makers' situational awareness (Brewer, 2002).

9/11 Terrorist events and disaster response led another technological development in collaboration of organizations from different governmental background. Since information and intelligence has a significant role in homeland security issues, governmental organizations (mostly state and partially local) established so-called fusion centers in order to eliminate the lack of flow of information from federal agencies through states and enhance information and intelligence sharing among stakeholders of homeland especially in federal government and other governmental levels (GAO, 2007). Differences in information systems of different agencies led to some challenges in this initiative. DHS and Department of Justice became more open to local and state agencies but they were unable to fully utilize this opportunities. In details, DHS and Federal Bureau of Investigation opened their information systems to fusion centers. But majority of the personnel (43 of the 58) faced challenges in obtaining personnel, and funding (54 of 58) (GAO, 2007).

Communication is one of the key factors in disaster management. It is important to have proper communication tools which will be utilized before, during, and after a disaster. Integrated public alert and warning system, a program developed by DHS in 2004, aims to improve communication for public alert and warning (Glaser, 2008). It is a joint action of National Oceanic and Atmospheric Administration, Federal Communication Commission and several other public/private stakeholders. It will utilize several communication tools like TV, radio, the internet, cell phones, etc. to alert and warn people. It will establish a conduit of information flow either from president or designated federal agency to public, from federal agencies to president, or any from any other governmental organization to decision makers or public (Glaser, 2008).

FEMA initiated a new web service called "collaboration." On national response framework (NRF) web page section called "collaboration" will allow EM community to share lessons learned in virtual world (FEMA, 2007). Scholars and government officials looked at communication failures in Hurricane Katrina mainly through two lenses, technology and media relations. However, antagonistic interpersonal relations and clashes of interorganizational cultures are other two important factors that caused failures in EM network communication. More research is needed through interpersonal relations and organizational culture lenses. Taking these lenses as points of view, in order to improve communication in emergencies, interorganizational and interpersonal interactions, both formal and informal, should be promoted (Garnett and Kouzmin, 2007).

For information sharing in disasters organizational liaisons have a key role. Also pre-disaster planning for information flow is inescapable for effective response. These principles above require real time information sharing through various technologies. Although various technological systems offer effective communication, a fit between various technologies and disaster circumstances should be sought (Shen and Shaw, 2004).

In order to maintain real time communication in an event, Washington, District of Columbia, Maryland, and Virginia launched capital wireless integrated network (CapWIN). This partnership was developed after a failure of response to a suicide event on the Woodrow Wilson Bridge over Potomac River. Since the location of the event was in the intersection of Maryland, Virginia, and Washington, District of Columbia responders from three districts was alerted. However, they could not talk to each other because they were not using same communication systems. CapWIN created harmonized communication devices and systems (chat rooms, messaging, sharing photos) for agencies from three different jurisdictions (Marsan, 2008).

National emergency management network

Disasters can cause trouble in local level emergency responders very easily (NEMN.net, 2008a). Local emergency responders might stay behind to response, recover from, mitigate, and prepare for a catastrophic disaster. Waugh (2003) underlines the need for broader perspective to EM. Waugh (2003) suggests the enhanced implementation of NEMNs to fully utilize the capabilities and capacities of nation. International City/County Management Association (ICMA) and Public Entity Risk Institute (PERI) have established NEMN to overcome these problems. ICMA is an organization that provides professional education and training for managers, administrators, local and regional governments. PERI defines its mission as "to serve public, private,

and nonprofit organizations as a dynamic, forward thinking resource for the practical enhancement of risk management” (NEMN.net, 2008a).

NEMN is founded as an initiative of PERI and International ICMA. NEMN aims to attract concerned stakeholders from all sectors: communities, businesses, nonprofit organizations. With this nationwide network, participants will be sharing their resources with disaster-strickens area and with each other (NEMN, 2006).

A complete EM perspective includes many aspects of response, recovery, mitigation, and preparedness. Consequence management, a broader EM perspective, is defined with assessment tools, planning tools, communication and alert tools, medical response tools, recovery tools, and command, control, communication, coordination, information tools by DHS (Smith, 2008).

In an emergency situation ICS and national incident management system (NIMS) offer certain response and recovery patterns to emergency responders. However, there are question marks about the successful implementation of these systems (Smith, 2008). In two conferences, needs of the EM system were discussed by ICMA (Smith, 2008).

NEMN was created after the Hurricane Katrina as a response to needs of local governments (NEMN.net, 2008b). ICMA and PERI formed NEMN in order to fulfill the needs of consequences management in local level governments. NEMN is basically a pack that includes an EM software program and several trainings and education opportunities for public and private organizations (NEMN.net, 2008b). Once participants become the member of the network, they are able to use a common platform with other participants. NEMN establishes bridges between regional and local governments and organizations from other sectors. It establishes these bridges with information sources and specific trainings (NEMN, 2006). It helps local governments for better preparation to local and regional disasters by enhancing network relationships with local and national governments, and organizations from other sectors (NEMN, 2006, 2008a). It is also:

[...] available both for local incident management and catastrophic event planning and for Mutual Aid on a regional and national scale where assets can be shared, accessed, and/or deployed via our national database (NEMN, 2006).

NEMN uses a software technology in preparing a database for human and physical resources. NEMN system collects demographic data and contact information. Later on users are matched with affiliates, subsidiaries, advertisers, or partners according to their specifications (NEMN, 2006). This database also includes credentialing system, mission planning, and full incident management functionality (ICMA and PERI, 2006). This software has a flexible structure that a member of NEMN can connect this software with another system or internally developed programs, and share with third parties and other members of the organization (NEMN.net, 2008b). In addition to these features, NEMN provides geo-mapping and situational awareness tools to identify, activate, track, and coordinate response assets.

NEMN (2006, p. 5) system contains:

[...] bulletin board services, chat areas, news groups, forums, communities, personal web pages, calendars, shared storage spaces, physical and human resource databases, graphical resource and incident management facilities, and/or other message, communication, information sharing, and/or collaboration facilities designed to enable you to communicate, share information, and collaborate with individuals, a group of individuals, or the public at large.

NEMN gives its users the flexibility to use the system to get the communication and information at any point. The NEMN (2006, p. 3) policy document details this as:

The NEMN Website gives users the opportunity to opt-in to receive communications and information from NEMN at the point where NEMN requests information about the user. This website also gives users the options listed below for removing their information from NEMN's database in order to stop receiving communications, information, or services; for reviewing, changing and modifying information previously provided. In addition, the NEMN Online Resource and Incident Management System give authorized users the opportunity to opt-in to access and utilize the software.

Emergency Visions and Georgia Tech Research Institute are supporting the technological background of these networks. Emergency Visions (n.d) "delivers software, consulting, and training solutions to those involved in homeland security and other emergency preparedness and response initiatives." It establishes a catalogue for human resources and physical assets. Catalogue is based the specifications of FEMA, DHS, Centers for Disease Control and Prevention, Health and Human Services, Joint Commission on Accreditation of Healthcare Organizations, Agency for Healthcare Research and Quality, Department of Defense, Department of Education, and Environmental Protection Agency (Emergency Visions, 2004). Resource vision follows the FEMA resource directives, supports national mutual aid and resource management initiative and tries to keep the organizations in track of NIMS (Emergency Visions, 2004). Georgia Tech Research Institute is the nonprofit organization that is technological research initiative of Georgia Tech University. Organizations that have an EM agenda can benefit from this system. This is not limited with specific types of organizations, sectors or regions; it is nationwide and any organization from any sector can be part of this network. NEMN aims to enhance and facilitate interagency collaboration for better sharing of human and physical resources. NEMN members have opportunities to feed from newsletters, training forums, and other information flows.

Conclusion

High expectations in EM require effective and wise use of resources. Massive participation from public, private, and nonprofit sector to disasters make EM a joint effort. The combination of the efforts with efficient use of resources needs collaboration among all stakeholders. CEM includes several items like coordination, communication formation of network, partnerships, and interoperability. Coordination, mainly, is an effort to eliminate redundancies in EM environment, while communication helps coordination via enhancing mutual understanding of people and transfer of information within and among organizations. In order to eliminate constraints and increase the available resources, organizations form networks and partnerships. Finally, interoperability is the understanding of how different partners come together and use their resources together, how do they work together, and how do they talk together. All these parameters form different functions within the CEM equation. Decision making, intergovernmental and interorganizational coordination, leadership, and ITs are larger pieces of CEM.

CEM can basically be defined as joint activity of two or more agencies that aim working together in order to create better public good. It aims to eliminate waste of resources and efforts via communication, coordination, establishing partnerships, and interoperability. Perception of cooperation in EM may be different in every agency.

This is due to the goals, objectives, and culture of collaborating agencies. On the other hand, in order to overcome these challenges, ICS and NRF provide roadmap to partnering agencies and identify their tasks.

Since a broader perspective is necessary for EM issues, ICMA and PERI formed NEMN to bring a fresh view to EM. NEMN stands as a great example for collaborative approach in EM. It is private sector initiative that aims to establish collaborative network among stakeholders from all sectors. It utilizes technology, communication tools in the system, and provides trainings for its participants. It is also compatible with NIMS and ICS which allow its members to be able to follow the road maps provided by governmental authorities. Projected consequence of this effort is better utilization of both material and human resources within not only one specific region or one single sector, but also the whole nation and all sectors.

Based on the vast literature examined, this paper clearly concludes that almost all scholars agree on the necessity of collaboration in EM. One obvious practical application of this fact is that practitioners should be able to adopt their organization culture, structure and processes to the collaborative environment of EM. The only limitation of this study is the subjectivity of researchers investigating the literature's findings. But, of course, this subjectivity is not a major threat what this meta-analysis puts forth due to the fact that social science itself is subjective rather than objective. By exhibiting what has been found in CEM field this study provided base line for future research.

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