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FACTORS INFLUENCING EFFECTIVENESS OF INTERORGANIZATIONAL NETWORKS
AMONG CRISIS MANAGEMENT ORGANIZATIONS: A COMPARATIVE PERSPECTIVE

by

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A dissertation submitted in partial fulfillment of the requirements
for the degree of Doctor of Philosophy
in the Department of Public Affairs
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at the University of Central Florida
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Major Professor: Thomas T.H. Wan

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ABSTRACT

Crisis management has become one of the most important public policy areas in recent decades with greater numbers of manmade and natural disasters. History showed that well-implemented crisis management policies can save lives and reduce costs in a disaster. Literature offered various suggestions for more effective crisis management policies with different techniques utilizing different theoretical frameworks. Informal relationships among crisis management employees were suggested to have a positive impact on crisis management effectiveness. Yet it was not demonstrated with advanced statistical tools if there is such a relationship.

This study considers crisis management effort as a network effort and employs complex adaptive systems theory in order to understand factors influencing effectiveness of crisis management networks. Complex adaptive systems theory presents that more open communication lines in a given network or an organization would increase effectiveness of it since inner processes of the network or organization would obtain more information from the chaotic environment. Quality of informal relationships (casual relationships, social capital etc.) was hypothesized as a tool to open more communication lines within an agency which would eventually increase effectiveness of the network constructed by the organization. Based on the theoretical framework, adaptiveness capacity of the agencies was also tested in order to understand a correlation between adaptation and effectiveness of crisis management networks.

Multiple case-study method was employed to identify incidents that can represent crisis management in full perspective. Terrorist attacks carried upon by the same terrorist network hit

New York in 2001, Istanbul in 2003, Madrid in 2004, and London in 2005 were selected. First response phase of crisis management and policy changes after and before the attacks were discussed. Public administration processes and other social-economical conditions of countries were examined in terms of crisis management structure.

Names of key agencies of selected crisis management systems were suggested by a social network analysis tool-UCINET. Six key agencies per incident were targeted for surveys. Surveys included a nine-item-quality of informal relationships, four-item-adaptiveness capability, and ten-item-perceived effectiveness of crisis management networks-scales. Respondents were asked to fill in online surveys where they could refer to their colleagues in the same incidents. 230 respondents were aimed and 246 survey responses were obtained as a result. Surveys formed a structural equation model representing 23 observed factors and 2 latent constructs. Confirmatory factor analysis was utilized to validate hypothesis-driven conceptual models.

Quality of informal relationships was found to have a significant positive impact on perceived crisis management network effectiveness (Standardized regression coefficient = .39). Two of the adaptiveness variables, openness to change and intra-organizational training were also positively correlated with the dependent variable of the study (Standardized regression coefficient = .40 and .26 respectively). Turkish and American groups' differences suggested a social-economical difference in societies. Majority of the respondents were some type of managers which made it possible to generalize the results for all phases of crisis management.

Discussions suggested improved informal relationships among crisis management employees to provide a better crisis management during an extreme event. Collaborative social events were offered to improve crisis management effectiveness. An agency's openness to change proposed that a crisis management organization should be flexible in rules and structure

to gain more efficacy. The other adaptiveness variable, intra-organizational training efforts were proposed to have certain influence on effectiveness of crisis management network. Factors built latent construct of perceived crisis management effectiveness were also found out to be important on crisis management, which of some are ability to carry out generic crisis management functions, mobilize personnel and resources efficiently, process information adequately, blend emergent and established entities, provide appropriate reports for news media etc.

Study contributed to the complex adaptive system theory since the fundamentals of the theory were tested with an advanced quantitative method. Non-linear relationships within a system were tested in order to reveal a correlation as the theory suggested, where the results were convincingly positive. Crisis management networks' effectiveness was demonstrated to be validated by a ten-item-scale successfully. Future research might utilize more disaster cases both natural and manmade, search for impact of different communication tools within a system, and look at the relationships among members of crisis management networks instead looking within an organization.

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1. INTRODUCTION

1.1 Statement of the Study Problem

Crisis management (CM) has received increasing attention in public policy research due to an increase in the number of natural and manmade disasters and casualties, as well as the damage caused by those events (IRIN, 2005). Different suggestions have been made to improve CM policy and administration (Quarantelli, 1987; Stern & Sundelius, 2002; Gillespie, Robards, & Cho, 2004; Perry & Lindell, 2003; Alexander, 2005; Jaeger, Shneiderman, Fleischmann, Preece, Qua, & Wu, 2007; Farazmand, 2007). There is no doubt that CM efforts should be improved in order to handle those events more effectively, as the public has been pushing governments to improve CM policies (Kapucu & Van Mart, 2006). There is, however, no consensus on universally applicable best-practice policies among the cited studies.

Research has shown that well-implemented crisis management policies can save human lives and reduce damage to property (McEntire & Myers, 2004). Inefficient crisis management efforts result in excessive property damage and an increase in lives lost (Alexander, 2005). The International Federation of Red Cross and Red Crescent Societies (IFRC) reported that in underdeveloped or developing countries, citizens were more vulnerable to disasters because of inadequate preparedness and mitigation efforts (IFRC, 2002).

Birkland defines disasters and crises as “focusing events,” which are “rare, harmful, sudden event(s) that become known to the mass public and policy elites virtually simultaneously” (1997, p. 3). Disasters and crises are focusing events; however, the term *crisis* has a broader meaning that includes change and learning processes in policies (Birkland, 2006, p.

5; Boin & Hart, 2006, p. 52). Although crises after disasters create devastating outcomes, they can still be neutralized and even routinized with mitigation and preparedness studies (Birkland, 2006; Alexander, 2005). Crisis management consists of hazard mitigation, disaster preparedness, response, and recovery operations (Petak, 1985; Waugh & Streib, 2006; Perry & Lindell, 2003). The term *crisis management* (CM) will be used in this paper instead of the terms *emergency management* and *disaster management*, which are also used in the literature to explain the same four-phase process, because this study also looked for the policy-changing aspects of CM (Birkland, 2006).

Research shows that boundary spanners among or within organizations can have an impact on the effectiveness of collective action (Kapucu, 2006; Rusaw & Rusaw, 2008); however, this perspective was not fully utilized specifically for crisis management organizations using different cases as examples. This study researched the relationship between the quality of informal relationships within CM organizations and the interorganizational effectiveness of CM networks. The adaptation of organizational rules and structures was also examined in terms of CM network effectiveness.

In order to understand the conditions affecting the effectiveness of interorganizational response efforts, various real-life crisis management operations worldwide were examined. The 9/11 WTC Attacks in 2001, the Istanbul Bombings in 2003, the Madrid Train Bombings in 2004, and the London Metro Bombings in 2005 were employed as case studies. The most interacting agencies in those incidents were obtained by UCINET Analysis (Borgatti, Everett, & Freeman, 2002). The employees of selected CM organizations were surveyed. The survey results formed a dataset that was used to construct a Structural Equation Model (SEM). The SEM results enable researchers to identify how the perceived effectiveness of interorganizational networks relates to

the quality of informal relationships and adaptation, using the measurement scale for CM organizations derived from Quarantelli (1997).

If this study verifies that an increase in the quality of informal relationships within CM organizations can increase interorganizational effectiveness during different emergencies, it can be used as a best-policy suggestion that will allow CM efforts to benefit more people. It will be a great success even if only one person is saved in a response/recovery effort of CM organizations backed up by developed informal relationships as a result of this study. Furthermore, the study will contribute to the network theory and the complex adaptive systems theory, as the theoretical constructs will be utilized and tested in a multivariate statistical model.

1.2 Definition of the Terms

Crisis management can be defined as the rescue, preparedness, and mitigation efforts accomplished by governments, volunteer organizations, or other local governments before, during, and after an “unexpected, uncontrolled public damage that disrupts or impedes normal operations, draws public and media attention, threaten public trust” (Smith, 2006, p. 7). Public damage can be anticipated and prepared for (Stallings & Quarantelli, 1985; Alexander, 2005). Petak (1985) classifies the four CM phases as “mitigation, preparedness, response, and recovery.” By contrast, CM generally refers to response efforts initiated immediately after a disaster. However, the response phase is actually just a smaller portion of CM (Waugh, 2000). *Mitigation* is considered a “risk reduction program” (Petak, 1985) that targets an area known to be source of a public danger. Mileti (1999) argues that mitigation is conducted to reduce the destructive effects of disasters. Land use planning, establishing warning systems, developing newer engineering codes, and the utilization of advanced technology to predict future hazards are

examples of mitigation (Gillespie, Robards, & Cho, 2003). Thousands of public and private organizations take place in mitigation efforts, which can require several decades or even more. Mitigation policies are not conducted against a specific hazard; they are applied in an all-hazard concept (Mileti, 1999; Waugh, 2000).

Preparedness, on the other hand, is a narrower term for a more specific risk area, which includes planning a disaster management policy, training first responders and volunteers, and developing essential agreements among public, local, and nonprofit organizations that are supposed to act together in a crisis situation (Petak, 1985, p. 3). Christoplos et al. (2001) also add ensuring the readiness of the society to the preparedness phase. Mitigation and preparedness efforts can seriously reduce the damaging effects of an emergency or disaster (McEntire & Myers, 2004; Alexander, 2005). Since crisis management is performed by public, private, and nonprofit organizations, and since these organizations' structures are different from one country to another, the emergency response systems of different countries are also different. There are, however, some best practices discussed in this study that increase the effectiveness of any CM organizations dramatically.

The recovery phase begins with the disaster. This phase includes the processes that return the society to a normal condition (Petak, 1985). Waugh (2000) suggests that the recovery phase is increasingly becoming a "long-term reconstruction of the community" (p. 12). Temporary housing, providing emergency food and energy, debris clearance, and even loaning to small businesses after a disaster are cited under the recovery phase in CM (Waugh, 2000). The response phase includes the immediate search and rescue operations. Professional and volunteer first responders provide emergency aid to the victims in this phase. Evacuation, medical

operations, and firefighting are frequent procedures used in this phase to minimize damage and save lives (Waugh, 2000).

The mitigation, recovery, and preparedness phases take more time than the response phase. A quantitative assessment of CM therefore requires decades of observation and measurement. Moreover, many public and private organizations take part in those CM phases for a very long time. On the other hand, the response phase is about “providing emergency aid and assistance, reducing the probability of secondary damage, and minimizing problems for recovery operations” (Petak, 1985, p. 3). It is also known that the majority of crisis management organizations showed their greatest efforts during those incidents, which makes it easier to define and measure their effectiveness in this phase alone. In order to measure the CM network effectiveness in a short period of time with the highest efficiency, this study utilized quantitative evaluations only about the response phase of CM efforts in cities that had been targets of terrorist attacks.

In order to reveal the first study variable, *quality of informal relationships*, the study utilized surveys filled out by CM first responders who were either managers or team members who actually took part in response efforts in each studied country case. The survey employed a nine-question scale that Nielsen, Jex, and Adams (2000) and Morrison (2004) created to indicate the quality of informal relationships within selected organizations. In conducting the surveys, the employees were selected from the CM organizations that played the most significant roles during the emergencies.

The *perceived effectiveness of the CM Network* is the dependent variable of the study, which indicated how effectively interorganizational CM networks operated according to the survey respondents selected from CM employees. It was difficult to build a scale to measure CM

networks' effectiveness since these efforts took a very long time, included numerous participant organizations, and occurred in a chaotic environment. Various dimensions of network effectiveness can be considered in the measurement process (Provan & Milward, 1995). However, Quarantelli (1997) suggests ten criteria to measure and evaluate the crisis management efforts of interorganizational actions. These criteria include having a crisis coordination center, the existence of crisis management training centers before major devastating events, and legal arrangements related to crisis management. This study applied all ten of those evaluation criteria to an SEM model to grade the effectiveness levels of case countries' CM organizations.

Additionally, the *adaptation processes of CM networks* were used as predicting variables to estimate effectiveness perception. In other words, interorganizational efforts were also examined in terms of organizational learning and adaptation processes (Comfort, Sungu, Johnson, & Dunn, 2001). Organizational changes after drastic events in the environment were important discussion points for this study. Because these changes may have positive or negative impacts on effectiveness, organizations should be aware of the ways in which environmental events have changed their operation in order to keep themselves on the right track. The harm caused by such drastic changes can be minimized with the help of a successful learning and adaptation implementation system (Comfort et al., 2001). Four adaptation variables derived from the complex adaptive systems literature quantified the adaptation capability of agencies. From that perspective, the predicting variable, adaptation, provided to the study both theoretical and practical insight.

1.3 Purpose of the Study

The variables having the greatest impact on the effectiveness of crisis management were revealed by quantified results, which led to a clearer understanding of CM research. The effectiveness of interorganizational networks was examined in terms of informal relationships and organizational adaptiveness, which was based on the Complex Adaptive Systems (CAS) theory and network theory literature. Different countries were studied to provide global insight to the study. Thus, a broader generalization of the results could be applied in the development of generic strategies for CM.

Studying different CM operations and different public administration systems in terms of interorganizational effectiveness would provide a comparative perception of crisis management action. If possible, efficient strategies could be suggested to improve crisis management efforts. These suggestions could provide more cognitive tools to first responders in crisis situations. As with mitigation efforts, this study will also reduce the devastating impact of crises and lead to the improvement of crisis management organizations' performance.

Research Questions

1. What constitutes the general difference among the case countries in terms of crisis management effectiveness? What can be suggested to improve CM actions universally?
2. Does the quality of informal relationships within crisis management organizations affect the effectiveness of the crisis management organizations?
 - a. If there is a relationship between the quality of informal relationships and the effectiveness of CM, what is its direction?

- b. If there is a relationship, what is the strength of that relationship?
- 3. Does the adaptation capability of organizations have any impact on the effectiveness of crisis management organizations?
 - a. Does the adaptation capacity of an organization have any impact on informal networks?
 - b. If such an impact exists, what is the magnitude of the correlation?

1.4 Significance of the Study

It was discussed above that the literature provides extensive qualitative information about methods for improving crisis management. The researchers did a great deal to indicate which method is more effective than the others to improve crisis management. National response plans or frameworks, professional public crisis management foundations, training facilities for first-responder agencies, and more collaborative CM policies replaced conventional Cold War civil defense tactics and methods with the help of studies performed in developed countries (Quarantelli, Lagadec, & Boin, 2006).

This study, on the other hand, combined different methodologies, which is distinct to the disaster management research area. SEM modeling was used to quantify the perceived effectiveness, the quality of informal relationships, and the adaptation capacity of agencies that took part in interorganizational CM networks formed during four different terrorist bombings that targeted civilians in the most possible destructive way. Such a multivariate statistical study represents a great example of empirical research on complex adaptive systems and crisis management.

2 THEORETICAL FRAMEWORK AND LITERATURE REVIEW

2.1 Complex Adaptive Systems Theory

Dooley (1997) argued that a paradigm shift has taken place in organization science over the last century. The deterministic Newtonian approach was used to understand the future scheme of an organization by utilizing the current environment and structure of that organization. The basic assumption of this approach was that the systems would continue to do the things that they are supposed to do if they were provided with a suitable situation, adequate resources, and convenient environmental conditions. Managerial theories in the beginning of the 20th century depended on this assumption (Dooley, 1997); Taylor, Fayol and other scientific management theorists built their mechanical metaphor for organizations on this deterministic approach (Morgan, 2006). Unlike mechanical approaches, complexity theory defends the notion that stability stands between order and disorder, firmness and chaos—what is called “edge of chaos” (Kauffman, 1993).

Quantum theory’s uncertainty clause altered the deterministic-Newtonian approach not only in physics but also in the social sciences (Dooley, 1997). Moffat (2003) argued that organizations exist in complex environments (p. 42). These complexities are related to the nonlinear interactions (nonequilibrium order), decentralized control (or self-organization), adaptation, and collectivist dynamics of the organization (Moffat, 2003). Complex adaptive systems have some common attributes, such as *parallelism*, *conditional action*, *modularity*, and *adaptation*. Parallelism explains the simultaneous relationships existing among the systems. Conditional action is the responsive strategic ties’ reporting feedbacks to the system. Modularity suggests some predetermined batch commands by which a system can overcome a problem.

Adaptation and evolution is the final phase for a CAS, because the learned patterns become involved in the system, which means a change in structures and goals (Holland, 2001, 2006).

Non-hierarchical relationships such as friendships, social contacts, and even accidental communications can directly affect the effectiveness of complex adaptive systems (Krackhardt & Stern, 1988). Morel and Ramanujam (1999) defined complex adaptive systems as an interdisciplinary area from which organizational behavior can benefit. Complexity and organizations are inevitably and naturally related (Axelrod & Cohen, 1999), but the relationship between these two concepts is complicated. Large numbers of non-linear elements make the study of complex adaptive systems difficult (Morel & Ramanujam, 1999).

Anderson (1999) examined the complex adaptive systems theory as a product of open systems theory because of its inclusion of environmental dependence as a factor. Interactions with the organizational environment cannot be accomplished through conventional hierarchical ties. Thus, organizations set up non-linear relations within and outside the system body to increase communication channels. These “strategic ties” that exist both inside and outside the system follow a descent path to increase efficiency and decrease dependency on the environment (Stacey, 1995). Stacey (1995) called the ties “strategic” because they provide both negative and positive feedback that helps the organization stay in an equilibrium state, which means that the organization can survive the situation despite detrimental effects.

Scholars interpret the steps of complexity in similar terms. Anderson (1999) defines the key elements of the complexity theory as “agents with schemata” (1999, p. 221), “self-organizing networks sustained by importing energy” (1999, p. 221), “coevolution to the edge of chaos” (1999, p. 223) and finally “system evolution based on recombination” (1999, p. 225). McKelvey (1999) argues that four fundamental forces replace Scott’s (2003) organization

metaphors, which are “adaptive tension, self-organization, interdependency effects, and multilevel coevolution” (1999, 302). In complex adaptive systems, the agents interact with each other regarding their perceptions, actions, and social roles in organizations. The first element of complexity is that the interactions will influence every single agent’s thinking and behaviors. These changes in agent thinking and behavior will alter the process principles of the entire organization (Rouse, 2000). The second element explains the self-organization of the system. After affecting and changing each other’s behaviors in the system, agents’ interactions create positive feedbacks; therefore, they do not need to be changed. Stability in interaction and organizing makes it possible to stay steady for the system without the involvement of a central or outside impact (Anderson, 1999).

The third element uses the Darwinian ecological evolution metaphor to explain the evolution process in the complex adaptive systems to adapt the changes in the environment and in the system itself (Anderson, 1999). Interestingly, small changes can result in great changes, while carefully implemented significant policy changes can produce insignificant change (Vogelsang, 2002). This evolution can even change an organization’s goals (Anderson, 1999), which form the final element of complex adaptive systems. Agents’ behaviors, interactions, organizational culture, inner processes, and goals are subject to change along with changes in the environment (Anderson, 1999; Vogelsang, 2002). Self-organized, agent-based, environmentally driven system rules are evaluated on an evolutionary basis; thus the system stands in the organizational environment with its strategic ties.

Kiel (1997) argued that CM agencies operate within dynamic and disproportionate systems. These organizations are complex systems by themselves because numerous organizations take part in the CM action randomly (Axelrod & Cohen, 1999). Irreducibility

(“knowing a system is not the same as knowing its elements”) is an important component of complex systems (Overman, 1996, p. 78). In any extreme event, local, regional, national, international, nonprofit, public, and private actors all play a critical role within the same environment for preparedness, mitigation, rescue, and recovery operations (Comfort, 1994). Even individuals moderately affected by events take part in those efforts independently. These emerging groups make CM a complex effort.

The relationships of these organizations with the other elements in the environment make CM action even more complex. Each CM organization in the crisis scene is connected to a different organizational entity, which produces a complex relationship web. For example, some local CM organizations, including first responders such as police and fire brigades connected to local municipalities, and some international disaster relief organizations, such as the German Technisches Hilfswerk (THW, Technical Help Service) connected to the German Government and the European Union, participated in the Hurricane Katrina rescue efforts that occurred in 2005 in the U.S. (Sherraden et al., 2006). Another reason for the complexity is that the exact timing of disasters is unknown before the incidents. The suddenness of manmade and natural disasters adds another dimension to the complexity of CM.

Chaos and unpredictability in the crisis environment increase nonlinearity in the systems (Carley, 2002) operating within it, including CM agencies. Even the best calculations and estimates in mitigation and preparedness efforts can result in big failures (Kiel, 1997). The policies formed for linearly operating systems may not work in chaotic times; normal procedures do not necessarily produce the expected results in nonlinear systems. However, Kiel (1991) suggested that the fluctuations caused by the chaos within and outside of an agency can be

repetitive or rhythmic. As a result, the nonlinearity of those systems does not necessarily form completely unknowable characteristics (Kiel, 1997).

Chaos is not detrimental to complex systems; it actually serves a useful function in providing stability. Organizations usually use *entrainment* to stabilize their processes and goals for as long as possible. Chaos breaks this rule and forces organizations to change this “mode lock-in” (1997, 191) since the only way to survive in chaotic times is to look for new process forms. Chaotic cycles also work as a learning opportunity, because in a chaotic situation the organization tries every possible method to survive. Successful methods are recorded in positive feedbacks, which results in organizational learning (1997, 192). Looking at these functions of chaos, it is clear that chaos offers both danger and opportunity (Overman, 1996).

Based on these assumptions, Kiel (1989) suggests that policy makers should consider both traditionalistic linear processes and the nonlinear relationship mechanics of complex and chaotic systems. Chaotic complex systems can be understood and managed properly once the definable boundaries of chaotic behavior are typified (Kiel, 1997). “Deterministic chaos” (Kiel, 1997, 190) defines the probability of chaotic cycles, which can be prepared for beforehand and managed in a simple and mechanical way. Rosendhead (1998) argued that the managers of complex systems should try to keep the agency in bounded instability instead of a perfect equilibrium mode. Chaos and unpredictability should, in other words, be employed as partners.

Kiel (1997) suggests two methods for controlling chaos. The first method is tightening the borders of agents’ actions. The limited freedom of agents will provide stability and reduce the unpredictability of the system. This conservative management style is a solution provided by the old deterministic ideology that considers linear hierarchies among and within the agencies. Limiting self-organization and increasing the central command authority appears to increase the

predictability of a system's actions. Kiel (1997) argued, however, that unconsidered nonlinear processes in a complex adaptive system will fail the processes used to regulate linear relationships.

Rosenhead (1998) and Kiel (1997) suggest another method for organizations that will employ complexity and chaos as an element. Constant feedback from the members of a system will make the administrative and executive branches aware of changes in system's environment. Comfort (1994) emphasized the importance of open lines of communication during chaos. More communication within and among the organizations in a CM system will grant faster and more reliable feedbacks. Eventually, nonlinearity would have been employed as an organizational attribute. The suddenness of positive and negative feedbacks can increase the effectiveness of CM operations (Figure 1).

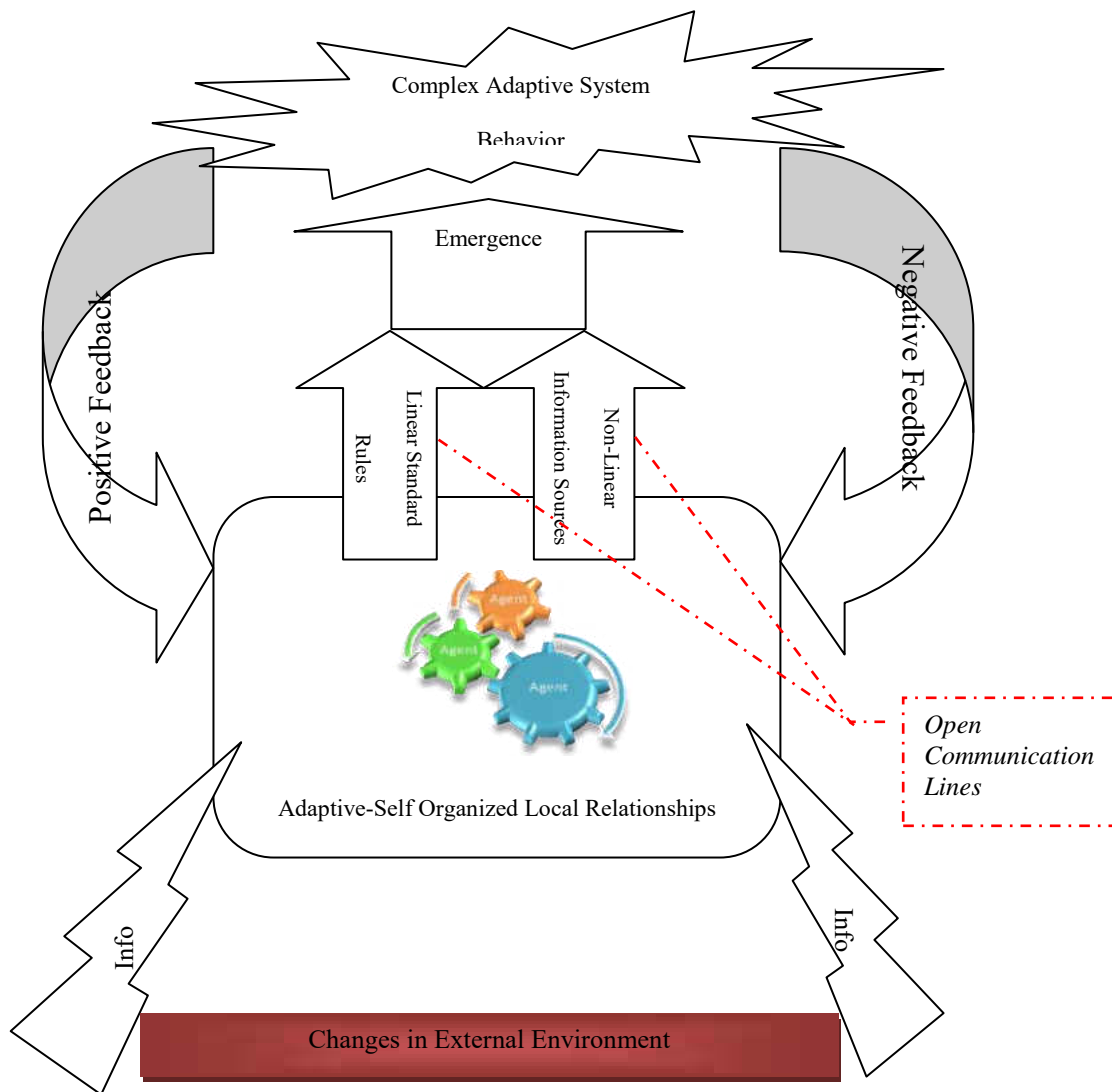


Figure 1. Proposed Theoretical Model

Cohen et al. (2002) blamed the communication failure between the New York City Police (NYPD) Department and the Fire Department of New York City (FDNY) for the deaths of firefighters at Ground Zero on September 11, 2001. Rosenhead (1998) introduces the idea of *extraordinary management* (1998, p. 7) to explain how administrators should absorb chaotic shocks from the environment. Extraordinary management also requires more open

communication lines among members. Continuous learning is the only tool for coping with the maximum-uncertainty situations that CM agencies face (Kiel, 1997).

Human organizations, like CM entities, learn from the outside world with the help of employees. The employees interact with the environment, which causes organizational learning (Fiol & Lyles, 1985; Levitt & March, 1988). The learning process makes CM organizations more prepared for future incidents because the lessons learned affect the structures and processes in an evolutionary way (Kauffman, 1993). Local and national CM organizations learn not only from their own experiences but also from other countries' practices with the help of developed communication tools. Successful CM tools and organizational structures in different places are copied and imitated to increase effectiveness in CM efforts (Comfort & Kapucu, 2006). The paradigm shift in CM from Cold War's notion of *civil defense* to the present model of *resilience* also indicates the adaptation process in CM systems.

Some CM systems are more responsive to negative or positive feedbacks than others, depending on the limitations of the self-organizing capabilities of agencies in different public management systems. Centralistic management makes it difficult for organizations to evolve easily, because strict hierarchy resists change by any means. Carroll and Burton (2000) showed that centralized structures can be as successful as decentralized ones in terms of the CAS framework as long as they maintain a state of adequate information exchange. As discussed below, this study's survey utilizes questions about the perception of the adaptation capability of a general management understanding of CM systems.

2.2 Validity Discussions of Variables in the Study

In this part of the study, the measurement for each dependent, independent, and predictor variables was explained. Two latent constructs were defined and operationalized in the analytical model of this study. These are the perceived effectiveness of CM networks and the informal relationships within them, which were discussed in this chapter comprehensively. Primarily, interviews and the literature review helped formalize the theoretical constructs. Structural Equation Modeling (SEM) enables the researchers to identify the strength and integrity of the study variables and their causal relationships (Byrne, 2001).

2.2.1 Perceived Effectiveness of Crisis Management Networks

Network studies have recently formed a new research area in the social sciences. The organizational effectiveness measurement cannot be used to evaluate network performance; therefore, the literature offers newer and better techniques (Provan & Milward, 1995). Since CM is an interorganizational network effort, the quantification process of this latent construct should include performance measurement methods specifically designed for networks. Before this process, the study briefly explains the conventional organizational performance measurement literature in order to provide a better understanding of network effectiveness concept.

A. Organizational Effectiveness

Effectiveness measurement studies for organizations have been conducted since the first organization was built. Numerous theories based on various assumptions and cultures were used to verify those effectiveness methods. Generally, different input-output comparisons were employed to grade effectiveness results. Kirchoff (1977) summarized the organizational

effectiveness literature and suggested an assortment of measurement rubrics for “organizational effectiveness, managerial effectiveness, and manager and subordinate behaviors and attitudes” (1977, p. 348). He stood against the oversimplification of effectiveness measurement. His study made it clear that researchers will acquire different effectiveness results for the same organization if they apply different measurement methods, such as goal-oriented or evaluation-oriented tests; however, the effectiveness measurement test will fail if only one of those criteria is applied. Therefore, one should utilize a unique measurement set to understand the effectiveness of an organization, since the complex organizations pursue complex goals. The measurement scale should be related to a particular set of derived or prescribed goals for the organization (Kirchhoff, 1977).

Steers also (1975) defined some problems in effectiveness measurement procedures. Some of the 17 effectiveness measurements he established as evaluation criteria were adaptability-flexibility, productivity, and satisfaction. Steers (1975) also stated that the evaluation criteria for organizational effectiveness evolved in time. The classical way of thinking favored basic cost-benefit analyses, or sometimes more retrospective cost-effectiveness analyses. Basically, the inputs and outcomes of an organizational effort were compared to each other in a cost-benefit analysis. Cost-effectiveness, on the other hand, was based on evaluating different strategies by comparing them to other alternatives. This is, however, no longer the case in organizational science literature.

Organizational effectiveness has more often been evaluated with other variables such as adaptability-flexibility, consumer satisfaction, and employee retention recently. Social values in societies and organizational norms are the best predictors for those evolving effectiveness criteria. For that reason, measuring organizational effectiveness needs a contingent approach

more than a predetermined one. In other words, there is no single universal way to evaluate the criteria for an effectiveness measurement model. The criteria should evaluate different characteristics of organizational effort in terms of the organization and its environment (Kirchhoff, 1977; Steers, 1975).

Quinn and Rohrbaugh (1983) also dealt with the criteria selection systems for measuring effectiveness in organizational studies in terms of complex systems. If one suggests too many various organizational variables by which to measure effectiveness, it is possible that no evaluation will be performed because of the impossibility of gathering all those variables into a single test (Quinn & Rohrbaugh, 1983). Social values and norms within an organization are also a part of those criteria, which toughens the job for researchers. An integrating, multiple-variable, contingent test seems to be the best alternative for effectiveness measurement, although it will raise many objectivity problems as well. Effectiveness analysis is simultaneously organizational analysis. One should know about the processes, policies, structures, and goals of an organization in order to assess it (Quinn & Rohrbaugh, 1983).

Scott (2003) suggests three different perspectives from which to analyze organizations: the rational, natural, and open-systems models. These models suggest different attributes for organizations, and thus different effectiveness criteria. Scott (2003) also discussed combined approaches. The structures and goals of organizations mainly defined the types besides the dependency factor to resources.

Rational organizations are defined using a “machine” metaphor (Morgan, 2006, p. 15). There are specific rules for rational organizations (Goal Specificity, 2003, p. 29). An organization is constructed to achieve a specific goal. The other important characteristic of rational organizations is “formalization” (2003, p. 33). There are strict and certain rules by which

rational organizations achieve their goals; these rules are followed through the whole structure of the organization. Scott (2003) gives examples of the successful implementation of rational organizational rules, such as Scientific Management (Taylor), Administrative Theory (Fayol), Bureaucratic Theory (Weber), and Rational Decision Making (Simon). “Scientific management” focused on increased efficiency, while the others focused more on the processes of an organization (2003, p. 49).

Natural organizations, on the other hand, have complex goals. They are like “living organisms” (Morgan, 2006, p. 33); they try to “survive” in the organizational environment (Scott, 2003, p. 73). Unlike rational organizations, natural organizations depend on informal relationships more than formal ones. “Processes” and policy implementation are more important than decision making. Scott (2003, p. 54) discusses the informal relationships among employees in formal organizations and its importance. Goal complexity is another issue that natural systems deal with differently from rational ones. There are real goals and “professed goals” (p. 52). Even though an organization can have written, rational-type rules, it can, for the sake of surviving, follow other rules that are not clearly defined. Like a living organism, social evolution can change the structure of the organization dramatically. New structures can be established to adapt to the change in the environment, while some structures can be abandoned for the same reason (pp. 52-73).

The *open system* is the third and the last structure type that Scott (2003) discusses while classifying organizations. Basically, organizations and, in a broader sense, systems are formed by different components that are independent and/or interdependent. Open systems theory has the greatest complexity among other types in terms of its “analogy” (Morgan, 2006, p. 38). The theory suggests that present organizations are interdependent with the other organizations in the

environment. Organizations are like components in a system, which interact with each other. Some systems use others' products as inputs. This creates "interdependency on the others" (Scott, 2003, p. 25). Systems cannot survive without others' existence. The networks theory also suggests the organizational networks' dependence on environmental factors.

B. Network Effectiveness

Provan, Fish, and Sydow (2007) argue that networks cannot be understood unless they are evaluated as "whole networks." In order to explain networks, the literature utilized "common themes (such as) social interactions, relationships, connectedness, collaboration, collective action, trust, and cooperation" (Provan et al., 2007). Networks theory takes its strength from the theory's suggestions for contingency, imperfect environment information, and interdependency clauses (Agranoff & McGuire, 2001). However, measuring the effectiveness of networks is more complex than simply measuring the effectiveness of single organizations. The satisfaction of stakeholders is a primary criterion for network effectiveness. Public organizational networks' common stakeholder is the public; thus, the community's satisfaction rate is the most common measurement tool for public networks (Provan & Milward, 1995). For that reason, any environment-driven policy tool that will bring customer satisfaction is supposed to achieve a significant level of network effectiveness.

Some stakeholders may be special; their concerns may be different from the rest of society. For example, Provan and Milward (1995) argue that special interest groups such as prison inmates or school children constitute different kinds of stakeholders that can have concerns that are completely different from—or even contrary to—the public. Thus, political concerns are also important to address when evaluating network effectiveness. Provan and

Milward (1995) summarize this idea as follows: “Networks must be evaluated as service-delivery vehicles that provide value to local communities in ways that could not have been achieved through the uncoordinated provision of services by fragmented and autonomous agencies” (p. 25).

Evaluations based on the services delivered made network effectiveness measurement scales unique. For example, Siegel, Clayton, and Kavoor (1990) defined a measurement set to evaluate the institutions educating students in public administration in the U.S that only included variables related to the processes of those departments (p. 221). Thomson, Perry, and Miller (2007) also suggested a contingent method for measuring the collaboration among the organizations in a network. Despite the low response rate (32%) of the surveys and insignificant statistical results (p for Chi-Square > 0.05) of the SEM structural model, the authors argued that reciprocity played a significant role in collaboration and governance. They suggested a more contingent measurement scale for the future research agenda in collaboration (Thomson et al., 2007).

Networks should be evaluated to understand whether they really work (O’Toole, 1997). The evaluation requires a comprehensive study regarding stakeholders, as well as the environment, structures, and rules of the network. The numerous difficulties discussed above force this study to have a contingent standpoint in terms of CM networks. The contingent network variables were assorted in Provan and Milward’s (2001) study in regard to the organizational and network level. Using Quarantelli’s ten criteria (1997), the study utilized the contingent approach suggested.

C. Perceived Effectiveness of Crisis Management Networks

Since the four phases of crisis management (Petak, 1985) include very different and complex labor and all these efforts are too difficult for a single entity to conduct (even when that entity is a government), society needs specialized and professionalized organizations for these operations. This is the basic reason why crisis management effort is a network effort; no single body can accomplish all the phases of crisis management by itself (Agranoff & McGuire, 2001). As suggested in the previous chapter, CM effectiveness could be measured first by defining the stakeholders. In the New York WTC Attacks (2001), the Istanbul Bombings (2003), the Madrid Train Bombings (2004), and the London Metro Bombings (2005), the CM networks' stakeholders were the organizations that took part in the response and recovery efforts and the victims who suffered from the attacks. *Victims* are the people directly affected by the attacks, whether physically or psychologically. In essence, entire nations can be counted as victims, and thus as stakeholders.

Measuring crisis management organizations' effectiveness is challenging because of the presence of complicated results, chaotic environments, incomparable or non-standardizable inputs and outputs, and numerous participants and stakeholders. CAS theory suggested that the complexity in non-linear interactions will increase with a greater number of interorganizational relationships (Alexander, 2005). Emergencies or extreme events leave a lot of people dead, injured, or incommunicado; destroy coordination routes such as roads, telecommunication lines, and the like; and halt the normal flow of life, which shocks the victims badly (Samardjieva & Badal, 2002; Helbing, Ammoser, & KÄuhnert, 2005; Dynes & Quarantelli, 1976). The stakeholders have very complex and immediate needs; thus the effectiveness measurement

should take as many of those variables as necessary into account to achieve a significant validation level for the proposed latent construct.

The effectiveness measurement scale should be designed to fit in a way that demonstrates the characteristics of CM networks. The structures, relationships, basic rules, processes, standard exercises, attributes, and any other traits of CM systems should be addressed in the scale. Several studies evaluated crisis management responses quantitatively. Drabek et al. (1981) is the pioneer of such studies; the study in question utilized a detailed questionnaire administered to both the emergency management officials and victims of selected fourteen case studies. They selected the target organizations by using a block modeling technique similar to the UCINET method. Block modeling is a tool used to reveal the relationships in a network (Drabek et al., 1981). The survey questions were related to organizational attributes more than to network effectiveness.

Quarantelli (1997) suggests a scale for empirical studies. The study operated on these “ten criteria” (Quarantelli, 1997):

1. Correctly recognizing differences between response and agent-generated demands
2. Adequately carrying out generic functions
3. Effectively mobilizing personnel and resources
4. Generating an appropriate delegation of tasks and division of labor
5. Adequately processing information
6. Properly exercising decision making
7. Developing overall co-ordination
8. Blending emergent and established organizational behaviors
9. Providing appropriate reports for the news media
10. Having a well-functioning emergency operations centre. (p. 41-54)

The first statement is about the preparedness phase. It controls whether the CM organization is aware of the reason for the crisis. If the CM employees' behaviors are based on a management crisis resulting from the chaotic environment, then CM will not be successful. If the

disaster agent (whether it is a flood, a terrorist attack, or something else) is clearly known and the CM efforts are based on that specific agent, then the CM operates effectively. The second criterion more specifically assesses CM capability. Generic functions such as evacuation, temporary housing, and the like are basic operations that a CM system should be capable of performing in the most extreme events. The third criterion concerns resource allocation in a crisis environment. If the CM system is ready to deliver those services and resources to the victims effectively, then the CM strategy is efficient.

The fourth criterion is more about the management of the CM effort. The organizations should have the specifics of division of labor and delegation of authority codified in writing before extreme events occur. The fifth statement tests whether the information transmittal process during a crisis is successful. Communication has been seen as the main problem in many disaster recovery actions; however, it was not due to the communication tools, it was about the things that were communicated. Quarantelli (1997) suggested that the fifth criterion has three dimensions: processing information within an agency, with other agencies, and with affected citizens. The surveys included different questions for each dimension, and another variable combined all these in one factor.

The sixth and seventh criteria concern the CM network process during an extreme event. Proper decision making and efficient coordination among the CM organizations is crucial, since the continuity of life depends on them. The eighth criterion may be seen in the same light; however, it is very different because it includes emergent groups besides CM organizations. Emergent groups are volunteers and affected citizens. Those groups should take part in CM plans as first responders for an effective CM. Otherwise, CM networks would not only lose an

important resource in the response and recovery phases, but would also face difficulties because of jurisdictional conflicts, authority problems, and lack of public support.

The last two criteria are the most concrete indicators of CM effectiveness. Appropriate and routine press meetings during an extreme event will provide accurate information to the press and eventually to the public. Quarantelli (1997) argues that the media will continue to disseminate information even if they do not receive accurate information from CM officials, which will lead to the public receiving inaccurate information. Press meetings can also be important for informing the public, as governments do not have adequate news channels to disseminate as much as the media can. The last criterion is a well-established coordination center for CM organizations. This center is not just the common infrastructure, but also a social system with which different organizations interact with each other via liaison personnel.

As seen above, the Quarantelli (1997) scale deals with the networks, coordination, communication, effectiveness, performance, cognitive skills, validity, and operability of CM efforts. The scale includes conventional organizational efficiency criteria (Kirchhoff, 1977; Steers, 1975) and advanced network performance criteria (Provan & Milward, 2001). It is also contingent, as the variables are only related to CM efforts. The “ten criteria” (Quarantelli, 1997) were used in this study’s survey with Likert scale questions in five response categories.

2.2.2 Quality of Informal Relationships

The quality of informal relationships within crisis management organizations is easier to measure with respect to the network’s effectiveness level. Selected organizations’ employees were surveyed to understand the degree of informal relationships among personnel. Friendship relationships were found out for each participant organization. A high quality in informal

relationships was assumed to be a predictor for better network effectiveness perception since more friendships were assumed as having more open communication lines.

Informal relationships involve friendships, casual encounters, and other social ties among employees of organizations, which can be made quantifiable with competent scales (Nielsen et al., 2000; Morrison, 2004). Friendships generally occur in the subunits of an organization. They can create dysfunctional results if uncontrolled. However, when correctly applied, informal ties among and within networks can bring efficiency to the related organizations (Krackhardt & Stern, 1988). Informal ties also provide trust among and within the agencies; they may even replace formal relationships. Additionally, increasing numbers of organizations employ teams for efficiency, another factor that reveals the importance of informal relationships (Nielsen et al., 2000). Informal relationships within an organization can directly affect the performance of the whole organization (Morrison, 2004). Both Nielsen et al. (2000) and Morrison (2004) built scales that measure informal relationships in the organizations they examined. This study evaluated those scales for selected CM organizations' personnel.

Informal "relationships are voluntary, reciprocal, and equal" (Morrison, 2004, p. 115). The more informal collaborative structure an organization has, the better it can withstand a crisis (Krackhardt & Stern, 1988). Nielsen et al. (2000) also suggested that informal relationships among employees can enable significantly better work-related outcomes. Thus, it can be theoretically accepted that friendships in a workplace can increase the effectiveness of an organization (Morrison, 2004).

The survey utilized the same questions Nielsen et al. (2004) used:

I am able to work with my coworkers to collectively solve problems.

In my organization, I have the chance to talk informally and visit with others.

I socialize with coworkers outside of the workplace.

I feel I can trust many coworkers a great deal.

I do not feel that anyone I work with is a true friend.

I have formed strong friendships at work. (2004, p. 635)

Nielsen et al. (2004) found that the internal consistency reliability of the utilized questionnaire estimated (with Cronbach's alpha) the “prevalence of friendship” at eighty-nine percent. The survey also used additional related questions from Morrison’s (2004) questionnaire. Morrison asked more than 100 questions in his study; however, this study used only the three most important of them that Morrison (2004) clearly emphasized, which are:

I personally work for this organization because she/he (a special peer) still works here.

Friendships make it [work] a happier place with friendly environment and I enjoy catching up with them each day.

Friendships help us to work cooperatively with each other and support each other at times of stress. (2000, p. 121)

Combined with Nielsen et al.’s (2000) questions, the questionnaire revealed the presence of informal relationships among crisis management organization employees. Responses to each of these items were made on a Likert scale that ranged from 1 (strongly disagree) to 5 (strongly agree). The results were evaluated with the SEM model (Figure 2). The study proposed the following statement based on literature findings:

H1 – A higher quality of informal relationships within crisis management organizations will increase the effectiveness of crisis management efforts.

2.2.3 Organizational Adaptation in Crisis Management Networks

Organizational learning phases were incorporated as the adaptive responses of interorganizational efforts. Stacey (1995) suggested that the evolutionary changes in a system happen within the structural relationships within and outside the organization and/or in changes in the goals pursued. In the learning phase, the organization “can restructure itself and acquire and implement new competences” (Rochet, Keramidis, & Bout, 2008, p. 66). The experience is recorded to the organizational memory, “which will allow it, among other things, to identify the warning signs of any future crisis” (2008, p. 66).

Researchers measured organizational adaptation in different ways. For instance, Chiva-Gómez (2003) processed nine organizational learning and adaptation measurement studies and summarized the evaluation criteria of organizational learning as “experimenting with new ideas,” “continuous improvement,” rewarding,” “openness to change,” “interaction with environment,” “mistake and/or risk acceptance,” “dialogue,” “communication and social construction,” “continuous training”, “empowerment, teamwork, and collective spirit,” “workers that want to learn and improve,” the existence of leadership committed to teaching, a non-strict and flexible organizational environment, and the like (2003, p. 112).

Spector and Davidsen (1998), on the other hand, list “actions as reflected in terms of information flow,” “goal formation processes,” “instances of goal cohesion and goal erosion,” nonhierarchical exchanges, reflective activities, “sentiments as reflected in attitudes and preferences,” respect, support, and trust, “team processes,” communication and co-mentoring, “tolerance for errors,” and the like. Their study compared numerous organizational learning evaluations (Spector & Davidsen, 1998, p. 120). The similarities between these two research efforts give this study a clear direction for selecting a predicting variable: adaptation. Since

adaptation is referred to in CAS theory and was only employed as a predictor variable, it did not serve as a unique latent construct. Instead, most of the important organizational adaptation variables that Chiva-Gómez (2003) and Spector and Davidsen (1998) suggested were utilized as predictor variables for the investigation of the relationship between the perceived effectiveness and quality of informal relationships.

On the other hand, organizational adaptation is generally thought to be exactly the same as organizational learning, despite the fact that the two terms refer to completely different phenomena (Fiol & Lyles, 1985). Organizational learning is an “insightful” experience that is hard to quantify and measure. Organizational adaptation is formed by basic reactions that the organization created against the changes in the environment. The study utilized changing capability and changes in the organization as experimental learning tools. Thus, surveys were also conducted to generate the measures for adaptation capability. The variables presented in the SEM model are “openness to change,” “change in the policies after important events,” “intra-organizational education efforts,” and “frequency of collaborative events,” as suggested in the two studies aforementioned (Chiva-Gómez, 2003; Spector & Davidsen, 1998).

All four of those variables represent a different aspect of organizational adaptation in terms of CAS theory. Openness to change is the starting component of adaptation. CM systems are open systems because they are highly affected by the environment. For example, Corbacioglu and Kapucu (2006) argued that the Turkish Disaster Management System was highly affected by major earthquakes that hit different regions of Turkey and left a great number of casualties. Birkland (2006) also discussed the importance of focusing events in terms of CM policy changes. The World Trade Center attacks in New York City on September 11, 2001 changed CM policies in the U.S. and throughout the world. Since then, terrorism events have been discussed

as crises that need to be taken care of more efficiently and with more adequately planned policies (Birkland, 2006). Based on the literature reviewed, the following hypothesis was made:

H2 – The openness of CM organizations to change has a positive effect on the perceived effectiveness of CM networks.

Policy changes after important events constitute the other adaptation variable in the SEM model (Figure 2). This variable is different from the first adaptation variable because openness merely defines the ability to change. However, concrete changes may not take place even if the CM organizations are capable of doing so. During the Cold War, CM policies were essentially locally operated civil defense strategies (Waugh & Streib, 2006; Birkland, 1997). CM organizations were the same first responders that acted with a more comprehensive understanding of CM right after the Cold War. This means that CM organizations were capable of change; however, the CM policies did not change, due to government pressure to maintain the status quo. In time, organizations learn lessons from their “routine” experiences and then codify the necessary changes in preparation for later crises (Levitt & March, 1988). Changes in policy indicate an organization’s willingness to keep an equilibrium state in the environment, which will eventually improve organizational effectiveness (Anderson, 1999; Kauffman, 1993; Stacey, 1995). Therefore; the next hypothesis is:

H3 – Changes in CM policies due to important events will positively affect CM effectiveness.

Intra-organizational training efforts are suggested to be helpful and performance-enhancing for organizations. Chiva-Gómez (2003) argued that continuous training for all personnel was encouraged by researched private companies. Moreover, in a report criticizing the poor intervention of Federal Emergency Management Agency (FEMA) in the response and

recovery efforts for Hurricane Andrew in 1992, the U.S. Government Accountability Office (GAO) asserted that more advanced training and professional education were needed for improved CM. The report made it clear that intra-organizational training for effective CM is not only needed for the local CM personnel but also for FEMA's federal employees (GAO, 1993). This information led the study to the following hypothesis:

H4 – Intra-organizational training of CM personnel will lead to more effective CM.

Levitt and March (1988) examined the methods for keeping routine experiences in the organizational memory. They found that sharing exercises with other organizations can help to improve organizational memory and capacity. In fact, collaborative team processes and real-time CM efforts are suggested by many scholars to have a positive impact on CM (Alexander, 2005; Perry & Lindell, 2003; Rodriguez, Quarantelli, & Dynes, 2006). By "collaboration," the study refers to CM experiences conducted with other organizations. Real experiences will create an organizational memory that increases effectiveness in later extreme events.

The study proposed that actual events can increase the effectiveness of CM organizations because the organizations will gain practical knowledge of real incidents. The more the organizations deal with crises, the more experience they will obtain. Thus, the hypothesis evaluating this adaptation variable is:

H5 – Frequent actual CM experiences increase CM effectiveness.

2.3 Research Hypotheses

1. *A higher quality of informal relationships within crisis management organizations will increase the effectiveness of crisis management efforts.*

2. *The openness of CM organizations to change has a positive effect on the perceived effectiveness of CM networks.*
3. *Changes in CM policies due to important events will positively affect CM effectiveness.*
4. *Intra-organizational training of CM personnel will lead to more effective CM.*
5. *Frequent actual CM experiences will increase CM effectiveness.*

3 METHODOLOGY

3.1 Analytical Model

Previous studies have found that informal relationships developed before crises and emergencies have a significant positive impact on crisis management efforts (Handmer, 2003; Comfort, 2005; Kapucu, 2006). In those studies, CAS theory was not internationally utilized to address this problem by scholars because a limited number of cases (for example, 9/11) were used to explain informal relationships. It was suggested that casual friendships and informal relationships increase the information about incidents in complex environments. Because complexity and bounded rationality increase in the environment during emergencies due to the increased number of participants and damaged communication lines (Dynes & Quarantelli, 1976), it is crucial that emergency management organizations strengthen their social capital (Kapucu, 2006).

Voorhees (2008) asserted that local emergency workers performed better than authorized emergency organization employees during the WTC attack because of the informal social relationships they had before the incident. Voorhees (2008) also suggested that social skills should be increased among rescue workers to increase the effectiveness of emergency efforts. The analytical model in this study focused on the basic suggestion of open communication lines offered by the CAS theory. However, this study is different because it employs four different emergency cases from around the world and compares them in terms of correlations among quality of informal relationships, adaptation, and network effectiveness. Finally, the study has

gathered evidence to show how informal relationships among crisis management workers can improve response and recovery efforts during an emergency.

The differences in crisis management systems and organizations among several countries were addressed in order to explain the effect of the structures and rules of crisis management organizations. Four countries' crisis management organizations were examined for their efforts during catastrophic terrorist events, including New York in 2001, Istanbul in 2003, Madrid in 2004, and London in 2005. Multi-organizational terrorism response and the coordination perspective were used to show the comparative effectiveness of CM organizations when engaging different management skills and efforts.

The organizational learning and adaptation processes of crisis management organizations in the related countries were examined to discern best practices in effective crisis management operations. Ten effectiveness, nine informal relationship, and four adaptation variables were included. An SEM model was formulated and validated (Figure 2).

3.2 Methods

Emergency management is a four-phase occasion that can take decades to occur (Perry & Lindell, 2003). Many different local, federal, governmental, non-governmental, public, and private organizations or individuals can take part in any CM stage. Quantifying selected study variables for such an occasion, which requires decades and involves thousands of organizations and individuals, is a challenge this study faced. Assessments of emergency management effectiveness are generally qualitative and descriptive (Paton & Flin, 1999; Buckland & Rahman, 1999; Williams, Batho, & Russell, 2000), or quasi-quantitative (Comfort & Haase, 2006). All of these studies used case analyses focusing on specific natural or manmade disasters.

Selecting and examining the rescue and recovery phase of crisis management makes sense when the following points are considered. Firstly, as discussed above, other phases of crisis management can take several decades to complete. Research requiring several decades would be too costly and time-consuming for the purposes of this project. Secondly, thousands of organizations and individuals take part in those phases at different times. This is an important challenge, since a researcher cannot keep records of such a large amount of input in a crisis management system. Lastly, almost all of the organizations and individuals taking part in other phases of crisis management have a role in the response and recovery phases. Therefore, capturing and examining the response and recovery phase enhances the efficiency of this research.

3.2.1 Multiple Case Study Analysis

“Focusing events” (Birkland, 1997, p. 3) are natural or manmade disasters. Terrorist attacks against civilians are the greatest manmade disasters in terms of social panic and public outcry. The fear of another attack has a psychological effect on society that is difficult to overcome. The emergency management systems of most countries in the world have generally been prepared for natural disasters. However, terrorist attacks create another kind of threat that these systems have not experienced before (Aguirre, 2004). Terrorist attacks are different because they are unexpected and unpredictable, the attackers’ methods and the public’s reaction are unknown to public administrators, and the scope of attacks cannot be understood immediately (Wise & Nader, 2002). This difference led this study to focus on terrorist events more than on other catastrophes.

There were and still are many different terrorist organizations in the world fighting for various reasons. Many of these terrorist networks carry out deadly attacks on civilians and government officials in different countries. The ETA in Spain, the IRA in the UK, and the PKK in Turkey, as well as some others in South American countries (Abrahms, 2008), can be said to be the most violent up to now. However, none of them operated worldwide as much as Al-Qaeda did. Al-Qaeda, after its founding during the Afghan-Russian war, operated violently in many European, Asian, African, and American countries. Using the U.S. occupation of the Middle East as a base for its attacks, this terrorist network used car bombings and suicide attacks in its military campaigns. Drugs, blood diamonds, and human trafficking in different countries have been financial resources for this network (Hoffman, 2007).

The sample for this study is members of agencies that operated in interorganizational crisis management efforts in response to four different terrorist attack cases. The study used a multiple-case study guide. Yin (2003) argued that the multiple cases selected in a research should replicate each other to provide consistency. This replication can occur literally by “predicting similar results” or theoretically by “contrasting results for predictable results” (2003, p. 5). For that reason, the study utilized the terrorist cases assumed to be organized by the same terrorist organization. Moreover, the attacks were conducted in the busiest time of the targets to kill as many people as people possible. Another similarity was the simultaneity of the attacks.

Literature generally cites these four cases together as major Al-Qaeda attacks against Western civilization (Riedel, 2007; Stevenson, 2006; Hoffman, 2007; Atwan, 2006, p. 10). However, besides the four attacks that were utilized by the study, the Bali bombings in 2002 and 2005 and the Jakarta Bombings in 2004 are also thought to have been major Al-Qaeda attacks. Nonetheless, there is no conclusive evidence tying those attacks to Al-Qaeda (International

Crisis Group, 2006). On the other hand, the attacks in areas like Indonesia, Saudi Arabia, and some other African countries took place in cities that did not have proper emergency management systems in place to respond to such disasters. Some international efforts were cited in the studies coming from the Australian government and some other western countries, including the U.S. (International Crisis Group, 2006); therefore, the Bali bombings and others were not considered a part of this study.

3.2.1.1 The New York WTC Attacks, 2001

Two different airplanes plowed into the North and South Towers of the World Trade Center on September 11, 2001, at 8:46 AM and 9:03 AM respectively. Within 90 minutes, both towers collapsed, causing the deaths of thousands of people including employees in the towers, people working close to the WTC towers, crisis management organization employees, police and fire department officials, and others. On the same day, another plane hit the Pentagon building in Washington, D.C. at 9:37 AM, killing dozens in the building and all the passengers on board. The last plane fell, with the passengers aboard, into a field in Pennsylvania at 10:03 AM (Kean & Hamilton, 2004). Nearly 3,000 people died, and the damage was calculated in the billions of dollars.

There were problems in New York with the emergency operations. The 9/11 Commission Report argues that there were problems especially in the Fire Department and Port Authority Department, neither of which were prepared for such an attack. Their equipment and communication tools were inadequate. Many of their employees lost connection and control during the emergency. The higher-ranked officials could not stay in touch with their teams, which caused inefficiency in the response efforts (Kean & Hamilton, 2004).

A significant amount of legislation was passed in the U.S. in the aftermath of 9/11. Combining intelligence tools, uniting crisis management organizations, and toughening protective measures were the primary goals of those new policies. Combining intelligence sources was intended to integrate centralized government law enforcement agencies in one database. In this way, the government hoped to make central and local agencies more aware of imminent threats in the future. However, such a transition could not be accomplished because of reasons that “merit examining” (Comfort, 2005). The Patriot Act was also questioned heavily by the public because of specific codes that seemed designed to limit individual freedom.

The most important aspect of this government restructuring, as far this study is concerned, was the effort to unite all crisis management departments under one centralized department dubbed “Homeland Security.” A department chief was appointed by the President; however, the department was officially without either budget or authority. A significant number of agencies involved with the White House opposed the department’s creation, because they thought that such a structure would fail local emergency efforts (Comfort, 2005). It is still unclear whether centralized or decentralized governmental efforts are more successful in preventing casualties and damages during disasters. 9/11 was the most horrifying terror incident ever. It shaped many crisis management policies both in the U.S. and abroad.

3.2.1.2 The Istanbul Bombings, 2003

On November 15, 2003, two trucks full of explosives were detonated by suicide bomber terrorists in order to attack two synagogues simultaneously in Istanbul at 9.29 AM. It was Saturday, and the terrorists aimed to kill Jewish people at prayer time. The attack killed 30 people, mostly Muslim Turkish citizens, and injured approximately 300 individuals. The second

attack came five days later, on November 20, and targeted both the largest HSBC Bank building in Turkey and the British Consulate in Istanbul with two trucks at 10.55 AM. The bloody terrorist attack killed 33 people, including the British Consul, and injured another four hundred fifty. The attacks created a crime scene dozens of miles square. The Turkish National Police was assisted by Israeli and British law enforcement agents during the crime scene investigation (Rodoplu, Arnold, Tokyay, Ersoy, & Cetiner, 2005; Tatil, 2005).

The centralized structure of the law enforcement agency in Turkey helped the police to define all the suspects immediately after the attacks. All criminals linked to the bombings were apprehended within weeks (Tatil, 2005). The police force was the first to arrive at the crime scenes with other first responders—medical operators. These first responders immediately secured the area, although it was a huge crime scene, and processed the victims in the crime scene. A few people were sent to the hospitals; many of them were discharged after a small medical intervention (Rodoplu et al., 2005).

The scale of these attacks was smaller than that of 9/11; however, it was the largest series of terrorist attacks the Turkish Republic had ever experienced. Communication and power lines were disrupted in the attack sites, which significantly undermined the rescue efforts. Four different attacks within five days affected the Turkish people psychologically and economically. The stock market fell 7.4% immediately after the attack. The chaotic environment remained until the roads were opened to service after CSI (Rodoplu et al., 2005).

It was clear that Medical Emergency Management Services (MEMS) were not ready for the attacks. Similarly to 9/11 and other cases that will be discussed later, resources were used inefficiently. Every MEMS ambulance was sent to the crime scene, which only increased the chaos. Other parts of Istanbul were left without immediate medical services as a result. The

MEMS ambulances were not aware of triage application, which may have led to greater problems. Public announcements about the incidents were also not conducted by government officials, which led to disinformation among the public (Rodoplu et al., 2005).

3.2.1.3 The Madrid Train Bombings, 2004

This incident was Europe's worst-ever terrorist attack. Fourteen different bombs were located in different locations on Madrid train lines. Ten of them exploded simultaneously; trains going to different locations in Madrid were targeted by the terrorists. One hundred ninety-one people, including the perpetrators, died, and more than 1,500 were injured. Similarly to the Istanbul, London, and New York bombings, the terrorists aimed to cause the greatest number of casualties possible and attacked the transportation system at the busiest time of the day: 7:39 AM (Bolling et al., 2007).

Spain's response was unprecedented. National and regional crisis management organizations worked together to help the people affected by the attack and find the criminals behind the attacks. The national authorities were involved in the case approximately one hour after the attack; by this time, the regional commanders had taken the injured to the nearest hospitals and secured the crime scenes for official investigation. Tent hospitals were established to mitigate the workload of the regular hospitals, and only 12 people died after being brought to the emergency health departments (Cornall, 2005). The Spanish Catastrophic Emergency Plan was well established to handle this kind of emergencies.

Preparedness against terrorist activities in Spain is a result of the existence of the Basque Separatists and the ETA threat. Regional and national emergency officials were well aware of the extreme need for manpower in these situations, and for that reason, even though the incident

took place at the night-to-day shift change, neither the police nor health officials left for home, which doubled the emergency response force (Bolling et al., 2007). Medical groups, security officials, and police organizations worked in coordination with other governmental departments, according to the Spanish Catastrophic Emergency Plan. Ninety minutes after the first blast, there were no injured people in the area. After 11 hours, the transportation system was running as before (Cornall, 2005).

3.2.1.4 The London Metro Bombings, 2005

Because of the Istanbul attacks targeting the British Consulate, the UK government was aware of the possibility that a terror incident would target British Civilians (HMG, 2006). The terrorist contingency difference in the Civil Contingencies Act (CCA) had been legislated, and related resilience efforts were being implemented. On the morning of July 7, 2005, at 8:50 AM, three different terrorists detonated their hand-made bombs in London Tube trains on their way to different destinations around London. The explosions in the trains killed 42 people, including the perpetrators, and injured hundreds of them. Approximately one hour later after the incident, another terrorist detonated his bomb on a bus, killing 14, including himself, and injuring 110 others (HC, 2006).

The government's preparedness can be understood from the timing of the first Cabinet Office Briefing Rooms (COBR) meeting formed by related Central Governmental agencies and Metropolitan Police. The COBR meeting started at 9:30 on the same morning, 15 minutes before the second attack. Even though the attack was not immediately confirmed as a terrorist attack, COBR remained steady. The Home Secretary and Metropolitan Police Commissioner made their statements on the incidents by adding that "everything [wa]s under control and transportation

w[ould] be halted for a moment” at 11:00 AM. Later, the police investigation uncovered the identities of the terrorists who took part in the incident by using CCTV records and crime scene investigation techniques (HC, 2006).

The central governmental approach to such an incident is important because of the need for public access to accurate, useful information (Rockett, 1994). A completely decentralized, local reaction to a major terror incident can create the danger of conflict between information sources, which can lead to greater chaos than the incident itself creates. Thus, COBR’s early and accurate statements were useful in handle the public pressure (HC, 2006). The local police’s and health officials’ immediate response to the incident decreased the casualties. More than 350 injured people were sent to the nearest hospitals. The coordination of the Civil Contingencies Secretariat (CCS) saved lives and helped solve the case (HC, 2006).

3.2.2 Social Network Analysis

In each country, thousands of organizations operated to respond to the selected incidents. It is not possible to examine and survey all of the organizations participated. Random or stratified sampling of the organizations could distort the results of the study, since very important organizations could be left out of the sample if those methods were used. Instead, the study proposed to find the agencies that played a central part in rescue and recovery operations in selected cases. Social network analysis can be used to determine the most interacting members of a network; it was the secondary method of this study. Different software designs have recently been developed to conduct social network analysis. This study utilized UCINET (Borgatti et al., 2002) which is widely accepted in the literature.

Scott (1988, p. 109) defines social networks as a reflection of a strange and powerful social reality that is generated by webs, grids, and textiles. These grids (or relationships) can be revealed with the help of computer software such as UCINET. UCINET (Borgatti et al., 2002) produces various scores to the relationships among elements in a network after a content analysis of the network examined. Such scores are generally provided by all social network analysis tools. Density and centrality scores are the most important outputs of a social network analysis. Degree centrality was seen as the immediate influence measurer by programmers of UCINET (Borgatti, 2005), which made it the most appropriate scale for this study's sampling purposes.

UCINET offers the centrality scores of networks based on the content analysis provided by researchers. Therefore, unless meticulously picked out, the content analysis and the results of UCINET can be misleading. The criteria for selecting UCINET content should be clarified. The objectivity of the selected content material will directly affect the possibility of objective research results and vice versa. Since the selected cases were generally the most important manmade disasters in the selected countries, the content was selected from governmental reports, non-governmental official reports, and news media reports. The UCINET analysis for each case selected was already conducted by a research team headed by Dr. Naim Kapucu at the University of Central Florida. The results of the network analysis data were used to identify agencies in response operations for the case countries.

3.2.3 Surveys and Structural Equation Modeling

3.2.3.1 Survey Instruments

The surveys involve personal questions about informal relationships. The questions on the adaptive capability and perceived effectiveness of organizations also required the privacy and confidentiality of the respondents. For that reason, surveys did not collect personal information such as names, email addresses, contact information, and so on. On the other hand, in order to have a description of the respondents, the administrative position each respondent held (Supervisor, Assistant Supervisor, Middle Manager, Team Leader, Frontline Manager, and Frontline Worker) and the type of first-responder organization to which each respondent belonged (Health, Nonprofit agencies such as the Red Cross, Law Enforcement, Education Facility, Search and Rescue Team, Fire Department, and Emergency Operation Center) were asked in surveys.

In order to provide unity in the selected cases, the actual names of organizations were not asked. Instead, respondents selected the type of agency that was the most relevant to the group named in the surveys. This provided better results because some large agencies have employees from different expertise areas. For example, FEMA has more than 6,500 employees, including administrative bureau personnel, search and rescue teams, medical emergency staff, and training assistants. Moreover, this agency operated only in the 9/11 WTC Attacks in selected cases. Therefore, a classification based on agency type is more logical than collecting the actual names of agencies.

Appendix A-1 presents the survey applied to American CM employees. Appendix A-1 was used as a base for translated versions for other countries. The Turkish version (Appendix A-

2) and Spanish version (Appendix A-3) were translated by bilingual independent translators. The British version (Appendix A-4) was also prepared with attention to the differences between British and American English.

3.2.3.2 Sample Size

Muthén and Muthén (2002) argued that the statistical models that employ structural equation modeling requires different sample sizes depending on the research study. There are rules of thumbs such as five (Bentler & Chou, 1987) and fifteen (Stevens, 1996) observations per used model variable. Loehlin (1992) suggests that an SEM model that has two to four endogenous variables should have at least one hundred observations. Loehlin (1992) also adds that two hundred observations will produce optimal results. However, all these rules of thumbs can mislead researchers and research results based on the discussed estimations. Muthén and Muthén (2002) cite the number of missing variables, the size of the model, the reliability of selected variables, and some other statistical characteristics as important factors for determining a sample size.

This study collected ten survey responses per variable in SEM model (Figure 2). Since there are 23 observed variables in the model, the study needed 230 survey responses. This amount is more than what cited researchers suggested. There are four case-study countries; therefore, it was proposed to gather 57.5 responses for each country. The question of the number of agencies to select per country was another problem. There is not a clear answer to this question in the literature. The number should be more than one, as the content analysis could mislead the research as discussed above—a disadvantage of UCINET use. Considering the importance of network effort during a terrorist bombing, the study suggested reaching out to the

top six agencies that received the highest centrality scores in the social network analysis tables provided (Table 2, 3, 4, and 5). Therefore, the surveys would receive 10 (~9.6) responses per selected agency from each country.

The selected organizations in the target countries were contacted via letters, e-mails, and telephones provided in the official websites. Periship Hazard Foundation provided a grant for the dissertation research which made it possible for the researcher to visit the selected countries in person. Agencies were asked to deliver the survey to their employees. Because the emergencies examined took place several years ago (New York-2001, Istanbul-2003, Madrid-2004, and London-2005), it would have been difficult to find all the members on the emergency worker lists at the time of this study. The snowball sampling method, a sampling method used for hidden or hard-to-find respondents, was therefore employed. Snowball sampling relies on referrals from initial subjects to generate additional subjects (Kalton & Anderson, 1986). As it had been some time since the attacks at each target location, employees who had retired or changed jobs were also targeted by sending out emails to related email newsletter groups and retiree foundations and organizations. The surveys also included an optional referral section. Using referrals, emails were sent out to those who had been referred directly.

3.2.3.3 Operationalization of the Variables

The study employed 23 factors and 2 estimated latent constructs. In total, 25 variables were defined and tested by the study. Factors and latent constructs were suggested by the literature discussed in previous sections. The fifth criterion of Quarantelli's effectiveness scale (1997) was examined in three dimensions in the survey as suggested. Table 1 demonstrates the

names and operationalization of 27 variables. Questions 18, 19, and 20 created a combined variable, which was used as a single factor in the statistical model.

Table 1 Operationalization of Study Variables

Survey Question #	Role of the Variable	Format of the Variable	Title in statistical tools	Survey Question	Explanation
Q1	Predictor	Categorical	Policy Changes after important events	There has been important change(s) in my organization (structure, goals, and rules) because of an important event (Flood, terrorist attack, hurricane, bush fire, earthquake etc&) before.	Variable tests flexibility of organization's goals and structures. If an important event changed something that failed to work during the process, this shows how adaptive and responsive an organization to environmental changes.
Q2	Predictor	Categorical	Frequency of Important events	There have been important events frequently up to now, which my organization should deal with.	Variable checks if organizational experience keeps an important place in organizational memory in terms of effectiveness perception. If this question and perceived effectiveness is correlated, that would mean experience is important for organizational effectiveness.
Q3	Predictor	Categorical	Intra-organizational training efforts	Intra-organizational training holds an important place in my organization.	Variable looks for a relationship between organizational learning mechanisms and effectiveness perception. Intra-organizational training is hypothesized to have an impact on organizational effectiveness.
Q4	Predictor	Categorical	openness to change	My organization is open to change by any means.	Variable seeks a correlation between openness of an agency and effectiveness perception of employees. This is different than the first variable since the prior one assumes coercion while the latter explains natural flexibility.
Q5	Observed Factor	Categorical	work with coworkers to collectively solve problems	I work with my coworkers to collectively solve the problems in the organization.	Variable controls whether an employee work together with his friends or not. Some agencies can form individual groups which prevent collective working; the variable tests if it affects effectiveness.
Q6	Observed Factor	Categorical	have chance to talk informally and visit others	I have the chance to talk informally and visit the other employees.	Variable questions if informally visiting and talking to colleagues have an impact on perceived effectiveness.
Q7	Observed Factor	Categorical	socialize with coworkers outside of workplace	I socialize with the coworkers outside of the workplace.	Variable tests whether employees of examined agencies are socializing outside of workplace. This would represent how informal relationships are

Survey Question #	Role of the Variable	Format of the Variable	Title in statistical tools	Survey Question	Explanation
Q8	Observed Factor	Categorical	trust many coworkers a great deal	I trust many coworkers a great deal.	promoted in personal time of employees. Variable tries to reveal the trust level of employees. Trust is an important determinant of informal relationships.
Q9	Observed Factor	Categorical	do not feel that any coworker is a true friend	I do not feel any coworker is a true friend.	Variable looks for a relationship that is exact opposite of previous question. If majority of employees do not agree with this, it would be believed that the workplace is a friendly environment.
Q10	Observed Factor	Categorical	formed strong friendships at work	I formed strong friendships at work.	Variable controls if relationships got better with time. Senior officials would have strong friendships in the workplace if they agree with this question.
Q11	Observed Factor	Categorical	work for organization because of someone else	I work for the organization because she/he is here.	Variable tests the strongest friendship variable of the study. Working for another soul in an agency states the strongest level of friendship.
Q12	Observed Factor	Categorical	friendships make work a happier place	Friendships make the workplace a happier place.	Variable questions how much the employees believe that the friendships affected the workplace. If the quality of informal relationships is high, employees would generally agree with the statement the variable offered.
Q13	Observed Factor	Categorical	friendships help to work cooperatively at times of stress	Friendships help to work cooperatively with each other at times of stress.	Variable tests if cooperative working is affected by friendships during stress times. Friendships are directly tested by this variable.
Q. o. I. R	Independent /Dependent latent construct	Ratio	Quality of informal relationships	N/A	This is the first latent construct of the study. Discussed nine questions estimate this latent variable. The correlations of estimating factors will indicate if the latent construct is successful to represent quality of informal relationships.

Survey Question #	Role of the Variable	Format of the Variable	Title in statistical tools	Survey Question	Explanation
Q14	Observed Factor	Categorical	know difference between response and agent generated demands	The employees of my organization know that each extreme event (terrorist bombings, flood, winter storm, earthquake, hurricane etc.) is different. My organization has plans and operates differently in each different extreme event. For example, we would use a different operational procedure for a flood than we would a terrorist bombing.	Variable questions about respondents' knowledge on different perspectives of demands of an extreme event. If CM is affected by characteristics of a disaster agent, it would indicate a well-planned and effective CM and vice versa.
Q15	Observed Factor	Categorical	carrying out generic functions	My organization is ready to operate any generic emergency management functions (evacuation, temporary housing, alternative communication tools, warnings etc.).	Variable tests the CM ability of the agencies. Cited generic functions are universal and vital for disaster victims.
Q16	Observed Factor	Categorical	mobilizing personnel and resources	My organization has plans to mobilize personnel (authorized employees and volunteers) and resources effectively. By effectively, I mean needed personnel and resources are well-identified in the crisis, they are located quickly and brought to bear correctly, and they are appropriate to the problems generated by the disaster.	Variable questions the ability of a CM agency about whether it is capable to mobilize any means of resources to disaster areas effectively. This capability requires good and careful planning which is a must of effective CM.

Survey Question #	Role of the Variable	Format of the Variable	Title in statistical tools	Survey Question	Explanation
Q17	Observed Factor	Categorical	delegation of tasks and division of labor	My organization has a certain job definition during an extreme event. My organizations employees do not get involved in other kinds of labor during an extreme event different than the professionalization of my organization.	Variable tests if the agency is supposed to conduct some certain labor that was planned before the incident. It would point out an ineffective CM if the respondents do not agree with the statement the variable proposed.
Q18	Observed Factor	Categorical	Adequately processing information within organization	Information is processed adequately within my organization during a disaster. Communication tools and communicated material are satisfactory.	Variable seeks a relationship between satisfaction level of processed information within an agency and effectiveness of CM.
Q19	Observed Factor	Categorical	Adequately processing information between an agency and other responding agencies	Information is processed adequately between my organization and other responding organizations during a disaster. Communication tools and communicated material are satisfactory.	Variable seeks a relationship between satisfaction level of processed information between an agency and other responding agencies and effectiveness of CM.
Q20	Observed Factor	Categorical	Adequately processing information between an agency and affected citizens	Information is processed adequately between my organization and affected citizens during a disaster. Communication tools and communicated material are satisfactory.	Variable seeks a relationship between satisfaction level of processed information between an agency and victims of the extreme event and effectiveness of CM.

Survey Question #	Role of the Variable	Format of the Variable	Title in statistical tools	Survey Question	Explanation
Q21	Observed Factor	Categorical	properly exercising decision-making	My organization keeps exercising decision-making properly in the crisis time as well. The organizational jurisdiction differences within or outside of the organization cannot be a problem; emergent groups and my organization do not have a conflict on organizational domains. Responsibility for new disaster tasks is not a problem that we cannot resolve easily.	Variable tests whether an agency is applying proper decision-making processes with affected citizens, emergent groups and with other agencies even during an extreme event. Jurisdictional conflict are resolved within this process, which result in effective CM.
Q22	Observed Factor	Categorical	developing overall co-ordination	My organizations employees work coordinative with the other organization employees in the crisis scene. Leadership in critical phases is not a problem. Since community good is more important to us, the willingness to de-emphasize organizational claims of leadership is high in my organization.	Variable controls if competition among agencies exist during a disaster. Competition and leadership conflicts among first responders would badly affect CM action.
Q23	Observed Factor	Categorical	blending emergent and established organizations	My organization has plans to include the emerging resources into the organizational labor during a disaster. I and my other colleagues believe that volunteers and other emergent stakeholders are important sources to bring the social order back. My organization employees do not think that the emergent resources are useless because they are not controllable as we are.	Variable questions ability of an agency about utilizing emergent groups and volunteers. It requires good planning to establish a CM system that would blend authorized and emergent resources, which is a sign for effective CM.

Survey Question #	Role of the Variable	Format of the Variable	Title in statistical tools	Survey Question	Explanation
Q24	Observed Factor	Categorical	appropriate reports for the news media	My organization supports the developments of relationships that are acceptable and beneficial to the responding organizations, the mass media and citizens in general. During extreme events, citizens are satisfied with the relatively accurate picture of what is going on via our broadcasting systems or press.	Variable seeks a correlation between appropriate and reliable reports provided to media and others requested, and CM effectiveness perception. For a successful CM, it was hypothesized that respondents should agree with the statement.
Q25	Observed Factor	Categorical	a well-functioning emergency operations center	My organization works with an emergency operation center (EOC) during disasters. We are represented in EOC in the highest level possible, we work co-operatively with the other responders, we benefit from it since we know what the others are doing and how we can help them.	Variable looks for a relationship between existence of an emergency operation center and CM effectiveness perception. The question emphasizes the importance of "well-operating" characteristic of EOC.
P. E. o. C. N.	Dependent latent construct	Ratio	Perceived Effectiveness of CM Network	N/A	This is the dependent variable of the study. Perceived effectiveness of CM networks is estimated by ten discussed variables. The SEM model looks for the relationships between this latent construct and other estimating and affecting it.
Q18a	Combined Factor	Categorical	N/A	Information is processed adequately between my organization and affected citizens, between my organization and other responding organizations, and within my organization during a disaster. Communication tools and communicated material are satisfactory.	Variable seeks a relationship between satisfaction level of processed information between an agency and other responding agencies, between an agency and affected citizens, and within an agency and effectiveness of CM. Variable combined Q18, Q19, and Q20 based on Quarantelli's (1997) suggestion.

Gefen, Straub, and Boudreau (2000) pointed out that SEM (Structural Equation Modeling) is a second-generation statistics analysis tool that can answer single, systematic, and comprehensive research questions. The ability to model both dependent and independent variable constructs simultaneously differentiates SEM from first-generation statistical tools such as ANOVA as well as from regression analysis, which can only handle one dependent variable at a time. SEM can calculate the regression scores among related latent variables created by software in a single test. The test can be projected on a figure with regression scores next to each relationship. Latent (estimated) constructs are illustrated in circles, and observed (indicator) variables are illustrated in cornered shapes. Hypothesized correlation paths between latent and observed variables are represented as arrows in model. Latent constructs that are targets of other constructs' arrows are endogenous (dependent) variables, while affecting latent constructs are called exogenous (independent) variables.

The study employed thirteen variables (nine informal relationship qualities and four organizational adaptations) to estimate the latent construct *the quality of informal relationships within crisis management organizations*. Another fifteen variables (four organizational adaptation variables, one latent quality of informal relationships, and ten perceived effectiveness variables) estimated the latent construct *perceived effectiveness of interorganizational network*. Both informal relationship and effectiveness constructs were endogenous variables while adaptation variables were predictor variables of the endogenous variables (Figure 2).

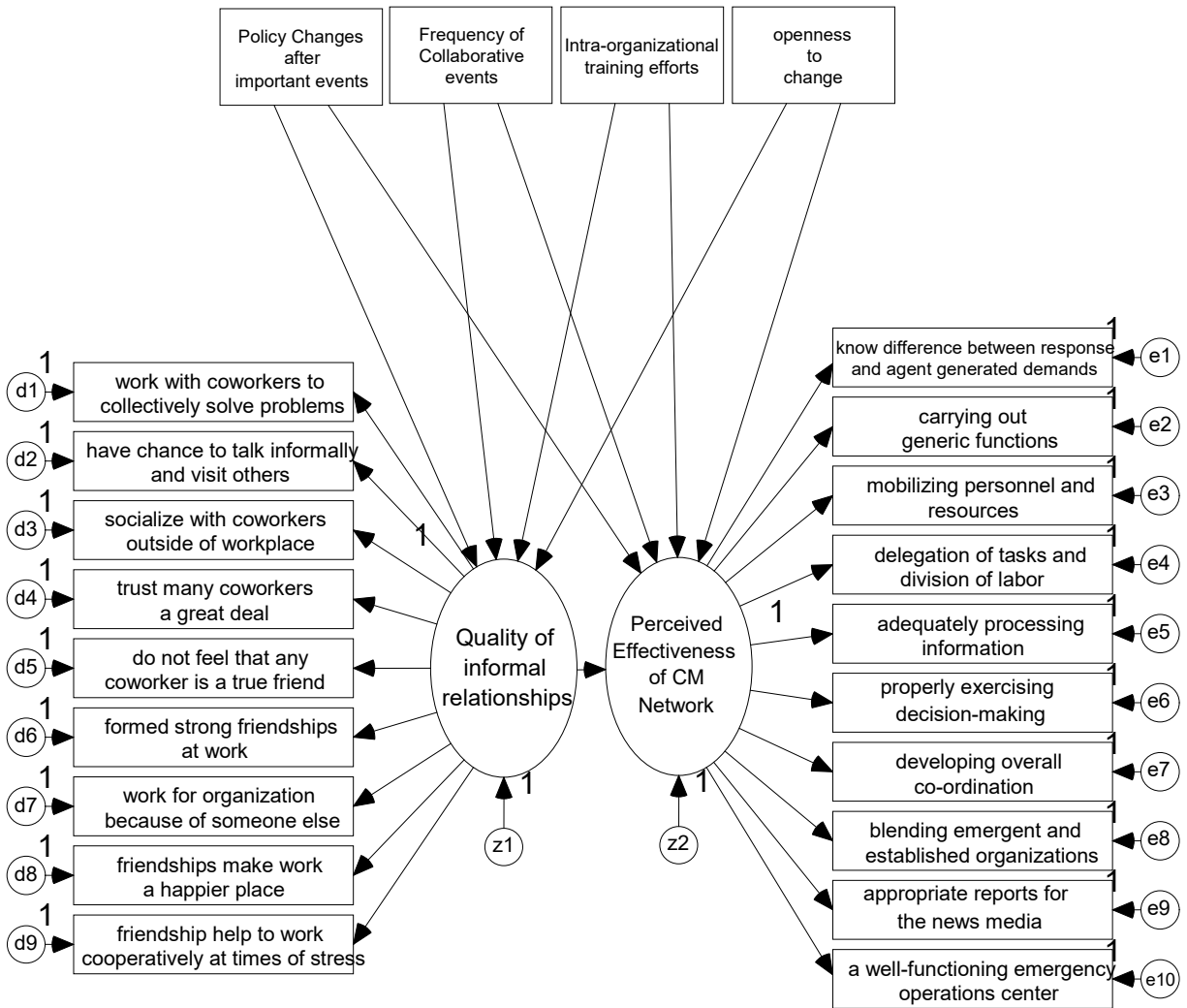


Figure 2. Proposed SEM Model for Comparative CM Analysis

To validate the proposed model, various goodness-of-fit measures were examined to improve the fit of the model with the data. The goodness-of-model-fit statistics of an SEM model (Arbuckle, 2006) include X^2 score (Chi-square fit index) tests if the given model's covariance/correlation matrix fits an unconstrained model. For that reason, chi-square fit index should not have a significant probability value, as this will mean the failure to reject null hypothesis. Some scholars have suggested that chi-square tests do not produce correct results

because sample size directly affects its results. The greater the sample size, the easier it is to wrongfully reject the null hypothesis (Schumaker & Lomax, 2004). For that reason, other statistical tests were used to evaluate the goodness-of-fit measures in addition to the chi square test.

Another test for Chi-square fit index is the likelihood ratio (LR), which is obtained by following formula;

$$LR = \chi^2/df$$

LR is expected to be less than 4.0 for a good model fit. The LR is also called *normalized* Chi-square index in the literature. It is better when the LR is closer to one. Bentler's comparative fit index (CFI) is another important test; it compares the given model against the independence model as a baseline model. The CFI can be between 0 and 1, though it is preferable for a model to get CFI value closer to one. The next test used in the study is the root mean square error of approximation (RMSEA). As can be understood from its name, RMSEA adds approximation errors to a given sample population and then tests whether the optimal sample size will fit when unknown parameter values are chosen.

Rules of thumb suggest that the RMSEA should be less than .05. However, it is also suggested that the fit is acceptable if the RMSEA score is less than .08. The GFI and AGFI (Adjusted Goodness-of-Fit Index) assess the squared residuals from prediction compared to the sample data. The GFI and AGFI statistics range from 0 to 1; greater than .9 is considered a good fit. There are also three important values for examining the individual effects of variables on latent constructs. The first of them is the critical ratio (CR). The CR is obtained by dividing an observed estimate to its own standard error. A significant CR value should be more than 1.96 if the effect is positive and vice versa. The other two individual assessment values are

unstandardized and standardized regression coefficients. Similarly to all other statistical tests, regression coefficients indicate the explained percentage of the variance in a tested variable (Byrne, 2001).

To sum up the quantitative part of the study, the methodology portion contained three phases. The first method is the case-study analysis (Yin, 2003) method that helped to define four terrorist attacks from all over the world. Selecting cases, the research utilized social network analysis tables to discern the top-interacting organizations that took part in response and recovery operations after those incidents. Besides officially contacting the agencies, the researcher utilized snowball sampling for individual sampling from those organizations because it was unlikely to find the list of employees that were on duty that day. Lastly, the sample was surveyed and the results were interpreted in an SEM model (Byrne, 2001).

The qualitative portion of the research examined the relationships among public administration systems, organizational attributes, and social-economical conditions of the countries and their emergency management systems. CM literature, official reports, and interviews with officials who actually took part in selected incidents were used in this qualitative portion to offer descriptive ideas, not to make figure-based comments.

3.3 Increasing Reliability and Item Response Theory

The surveys the study utilized directly affected the correlation results of this study. Any misinterpretation and/or miscalculation would lead to a failure in testing the hypotheses. Therefore, the survey questions should be designed carefully. Since informal relationship questions could generate biased answers, the researcher should consider giving enough response

space for the interviewee. Item Response Theory (IRT) argues that fewer or more answers than needed will fail the test (Baker, 2001).

Instead, the researcher should add or subtract unrelated suggestive multiple choices from the test. For example, assume that an interview conducted within selected organizations will include a question asking how often somebody sees colleagues within the same organization during a given time period. This question is different from a question that asks whether the employee has the cell phone number of any other employee from the same organization. The second question will be answered by a “Yes” or “No.” The first question, however, will be answered by a number. Therefore, personal judgments can affect the response of the interviewee. In order to prevent this situation, the survey should include more than three answers. For example, answer choices of “1,” “2,” and “3 and more” will not be sufficient to understand the relationship level of the interviewee.

The multiple choices for this specific interview question can even be different in different countries. For example, shaped as it is by the religion of Islam, Turkish culture is less individualistic than the other countries surveyed through this study. For that reason, Turkish crisis management employees could be more communicative with each other than other countries’ employees. The multiple choice answers for the question discussed above should therefore be structured differently in Turkey. IRT suggests that the numbers used to answer that question should be greater in Turkey than the other countries because of the social characteristics of Turkey. If IRT were not utilized, the study would make erroneous conclusions.

3.3.1 Human Subjects

Some of the surveys were conducted using the snowball sampling method, while some other respondents were reached directly. Informed consents from the survey participants were obtained before they filled out the surveys. In the consent forms, it was documented that the rules for the protection of human subjects would be strictly adhered to and results would be provided to the participants after the completion of the study. No personal identifiers were retained in the research file, so the confidentiality of the respondents was ensured.

4 RESULTS AND DISCUSSIONS

4.1 Qualitative Analyses

Disasters were not realized as disasters by human beings for a long time in history. This public belief changed with modern science and its effect on public administration systems.

Quarantelli (2000) classifies current societies in the world in three categories:

1. Societies that think the disasters are inevitable. These societies generally link extreme events to supernatural powers. The mitigation and preparedness phases of CM are largely ignored in those public administration systems.
2. Societies that accept disasters as natural occasions that can be mitigated but cannot be prevented in any way.
3. Societies that argue that disasters can often be prevented. Mitigation and preparedness are the most important components of these CM systems.

The historic development of public systems follows this path sequentially through time. Quarantelli (2000) summarizes these three perspectives and their historical development as “Act of God” through “Act of Nature” to “Act of Human Beings” (2000, 4). Necessary precautions against disasters are not taken adequately until the last phase, which has generally worsened the situation in future disasters (Birkland & Waterman, 2008). Until World War Two, no society on earth had established an agency specifically dealing with disasters. Police, fire brigades, and others operated only to do their jobs and acted non-collectively. Quarantelli (2000) argued that ancient structures built to stop flood-type disasters were generally not successful and did not last long enough to establish CM systems. The air raids that caused many civilian deaths during

World War Two were the main reason for the development of civil defense (civil protection) strategies. Public alarms or sirens were primitive tools in air attack warnings. Shelters, search and rescue teams, and air raid wardens were connected to public agencies, which started the first CM policies (Quarantelli, 2000). Presently, mitigation and preparedness phases are increasingly receiving government attention.

The public administration systems of selected countries are quite different from one another (Table 18/Appendix C). Although they can be grouped as European (Spain, U.K.), American (U.S.), and Middle Eastern (Turkey), this type of distinction is not enough to explain all of the differences. Roughly speaking, federal government involvement in Turkey is the strongest of the countries others in terms of local administrative involvement. The U.S. federal government can be assumed as the weakest at handling crises, since the U.S. local administrations have more power and authority than those of the European countries selected. Turkey and the U.S. do not have a royal family, while Spain and the U.K. have had royal institutions for hundreds of years. Explaining the differences in CM efforts and policies during selected incidents, as well as the public administration and CM systems of the case countries, will be presented in detail in this section.

Different reports and interviews related to the incidents in selected countries may demonstrate how local and federal public, private, and nonprofit agencies acted in the incidents. Looking at those reports, one can discuss the procedures that CM network followed in crisis time. Official CM response frameworks were examined to see whether there is a difference between theoretical and practical crisis procedures. The differences caused by the presence of a chaotic environment will mark how well a country's CM policies worked.

4.1.1 U.S.A.

Cold War tactics framed the first CM policies in the U.S. The Cold War-type disaster understanding is a centralistic-militaristic command-control perspective (Dynes, 1989). There are two versions of disaster management in command-control: pre-disaster normal term and disaster term. Chaos during disasters affects any kind of social order badly, so it must be reordered no matter the cost. During chaos, only central structures can be reliable, because they are authorized over all other structures and possess the most extensive power and technology. Ordinary management structures are not reliable because so many of them are trying to survive without sufficient information and sources. In the pre-disaster term, local authorities can be coordinated and supervised because it is easier to do so without a chaotic environment. However, during disasters there is no other possibility for reestablishing social order than command and control.

4.1.1.1 History

Dynes (1989) argues that the basic assumption of the command-control model, which supposes that an emergency declaration will reestablish social order, is wrong. He asserts that it requires a great deal of interorganizational effort even to estimate the actual scope of a disaster. Collaborative efforts are prevented by command-control systems because the central agency holding authority can deter others from gaining useful information. Since command-control management assumes that the disasters are obvious, it generally fails to detect them even after they began. Late detection of a disaster increases harm caused to affected entities.

Another argument defended in command-control policies is that civilian forces cannot be adequate to respond to disasters. For that reason, responders should be military personnel or

paramilitary personnel such as law enforcement officials. Volunteers or victims of disasters cannot be of any help since they are outside the command chain. Dynes (1989) suggests that civilian forces are ignored in command-control systems since they are thought to be self-centered, weak, panicked, and antisocial. The disorganization of non-military personnel is another argument in defense of command-control. Loosely coupled connections cannot be allowed, the better to stop chaos. Delivering resources to persons needed is the job of military, or at least paramilitary, personnel. Disorganized behaviors are targeted during the pre-disaster era with tough legislations.

The discussion of command-control systems has taken almost the same route in all of the countries selected by the study. However, the U.S. example is so clear and so thoroughly discussed that it is mentioned under the U.S. part of this study. The primitive U.S. crisis handling system had a militaristic background because the aim of civil protection was to defend the community against nuclear attacks (Dynes, 1989). The Federal Civil Defense Act of 1950 legislated against enemy attacks and held the Secretary of Defense responsible for crisis management. The Secretary of Defense then assigned CM duties to the Defense Civil Preparedness Agency. Because of the Cold War's influence on the U.S. CM perspective, the majority of employees in the agency were ex-military personnel. Over time, international tension reduced, but the military understanding of national defense did not change for a long time despite local administrations' participation in CM efforts.

A series of natural disasters in the 1960s and 1970s (Hurricane Carla-1962, Alaskan Earthquake-1964, Hurricane Betsy-1965, Hurricane Camille-1969, San Fernando Earthquake-1971, and Hurricane Agnes-1972) triggered new legislations specifically addressing natural disasters. The Disaster Relief Act of 1974 tried to shift the enemy attack perspective of CM to

that of disaster assistance by authorizing and holding responsible local and state authorities for disaster assistance (Birkland & Waterman, 2008). FEMA's foundation during the Carter Administration in 1979 was a response to criticisms reminding the central government of its responsibility in disaster response. Many different disaster relief agencies were combined into FEMA, which also involved local and state authorities. These partnerships in time evolved CM into a loosely coupled system. Local, state and federal partnerships shifted from the command-control approach to that of coordination-supervision. The debate between the two methods is ongoing, though scholars by and large support coordination-supervision (Dynes, 1989).

Birkland and Waterman (2008) argued that the Reagan and Bush administrations (1981-1993) ignored the importance of FEMA, which turned agency into a "turkey farm" (2008, p. 696). Although the National Earthquake Hazards Reduction Act clearly put FEMA in a leading role in CM, the agency could not do much without presidential support. The Stafford Act of 1988 and the amendments to the Act in 1993 and 2000 did not change the notion of command-control system. The bills introduced a shared-governance idea; however, local and state governments remained limited to the role of first responders in any kind of extreme event, with their role in mitigation efforts ignored. The federal government still assumed primary responsibility, although the Stanford Act and its amendments tried to change this dynamic.

FEMA's unsuccessful disaster assistance efforts were sharply criticized in the early 1990s. Birkland and Waterman (2008, p. 697) quote a U.S. Senator who called FEMA officials "the sorriest bunch of bureaucratic jackasses" in the aftermath of Hurricane Andrew in 1992. The Federal Response Plan of 1992 included many civilian organizations, such as the American Red Cross, as first responders in addition to the traditional first responders—police and fire departments. The Clinton Administration applied the lessons learned after Hurricane Andrew and

widened the definition of the term “disaster” to make more disaster relief studies eligible for federal funding. In 1994 and 1997, hazard mitigation was specifically targeted by Mitigation Directorate, which started Project Impact.

FEMA turned its attention to natural hazards, but manmade disasters such as terrorist attacks were not forgotten. The Office of Domestic Preparedness was established in 1998 under the Department of Justice; it focused on weapons of mass destruction and terrorism. Right after 9/11, the natural-hazard perspective of CM policies was changed once again with the passing of the Patriot Act in 2001, and funding for Project Impact was cancelled. The Department of Homeland Security (DHS) was established as a Cabinet office in 2002, and FEMA was transferred into this newly established federal office. In other words, 9/11 caused the federal government to change the natural-disaster-and-hazard-mitigation perspective of CM back to civil defense and command-control once again. Unfortunately, the transfer of FEMA into DHS did not make some senior FEMA officials happy; eventually many of them left the agency. The FEMA director’s direct connection with the President was discontinued in new system, which left disaster management under the authority of the inexperienced DHS.

Despite U.S. CM developments away from the natural hazard perspective, the four different hurricane disasters that hit Florida in 2004 were successfully managed by FEMA and Florida emergency management organizations. Birkland and Waterman (2008) suggest that this success was misleading because all four of hurricanes were respectively small and the state of Florida itself was prepared for hurricanes more than any other state in the country. Hurricane Katrina revealed the fact that FEMA and the federal government were actually ineffective in coordinating and supervising disasters. Their failure to evacuate victims, underestimation of the importance of mitigation efforts, and shortcomings in handling the chaotic environment in the

recovery phase resulted in heavy criticism of federal and local CM policies in the U.S. FEMA was criticized for being slow, DHS was criticized for constraining FEMA's ability, and the National Response Plan (NRP) adapted from the Federal Response Plan (FRP) was blamed for being extremely centralist. The NRP was prepared without FEMA's participation, and it was written in vague language that failed to clearly address the agencies authorized in disaster management. The focus of the NRP was terrorism or terrorism-related disasters, reminiscent of the 1950s' Cold War strategies.

NRP was revised into the National Response Framework (NRF) after Hurricane Katrina, but the basic command-control routines remained. Cold War tactics and the terrorism focus are still dominant, although Katrina cost more in human lives and public damage than 9/11 did. FEMA is still underrepresented in the NRF. The NRF was also not discussed with local or state officials or any other professional emergency management organizations before going into effect. Homeland security still has priority over disaster preparedness in U.S. CM. The Obama Administration's first year did not bring any significant change in disaster management policies, except that the experienced director of the Florida Emergency Management Office was appointed to head FEMA. It is expected that FEMA will be taken out of DHS to give priority to natural hazards and shift the command-control back to that of coordination-supervision; however, the economic crisis seems to have postponed those changes for now.

Birkland and Waterman (2008) argue that shifting CM attention from natural hazards to homeland security or vice versa is pure politics. Such moves actually stem from the clash between different understandings of federalism. Giving authority to state and local governments is a bad idea according to those who think the federal government should be superior, strong, and powerful all the time, in times of both peace and war. Although it remains relatively small in

size, the U.S. federal government takes critical aspects of its jurisdiction as givens, such as intelligence gathering and use, the gathering and use of any kind of other information source, unquestionable authority on any property and right inland, and the cooperation of local and state governments in these understandings. In terms of CM, local and state administrations are only first responders; they initiate response and recovery but then ask for federal help. Mitigation efforts are generally ignored or underrated.

Others think the federal government should not be small, but instead cooperative, coordinative, and more a partner than a director. Natural hazards and disaster mitigation, in this perspective, should have federal importance equal to terrorism threats. Therefore, national plans should clearly define the roles of local, state, and federal agencies. In order to provide the highest efficiency, local emergency management agencies' participation is important to the planning process. Federal disaster assistance organizations have the highest possible representation in White House. Terrorist threats are also important and evaluated by other professional federal organizations. The basic philosophy of disaster management should, in this view, be coordination-supervision rather than command-control.

4.1.1.2 Discussion

The Federal Response Plan (FRP), which mobilizes Emergency Support Functions (ESF) during a disaster, was in effect during 9/11. Each first-responder organization has one or more roles in these ESFs. An agency is held primarily responsible for each ESF. Once a disaster is called in, the primary agency coordinates others and operates the action that has already been defined in the FRP. FEMA was supposed to be the main coordinator of all CM; therefore it was supposed to be the most central agency in 9/11 CM network.

The NY Emergency Management Office (NYEMO) was the main local coordination agency during the attacks. Its efficiency was questioned since NYEMO's establishment was in the World Trade Center 7 building, which also collapsed that day (J. Feal, personal communication, June 5, 2009). The local CM network was based on NYEMO, FDNY, and NYPD communication and coordination; however, NYEMO stayed off CM because of the attack, which badly affected local CM efforts (Asaeda, 2005). FBI and the U.S. Army did the job that was supposed to have been done by local organizations. Asaeda (2005) also mentions communication failure between the FDNY and the NYPD, as well as the demoralization of personnel because of the death of colleagues, as having a negative impact on local CM efforts.

American Red Cross (ARC) established nine public shelters in Manhattan within 24 hours of the attacks. The agency also started blood and money donation campaigns for victims immediately. The FRP suggested that other local and federal agencies should be in control in a terrorist attack; however, the ARC holds an important place in recovery studies. The Department of Design and Construction for the City of New York (DDC) and The Port Authority of New York and New Jersey (PAPD) were other effective local agencies helped the life coming back to normal (M. Horn, personal communication, March 23, 2009). The FDNY lost 343 of their members in collapsed buildings (Asaeda, 2005), which shows that the agency was in a key position in the CM network. Fallen officials were accepted as a failure in the WTC response, but Asaeda (2005) argues that the attacks were completely unexpected. It was also mistakenly believed that the WTC buildings would not collapse because they had not in the 1993 bombings; as well, the local CM center was demolished and an alternative location had not been defined beforehand; finally, the first responders' communication devices did not work effectively.

Against all odds, local Emergency Medical Services (EMS) belonging to local and non-profit agencies established the first triage units within ten minutes, right across the street from the North Tower. After the collapse of the buildings the triage units were drawn back from the incident site, but patients continued to be treated. One hundred four New York regional hospitals treated 6,538 patients, of which 477 were admitted. Of those who were admitted, only 16 patients died in hospitals within a week (Asaeda, 2005). NY City has a population of 8,000,000, and Manhattan alone houses over 1,500,000 people. The WTC incident site is located in one of the busiest places in Manhattan—especially at morning rush hour, the time of the attacks. In terms of the scope and unexpectedness of such an attack, the response can be said to have been quite successful.

Nonetheless, FRP and actual CM evaluation indicated that some agencies did not perform as well as they were supposed to, while others operated well above expectations. J. Feal (personal communication, June 5, 2009) evaluated federal government involvement in WTC attacks as weak at best. In the response and recovery phases, local operational agencies should have done more, as pointed out in the FRP (Now the NRF). Unfortunately, new developments in CM in the U.S. in 2002 did not apply the lessons learned from 9/11, and in fact worsened the situation by disregarding the roles of local and state authorities (Wise & Nader, 2002). This oversight caused the failure of CM in Hurricane Katrina (Birkland & Waterman, 2008).

4.1.2 Turkey

The Ottoman Empire was defeated in World War One, and almost all Anatolia was occupied by different countries' armies. A war of independence began in 1919 and succeeded in 1922. Turkey abolished the monarchy in 1920 and changed her name from Ottoman Empire to

Turkish Republic. Since then, elections have been held every four years to elect the government, but the central government has remained strong in the public administration system. The highest-level local public administrators in cities are appointed by the central government, and there is no local police force in Turkey. The heads of municipalities, mayors, are still elected, and municipalities are supposed to provide basic services such as water, electricity, and sewage. Local administrations' authority has increased steadily in the last decade and seems likely to increase in the near future.

4.1.2.1 History

Ninety-eight percent of the Turkish population lives in areas with a significant risk of earthquakes. Sixty-one percent of all the disasters that have happened in Turkey between 1931 and the present have been earthquakes, and another 30% have been landslides and floods. Turkey tops the life-loss list of disasters of the last 60 years, along with China, Russia, Peru, and Iran. The latest major earthquakes to hit Turkey took place in Marmara on August 17 and November 12, 1999, leaving a total of 18,243 dead and 48,901 injured (Akdag, 2002). Terrorism is another threat to Turkish society; it has claimed 30,000 to 35,000 people in last 30 years (Rodoplu et al., 2005). The total death toll is not comparable to any other developed country on the planet. Turkish disaster management changed its course after the Marmara Earthquakes in 1999.

Akdag (2002) sorts the disaster management history of Turkey into four periods. The pre-1944 period includes CM policies in the Ottoman Empire and early years of the Turkish Republic. In this period, the disaster-oriented policies were aimed solely at response and recovery. Although the majority of population lived in earthquake-prone areas, local and central

governments failed to address needs for stronger buildings. Victims rebuilt their houses without the necessary supervision. Akdag (2002) cites a law from 1509 outlawing non-wooden structures in Istanbul; clearly, these types of regulations were neither updated nor enforced. The greatest earthquake to hit Turkey was in 1939 in an eastern city, Erzincan; it claimed 32,962 lives. The quake was so strong that 116,720 buildings collapsed during the disaster and the city was relocated.

Besides Erzincan, other strong earthquakes took place in Niksar, Adapazari, Tosya, and Bolu within five years of each other (between 1939 and 1944), resulting in over 43,000 deaths and 200,000 collapsed buildings. A mitigation law dated 1944 started the new period in CM in Turkey. Partnerships with universities were established, new regulations were created, and an earthquake risk map of Turkey was created in the following year. The 1944 legislation did not change the need for specific legislations for other specific disasters. However, it offered a strong basis for mitigation and preparedness efforts, especially against earthquakes. Building new structures was allowed only with control and permits after the 1944 legislation passed.

These regulations were applied mostly by central agencies. However, confusion reigned among executive agencies because there was no primary agency to administer those efforts. In 1958, The Ministry of Reconstruction and Settlement was established in the Cabinet to pursue mitigation efforts in Turkey. Later, in 1983, the ministry was merged with The Ministry of Public Works and turned into The Ministry of Public Works and Settlement. The third period of CM in Turkey (1958-1999) begins with establishment of this cabinet office. Additional regulations cancelled the maintenance of individual funds for each disaster; instead, a single fund, the Disasters Fund, was created for all past and future disasters managed by the above

ministry. Furthermore, all natural hazards were defined as disasters, including forest fires, floods, avalanches, earthquakes, landslides, storms, and the like.

A series of earthquakes and other natural disasters continued to hit different Turkish regions and claim more lives in the third period. Specific legislations and disaster declarations for the affected regions were passed by Parliament. Earthquake funds were separated from other disaster funds. Minor changes in CM policies were made with amendments, but the 1958 legislation remained largely the same until the 1999 Marmara Earthquakes, which started the most recent period of the Turkish CM system. These earthquakes differed from others because they affected a large area of land containing the majority of nation's population. The affected area was the most industrialized region of the country, and present-day policies failed because of the scope of disaster. The Cabinet immediately declared a state of emergency in the affected region, and a new CM legislation came into effect in ten days privatizing the supervision of building privately owned structures. All newly built structures were mandated to have valid insurance.

The Ministry of Public Works and Settlement has been the major player in natural disasters management from the 1999 earthquakes up to now. The General Directorate of Disaster Affairs (GDDA), under the Ministry, coordinates CM in Turkey. In extreme events, CM is supervised by a committee called the Prime Minister Crisis Management Center (PMCMC), headed by the Prime Minister. The Secretariat in the PMCMC is the GDDA, providing coordination among central and local committees and subcommittees. Member agencies of different committees or subcommittees do not change; the only change is in the ranks of the participating personnel. This type of CM administration is common in Europe (Sahin et al., 2008).

Red Crescent is an important agency in CM; almost any kind of primitive sheltering and food is provided by this organization. It is a nonprofit agency just like the Red Cross, which also heavily depends on donations. Red Crescent's duties are not limited to disaster relief; they also include delivering incoming aid material to those who need it, providing immediate medical assistance to victims, coordinating aid efforts with international disaster relief organizations such as the Red Cross, and campaigning for blood donations. Local and national Red Crescent officials take part in official CM committees.

As a result of the 1999 earthquakes, a central CM office under the Prime Minister was established. The General Directorate of Turkey Emergency Management (GDTEM) is a FEMA-like agency that is responsible for coordinating CM when natural and manmade disasters threaten the nation. The GDTEM is assigned to establish CM units in local and central public agencies, to supervise and provide essential communication among them, to prepare disaster plans for national threats, and to administer further arrangements in future CM. The International Money Fund (IMF) funded many other mitigation projects after the 1999 earthquakes, and the establishment of GDTEM was a condition of receiving the credit. The government would not have gotten the IMF loan if the GDTEM had been established even one day later (Celik, 2007). Akdag (2002) argues that the GDTEM has not solved Turkey's CM problems. The GTDEM has a very limited number of personnel and insufficient resources and expertise, posing another obstacle for successful CM.

Case-study city Istanbul established a local emergency management center, which also mobilizes disaster relief mechanisms during disasters occurring in the city. Although it has limited resources and limited authority, the Istanbul Disaster Coordination Center (AKOM) is coordinating with universities and other NGOs to prepare for future disasters. Besides AKOM

(which is controlled by an elected official) there exists another emergency management center belonging to the Governor of Istanbul (an appointed official). While AKOM lacks a law enforcement agency in the disaster plan, the Governor's CM center lacks a fire brigade service. As discussed in the beginning, this is a result of the central government's attitude toward the public administration system of Turkey.

Some voluntary CM agencies play critical roles in Turkish CM, although they are underrated. The Search and Rescue Association (AKUT) and the Search, Rescue, and Research Association (AKA) are important civilian voluntary search-and-rescue teams in Turkey. These organizations generally recruit mountaineers. Volunteers belonging to those organizations are mobilized to disaster areas to search for and rescue survivors in inaccessible areas, such as building ruins after an earthquake or a high altitude location after a plane accident. Like the Red Cross, these organizations also operate in Turkey and will assist in any country if requested. AKA, AKUT, and the Red Cross provided disaster assistance to Taiwan in 1999, India in 2001, and Iran in the 2003 earthquakes. The Red Crescent donated \$1.5 million to the American Red Cross for disaster assistance during Hurricane Katrina. Akdag (2002) suggests that the further involvement of voluntary nonprofit agencies in CM is a must for successful disaster response and recovery.

CM coordinating agencies established after 1999 number so many that they nearly equal the number of CM participants. Therefore, coordination is not the issue in a possible disaster; the multiplicity of coordinating agencies is itself a problem. CM authorities do not have skills and expertise, while CM operatives do not have adequate authority to perform in disaster areas and to receive essential information. This is somewhat similar to the situation in the U.S. Unfortunately,

while both central and local organizations struggle for more authority and power it is the community who pays for the price of ineffective CM (Celik, 2007).

4.1.2.2 Discussion

It was discussed that it would be ineffective to have too many coordinating agencies instead of actual CM-performing agencies. Although AKUT and AKA are volunteer-based, donation-funded, small, and non-profit organizations, they were reported to have dominated the CM network in Istanbul Bombings in 2003 (K. Coban, personal communication, April 12, 2009). USAID Report (2005) claimed that AKOM, GTDEM, and GDDA did not perform enough to be considered in an effective place in the CM.

The Medical Bureau, 112 Emergency Medical Service (EMS), and the Red Crescent provided immediate health assistance to victims. Although EMS officials failed to set up triage units in the incident site, Rodoplu et al. (2005) reported that medical intervention was successful. The Medical Bureau is under the municipality and a local agency. However, 112 EMS belongs to the Ministry of Health of federal government. All ambulance vehicles in Turkey use capital city Ankara's license plate codes. Kizilay, on the other hand, is a nonprofit agency that falls between a central and local agency. Fortunately, despite being responsible to different level of government agencies, all three medical agencies operated together.

There is just one law enforcement agency operating in cities in Turkey. It is Turkish National Police. The agency is represented by local divisions that are connected to capital city Ankara. Therefore, Istanbul Police Department (IPD) is the only law enforcement agency that can fulfill crime scene protection and investigation efforts that started immediately after the attacks. Religious (Hezbollah, IBDA-C), Marxist (DHKP-C, PKK-KADEK), Ultrationalist

(Ergenekon) and many other different terrorist organizations have attacked civilians and government officials for own purposes for many years. The Turkish National Police (TNP) has an important role in terrorist-made disasters.

Thanks to good medical services, the coordination agencies' ineffectiveness did not do any harm to CM; however, some other aspects of the response and recovery phase were eventually neglected. R. Kilic (personal communication, April 12, 2009) argued about impressive involvement of Istanbul Fire Department and other municipal services. Coordination and communication among first responders is an essential need which was largely neglected during the recovery phase in the Istanbul Bombings.

Reports confirm ineffective CM from different aspects (Rodoplu et al., 2005). For example, medical units and other first responders rushed into bombing sites without considering the possibility that there might be a second bomb. Additionally, the poisonous gas ammonia that had been used for the blasts was still in the air when first responders took control of the scene. Volunteers, bystanders, and the press could not be kept out of crime scenes, endangering their own security. 112 EMS centers dispatched almost all of the available ambulances to incident sites, which left the city of Istanbul without emergency medical resources for a long time. The Istanbul Police could not provide security and clearance on the crisis scene for nearly half an hour. The heavy load placed on cellular lines prevented communication even among first responders, which also affected CM badly (wireless communication among first responder agencies is still not established in Turkey).

Worst of all, there was no coordination agency through which the media could access essential information about the attacks. Blocked communication lines suddenly increased the importance of press coverage for the public. However, without a proper and reliable source, both

public and private TV networks continued to cover the incidents via the media agents' own experiences and knowledge. Several other bombings in Istanbul were reported which in fact had not taken place, which only increased the chaos. Hours later, the government banned live news reports covering the bombings. Turkish CM definitely needs a coordinative agency with both expertise and authority. To sum up, separated, loosely connected local and central CM forces did not create a successful CM network.

CSI efforts played a very important role in the investigation of the Istanbul bombings. The Istanbul Police Department's CSI units rushed into the bombing sites within minutes of the attacks. R. Kilic (personal communication, April 12, 2009) implied that CSI units came in and secured the areas in a very short time. CSI efforts directly affected the results of the investigation. Perpetrators and others aiding and abetting the bombings were quickly brought to justice, thanks to CSI findings. Law enforcement's CSI examination is the only way to know about a terrorist attack. Figuring out the terrorists' tactics successfully deters future terrorist incidents.

K. Durmus (personal communication, April 12, 2009) added that the CSI investigation may be the most important in a disaster scene, yet it does not get required attention. CSI units do not have a role in emergency plans; they lack direct communication with other first responders, and they are generally not the leaders of a crisis scene. R. Kilic (personal communication, April 12, 2009) argues that even hierarchical superiors in law enforcement units may not understand the importance of CSI. Crisis scene leadership is a problem waiting for necessary regulations.

Quarantelli's (1997) seventh criterion (Q22 of the study) deals with this leadership problem. It is not only significant for effective CSI effort, but also essential for all CM. CSI can document material damage after a disaster, which is important for insurance issues. Another use

of CSI is the identification of victims. K. Coban (personal communication, April 12, 2009) suggests that natural and manmade disasters can leave many people dead. After great disasters, identification of all the dead may not be possible by victims' relatives. From terrorist bombings to earthquakes, it is the government's responsibility to identify victims. Inefficient CSI would result in an unevaluated CM, which would create greater inefficiencies in future events.

4.1.3 Spain

Spain's transition from Franco's dictatorship to a modern democracy in the 1980s changed its public administration system completely. CM policies were rewritten because of democratic expectations. The Cold War tactics of dictatorship had remained until the end of Franco's term; civil defense was the only strategy employed, and disaster mitigation was not considered as a method. After 1980s, elected governments passed many CM laws to regulate CM efforts. The central government's effect on regional governments is very weak, and Spain's autonomous regions are almost like U.S. states. Local or regional emergencies are not handled by the central government. Regions are responsible for the response, recovery, preparedness, and mitigation phases of CM. Only a national emergency declaration mobilizes the central government's forces.

4.1.3.1 History

Bremberg and Britz (2007) date Spain's CM policies back to the 1940s. Like all other European countries, Spanish civil protection aimed to stop the killing of civilians in air raids. After it became a democracy with the creation of the 1978 Constitution, Spain decentralized 17 regions within her borders. All regions and sub-regions have remained loyal to the King and the

government. The Law 2/1985, which came into effect in January 21, 1985, assigned the General Directorate for Civil Protection and Emergency (Dirección General de Protección Civil y Emergencias, DGPCE) to execute National CM policies. All regions also have their own CM organizations, and coordination among them is operated by DGPCE. DGPCE has an education facility that trains CM officials in Spain. The National School of Civil Protection (la Escuela Nacional de Civil, ENPC) serves Spanish and other nationals in emergency management issues (MDI, 2009).

The Operative Coordination Center (SACOP, Sala de Coordinación Operativa) is the highest CM council brought together during national emergencies. SACOP includes the Prime Minister and other delegated ministers. The DGPCE coordinates SACOP's meetings. In 2005, amendments gave authority to SACOP to mobilize the Military Emergency Unit (Unidad Militar de Emergencias, UME) which was used to evacuate the residents of Canary Islands during the 2007 bushfires. UME mobilization is the last degree of national CM efforts (Bremberg and Britz, 2007). Decentralizing public administration and CM efforts did not make them ineffective; local and regional administrations prepared for disasters with realistic plans.

The City of Madrid has the Territorial Plan of Civil Protection of Madrid (Plan Territorial de Protección Civil de la Comunidad de Madrid, PLATERCAM), which was prepared and legislated in 1992 with Decree 85/1992 of 17 December. PLATERCAM was conducted during the 11-M bombings. Each first responder and other CM agencies have a role in the plan. PLATERCAM is directed by the Ministry of the Interior and the Ministry of Justice together (MDI, 2009). DGPCE is the coordinator agency of the plan. PLATERCAM's CM policy is operated on four levels.

Level 0 is for small-scale emergencies. The municipal first-responder agencies, such as local police and local EMS, are mobilized on this level. This is the normal procedure for any emergency reported. CM interactions in this level are similar to Level 1, with the difference that Level 1 procedures are headed by a central commander. In Level 1, even though the emergency is local, the whole CM action is operated and supervised by a central commander in the PLATERCAM center. This can happen on the director's own initiative or at the local first responders' request. The important thing in both Level 1 and Level 0 is that the CM actions do not require authority and sources at a level higher than the municipal level.

Level 2 is declared when the emergency incident exceeds one local administration's region and authority. PLATERCAM's director takes over the control of CM in Level 2. Coordination is provided among all participating local first responder agencies by the PLATERCAM center. PLATERCAM's director is responsible for determining and reporting a higher emergency level if needed. Public information dissemination is also one of the duties of PLATERCAM's director. In this way, the media and citizens can get vital information about the incidents from the most reliable source.

Level 3 goes into effect when a national emergency is declared. Level 3 is declared by the Ministry of the Interior. The Ministry of the Interior can declare such an emergency on its own or at the request of DGPCE's or PLATERCAM's director. Authority in the disaster region is given to SACOP, which also takes part in PLATERCAM's governing body. PLATERCAM has two groups of agencies in the CM action plan: the executive group and the action group. The executive group is formed of SECOP and subcommittees. This is very similar to the Turkish system discussed above. However, PLATERCAM's DGPCE has a history of more than ten years. The agency has an education facility which has good relationships with local and central

CM bodies. DGPCE works under the Ministry of the Interior; nonetheless, it reports to the Prime Minister, who is head of SECOP in national emergencies. This setup gives authority to director of DGPCE (Bolling et al., 2007). Because expertise and authority is combined within one agency, PLATERCAM is a powerful and efficient tool in Spanish CM.

PLATERCAM's action groups are classified based on the type of response and recovery efforts they pursue. These include security, intervention, emergency health, technical support, and logistics groups. Law enforcement and intelligence agencies form the security group of PLATERCAM. Whether they are local or national, all law enforcement agencies on a disaster scene operate in this group. The intervention group is headed by the Chief Fire Officer, and includes fire departments, the Red Cross, and other local nonprofit agencies. The emergency health group is formed by agencies serving EMS. SUMMA (Servicio de Urgencias Médicas de Madrid) and SAMUR (Servicio de Asistencia Municipal de Urgencia y Rescate-Protección Civil) are the most important health agencies providing emergency medicine on the scene. They are coordinated by the 112 EMS center of Madrid in the PLATERCAM plan. Technical support and logistics groups are agencies coordinated by central command (DGPCE) to monitor the needs of other first-responder organizations.

4.1.3.2 Discussion

According to the CM plans discussed, the Ministry of the Interior is the head of CM system, because DGPCE serves for this ministry. SUMMA and SAMUR are the EMS organizations of the response. Bolling et al. (2007) reported that they did not perform triage at the bombing sites, since individual visual assessment of the victims was enough to adequately treat all of them. Additionally, there were four different incident sites, which may have made it

difficult to establish triage centers. The first ambulance arrived to Atocha Station in seven minutes. Hospital tents were set up within thirty minutes at all four bombing sites. The first bomb went off at 7:39 AM, and more than 1,500 persons were injured in total. By 10:17 AM, there were no injured persons at the sites; all patients had been transferred to 15 different hospitals by that time. When the bombing alarm was given by the 112 Call Center at 7:45 AM, the hospitals in Madrid cancelled all surgical operations for that day and waited for the casualties of the bombings.

Cancelling surgeries made many beds and medical personnel available, which prevented congestion in the hospitals. Another source of medical personnel was provided by the change in shifts. Night-shift personnel were not given permission to go home, which doubled the number of personnel available to care for bombing victims. The hospitals, 112 Call Center, and ambulances were connected to each other for a long time before the attacks; as a result, SUMMA and SAMUR's CM action was very coordinated. Madrid's train lines carry more than 800,000 passengers daily from 93 stations. Considering the chaotic environment at attacks' time, the success of EMS is even clearer.

The 112 Call Center conducted one of the most important duties of the CM network. Firstly, this center maintained communication among first responders, executive managers, and victims. Secondly, the 112 Call Center set up a special telephone service that provided information to the public about the attacks only one half hour after the attacks were confirmed. Victims, victims' relatives, the media, and other citizens were informed via this center. Public panic was prevented in this way. The cell phone lines' overload created a communication problem in the city for the first several hours. A new telephone line was set up among the hospitals after the attacks to eliminate this communication problem.

The Spanish law enforcement agencies in PLATERCAM are the Spanish National Police, the National Intelligence Center, the Madrid Police Department, and the Spanish Civil Guard. These agencies take part in PLATERCAM's action groups' security section. The Madrid Police Department is a local law enforcement agency, while the others operate nationally in Spain. Their quick deployment is similar to what occurred in the Istanbul case; since Spain has been experiencing terrorist incidents for more than 50 years. Law enforcement agencies, whether local or central, are well prepared for such incidents.

The collaboration between law enforcement and intelligence led the prosecution to a building in Madrid on April 3, almost one month after the attacks. The neighborhood was evacuated, and the terrorists believed to be the masterminds behind the attacks blew themselves up inside the building. The police found enough evidence in the blasted building to track other terrorists linked to the attacks. The investigations continued throughout Europe, and Italian officials arrested another mastermind of the Madrid attacks in June 2004. Several other terrorist attacks planned in Spain were stopped before they occurred, thanks to law enforcement personnels' efforts (Bolling et al., 2007).

CM organizations in Spain were ready for such an attack. The CM plans were prepared in the 1990s after the democratization of the country. Local authorities were empowered to the highest degree as a result of decentralization came with the democracy. Contrary to the centralist command-control argument, decentralization did not cause CM policies to fail, even if it did not make them more successful. The Madrid Bombings indicated that if central and local authorities are balanced carefully in CM plans, CM will be successful on the national as well as the regional level. One should note that Madrid CM personnel were experienced in terror attacks, which also increased the level of disaster response.

4.1.4 U.K.

The U.K., like Spain and Turkey, is a unitary state. The country is an island separated from the Europe mainland. A constitutional monarch governs the country similarly to Spain's royal family. Parliament has two branches, the House of Lords and the House of Commons. The Prime Minister is the main wielder of executive power. There are four countries in the U.K.: Wales, Northern Ireland, Scotland, and England. London is the capital city of England. The public administration system is similar to the U.S. states' systems. Local authorities are autonomous, and the central government's effect on them is limited by regulations. The U.K. is the sixth greatest economy in the world with a population of over sixty million.

4.1.4.1 History

The U.K. was no exception when it came to passing Cold War CM policies in the 1950s. Heavily bombarded by Nazi Germany in World War Two, the British government passed the Civil Defense Act in 1948. The law aimed to reduce the number of casualties during air raids. Local administrations were allowed access to national resources in case of emergency, but CM planning and recovery operations were left completely to their authority (O'Brien & Read, 2005). The coordination of local CM was not considered a national government responsibility. Based on Cold War politics, the only disaster that interested the national government was nuclear war.

A series of mass-casualty disasters changed this perception in the 1980s. The King's Cross underground fire in 1987, Zeebrugge Ferry Disaster in 1987, Clapham Junction rail crash in 1988, and Hillsborough Stadium Disaster in 1989 pushed the central government to take a greater role in disasters. The Civil Defense in Peacetime Act of 1986 was altered with the

required amendments to give the central government a more coordinating role in local and regional emergencies. Local authorities were still responsible for CM mitigation and preparedness in beginning of the millennium.

The U.K. Fuel Blockade Crisis in September 2000 resulted in a regulation effort by the Home Office (Ministry of the Interior). In July 2001, the lead role in CM was assigned to the Civil Contingencies Secretariat (CCA) in the Cabinet Office. September 11, 2001 changed the scope of CM policies that already were being revised. New CM policies created a framework containing national, regional, and local perspectives in coordinating and collaborative language. The system was close to the Spanish CM system discussed above. The HSBC attacks and slaying of the British Consul in the 2003 Istanbul Bombings made it clear that the U.K. would be a target of future Al Qaeda attacks (HMG, 2006). As a result of increasing terrorist attacks against civilians in foreign countries, the U.K. government applied the notion of *resilience* to CM policies and passed the Civil Contingencies Act (CCA) in 2004 (HMSO, 2004).

CCA divided CM personnel into two categories: “core responders” and “co-operating responders” (CCS, 2009, p. 8). Category 1 is formed by law enforcement personnel, EMS, fire brigades, search-and-rescue teams, local authorities, and other first-response teams. Electricity, gas, sewer, and water suppliers, as well as transportation authorities and telecommunication providers are in Category 2 (Devitt & Borodzicz, 2008). U.K. resilience is a proactive approach to CM. Resilience is a biological term referring to the idea that environmental changes are inevitable and organisms should be ready for them, whatever the impacts. Resilience does not mean that the victims should not prepare for those detrimental impacts from the environment. Instead, the target population should be ready for any kind of extreme event, and it should aim to return to normal life as soon as possible.

CCA categorizes emergencies into two types: terrorist contingencies and non-terrorist contingencies. Natural disasters and man-made disasters that are not sourced from a terrorist attack are considered non-terrorist contingencies. When it is declared a national disaster, a non-terrorist contingency CM is managed by the related minister or Cabinet member. Terrorist contingencies, on the other hand, are managed directly by the Cabinet Office Briefing Rooms (COBR) headed by the Prime Minister. The COBR's members can change depending upon the characteristics of the incident. Representatives of the Home Office, the Ministry of Defense, the Department of Transportation, the affected region's police and fire chiefs, and members of other relevant offices are likely members of COBR (CCS, 2009).

4.1.4.2 Discussion

The London Ambulance Service (LAS) is the main EMS agency in the CM network involved in the 2005 London Bombings. The British Red Cross and Saint John's ambulance services also served in the London bombings response; however, these organizations are volunteer-based. The LAS has vast resources in terms of personnel and equipment. The LAS is also prepared for such attacks because of the Irish Republican Army's (IRA) long lasting terrorist campaign. Additionally, the LAS is connected to the regional hospitals in the disaster plan, which make coordination efforts easier during a disaster. Just as in the Madrid bombings, when the 112 Center in London gave a bombing alarm at around 9:20 AM on July 7, 2005, hospitals cancelled all operations planned for that day. EMS organizations and hospitals did not accept blood donations, as it had been learned in the WTC attacks in 2001 and the Madrid attacks in 2004 that the blood donation process take the EMS's precious time where there is no need for extra blood.

It was argued that CM policies were changed and centralized especially for specific types of disasters with CCA legislation in 2004 in the U.K. The involvement of central government members shows the output of CCA's effect in CM. According to O'Brien and Read (2005), such central government involvement is the new face of CM in developed countries. Local disasters will continue to be evaluated and addressed by local authorities with central government's coordination. However, national-level disasters will be handled by strong government involvement in the future. The public's expectation for more efficient CM is increasing, especially for occasions that exceed local authorities' capability, such as Hurricane Katrina. The U.K. model of resilience for terrorism-related contingencies will continue to involve central government involvement (CCA, 2009).

Main law enforcement agencies authorized in such an incident in London are the City of London Police (CLP) and the Metropolitan Police Service (MPS). There is no uniformed national police force in the U.K. The Ministry of Defense has a national law enforcement agency called the Ministry of Defense Police (MDP), but this agency is not a uniformed police force; they only have just over 3,000 officers in the U.K. Because of the decentralized system, borough police organizations are the most important law enforcement agencies for the public. The MPS is responsible for the region known as the Greater London Area. The CLP's responsibility area is very small respectively, and the area is called the City of London. The CLP's territory is within MPS's territory geographically, but according to the agreement between agencies, MPS enters the CLP's jurisdiction only when requested.

CLP and MPS showed a great coordination effort in London bombings response. The evacuation of victims and conducting of CSI efforts together was very successful. Panic did not cause any casualties in the London Underground Metro. Moreover, evidence led to a quick and

efficient investigation that revealed all the perpetrators behind the attacks. The telecommunication-line overload that plagued previous terrorist bombings was not experienced in London's response because of regulations passed by law enforcement officials before the attacks. According to those regulations, mobile phone companies were provided with a list of first responders beforehand. When needed, mobile phone companies cut communication for all customers but the numbers in first responders' list. Although the aim of this idea was to provide more effective CM by creating extra communication lines among first responders, it was reported that the phone number list of first responders was not updated, which led to communications failures for the majority of first responders, especially in EMS (Devitt & Borodzicz, 2008).

Law enforcement agencies in the London response helped the public obtain reliable information. MPS's Chief joined the first COBR meeting, which took place just 15 minutes after the alarm was given by London Underground authorities. At 11:00 AM, the MPS Chief gave the first press briefing and confirmed that terrorist attacks had occurred at several sites. He also added that everything was under the control of the government and there was no reason to panic (HMG, 2006).

London Fire Brigade (LFB) was another very important local agency in recovery phase of CM in the London Bombings. The LFB is also in Category 1 in the CCA plan. In coordination with the MPS, CLP, and LAS, the LFB served in all four bombing sites. A local coordination agency, Network Control Center (NCC) controls the traffic in the London Underground metro. Therefore, the NCC worked as a primary coordinator during the attacks. However, the NCC was criticized for its tardy reception of information about the incidents. Apparently, after the bombings took place at 8:50 AM, the NCC informed authorities only of a power shortage in

several lines, when the trains had in fact stopped because of the explosions. The NCC waited to call the MPS about a possible attack until 9:17 AM, which slowed the CM process significantly.

4.1.5 Conclusions

The case countries' public administration systems seem to affect CM systems deeply. The U.S., the U.K., and Spain have decentralized systems that left all CM stages to local administrations. Turkey has the strongest centralist system among the selected countries, and CM in Turkey developed in a centralist way as a result. Nonetheless, there is no clear correlation between decentralized CM policies and the effectiveness of CM networks. For example, centralist Turkish CM was not successful in terms of delivering necessary services to the neediest victims and offering the public reliable and useful information. On the other hand, the decentralized U.S. system failed to communicate and coordinate first responders, or to provide for the sufficient participation of all responders in response and recovery.

Analyzed roughly, Spain and the U.K. CM networks seem to have performed better than the U.S. and Turkey CM networks. The U.S. and Turkey failed to empower local authorities in CM efforts. Although serious natural and man-made disasters had resulted in mass casualties before the analyzed cases in Turkey and the U.S., central and local governments and other authorities did not apply lessons learned. For example, the 1993 World Trade Center attacks clearly demonstrated that the first responders of New York City needed more effective communication devices (Kean & Hamilton, 2004). Similarly, the 1999 Marmara Earthquakes in Turkey showed that the Turkish CM system needs a coordinating agency with both expertise and authority.

Democratization processes did not seem to have affect CM's efficiency, either. The oldest democracies in the selected cases are the U.K. and the U.S. Both of these countries have had political parties and national and regional elections for hundreds of years. Spain is the youngest democracy, having abolished its dictatorship only a few decades ago. However, along with the U.K., Spain conducted a very successful CM that is actually taken as an example by other CM organizations throughout the world (Cornall, 2005). Social-economical conditions are another dimension that explains organizational behaviors; however, they are not enough to explain the CM failures in the U.S. and Turkey.

Historically, all four selected countries experienced their golden ages as world powers. Spain (the Spanish and Portuguese Empire) was a world power in the 15th century. Turkey (the Ottoman Empire) ruled more than half of the known world in the 16th century. The U.K. (Great Britain) was the strongest empire in the world in the 19th century. The U.S. has been the superpower of the world since 1950s. Economically, the richest country is the U.S., while the poorest of the selected countries is Turkey. Nonetheless, Turkey and the U.S. did similarly badly in evaluated CM efforts. Socio-economical factors are argued to play an important role in underdeveloped countries (IRIN, 2005), but that was not the case for this study's evaluations.

While looking for causes for CM effectiveness or ineffectiveness, different characteristics of the incidents should be taken into account. The terrorists used four passenger planes as bombs in the U.S., while they used four bomb-laden trucks in Turkey. In Spain, they used ten bomb-loaded backpacks. Four bomb-loaded backpacks were used in the U.K. The limited capability of the terrorists forced them to conduct much smaller attacks. Although all selected incidents were inspired by the same terrorist organization and greatest civilian casualties were targeted, the perpetrators' methods of operation were different in style and in scale. The terrorists' tactics

evolved, and the CM systems encountering them were also evolving in response to previous attacks. Kenney (2007) defines this evolution as “competitive adaptation” (2007, 6). After the WTC attacks in 2001, plane hijackings were prevented with high-security measures. Law enforcement agencies learned from the 2003 Istanbul bombings and deterred loaded trucks from going into crowded parts of cities. When terrorists understood that they would not be able to attack with car bombs, they used numerous backpack bombs aimed at smaller targets such as underground trains or passenger buses in Spain and in the U.K. The shift in terrorist tactics created an element of surprise that had a negative impact on the CM network’s effectiveness.

From this perspective, it is to be expected that the latest selected incident’s response will be managed more effectively than the previous cases. Additionally, the WTC attacks’ response should be expected to be the least effective, since such a suicide-attack style had not been previously experienced or even considered. After the WTC attacks not only the U.S. but almost all of the countries in the world also changed or revised their CM policies. Larger-scale disaster exercises were conducted in developed countries. More effective communication lines among first responders were established. Central coordination centers were strengthened and newer technologies were developed and adapted. For example, the British CM system learned to shut down mobile phone lines for people in a particular region except for the first responders from previous attacks such as the Madrid attacks and the WTC attacks.

Assuming that previous CM actions will be less effective and later ones will be more effective makes sense from different aspects. However, ineffective CM efforts like the one that took place after Hurricane Katrina, which occurred years after the WTC attacks, indicate that applying lessons learned is aspect crucial aspect of successful CM policies. In other words, it is not enough simply to evaluate and point out mistakes with official or scholarly reports; applying

them to developed CM plans is also vital. Policy makers and experts should be contacted and listened to more fully in order to prevent CM failures in the future.

Terrorist organizations learn just as CM networks learn. They adapt themselves to new conditions to reach their targets. For that reason, terrorist attacks are not like natural disasters that will do the same harm each time. CM networks can fail even in natural disasters if basic rules are disregarded, as they were in Hurricane Katrina, which make it absolutely normal to fail in terrorist attacks. It would be harsh to decide whether a CM network is ineffective or not, especially in a large-scale terrorist attack, merely by looking at a statistical tool's analyses.

4.2 SEM Results

In order to create the study's dataset, six organizations were selected from each case-study country. The UCINET results in Table 2, Table 3, Table 4, and Table 5 were used to define the target agencies. Organizations with a significant number of professional CM employees were chosen, rather than selecting the top six organizations regardless of their attributes. Specific government agencies, offices, or ministries, such as the President of the U.S., the Prime Minister of Turkey, or the Home Secretary of the U.K., were either unreachable by the study, or contain fewer persons than the targeted ten per agency. The eliminated agencies have been discussed in the text in detail.

Online surveys were uploaded to a survey portal at www.surveygizmo.com. Selecting agencies from each country, the surveys' links were sent to them directly. When it became apparent that the agencies' response rate was lower than expected, scholars, web groups, mail groups, and other sources were used to find more respondents. Unfortunately, the Spanish and British CM agencies targeted were not responsive. Consequently, Spain and the U.K. were taken

out of the SEM analysis. To obtain the target sample size of 230 responses, the proposed sample size per agency was doubled. However, since the surveys were distributed as web links, and since for privacy reasons there was no ID control in the surveys, equal distribution per agency might not have been achieved.

4.2.1 Descriptive Statistics of Respondents

4.2.1.1 U.S.

FEMA, the Federal Bureau of Investigation (FBI), the American Red Cross (ARC), the FDNY, and the U.S. Army were selected as respondent agencies for the surveys from Table 2.

Table 2. Top Ten CM Organizations with Highest Degree Centrality Score in WTC Attacks

	<i>Degree</i>	<i>Normalized Degree</i>
<i>1. FEMA</i>	<i>71.00</i>	<i>4.418</i>
<i>2. President Bush: The White House</i>	<i>31.00</i>	<i>1.929</i>
<i>3. FBI</i>	<i>16.00</i>	<i>0.996</i>
<i>4. American Red Cross</i>	<i>14.00</i>	<i>0.871</i>
<i>5. NY City Government</i>	<i>13.00</i>	<i>0.809</i>
<i>6. NY Fire Dept.</i>	<i>11.00</i>	<i>0.685</i>
<i>7. NY State Government</i>	<i>11.00</i>	<i>0.685</i>
<i>8. U.S. Congress</i>	<i>9.00</i>	<i>0.560</i>
<i>9. U.S. Army</i>	<i>9.00</i>	<i>0.560</i>
<i>10. Secretary of State</i>	<i>9.00</i>	<i>0.560</i>

President Bush, the New York State and New York City governments, the Secretary of State, and the U.S. Congress were eliminated as respondents, although they received an important place in the CM network of WTC attacks. Since the study proposed selecting six agencies per country, the New York Police Department (NYPD) was added to the selected agencies. NYPD is not in a central place in the CM network, according to Table 2; however, the literature and other resources suggested that NYPD was in fact a key organization in the response to the WTC attacks.

Since the response reserve doubled, 20 ($19.2 = 9.6 \times 2$) responses per agency selected were expected. Nonetheless, the research could utilize 115 responses from the U.S. in total. The organizations' descriptive statistics of respondents is indicated in Figure 3; respondents' positions in their agencies are demonstrated in Figure 4. Figure 16 (Appendix C) exhibits the gender statistics of U.S. respondents.

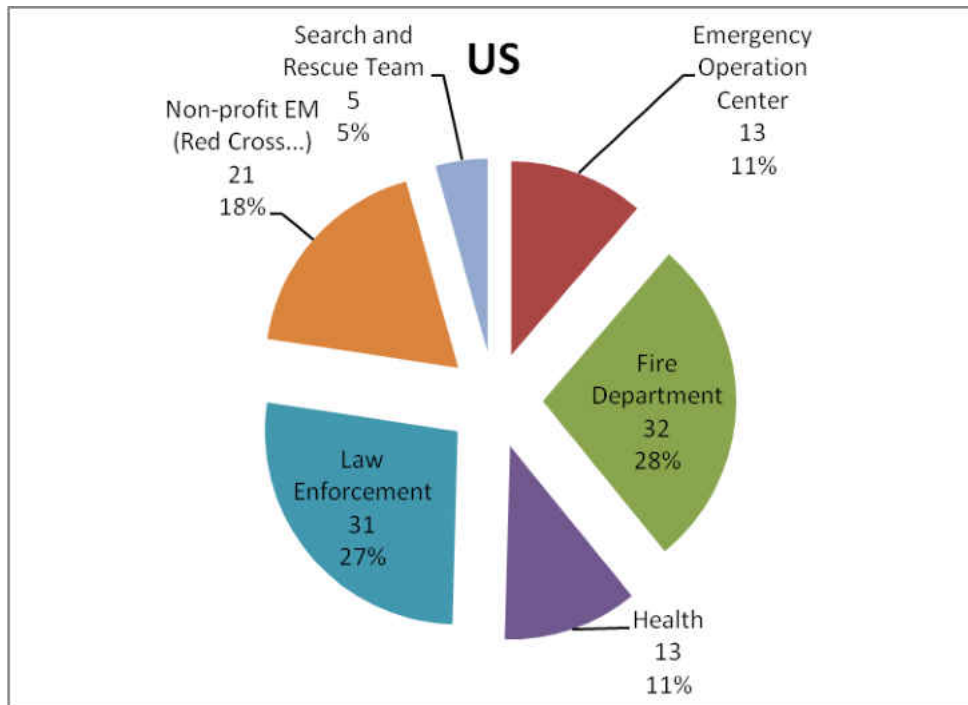


Figure 3. US Respondent Organizations Descriptive Statistics

Figure 3 shows no agency names. In order to unify the types of participating agencies in all case study countries, a classification scheme was applied in the surveys. Therefore, it cannot be determined which particular organization(s) did not respond to the surveys in the required amount. Although a specific classification category such as “fire department” suggests groups such as the FDNY or “emergency operations center” suggests FEMA, it is not certain that those specific types represent those agencies. For example, FEMA also contains Urban Search and Rescue (USAR) teams that participated in the recovery operations after the WTC attacks. Moreover, federal officials such as FBI employees may have worked in emergency operations centers and selected that option in response to the survey question. Other permutations of agency-classification combinations are also possible.

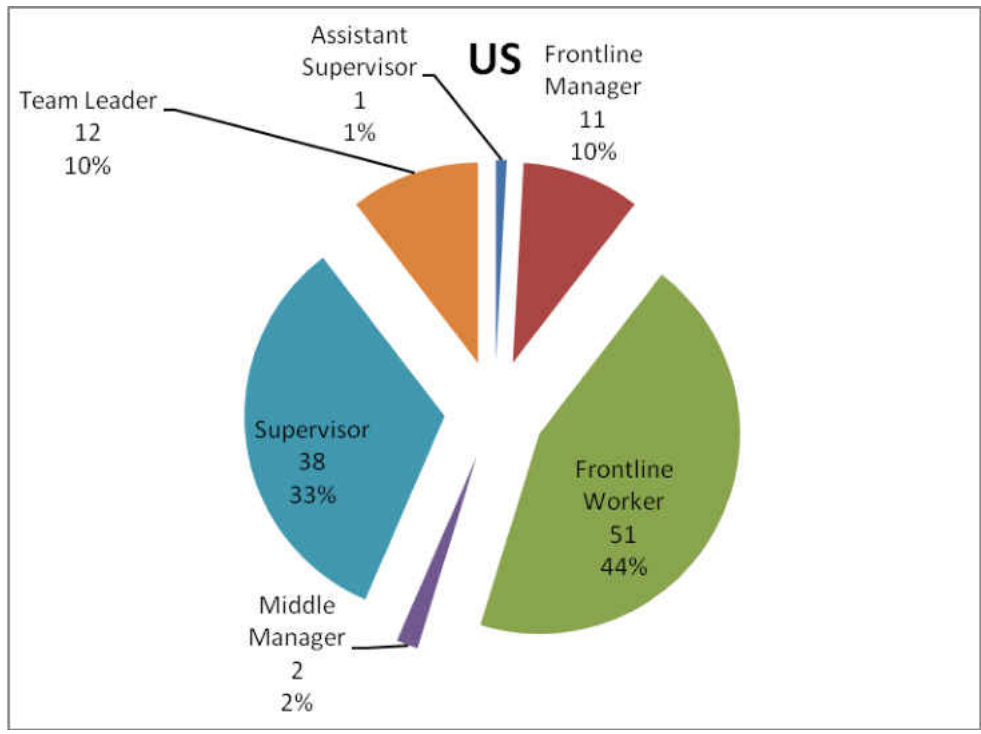


Figure 4. U.S. Respondent Employee Positions Descriptive Statistics

As a result, it cannot be argued that each targeted organization responded at an equal rate. However, there is no reason to believe that certain agencies responded to the survey in significantly greater numbers than some others. For instance, three law enforcement agencies were targeted (the FBI, the NYPD, and the U.S. Army) that are in total numbers supposed to comprise half of all targeted agencies. There are, however, 31 law enforcement responses, which constitute only 27% of the U.S. sample. Nonetheless, it is quite possible that some of respondents from the FBI, the NYPD, or the U.S. Army selected “emergency operations center,” “search and rescue team,” or “health” as their employee organization. There is no specific search and rescue team or health organization among selected U.S. agencies; however, these options were chosen in 16 percent of the responses.

Figure 4 indicates that the majority of respondents are frontline workers. Although it was not specifically a goal of the survey, the other 49% of respondents are some type of managers. Thirty-eight (33%) of the respondents selected the option of “supervisor,” which was the highest position name available in the survey. The fact that 33% of U.S. survey respondents considered themselves supervisors is important for the study because the response and recovery phases are utilized to generalize the results to the entire CM cycle. Half of the U.S. survey respondents are managers in some capacity, which would reflect effectiveness of CM organizations in mitigation and preparedness phases as well.

4.2.1.2 Turkey

Similarly to other countries’ lists, the Turkish top-ten network centrality list (Table 3) also includes agencies, such as the Prime Minister and President, who could not be surveyed for the study. Skipping those two offices, the AKA, the AKUT, the IPD, the Medical Bureau of Istanbul, Red Crescent, and 112 EMS were selected from the list. Six organizations were sent official letters. After receiving very few, if any, responses from official agency contacts, related scholars, internet and email groups, and other relevant contacts were contacted. After doubling the targeted sample size per agency, 20 responses from each agency were expected.

Table 3. Top Ten CM Organizations with Highest Degree Centrality Score in Istanbul-2003 Attacks

	<i>Degree</i>	<i>Normalized Degree</i>
1. <i>AKUT</i>	11	14.103
2. <i>Prime Minister</i>	5	6.41

	<i>Degree</i>	<i>Normalized Degree</i>
3. <i>AKA</i>	4	5.128
4. <i>112 EMS</i>	4	5.128
5. <i>Istanbul Police Department</i>	3	3.846
6. <i>Red Crescent</i>	2	2.564
7. <i>Medical Bureau</i>	2	2.564
8. <i>President</i>	2	2.564
9. <i>National Intelligence Agency</i>	2	2.564
10. <i>Bogazici University</i>	2	2.564

One hundred twenty total responses from Turkish CM agencies were targeted; however, since the surveys could not be strictly controlled because of privacy issues, 122 responses were collected from Turkey. The unifying of agency types for comparative research purposes hindered the demonstration of exactly how many respondents from each organization were surveyed, as it did in the U.S. sample. However, when the numbers in Figure 4 are examined, it is apparent that 35 respondents from search and rescue teams comprise 29% of the Turkish CM sample. AKA and AKUT were the only search and rescue teams among the selected agencies. The responses of these agencies combined were supposed to construct one third of the total Turkish sample in the study. Twenty-nine percent is fairly close to one third.

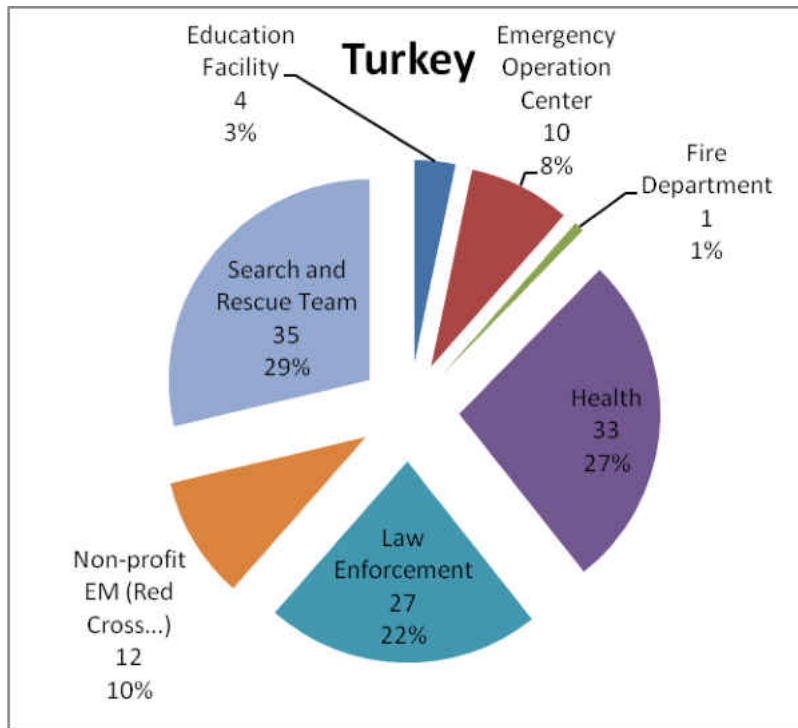


Figure 5. Turkey Respondent Organization Descriptive Statistics

Moreover, three health-related agencies were targeted: Red Crescent, 112 EMS, and the Medical Bureau. Half of the Turkish sample was supposed to be formed by health agencies. However, Figure 5 demonstrates that 33 responses came from health organizations, which constitutes only 27% of the sample. Nevertheless, the 12 responses for nonprofit CM organizations, 10 responses from emergency operations centers, and 4 responses from education facilities, which in total constitute 21% of the sample, could be considered part of the health agencies targeted. Just as in the U.S. sample, it is impossible to claim for certain that each organization participated in the study equally.

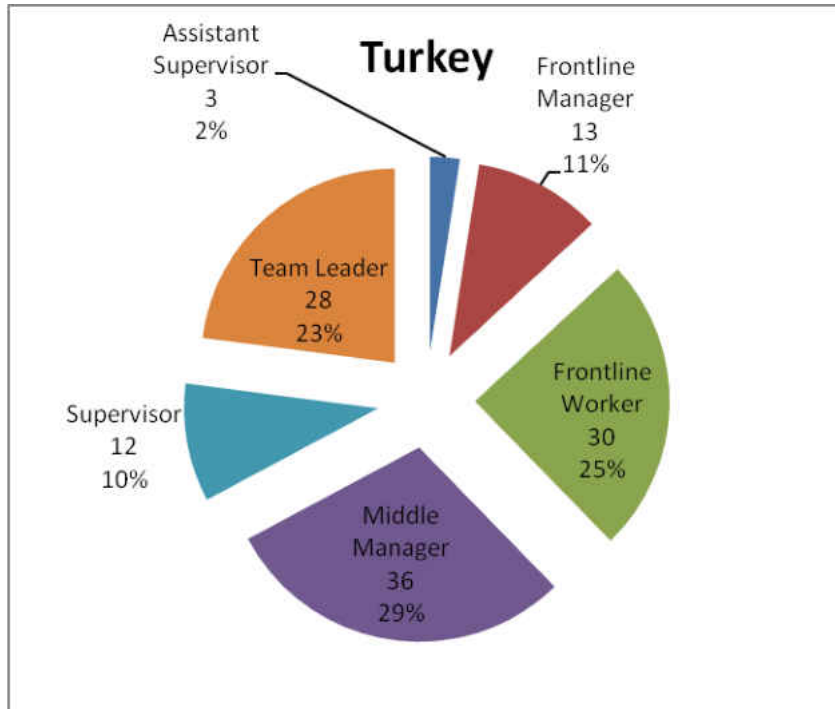


Figure 6. Turkey Respondent Employee Positions Descriptive Statistics

Figure 6 indicates respondents' organizational positions in Turkish CM. In respect to American respondents, Turkish respondents have fewer supervisors and fewer frontline workers. Middle level managers are majority of Turkish CM respondents of the study. However, 92 responses were filled out by some type of managers, comprising 75% of all responses. Middle managers were the largest group, with 36 responses (29 of the Turkish sample). Consequently, the Turkish CM sample successfully represents all CM phases in terms of study variables, as well.

4.2.1.3 Spain

The same method of selecting agencies was used for Spain as for the U.S. and Turkey. The Spanish government was skipped for research purposes, although it held the most central place in the CM network during the Madrid attacks (Table 4).

Table 4. Top Ten CM Organizations with Highest Degree Centrality Score in Madrid-2004 Attacks

	<i>Degree</i>	<i>Normalized Degree</i>
<i>1 Spanish Government</i>	<i>9</i>	<i>25.714</i>
<i>2 Spanish National Police</i>	<i>6</i>	<i>17.143</i>
<i>3 National Intelligence Center</i>	<i>5</i>	<i>14.286</i>
<i>4 Servicio de Urgencia Médica de Madrid</i>	<i>4</i>	<i>11.429</i>
<i>5 Madrid Police Department</i>	<i>3</i>	<i>8.571</i>
<i>6 Spanish Civil Guard</i>	<i>3</i>	<i>8.571</i>
<i>7 Servicio de Asist. M. de Urg. y Rescate</i>	<i>3</i>	<i>8.571</i>
<i>8 Ministry of Interior</i>	<i>2</i>	<i>5.714</i>
<i>9 Moroccan Intelligence Agency</i>	<i>2</i>	<i>5.714</i>
<i>10 Spanish Foreign Ministry</i>	<i>2</i>	<i>5.714</i>

As a result, the survey link for Spanish CM was sent to the official contacts of the Spanish National Police, the National Intelligence Center, SUMMA, the Madrid Police Department, the Spanish Civil Guard, and SAMUR. Unfortunately, no response was obtained, either positive or negative, from the agencies. Researcher has been to Spain and tried to find contacts for the research in person. Scholars, web groups, and other relevant contacts were also

contacted in order to gather respondents for the survey; however, no response from Spain was available for the study. For that reason, Spain's CM sample was removed from the SEM analyses.

4.2.1.4 U.K.

A similar process was utilized in the U.K. sample to define the target agencies from UCINET analyses (Table 5). The British government (2nd place), the Home Secretary (4th place), the COBR (5th place), and the Prime Minister (7th place) were skipped. Accordingly, MPS, LAS, LFB, CLP, NCC and 7JAC were sent official letters to request participation in the study. Researcher has been to England in order to find respondents for the survey in person. Since there was no answer for a considerable time, the U.K. was dropped, along with Spain, from the SEM analyses. After doubling the U.S. and Turkey target sample sizes, 9 responses were obtained from British CM organizations.

Three responses for "fire department" (possibly LFB), one response for "health" (possibly LAS), four responses for "law enforcement" (possibly MPS or CLP), and one response for "nonprofit CM agency" were obtained in total. Since the sample size is too small, the U.K. sample was not individually evaluated via SEM analysis. However, the responses were imported to the total sample and were evaluated with the others.

Table 5. Top Ten CM Organizations with Highest Degree Centrality Score in London-2005 Attacks

	<i>Degree</i>	<i>Normalized Degree</i>
<i>1 Metropolitan Police Service</i>	<i>16</i>	<i>28.07</i>
<i>2 British Government</i>	<i>9</i>	<i>15.789</i>
<i>3 London Ambulance Service</i>	<i>7</i>	<i>12.281</i>
<i>4 Home Office/ Home Secretary</i>	<i>5</i>	<i>8.772</i>
<i>5 COBR</i>	<i>5</i>	<i>8.772</i>
<i>6 London Fire Brigade</i>	<i>4</i>	<i>7.018</i>
<i>7 Prime Minister</i>	<i>4</i>	<i>7.018</i>
<i>8 City of London Police</i>	<i>4</i>	<i>7.018</i>
<i>9 Network Control Centre</i>	<i>3</i>	<i>5.263</i>
<i>10 7 July Assistance Service</i>	<i>3</i>	<i>5.263</i>

4.2.1.5 Total Sample

In total, the final sample size was 246—16 more than the expected sample size. Figure 7 demonstrates the organizational profile of the sample. The largest group of the sample is law enforcement employees, who form a quarter of the sample. Health officials follow law enforcement with 19% of the sample. Search and rescue teams, fire department, and nonprofit CM employees are nearly equal to one another, numbering 16, 15, and 14 respectively. Twenty-three respondents in total served at emergency operation centers, which comprised only 9 percent of the sample. The sample also has 4 respondents from education facilities.

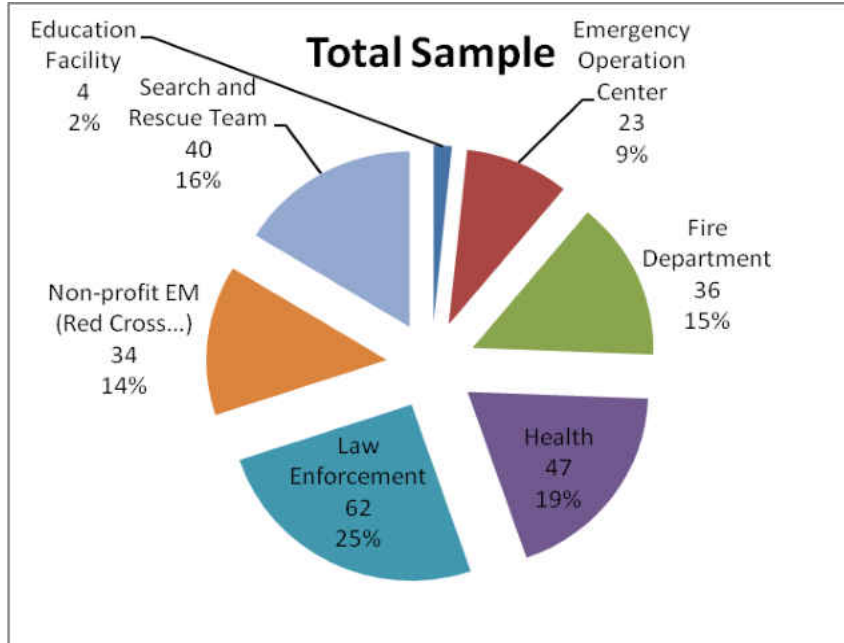


Figure 7. Total Respondent Organization Descriptive Statistics

From an organizational perspective, the sample represents a first responder population. The affiliated organizations are the ones that CM literature and various CM reports frequently suggested as first responders. In other words, it is not surprising to see firefighters, police officers, emergency health personnel, and search-and-rescue teams in a CM research study sample.

An important limitation of the study was generalizing the results for the response and recovery phases of CM to mitigation and preparedness phases, which require much more time and effort. Finding respondents who have higher positions in selected institutions could be a solution to this problem. Privacy issues prevented the study from contacting particular individuals from particular organizations. The surveys were delivered to groups to provide confidentiality. Although it was not planned beforehand, Figure 8 indicates that only 34% (85

people) of the sample were frontline workers. Twenty-one percent (53 people) of the sample were supervisors, and 66% of the sample identified themselves as some type of manager. The high rate of manager participation reduces the effect of argued limitation and makes the study results more generalizable.

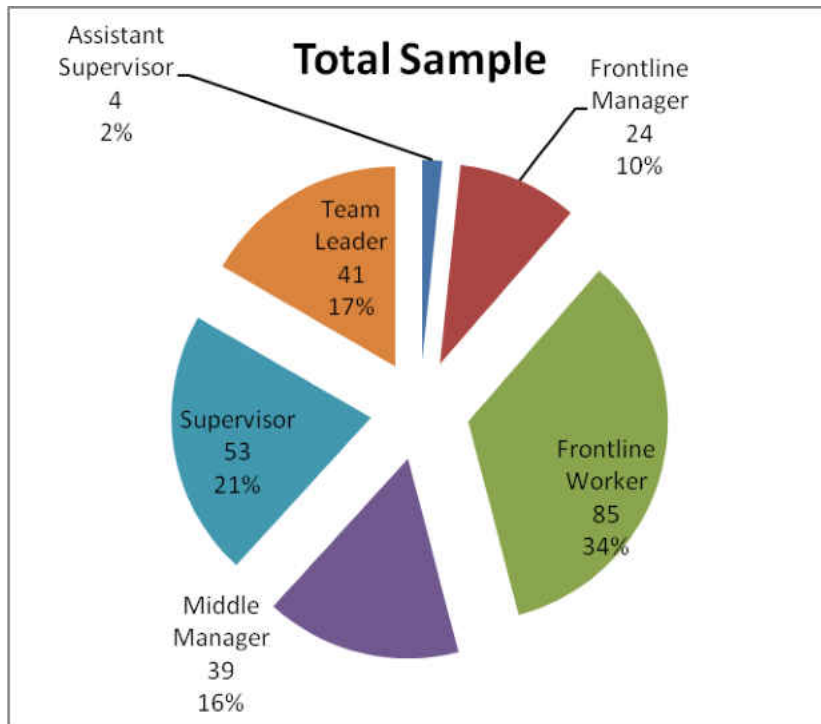


Figure 8. Total Respondent Employee Positions Descriptive Statistics

A disproportionate number of male respondents replied from the survey. Figure 18 (Appendix C) indicates that female respondents of the survey comprise only 15 percent of the total sample.

4.2.2 Descriptive Statistics of Survey Results

Table 6 demonstrated the simple descriptive statistics of the sample. Q18a is the combined version of Q18, Q19, and Q20. The fifth criterion Quarantelli (1997) suggested was represented by Q18a in the SEM models in the study.

All questions asked in the surveys received answers ranging from 1 (Completely Agree) to 5 (Completely Disagree). A distribution from all perspectives of respondents is shown. Furthermore, only five questions (questions #9, #10, #11, #12, and #13) had a mean of less than two or more than three. Other questions generated a mode between two and three, indicating that the answers fall in the neutral agreement area. Questions #9, #10, #12, and #13 have a mean value of more than 1.90, which shows that they have relatively normal answers. However, the mean for question 11 is 3.69. This value is close to “Agree.” The respondents overwhelmingly agreed upon this question’s statement.

Table 6. Descriptive Statistics of Survey Results

	N	Minimum	Maximum	Mean	Skewness			Kurtosis		
					Statistic	Std. Error	Rate	Statistic	Std. Error	Rate
Q1	246	1	5	2.55	0.47	0.16	3.03	-0.76	0.31	-2.45
Q2	246	1	5	2.39	0.60	0.16	3.86	-0.67	0.31	-2.18
Q3	246	1	5	2.17	0.87	0.16	5.60	-0.07	0.31	-0.23
Q4	246	1	5	2.58	0.42	0.16	2.70	-0.93	0.31	-3.00
Q5	246	1	5	2.26	0.90	0.16	5.80	0.24	0.31	0.78
Q6	246	1	5	2.12	0.87	0.16	5.60	0.52	0.31	1.69
Q7	246	1	5	2.25	0.83	0.16	5.32	0.05	0.31	0.15
Q8	246	1	5	2.13	0.75	0.16	4.86	-0.04	0.31	-0.14
Q9	246	1	5	1.98	1.03	0.16	6.63	0.57	0.31	1.85
Q10	246	1	5	1.98	1.12	0.16	7.21	1.02	0.31	3.29
Q11	246	1	5	3.69	-0.70	0.16	-4.51	-0.11	0.31	-0.35
Q12	246	1	5	1.97	1.08	0.16	6.94	1.06	0.31	3.44
Q13	246	1	5	1.91	1.21	0.16	7.77	1.52	0.31	4.93

	N	Minimum	Maximum	Mean	Skewness			Kurtosis		
					Statistic	Std. Error	Rate	Statistic	Std. Error	Rate
Q14	246	1	5	2.34	0.72	0.16	4.63	-0.37	0.31	-1.20
Q15	246	1	5	2.35	0.58	0.16	3.73	-0.54	0.31	-1.74
Q16	246	1	5	2.24	0.77	0.16	4.97	-0.06	0.31	-0.20
Q17	246	1	5	2.53	0.47	0.16	3.04	-0.75	0.31	-2.42
Q18	246	1	5	2.56	0.48	0.16	3.06	-0.71	0.31	-2.28
Q19	246	1	5	2.81	0.29	0.16	1.88	-0.88	0.31	-2.86
Q20	246	1	5	2.89	0.10	0.16	0.64	-0.90	0.31	-2.90
Q21	246	1	5	2.76	0.43	0.16	2.78	-0.63	0.31	-2.04
Q22	246	1	5	2.61	0.42	0.16	2.71	-0.73	0.31	-2.36
Q23	246	1	5	2.67	0.42	0.16	2.68	-0.68	0.31	-2.19
Q24	246	1	5	2.61	0.52	0.16	3.36	-0.46	0.31	-1.48
Q25	246	1	5	2.26	0.71	0.16	4.60	-0.08	0.31	-0.25
Q18a	246	1	5	2.76	0.21	0.16	1.34	-0.67	0.31	-2.18

Question 11 represents the variable *working for organization because of someone else*.

The responses for the question were reversely coded to prevent possible negative correlations in the model. Therefore, the overwhelming “Agree” response actually shows an overwhelming “Disagree” response to the question. In other words, the majority of sample population does not work for their agencies because of someone else. It was noted that question #11 represented the strongest form of friendship; apparently that level of friendship exists rarely in the examined agencies. Other statistical interpretations of this variable will be made in the following chapters.

Kurtosis and skewness statistics are also represented in Table 6. Although the kurtosis and skewness values are not too large (the greatest skewness is 1.21 and the greatest kurtosis is 1.52), the distribution of the sample is not considered normal by definition unless the skewness and kurtosis values are equal to zero. Rule of thumb suggests that the ratio of skewness and kurtosis to their standard deviation should not exceed (-) 2.00. Table 6 indicates that a number of variables violate this assumption. As a result, many study variables are skewed to right or left,

and some are platykurtic (flatter than the corresponding normal curve) or leptokurtic (more peaked than the normal curve). For this reason, SEM tests were conducted by controlling the non-normality of data distribution.

Table 7. Descriptive Statistics of Survey Responses

		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Q1	Count	53	84	50	39	20
	%	21.5	34.1	20.3	15.9	8.1
Q2	Count	61	97	32	44	12
	%	24.8	39.4	13	17.9	4.9
Q3	Count	82	90	36	26	12
	%	33.3	36.6	14.6	10.6	4.9
Q4	Count	52	87	39	49	19
	%	21.1	35.4	15.9	19.9	7.7
Q5	Count	58	115	36	25	12
	%	23.6	46.7	14.6	10.2	4.9
Q6	Count	62	122	37	21	4
	%	25.2	49.6	15	8.5	1.6
Q7	Count	61	110	37	28	10
	%	24.8	44.7	15	11.4	4.1
Q8	Count	75	98	44	24	5
	%	30.5	39.8	17.9	9.8	2
Q9	Count	96	89	38	16	7
	%	39	36.2	15.4	6.5	2.8
Q10	Count	85	110	28	17	6
	%	34.6	44.7	11.4	6.9	2.4
Q11	Count	12	24	54	95	61
	%	4.9	9.8	22	38.6	24.8
Q12	Count	80	118	27	17	4
	%	32.5	48	11	6.9	1.6
Q13	Count	91	108	30	11	6
	%	37	43.9	12.2	4.5	2.4
Q14	Count	62	100	36	34	14
	%	25.2	40.7	14.6	13.8	5.7
Q15	Count	64	88	48	35	11

		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	%	26	35.8	19.5	14.2	4.5
Q16	Count	70	94	47	24	11
	%	28.5	38.2	19.1	9.8	4.5
Q17	Count	52	88	47	42	17
	%	21.1	35.8	19.1	17.1	6.9
Q18	Count	44	96	46	44	16
	%	17.9	39	18.7	17.9	6.5
Q18a	Count	26	84	72	52	12
	%	10.6	34.1	29.3	21.1	4.9
Q19	Count	27	90	53	54	22
	%	11	36.6	21.5	22	8.9
Q20	Count	30	70	65	58	23
	%	12.2	28.5	26.4	23.6	9.3
Q21	Count	27	92	64	39	24
	%	11	37.4	26	15.9	9.8
Q22	Count	42	91	52	44	17
	%	17.1	37	21.1	17.9	6.9
Q23	Count	39	86	61	38	22
	%	15.9	35	24.8	15.4	8.9
Q24	Count	36	96	61	34	19
	%	14.6	39	24.8	13.8	7.7
Q25	Count	64	98	50	25	9
	%	26	39.8	20.3	10.2	3.7
Average	%	22.69	37.92	18.60	14.63	6.17

Responses for individual questions were represented in Table 7. “Strongly Disagree” was the least selected option by respondents, with 6.2 % average per question. “Agree” was the most selected choice (37.9% average). The second most selected option was “Strongly Agree,” at a rate of 22.7 percent. The non-normality of the sample statistics can be understood by looking at the affirmativeness of the respondents. The statements the survey offered were generally favored, which created a positively skewed dataset. AMOS controls the non-normality and reports if non-normality distorted statistical results occur.

4.2.3 Confirmatory Factor Analysis (CFA)

The data from the respondents to the U.S., U.K., and Turkey surveys were merged to form a complete dataset, using SEM. The analysis was then performed for each country. However, individual analysis for the U.K. respondents was not done because of its small sample size.

CFA is used to create a generic measurement model for each latent construct. This study has two latent constructs. CFA models help to eliminate unrelated variables before the complete model computation. Hypothesized correlations are demonstrated as arrows, latent constructs as squares, and observed variables as circles. During CFA, researcher also has a chance to indicate correlated observed variables. The capability to demonstrate correlations among measurement errors and perform the factor analysis based on those correlations is an important advantage of SEM analysis.

4.2.3.1 Latent Construct # 1 – Quality of Informal Relationships

Since the survey has two groups, the CFA was done for both of them separately. Figure 19 (Appendix C) shows the CFA model for the quality of informal relationships, a latent construct. Normally, a relationship between an indicator and its common factor equal to or less than .20 is considered to be a weak association and must be removed from the analysis (Byrne, 2001). Therefore, the observed variable of *work for organization because of someone else* was removed from the measurement model.

Other indicators seem to be significantly associated with the latent construct. The strongest factor (1.00) is the observed variable for Question 10, *formed strong friendships at work*, whereas the least correlated indicator (less than .20) is Question 11, *work for organization*

because of someone else. If the observed variable for Question 11 is eliminated from the model, the standardized regression coefficients of the first latent construct of the study change from .43 to 1.00, which shows a strong latent construct formed by the hypothesized indicators.

Table 8 shows the default model statistics for the Chi-square fit index of the generic model in Figure 19 (Appendix C) and the developed model in Figure 9 (p. 119). The chi-square fit shows the model fit for the CFA model. The probability level of this fit is expected to be more than .05 to reject the null hypothesis. In this case, the null hypothesis cannot be rejected ($p=.001$). The low probability value means that the model fit needs improvement.

Table 8 presents the comparative fit index (CFI), which is expected to be close to one. The CFA model's CFI is close to 1 (.916) but can be developed with better assessments. The likelihood ratio is acceptable (=2.1) and the GFI is close to the accepted level (=0.955). However, the GFI and AGFI still need improvement to yield the suggested estimations. The RMSEA is also a little bit over (.017) the expected model fit.

Table 8. Goodness of Model Fit of CFA of Quality of Informal Relationships

	Criterion	AMOS	
		Generic Model CFA	Developed Model CFA
Chi-square (χ^2)	Low	56.705	11.78
Degrees of freedom (df)	> 0	27	15
Probability	>0.05	.001	.696
Likelihood Ratio (χ^2/df)	<4.0	2.1	0.785
Goodness of Fit Index (GFI)	>.95	0.955	0.988
Adjusted GFI (AGFI)	>.90	0.925	0.971
Comparative Fit Index (CFI)	>.95	0.916	1
Root Mean Square Error of Approximation (RMSEA)	<.05	0.067	0

Table 15 indicates the error correlations (modification indexes) among tested variables in the CFA model. The CFA model has five different correlations, according to the table. Based on these calculations, the measurement errors of variables representing question #5 and question #7, question #7 and question #6, question #7 and question #12, question #5 and question #9, and question #12 and question #13 were correlated in the final CFA model of the quality of informal relationships.

The developed CFA model is presented in Figure 9. Correlations established among the suggested variables are represented as double-headed arrows. Table 8 gives the model fit values for the developed final CFA model of the *quality of informal relationship* latent construct. The chi-square value went down to 11.78, and the probability level increased to well above .05 (.696). Degrees of freedom also dropped to 15. LR got a lower value of .78. The GFI and AGFI values became closer to 1. The RMSEA was over .05 and went down to 0. The best advance was for CFI, which went up to 1, indicating a perfect fit for the model.

Removing an observed variable and correlating the relevant variables increased the success of the model fit. The final CFA model supports the literature, and confirms related hypotheses regarding the *quality of informal relationship* model. This final model was used in the final evaluation of the structural model that contains predictors of the two endogenous latent variables.

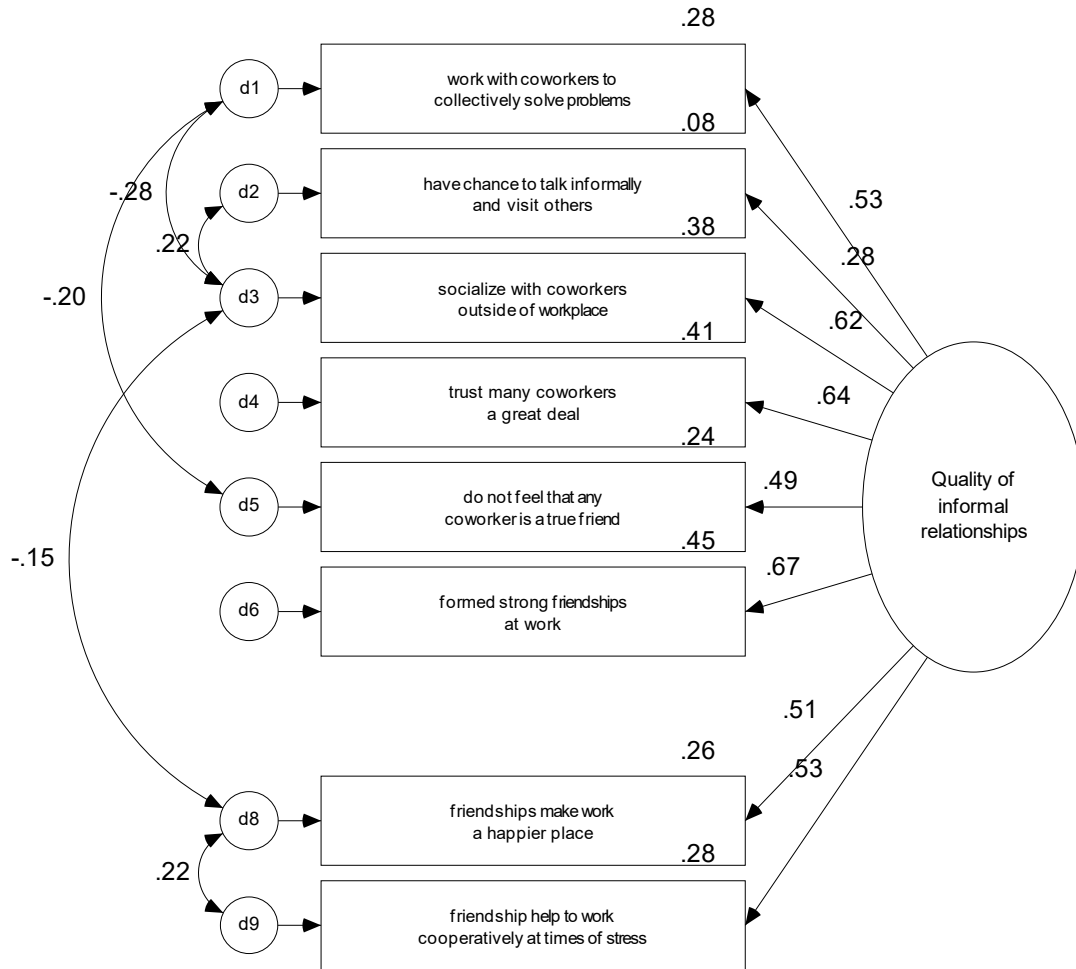


Figure 9. Final CFA Model for Quality of Informal Relationships

4.2.3.2 Latent Construct # 2 – Perceived Effectiveness of CM Networks

Figure 20 (Appendix C) demonstrates the CFA model for the other latent construct of the study. Both groups' observed variables' relationships on latent construct have values over .2.

As a result, no observed variable was removed from the CFA model to further develop it. Table 9 gives selected goodness-of-model-fit measurements. The probability level is below .05 and the model needs improvement to be able to reject the null hypothesis. Other tests' values in the generic CFA model are not satisfying, either. LR shows a good model fit (=3.041) besides

the GFI and CFI, which are over .9 (0.914 and 0.911, respectively). However, the AGFI is not over .9, although it is very close (=0.865). RMSEA is the other indicator that needs an improvement; it is over the expected .05 (=0.091). Although these values do not match the criterion values selected, it should be noted that they are still within acceptable levels.

Table 9. Goodness of Model Fit of CFA of Perceived CM Network Effectiveness

	Criterion	AMOS	
		Generic Model CFA	Developed Model CFA
Chi-square (χ^2)	Low	106.422	18.366
Degrees of freedom (df)	> 0	35	23
Probability	>0.05	.000	.737
Likelihood Ratio (χ^2/df)	<4.0	3.041	.799
Goodness of Fit Index (GFI)	>.90	0.914	0.985
Adjusted GFI (AGFI)	>.90	0.865	0.965
Comparative Fit Index (CFI)	>.90	0.911	1
Root Mean Square Error of Approximation (RMSEA)	<.05	0.091	0

Table 16 provided possible developments that can be made in the CFA model in order to increase the probability level. In light of the suggestions in Table 16, correlations were established with error residuals of observed variables representing question #23 and question #24, question #23 and question #22, question #23 and question #21, question #16 and question #24, question #23 and question #16, question #15 and question #24, question #23 and question #15, question #22 and question #22, question #15 and question #16, question #14 and question #22, question #14 and question #16, and question #14 and question #15.

Figure 10 presents the developed CFA model for *perceived CM network effectiveness*. Some correlations have negative values, which reflect that there is a negative correlation among

some of the observed variables of CM network effectiveness. All these values were interpreted in the structural model.

The suggestions from Table 16 clearly helped to improve the model fit. The chi-square fit index dropped to 18.3 from 106.4. This is a clear development, because it automatically reduced LR as well. Although the degrees of freedom fell from 35 to 23 with the added correlations, it did not do so as much as the chi-square fit index; as a result, LR came closer to 1 (dropping from 3.041 to .799). The probability value also increased to an insignificant .737 from a significant 0.00. Therefore, the null hypothesis of having no relationships between the observed and hypothesized variables and the latent construct is rejected in favor of the given measurement model.

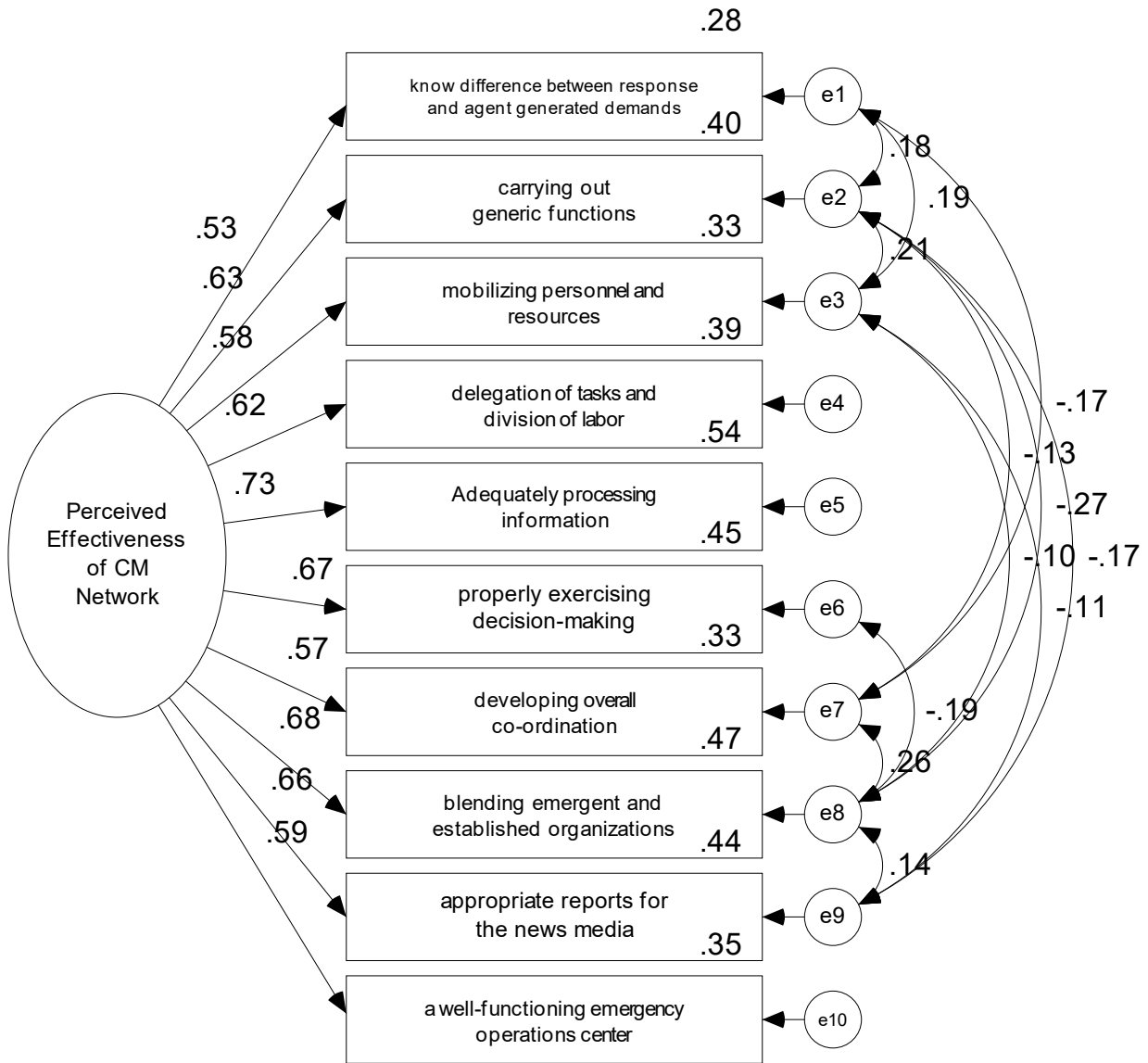


Figure 10. Final CFA Model for Perceived CM Network Effectiveness

The AGFI result also increased from .865 to .965 in the developed CFA. Therefore, besides the GFI, the AGFI score also indicates a good model fit level (>.9). The GFI score indicated a good model fit in the previous model; however, it improved and surpassed .95 (= .985). On the other hand, the CFI test score improved, as expected, to over .95. The CFI was

.91 in the primitive CFA model and went up to 1 in the developed final CFA model. The RMSEA made an improvement and fell down to 0.0 from an unacceptable .091.

4.2.4 The Main Model

The main model is created by combining two latent construct CFAs and the previously proposed predictor variables. The developed models of the CFAs were added to the structural model; therefore, removed variables and correlated observations were inherited in the final model. In Figure 2, a model was suggested with 23 observed and 2 latent variables. However, one observed variable from the Quality of Informal Relationship latent construct was omitted from the test. Figure 21(Appendix C) represents the generic structural model.

The structured model includes 22 observed and 2 latent constructs. Correlations are imported from the discussed developed CFA models. All correlations from the observed variables to the latent constructs are positive. On the other hand, it is apparent that some of the correlations among some error residuals of the observed variables have negative values, indicating that some of the observed variables are negatively correlated with each other.

Before interpreting individual regression scores, goodness of model fit was examined. As it was conducted in measurement models, if needed, the model would be revised and developed to fit.

Table 10. Goodness of Fit Statistics of Structural Models

	Criterion	AMOS	
		Generic Model	Developed Model
Chi-square (χ^2)	Low	386.435	278.742
Degrees of freedom (df)	> 0	187	183
Probability	>0.05	.000	.000
Likelihood Ratio (χ^2/df)	<4.0	2.066	1.523
Goodness of Fit Index (GFI)	>.90	0.878	.910
Adjusted GFI (AGFI)	>.90	0.835	.875
Comparative Fit Index (CFI)	>.90	0.872	.938
Root Mean Square Error of Approximation (RMSEA)	<.05	0.066	.046

The goodness-of-fit measures generally need improvement in Table 10. The chi square value is high; however, the LR is within accepted levels (=2.066). The probability value is low, suggesting a failure to reject the null hypothesis. The GFI, AGFI, and CFI are not over .9, but they are close to the accepted level (0.878, 0.835, and 0.872 respectively). The RMSEA is also high (=0.066), which means that the model needs an improvement.

Table 17 indicates the suggestions coming from modification indices table in AMOS. Byrne (2001) suggested that the modification indices can be used only if they are backed by the theory utilized. The majority of the correlation suggestions in Table 17 are not hypothesized in the study. It is possible to correlate all of the correlation suggestions in a measurement model because CFA models are already hypothesized by a theoretical discussion. However, the structural model utilizes all observed and latent constructs, and theory cannot allow all the factors to be correlated. The study used the correlation suggestions among predictor variables. No other suggestions in Table 17 can be supported by the theory because those suggestions require correlating the observed variables of different latent constructs or predicting variables directly.

Looking at the correlations in Table 17, the developed structural model correlated predictor variables that represent Question #3 and Question #2, Question #3 and Question #4, Question #3 and Question #1, and Question #1 and Question #2. The developed model is presented in Figure 11.

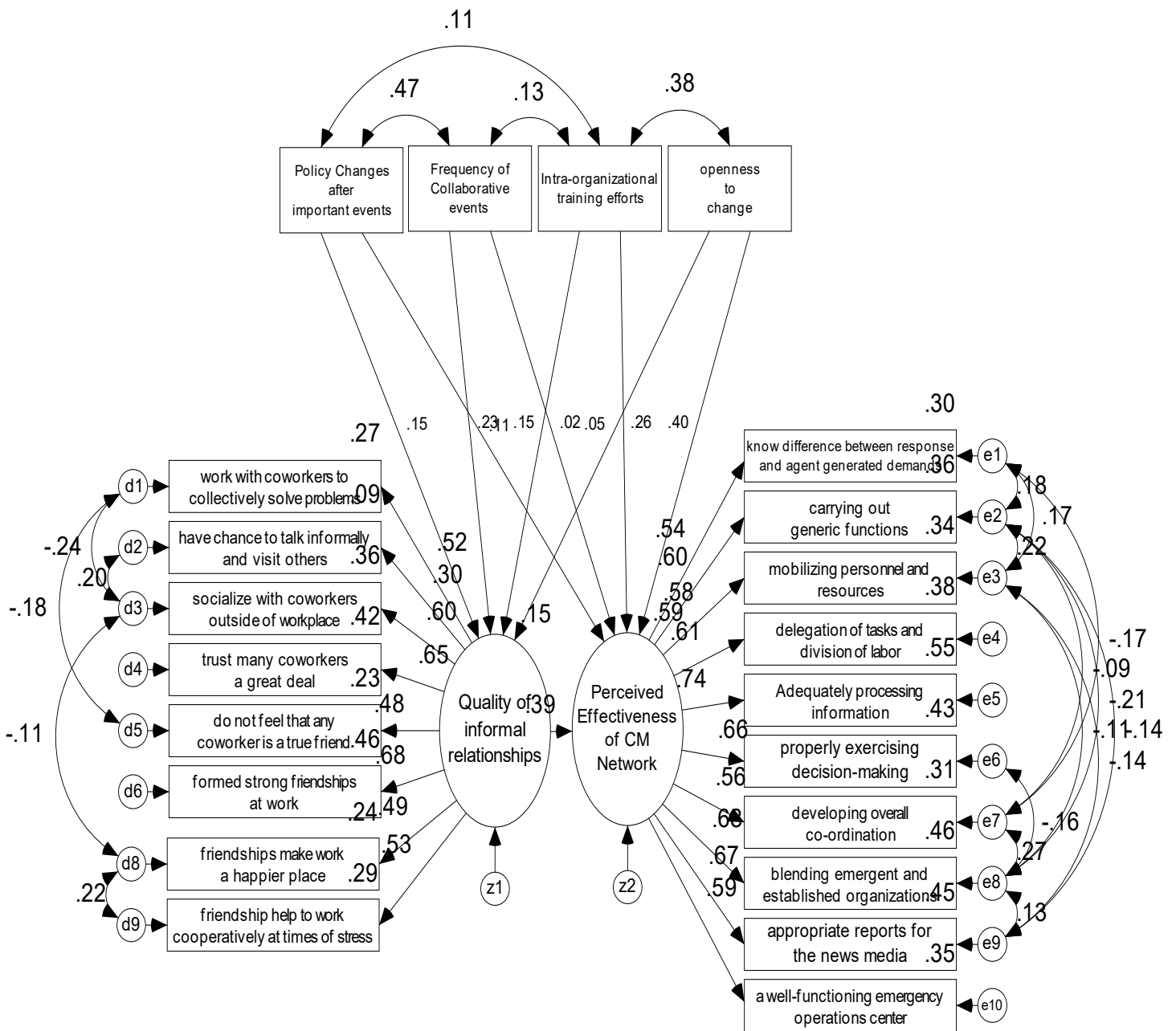


Figure 11. Developed Structural Model

The probability value for the developed structural model did not go over .05 confidence level in developed model, which indicates that the model fails to reject the null hypothesis. However, Schumaker and Lomax (2004) pointed out that chi square test statistics are highly affected by sample size; therefore, they are only reliable when evaluated with other goodness-of-model-fit tests. The chi square value reduced to 278.74 from 386.43, which shows an improvement in the developed model despite the fact that the probability value did not change.

Moreover, the LR also became smaller; it was already under the accepted level (=1.523). The GFI and CFI also went over the accepted level of .90 (.91 and .94 respectively). The AGFI stayed under .90 (=0.875); however, it was close to the accepted level. The RMSEA was another measure that improved well enough to support a good model fit (=0.046). Based on these measures, the model is accepted as having a good model fit.

AMOS was discussed as having the ability to test whether non-normality in the dataset significantly distorts statistical findings. Table 11 demonstrates the non-normality tests of the latest SEM model.

Table 11. AMOS' Assessment of Non-Normality Test

Variable	skewness	Critical Ratio	kurtosis	Critical Ratio
Q4	0.416	2.665	-0.933	-2.987
Q3	0.864	5.531	-0.094	-0.301
Q2	0.596	3.816	-0.684	-2.189
Q1	0.467	2.99	-0.765	-2.45
Q25	0.709	4.542	-0.101	-0.323
Q24	0.518	3.317	-0.472	-1.513
Q23	0.414	2.648	-0.688	-2.202
Q22	0.418	2.675	-0.739	-2.366

Variable	skewness	Critical Ratio	kurtosis	Critical Ratio
Q21	0.429	2.748	-0.643	-2.059
Q18a	0.207	1.324	-0.684	-2.188
Q17	0.469	3.001	-0.759	-2.43
Q16	0.766	4.907	-0.086	-0.275
Q15	0.576	3.687	-0.55	-1.761
Q14	0.715	4.576	-0.388	-1.242
Q5	0.895	5.729	0.211	0.676
Q6	0.864	5.532	0.487	1.559
Q7	0.821	5.258	0.022	0.071
Q8	0.75	4.801	-0.068	-0.217
Q9	1.023	6.552	0.537	1.719
Q10	1.112	7.123	0.973	3.116
Q12	1.071	6.858	1.018	3.258
Q13	1.199	7.679	1.469	4.703
Multivariate			124.081	29.944

The rule of thumb of AMOS suggests that a critical ratio value different from zero indicates the non-normality of the dataset in Table 11. However, critical ratio values for skewness and kurtosis are negligible when less than one. In order to have a severe non-normality, critical ratio values should go over ten. No critical ratio value in Table 11 violates this assumption. The greatest critical ratio for skewness (7.7) and kurtosis (4.7) value belongs to question #13. Therefore, the test results would be considered to have moderate non-normality that does not distort statistical results.

4.2.5 Latent Constructs

Table 12 demonstrates the test results of the developed SEM model. Correlations representing study hypotheses were evaluated in the following section. All of the factors

estimated in latent constructs of the study produced statistically significant coefficients. The probability values of those correlations were significant at the .01 confidence level.

Table 12. Individual Effects among Variables in SEM model

			<i>Developed Structural Model</i>				
Correlation Direction			URC	SRC	S.E.	C.R.	<i>p</i>
Q. o. I. R.	<---	Q1	0.08	0.147	0.042	1.911	0.056
Q. o. I. R.	<---	Q2	0.132	0.233	0.044	2.99	0.003
Q. o. I. R.	<---	Q3	0.088	0.151	0.043	2.041	0.041
Q. o. I. R.	<---	Q4	0.026	0.048	0.039	0.661	0.509
P. E. o. C. N.	<---	Q1	0.068	0.108	0.036	1.892	0.059
P. E. o. C. N.	<---	Q2	0.012	0.018	0.038	0.309	0.758
P. E. o. C. N.	<---	Q3	0.177	0.262	0.038	4.626	***
P. E. o. C. N.	<---	Q4	0.252	0.402	0.036	6.92	***
P. E. o. C. N.	<---	Q. o. I. R.	0.459	0.394	0.083	5.535	***
Q13	<---	Q. o. I. R.	0.756	0.535	0.106	7.135	***
Q12	<---	Q. o. I. R.	0.688	0.494	0.107	6.46	***
Q10	<---	Q. o. I. R.	1	0.68			
Q9	<---	Q. o. I. R.	0.748	0.483	0.117	6.391	***
Q8	<---	Q. o. I. R.	0.998	0.651	0.117	8.513	***
Q7	<---	Q. o. I. R.	0.975	0.601	0.128	7.617	***
Q6	<---	Q. o. I. R.	0.425	0.302	0.104	4.1	***
Q5	<---	Q. o. I. R.	0.838	0.517	0.126	6.634	***
Q15	<---	P. E. o. C. N.	0.874	0.597	0.101	8.645	***
Q16	<---	P. E. o. C. N.	0.826	0.583	0.097	8.513	***
Q17	<---	P. E. o. C. N.	0.941	0.612	0.102	9.236	***
Q18a	<---	P. E. o. C. N.	1	0.739			
Q21	<---	P. E. o. C. N.	0.964	0.657	0.098	9.854	***
Q22	<---	P. E. o. C. N.	0.835	0.559	0.101	8.261	***
Q23	<---	P. E. o. C. N.	1.023	0.678	0.104	9.855	***
Q24	<---	P. E. o. C. N.	0.973	0.672	0.098	9.966	***
Q25	<---	P. E. o. C. N.	0.806	0.589	0.091	8.871	***
Q14	<---	P. E. o. C. N.	0.811	0.544	0.101	8.048	***

Note: *** = Correlation significant @ $p \leq .01$

Note: U. R.C. = Unstandardized Regression Coefficients; S. R. C. = Standardized Regression Coefficients; S. E. = Standard Error; C. R. = Critical Ratio; Q. o. I. R.: Quality of informal relationships; P. E. o. C. N. = Perceived Effectiveness of CM Network

The greatest unstandardized regression coefficient score for the latent construct *quality of informal relationships* belonged to question #10, which was 1 (.68 for the standardized regression coefficient). Question #10 represented the observed variable *formed strong friendships at work*. This question was followed by the *trust many coworkers a great deal factor* with a .998 unstandardized regression coefficient score (.65 for the standardized regression coefficient). The lowest value for estimating factors came from question #6, with .42 of the unstandardized regression coefficient score (.30 for the standardized regression coefficient).

Question #6 represented the observed variable *have chance to talk informally and visit others*. One should notice that although there is a difference among the correlations' strength in estimating the quality of informal relationships, all of them are high for a social science study, and all of them are strongly significant. The informal relationship scale asked a similar question, as expected, but the correlations with the latent construct should be considered in one piece. The only variable left out of the study was the observed variable *working for organization because of someone else*, which indicated the highest degree of friendship. Therefore, it can be said that the CM employees had informal relationships to a significant degree within the agencies, but not friendships of the highest level.

Factors estimating the perceived effectiveness of CM networks were much stronger than the ones estimating the independent variable. The lowest unstandardized regression coefficient was for the last question of the survey, which asked about *a well-functioning emergency management center*, with an unstandardized regression coefficient score of .81(.59 for the standardized regression coefficient). This indicates how important all ten criteria are for CM networks. Ten criteria factors had an average unstandardized regression coefficient score of .91. It would be misleading to discuss which one of them is superior to the others. Therefore,

Quarantelli's (1997) ten criteria should be applied without preferring one over another. All suggested factors are proven to be important for the effectiveness of CM networks.

4.2.6 Hypothesis Testing

The study utilized five hypotheses; they are evaluated in this section. The standardized and unstandardized regression coefficients for each given relationship in the structural model are demonstrated in Table 12.

H1: A higher quality of informal relationships within crisis management organizations will increase the effectiveness of crisis management efforts.

The analysis results show that the model supported this hypothesis. Table 12 presented that the suggested relationship has a .46-unstandardized regression coefficient value and a .39 standardized regression coefficient value, which are statistically significant at the .01 confidence level. It means that when the *quality of informal relationships* latent construct goes up by 1, the perceived effectiveness of the CM network goes up by 0.46. Unstandardized regression coefficients can be misleading because they are related to other relationships of the measured variable. On the other hand, the standardized regression coefficient value of the relationship suggests that when the *quality of informal relationships* latent construct goes up by 1 standard deviation, the perceived effectiveness of CM network goes up by 0.394 standard deviations.

.39 is a high correlation for examined latent constructs. The test is statistically significant at a high confidence level, as well. It can be suggested that each intervention aiming to increase the quality of relationships among CM personnel can increase the perceived network effectiveness by almost 40 percent. For a social science project, this is a considerably high value. Therefore, the study rejects the null hypothesis for H1 and accepts the hypothesis.

H2- The openness of CM organization to change has a positive effect on the perceived effectiveness of CM networks.

Openness of change was assessed by Question #4 in the surveys. In Table 12, the highlighted values show that this relationship was proved to be correct at the .01 confidence level. The correlation has a .25 unstandardized regression coefficient value and a .40 standardized regression coefficient value. Similarly to the first hypothesis, this correlation is also a very high value for social science research. The correlation basically suggests that the more open a CM organization is to change, the more effective it will be perceived to be.

Table 12 suggests that when the openness of an organization value goes up by 1 standard deviation, the perceived effectiveness of the CM network goes up by 0.40 standard deviations. Therefore, the null hypothesis is rejected and H2 of the study is proven to be correct.

H3- Changes in CM policies due to important events will positively affect CM effectiveness.

This hypothesis was operationalized with question #1 in the surveys. The unstandardized and standardized coefficients' values are low relative to the prior hypotheses (.07 and .11 respectively). Moreover, the correlations do not have a significant probability value, which violates the .95 confidence level ($=.059$). Although the probability value is very close to the accepted confidence level, the weak correlation for the observed variable representing *changed CM policies due to an important event* fails to reject the null hypothesis of H3. Therefore, the study fails to prove that the H3 is correct. In other words, the study cannot find statistical proof that *changed CM policies due to an important event* affect the perceived effectiveness of a CM network based on proposed the SEM model.

H4-Intra-organizational training of CM personnel will lead to more effective CM.

H4 was represented by question #3 in the surveys. The observed variable has a weak correlation on perceived effectiveness (unstandardized regression coefficient = .18, standardized regression coefficient = .26). Although this can be considered a low degree of effect, it is statistically significant at the .01 confidence level. When the intra-organizational training variable's value goes up by 1 standard deviation, the perceived effectiveness of the CM network goes up by 0.26 standard deviations. This is a relatively high score in terms of the social science perspective.

Therefore, the study proved that the null hypothesis of H4 was rejected. To put it differently, it is been supported by the study that intra-organizational efforts statistically increase the perceived effectiveness of the CM network.

H5- Frequent actual CM experiences increase CM effectiveness.

H5 was represented in the surveys with question # 2. A very weak correlation with .01 unstandardized regression coefficient value and .02 standardized regression coefficient value shows that there was almost no relationship between the observed variable representing frequent CM experiences and the perceived effectiveness of CM network. Moreover, the relationships probability value violates the confidence interval ($=.76$). The literature suggests that real CM experiences with other organizations based on real scenarios do increase CM effectiveness. This study's result is controversial, given what the literature suggested. Possible reasons for this controversy will be discussed in the conclusion of this study. Finally, the study claims that the null hypothesis for H5 could not be rejected. The hypothesized correlation in H5 does not exist, based on statistical model's findings.

4.2.7 Group Comparisons

In this part the American and Turkish groups' differences were examined based on the same structural SEM model. The developed model in Figure 11 was used to provide consistency in the results. The groups' differences were discussed in regards to the socio-economical characteristics of the groups and other reasons that could stem from the organizational differences of employees.

The American groups' standardized regression coefficients based on the proposed final model are in Figure 12.

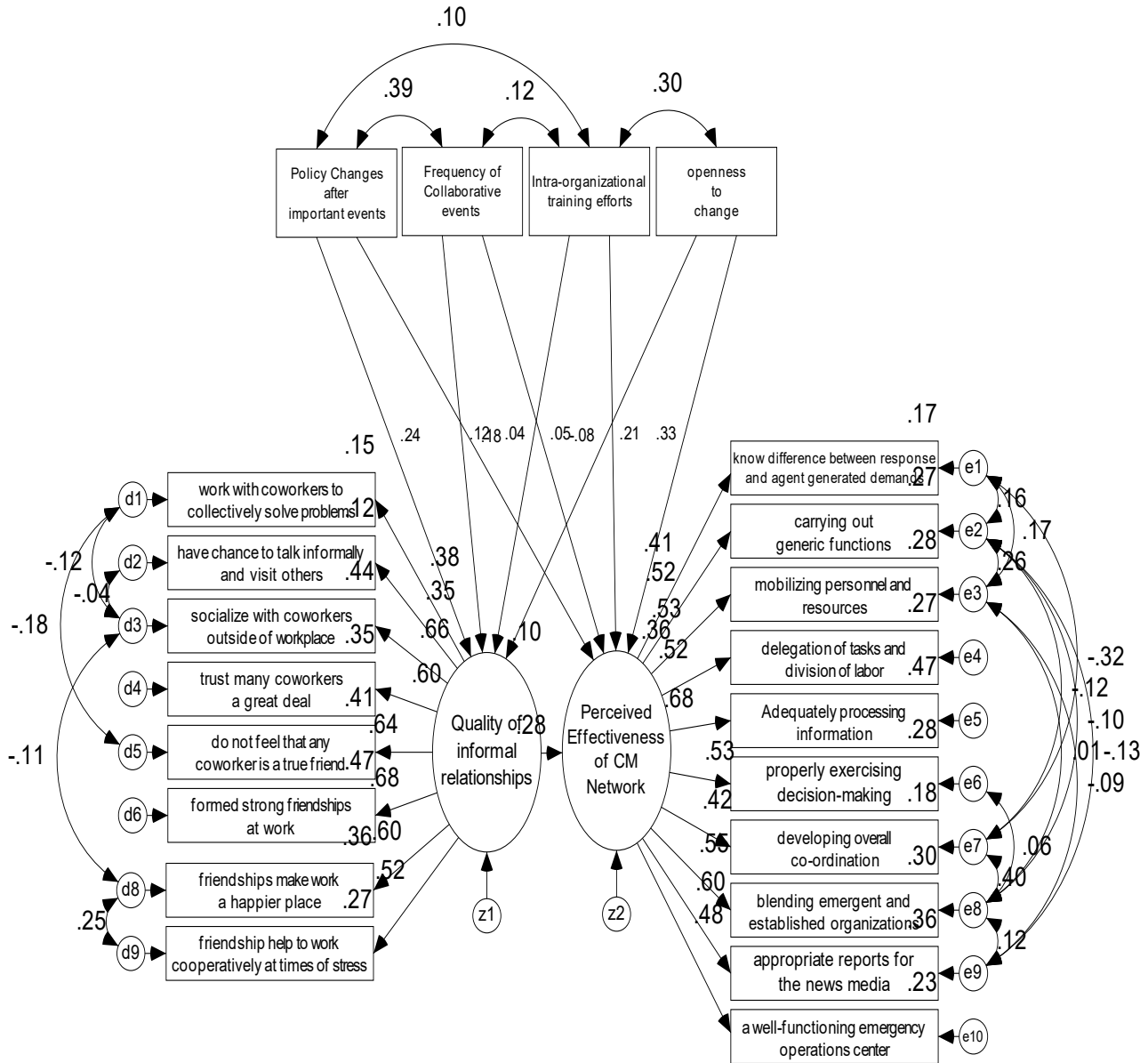


Figure 12. Developed Structural Model for American Group

The Turkish groups' standardized regression coefficients based on the proposed final model are shown in Figure 13. There are small differences in the scores of correlations among the given model's observed and latent variables. Although the figures change for the same variables, the directions of the correlations remain similar, which shows that although the same

factors affected related variables differently in weight, the correlations were in the same direction.

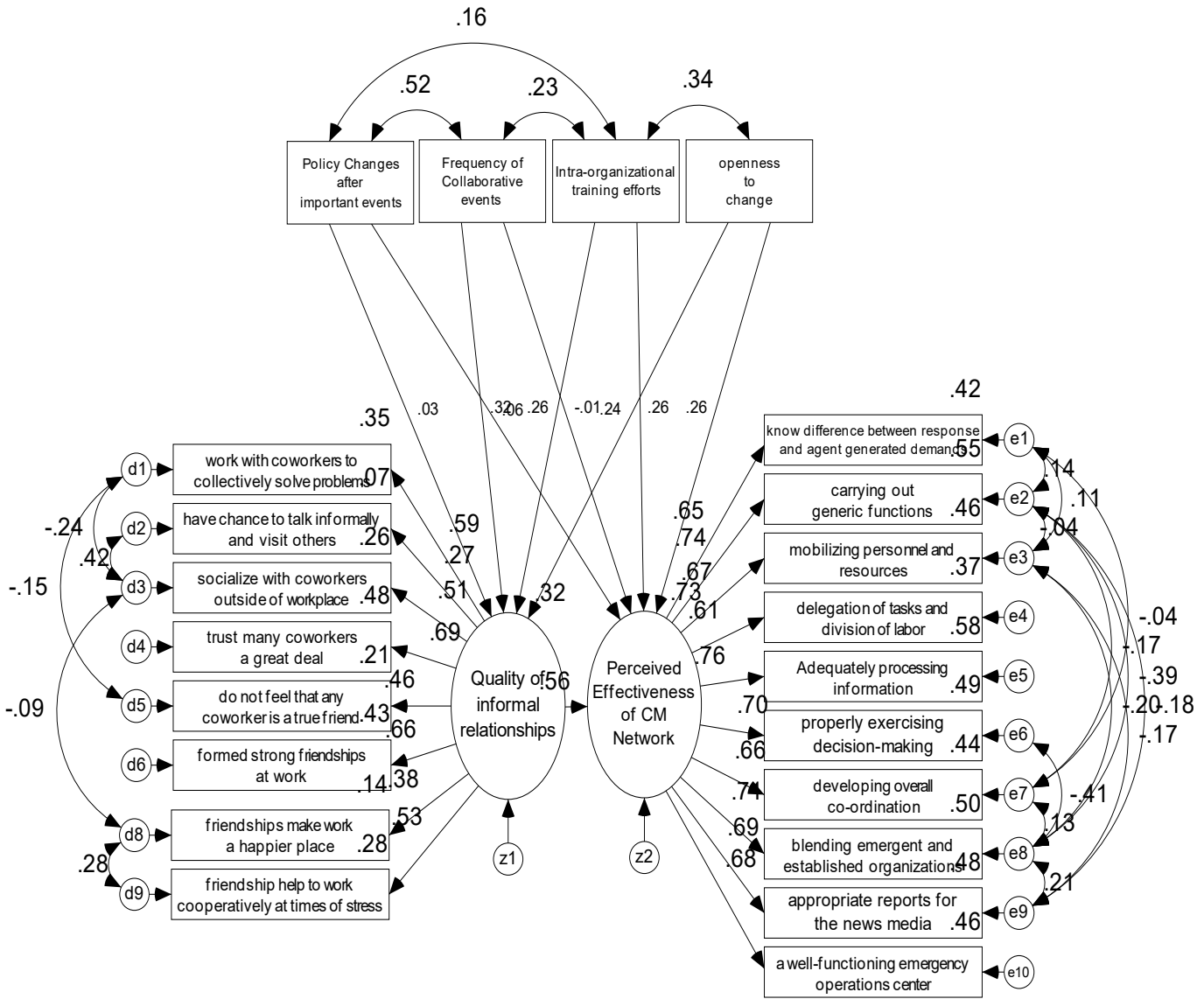


Figure 13. Developed Structural Model for Turkish Group

The small sample size affected the goodness of fit of the group models. Table 13 represents various goodness-of-fit statistics belonging to the group-based model and developed final model.

Table 13. Goodness of Fit Statistics of Structural Models of American and Turkish Groups

	Criterion	AMOS	
		Group Based Structural Model	Developed Final Structural Model
Chi-square (χ^2)	Low	534.819	278.742
Degrees of freedom (df)	> 0	366	183
Probability	>0.05	.000	.000
Likelihood Ratio (χ^2/df)	<4.0	1.461	1.523
Goodness of Fit Index (GFI)	>.90	.840	.910
Adjusted GFI (AGFI)	>.90	.778	.875
Comparative Fit Index (CFI)	>.90	.894	.938
Root Mean Square Error of Approximation (RMSEA)	<.05	.044	.046

When the same model was divided into two groups, the chi square (=534.82) and degrees of freedom (=366) values doubled because of decreased sample size per group. The probability value did not change. Therefore, the model is still not fit, according to a probability value that is less than .01. LR, and the RMSEA improved in the groups' model (1.46 and .044 respectively). These two figures are the only measures that offer a good model for the given model.

The CFI fell under the .9 acceptance level (= .894) but it still represents a close fit model. The GFI is the other variable that worsened; however, it too stayed over .80 (= .84). The AGFI dropped to .778, also failing to show a good model fit in the developed model. Since there are measures indicating a good model fit, and since the reduced sample size of the model is expected to yield a poorer model fit than the general structural model, the study examined the individual correlations of each group comparatively. Table 14 demonstrates the discussed differences.

Table 14. Individual Effects among Variables in SEM model

		<i>American Group</i>					<i>Turkish Group</i>					
Correlation	Direction	URC	SRC	S.E.	C.R.	<i>p</i>	URC	SRC	S.E.	C.R.	<i>p</i>	
Q. o. I. R.	<---	Q1	0.134	0.237	0.063	2.137	*	0.017	0.032	0.053	0.314	0.754
Q. o. I. R.	<---	Q2	0.072	0.116	0.068	1.067	0.286	0.171	0.318	0.059	2.89	***
Q. o. I. R.	<---	Q3	0.021	0.038	0.059	0.362	0.718	0.16	0.26	0.062	2.581	***
Q. o. I. R.	<---	Q4	-0.042	-0.08	0.056	-0.761	0.446	0.155	0.244	0.062	2.496	*
P. E. o. C. N.	<---	Q1	0.11	0.176	0.064	1.719	0.086	0.035	0.061	0.039	0.879	0.38
P. E. o. C. N.	<---	Q2	0.037	0.055	0.067	0.555	0.579	-0.007	-0.011	0.045	-0.149	0.882
P. E. o. C. N.	<---	Q3	0.131	0.212	0.06	2.176	*	0.177	0.261	0.049	3.636	***
P. E. o. C. N.	<---	Q4	0.194	0.331	0.059	3.299	***	0.181	0.258	0.049	3.71	***
P. E. o. C. N.	<---	Q. o. I. R.	0.312	0.284	0.125	2.492	*	0.614	0.558	0.126	4.876	***
Q13	<---	Q. o. I. R.	0.854	0.516	0.181	4.714	***	0.644	0.533	0.128	5.031	***
Q12	<---	Q. o. I. R.	0.727	0.601	0.138	5.25	***	0.565	0.377	0.156	3.619	***
Q10	<---	Q. o. I. R.	1	0.683				1	0.657			
Q9	<---	Q. o. I. R.	1.039	0.642	0.182	5.698	***	0.691	0.462	0.159	4.348	***
Q8	<---	Q. o. I. R.	0.977	0.595	0.18	5.424	***	1.005	0.691	0.161	6.255	***
Q7	<---	Q. o. I. R.	1.184	0.66	0.21	5.634	***	0.778	0.514	0.163	4.781	***
Q6	<---	Q. o. I. R.	0.56	0.353	0.172	3.257	***	0.348	0.267	0.133	2.617	***
Q5	<---	Q. o. I. R.	0.61	0.381	0.182	3.358	***	1.007	0.594	0.186	5.41	***
Q15	<---	P. E. o. C. N.	0.862	0.523	0.19	4.528	***	1.123	0.739	0.137	8.167	***

Correlation Direction	<i>American Group</i>						<i>Turkish Group</i>					
	URC	SRC	S.E.	C.R.	<i>p</i>	URC	SRC	S.E.	C.R.	<i>p</i>		
Q16	<---	P. E. o. C. N.	0.803	0.526	0.174	4.612	***	1.036	0.675	0.14	7.414	***
Q17	<---	P. E. o. C. N.	0.891	0.524	0.185	4.819	***	0.933	0.611	0.136	6.872	***
Q18a	<---	P. E. o. C. N.	1	0.685				1	0.761			
Q21	<---	P. E. o. C. N.	0.834	0.53	0.172	4.855	***	1.083	0.7	0.137	7.907	***
Q22	<---	P. E. o. C. N.	0.692	0.423	0.179	3.876	***	1.032	0.661	0.141	7.318	***
Q23	<---	P. E. o. C. N.	0.857	0.546	0.18	4.754	***	1.131	0.71	0.145	7.787	***
Q24	<---	P. E. o. C. N.	0.971	0.6	0.184	5.281	***	1.007	0.694	0.131	7.696	***
Q25	<---	P. E. o. C. N.	0.727	0.48	0.163	4.453	***	0.975	0.678	0.126	7.716	***
Q14	<---	P. E. o. C. N.	0.707	0.413	0.188	3.765	***	0.989	0.651	0.137	7.214	***

Note: * = Correlation significant @ $p \leq .01$, * = Correlation significant @ $p \leq .05$**

Note: U. R.C. = Unstandardized Regression Coefficients; S. R. C. = Standardized Regression Coefficients; S. E. = Standard Error; C. R. = Critical Ratio; Q. o. I. R.: Quality of informal relationships; P. E. o. C. N. = Perceived Effectiveness of CM Network

It should be noted that the latent constructs' correlations with the observed variables that created them are statistically significant in both groups. The CFA models of latent constructs were so successful that reduced sample size did not change the correlations' statistical significance. Before looking at the latent constructs, the proposed hypotheses were examined from the groups' perspectives.

The main hypothesis of the study, H1, was supported in each group statistically. The Turkish group's standardized regression coefficient for H1 ($=.59$) more than doubled the one belonging to the American group ($=.28$). Quality of informal relationships meant more to the Turkish group than the American group in terms of perceived effectiveness. The individualistic culture of the American people may have affected this perception negatively for the American group. The opposite of this judgment is also possible: the Turkish group may have shown this high correlation for H1 because of the influence of collectivism.

American society is ranked #1 on the individualistic culture scale of Hofstede (2001), with a score of 91. The lower the individualism score on Hofstede's scale, the more collectivist a society is. Turkey's score is 31, and the median score on the scale is forty-three. The collectivist society of Turkey may have affected the perceived effectiveness of the CM network, thus a high quality of informal relationships is important for effective CM in Turkey. Although it is lower than the Turkish group's score, it should be noted that the American group's correlation for H1 is also strong from the social science perspective, as well as statistically significant.

H2 was tested with question #4 in the surveys. There is not much difference between the standardized and unstandardized regression coefficients. The Turkish group has a slightly lower ($=.26$) value than the American group ($=.33$) for the given test. The correlations were significant at the .01 confidence level. The question regarded the respondent's opinions about CM agencies'

openness to change. The American group's respondents thought that openness to change was more important for the effectiveness of a CM network than Turkish group did; however, the results are close to each other, and considering the standard error of correlations (.06 for the American and .05 for the Turkish group), it can be assumed that the groups answered this question in almost the same way.

H3 was represented by question #1 of the study, regarding policy changes after important events. The general structural model could not find a statistically significant correlation for H3. Table 14 demonstrates that the group model statistics also failed to find a statistical relationship for H3. The standardized regression coefficient for the given variable in the American group is low ($=.18$) and not statistically significant ($p = .09$). Similarly, the Turkish group's correlation for H3 is also low ($=.06$) and insignificant ($p = .4$). Both groups agreed that policy changes after important events do not have a significant effect on perceived effectiveness.

Question #3 operationalizes H4, and the groups have close significant values for this hypothesis. The American group's standardized regression coefficient ($=.21$) is a little less than the Turkish group's ($=.26$). The American group's correlation for H4 is significant at the .05 confidence level, while the Turkish group's correlation is more statistically significant at the .01 confidence level. Question #3 discusses an important predictor variable: intra-organizational training efforts. Both groups felt that intra-organizational training holds an important place in perceived CM network effectiveness.

H5 was rejected in the developed structural model. Question #2 was utilized to prove this hypothesis. The groups' statistical values also rejected H5. The standardized and unstandardized regression coefficients are very low for the American ($=.04$ and $=.05$ respectively) and Turkish groups ($= -.01$ and $= -.01$ respectively). Additionally, the probability values for the American

(=.55) and Turkish (= .88) groups also violate the .05 confidence level. The frequency of important events has no relationship to the perceived effectiveness of CM networks, according to the findings in Table 14.

5 IMPLICATIONS, CONCLUSIONS, LIMITATIONS, AND FUTURE RESEARCH

The study discussed both qualitative and quantitative results. The SEM results helped to illuminate possible socio-economical and technical aspects of differences from one country to another. The discussed variables' importance in terms of CM agencies was analyzed in detail. Several hypotheses, including the primary one, were found to be statistically significant with AMOS software.

5.1 Implications

5.1.1 Policy Implications

The qualitative discussions revealed that terrorist events disrupt public administration mechanisms. Whether the examined CM systems were ready for a terrorist attack or not, chaos and disorder occurred right after the events. The case countries developed similar processes relevant to their own public administration systems to block interruptions in public services. The politically decentralized countries prepared for extreme events differently from the politically centralized ones. However, the results were not related to whether a system was centralized or not. CM policies did not fail or achieve in their totality in any single country. Instead, some parts of CM networks failed in each country, while some others were extremely successful.

Communication failures were the most important deficiency in all observed cases; they resulted in management failures. The command structure of first responders was lost in the WTC attacks, and it took significant time to restore the hierarchical management structure in New

York City after the event. In the Istanbul bombings, the first responder faced similar communication shortages. The reaction of emergency health agencies in Istanbul was so uncoordinated that a significant part of the city was left without emergency health services during the response phase. Blood donors kept the Spanish emergency services busy, which resulted in a relatively ineffective emergency medical response.

London was prepared for communication failures. British CM agencies included even private telecommunication services in their CM plans for the sake of a successful emergency communication. However, an out-of-date first responder phone list left health officials in particular without personal communication capability. The London bombings showed that even the most well-crafted CM plan can partially fail. Communication is an important element of coordination, which is crucial to a successful CM policy.

Al-Qaeda began to use suicide bombers to kill civilians after the WTC attacks, which mobilized especially the western world to prepare against such tactics. Coordination agencies were given authority to provide connectedness and continuity in the response and recovery phases of CM. Central-command policies were applied differently; in the U.S. and Turkey, command-control was preferred to coordination-supervision because of the political turbulence that these countries were experiencing. Spain and the U.K. took a different stand on this issue and chose coordination-supervision over command-control.

Centralization or decentralization is not adequate to explain why the U.S. and Turkey do not favor the coordination-supervision approach. Since their public administration systems are similar, besides the U.K., Spain appeared to have the same CM structure as the U.S. Spain has another similarity with Turkey: the Mediterranean culture. However, it was the U.K. and Spain that provided effective resources and adequate authority to regional and local administrations.

Even complex and expensive processes of mitigation and preparedness are in the control of regional authorities in these countries.

After the Obama administration took office in the U.S., changes in the CM system were expected. The global economic crisis affected public policies, but a shift to coordination-supervision can only occur in a one-way direction, according to some scholars (McNabb, 2009). Turkish CM policies were also criticized after a helicopter accident killed five people on board, including a political party leader. Because of ineffective search and rescue operations, the incident location could not be found for a long time, despite enormous budget support to central CM agencies (Referans, 2009). A new direction favoring local and regional authorities was pointed out for CM in Turkey after the accident; this approach is still advancing.

On the other hand, the quantitative assessments of this study offered another important and practical lesson, especially for first responders of CM. Improving the quality of relationships among CM personnel can provide better CM. Improved friendships among personnel will provide more open communication lines, which eventually will help the agencies stand and serve in a chaotic environment. A sample population selected from British, American, and Turkish first responders showed that the presence of friendships within their agencies improved the perceived quality of CM efforts significantly. This correlation had been pointed out before, but not proven with statistical tests.

Events that increase friendships in a CM organization will help the employees to be in touch with other employees, no matter how chaotic the environment becomes. CM policies should address this specific need of CM agencies. Sporting events, picnics, traveling, associations, and other social activities can enrich informal relationships within and among agencies. Holding those events is inexpensive relative to many other collaboration-enriching

methods; based on the results of the study, it is entertaining, trust-building, and very effective, no matter how individualist or collectivist the society.

The adaptation capabilities of CM agencies were tested in the study as well. The selected four aspects of adaptation were tested via the hypotheses. *Openness to change* had the greatest impact on perceived CM effectiveness. It is not surprising to see such a result, since the theoretical background suggested an evolutionary path for organizations. If a CM agency is not open to developments and to adapting to changes in environment, sooner or later it will fail. However, if the agency is open to change, not only it will continue to proceed, but it will also run more effectively. CM policies should be created with local and regional authorities' participation to give them freedom to change their structures. The top-down approach will prevent openness to change, which will negatively affect CM organizations' performance during an extreme event. Moreover, the interior dynamics of CM agencies should also be designed to provide flexibility in management and production. Therefore, openness to change is essential in order for a CM agency to perform effectively, and the support for it must come from both inside and outside the agency.

Another important perspective of adaptation found to have a significant impact on CM effectiveness is intra-organizational training efforts. Although it has a weaker correlation than the prior hypothesis discussed above, the relationship between intra-organizational training and the perceived effectiveness of the CM network is statistically significant. From the adaptation perspective, intra-organizational training helps agencies to have the most updated information and thus to evolve through changes in the environment. Therefore, institutional memory advances through new social and technological developments. Agencies that disregard intra-

organizational training will face ineffective CM efforts because they failed to go forward by using changed environmental components.

The informal relationship scale (Nielsen et al., 2000; Morrison, 2004) and the perceived effectiveness of CM network scale (Quarantelli, 1997) were successful in defining latent dependent and independent variables. The correlations between observed variables and latent constructs were high and statistically significant in all CFA and structural models. Even the reduced sample size in the groups' models did not change the significance of the correlations defining latent constructs. It shows the validity of models run and statistical constructs built in the study. Policy makers should target the cited factors for each latent construct in order to operate more effectively.

The top three correlations with the quality of informal relationships variable were *socialize with coworkers outside of workplace*, *formed strong friendships at work*, and *trust many coworkers a great deal*. Social events will allow these variables to improve the quality of informal relationships more than others will. Creating trust should be a priority of those social activities. Picnics, sporting events, and other activities were only some of the suggestions made by the study. Policies regulating these activities should be developed professionals in order to improve the quality of intra-organizational friendships.

Factors representing “appropriate reports for the news media,” “blending emergent and established organizations,” and “adequately processing information” had the greatest impact on the perceived CM effectiveness of first responders. When appropriate reports are not made available to news sources, the chaotic environment will become larger than it actually is. The examined Istanbul bombings showed that when public officials avoid sharing information during

times of crisis, it produces a poor CM effort whether the ground units at incident sites perform successfully or not.

Emergent sources are either volunteer-based resources or victims directly affected by extreme events. Cold War tactics did not suggest any plans to involve those resources in CM plans. Recent policies have offered methods to include emergent resources in CM plans, and they have achieved that to a certain degree. The respondents to the study surveyed showed that including emergent sources is one of the most important effectiveness factors in utilizing and managing these resources. Policy makers should make CM plans based on the assumption of emergent source existence.

Adequately processing information has three layers, according to Quarantelli's scale (1997). The factor utilized all three dimensions with the statistical software's help. Three different questions were combined into one factor. For this reason, the implication of this variable has three dimensions as well. Information obtained during an extreme event should be shared within the agency, with other agencies, and with affected citizens. Regulations should aim first to employ communication methods that make it possible to process information. Second, CM plans should be designed to share and process information within the agency, with other agencies, and with affected citizens.

5.1.2 Theoretical Implications

This study will contribute to the network effectiveness area. Network theory and its implications are still in progress. It is known that interorganizational efforts are hard to define and evaluate with conventional methods used to assess individual organizations. The methods

utilized in this study are fairly distinctive in the literature, which will contribute to interorganizational network studies.

Additionally, CAS had not been utilized with such quantified methods before. Recently introduced to the social sciences, CAS needs more research and applications. CAS's suggestions were combined with network theory literature to explain adaptiveness, nonlinear relationships, developed communication lines, and effectiveness within CM organizations and networks. The theory's methodological application is another contribution, because the adaptation perspective of the theory was utilized as a predictor variable while the *quality of informal relationships* construct represented more open communication lines as an independent variable.

Methodologically, SEM was successful in showing complex relationships' correlation in a given model. Correctly applied, SEM can demonstrate multiple regression tests in one model, which can contribute to both CAS and CM studies. CAS, like network literature, requires the employment of many different variables and perspectives to explain social occasions. CM networks are also dependent on various social factors as cited in the study, which require more than a simple regression test. SEM is powerful and reliable enough to serve in more research in those areas.

This study will also improve crisis management efforts. Informal relationships within crisis management organizations should be improved to better crisis management efforts worldwide. The diversity of cultures included in the study increases the chance of replicability. More importantly, improved crisis management efforts will allow the emergency networks to save more lives and prevent more damage in future emergencies and extreme events.

5.2 Conclusions

This study evaluated the crisis management operations implemented after four different terrorist attacks performed in New York in 2001, in Istanbul in 2003, in Madrid in 2004, and in London in 2005. The immediate collaborative emergency response and recovery efforts conducted by local, national, and international organizations after each attack were examined as a sample of CM efforts that actually consisted of mitigation and preparedness along with response and recovery against natural and manmade disasters.

Public administration systems, historical facts, and social-economic conditions were found to affect the effectiveness of CM policies. The CM structures, CM policies, and CM coordination changed in the countries examined. Central-regional or federal-local government competition not only affected the style and processes of CM, but also the effectiveness of CM. Centralization and decentralization clearly affected CM performance, but the direction of this effect was not clear. The study suggested that a well-planned, combined decentralization and centralization can be the best CM intervention.

Organizations selected based on social network analysis results were surveyed to measure the hypothesized correlations. The perceived effectiveness of interorganizational efforts was shown to have been affected by the quality of informal relationships within crisis management organizations. Two of the adaptation factors that CAS theory suggested were also proven to create effective CM in a chaotic environment.

The increased effectiveness of interorganizational efforts among crisis management organizations will lead to a successful crisis management methodology worldwide. More than half of the respondents were managers; as a result, the findings can be generalized to all CM

efforts. Additionally, the study examined cases from all over the world, which increases the chance to apply the results universally.

5.3 Limitations

The study faced serious limitations stemming from the theory, methodology, statistical tools, and difficulty of studying controversial terrorist cases. CAS is a recently developed theory that is still growing. The methodology includes several assumptions that can be a threat to external and internal validity. AMOS and UCINET are discussed to have certain limitations. Moreover, the selected CM cases were terrorist cases, which minimized the probability of finding available survey respondents.

CAS was first developed for use in biology. Leading scholars of the theory are also famous for their studies on microorganisms and evolution. CAS's social science and public affairs standpoint is new and needs development. The non-linear relationship clause is applicable in biology but needs more application in social science. In addition to that limitation, CAS assumes that a relationship between an organization and its environment is based on positive and negative feedbacks. This can explain cybernetic systems like simple organisms, but organizations do not necessarily receive clear positive or negative signals from the environment.

The term *complexity* also needs more research. How complex a system must be in order to be called a complex system is an important question for further research in CAS. Although it is a new theory, CAS explained many perspectives of the study. CAS also contributed to the research with four predictor variables. Since the study employed a network approach in the dependent variable, CAS was used to its latest extent in the study.

The methodology used a three-fold path. The multiple-case study method was used to find CM cases from the world. By using those cases, informal relationships were tested to see whether they had an impact on perceived CM effectiveness. Four terrorist bombing cases were conducted by the same terrorist network with different methods. It can be argued that terrorist bombing cases do not represent all CM efforts. Also, only the response and recovery phases were utilized, which left the mitigation and preparedness phases out of the study.

However, the research focused on CM efforts that were conducted by reliable CM systems. Many other great natural disasters have claimed hundreds of thousands of people's lives, such as Iran-Bam earthquake in 2003 that killed 43,000, the Indian Ocean tsunami in 2004 that killed over 230,000, the 2005 Kashmir Earthquake in Pakistan that claimed over 85,000 lives, and the recent Sichuan earthquake in 2008 that took 70,000 lives in China. Manmade disasters also cost many human lives. The Al-Qaeda terrorist organization, which was the case studies' point of commonality in this study, has conducted many other deadly attacks in Saudi Arabia, Congo, Sudan, Bali, and some other Arabic and African countries. Nonetheless the study did not employ any but the four cases examined in the text.

It should be noted that the unselected countries did not have a proper CM system. Moreover, the cases did not have reliable official and/or news reports. Even the death tolls of cited events are questionable because of the political conditions of those countries. Without proper knowledge resources, the study could not provide an adequate literature review should any of those cited events be selected as case studies.

The response and recovery phases were chosen to represent all CM cycles, which also includes mitigation and preparedness. The response and recovery phases take much less time to complete than the other two phases of CM. From that perspective, the study results have a

limited capacity for generalization. However, more than half of the survey respondents were managers. Unlike frontline workers, managers of CM organizations can shape the strategies of mitigation and preparedness. Therefore, the results should not be limited to response and recovery; instead, they should be generalized through other phases based on the characteristics of the study sample.

Another method used in the study was snowball sampling. In the SEM section of the study, the survey respondents were asked to name names of their coworkers to identify more respondents. The reason was simple: it has been a long time in the case countries since the incidents took place, and many possible respondents have left their jobs, retired, or died. A limited but unknown number of respondents could be found out with this method. However, one of the latent variables of the study was quality of relationships. This variable could be affected since the respondents would likely name their own friends in the organizations.

Snowball sampling did not significantly affect the results of the study. For example, the only observed variable left out of the study was “working for the organization because of someone else.” Moreover, the *quality of informal relationships* latent construct’s correlations with the factors that created it was not stronger than the correlations created by the *effectiveness* latent construct. Additionally, in Appendix B, www.surveygizmo.com provides a map for the surveys that demonstrates the geographical locations of respondents. The maps showed that the respondents came from many different regions in the case countries. Finally, it took a very long time to gather all responses. Had some friend groups performed all the surveys, the study would have reached many people within a considerably shorter time and with less effort.

The number of selected agencies can also be cited as a limitation of the study. The literature offered studies utilizing UCINET to explain the relationships within a selected

network. Utilizing UCINET as a sampling tool to find the most interacting agencies in a network was not utilized in the literature. Therefore, the decision regarding the number of selected organizations for each country was made based on a logical interpretation of current sampling methods. The number six was reached after discussions with dissertation committee members.

The statistical software used presented problems as well. UCINET analyses are as relevant as the contents used. If the researchers are not sure what they are looking for in which content, UCINET will not help them. Content selection is even more important than the scientific results of UCINET analyses because the results are directly shaped by the content. The UCINET analyses of the study were created by a professional research team. Almost all of the results corroborated with the literature. However, 7JAC was in the top-ten list of degree centrality scores of London Bombings (Table 5) even though it was established more than one month after the incident. NYPD's absence from the list (Table 2) was also questioned by a number of survey respondents because the agency was very active during the WTC attacks and lost a significant number of its members. However, the weakness of the software was evaluated in the study and the required adjustments were made while interpreting the analyses.

Selecting terrorism cases may also have affected the findings of the study. Since terrorist cases are top-secret security issues, the respondents were not very eager to participate in the study. Even though the survey instruments clearly stated that the research had nothing to do with terrorism, people were reluctant to respond to the surveys. For that reason, the study could find very few participants in the U.K. and Spain. Possible respondents could not be contacted to explain that the research was purely about factors affecting crisis management effectiveness.

As a result, the study had to remove two case countries from the quantitative SEM discussions. Reducing the cases by half might have had a negative impact on the proposed

results. Logically, four cases are more universally generalizable than two cases. Using only two cases unquestionably limited the generalization capacity of the results. Every method was tried to reach possible respondents in the U.K. and Spain. Personal official contacts, familiar scholars, word of mouth, internet groups, social network websites, and other available methods were employed. The translations of the surveys and invitation messages were prepared by professional translators. None of these tactics helped the study gather responses from those countries. The number of respondents from two countries was consequently doubled to provide a testable sample. However, selecting only the U.S. and Turkey offered sufficient opportunity to compare very different public administration systems and cultures in terms of CM. Centralist-decentralist, developing-developed, European-American, Middle Eastern-Anglo Saxon, and Old World-New World comparisons evaluated CM systems adequately.

A significant amount of time had passed since the incidents, which created another threat to the study's external validity. The surveys included questions regarding the past circumstances of the CM organizations. The respondents could have forgotten the organizational situation at the time of the attack. Moreover, bad experiences such as an illness because of the incident or the loss of a beloved colleague in those events may have changed mentality of the respondents for organizations negatively. The opposite of this also possible: rewards after those incidents may have altered the perspective of the respondents positively. The surveys and the invitation letters emphasized passages specifically targeted to eliminate the retrospective approach problem of the study.

Comparing the Turkish and American groups, the study's results cannot be argued to be distorted by this problem. The American group lost almost 500 members in the WTC attacks. This generated great physiological depression for the first responders to the WTC attacks.

Moreover, casualties continued over time because of poisonous gases inhaled by them in response and recovery operations. All these obstacles were supposed to produce very negative answers for selected variables of the study. The Turkish respondent group did not experience any of those circumstances because of the smaller scale of the attacks. Nonetheless, the compared statistical tests generated nearly the same results. Differences originated from social-economic conditions, not the retrospective perceptions of the respondents.

5.4 Future Research

More cases will be needed in future research based on this study. Since the multiple-case-study approach is implied, the CM response to recent Al-Qaeda attacks in India in 2008 may be considered as a part of future studies. Moreover, natural disasters can be selected as case studies. However, those studies should make sure that the target cases have a proper CM system. In addition to that, all CM cycles can be studied to grasp the big picture in CM. It will take more time and effort to study the mitigation and preparedness stages as well, but it is certainly a valid direction for future studies.

Future studies could also include more respondents from more organizations. Although the almost 250 respondents to the study resulted in statistically significant results, half of the predictor variables used to explain adaptiveness could not be found statistically significant. A higher sample size could have led to better and more significant results. Moreover, including more agencies could prevent incorrect assessments from being made with the statistical tools employed. Additionally, more organizational or network variables could be used as predictor variables in future research. Organizations' budgets, size, characteristics, and other attributes will add important perspectives from an organizational viewpoint.

APPENDIX A: SURVEYS

5.4.1 Survey for Emergency Management Organizations (US)

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RESEARCH USE INFORMED CONSENT FORM

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Researcher Information: Bahadir Sahin
Department of Public Affairs
bahadir@mail.ucf.edu
+ (1) 646-220-0628 (cell)

I. PROJECT TITLE: Factors Influencing Effectiveness of Crisis Management Networks: A Comparative Perspective

II. INTRODUCTION: Increased number of manmade and natural disasters forces the policy makers to make more effective crisis management policies. Since the crisis management cannot be conducted by one single entity, it is a collaborative network effort among first responder public organizations, nonprofit disaster relief institutions and other public and private entities. Ineffective crisis management policies coordinating the response and recovery efforts will result in failures that cost numerous human lives and great material damages to public and private infrastructures. The disasters will occur in a more increasing rate in the future (e.g. Iowa Floods in June 2008). The crisis management policies and organizations should be ready for worse conditions to be more effective and to save more human lives and hinder more property damage in future disasters.

Based on this information from the literature, you will be asked 25 questions regarding the organizational conditions you are in. It will probably take 10 minutes of your time. Your participation is greatly appreciated. If you requested it (by mail, e-mail, or phone, the researcher will also provide a copy of consent form to you.

III. Your confidentiality will be guarded.
If you have any questions about participation into this research project, you may file a claim with UCF Environmental Health & Safety, Risk and Insurance Office, P.O. Box 163500, Orlando, FL 32816-3500 (407) 823-6300.

IV. If you have any other questions, you may also contact the principal investigator:

Thomas Wan
Professor and Director
Doctoral Program in Public Affairs
twan@mail.ucf.edu
+ (1) 407-823-3678

I have read and understood the information in this form. I am at least 18 years of age. I consent to take part in this research entitled "Factors Influencing Effectiveness of Interorganizational Networks among Crisis Management Organizations: A Comparative Perspective"

=====

Survey for Emergency Management Organizations

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This survey examines the effectiveness of emergency operations during the WTC attacks in New York City. The survey takes about 15 minutes to complete. Your responses are confidential, and will not be revealed without your consent; only aggregate results will be made available. We are happy to make a copy of final results available to you.

Employee Organization:

- Health
- Law Enforcement
- Search and Rescue Team
- Non-profit EM (Red Cross...)
- Education Facility
- Fire Department
- Emergency Operation Center

Employee Position:

- Supervisor
- Middle Manager
- Frontline Manager
- Assistant Supervisor
- Team Leader
- Frontline Worker

Gender

- Male
- Female

Age:

Important Note: All the questions below will be asked for the time BEFORE 9/11 WTC Attacks took place in the US. Please answer the questions for the situation in your organization before the incident.

1. There has been important change(s) in my organization (structure, goals, and rules) because of an important event (Flood, terrorist attack, hurricane, bush fire, earthquake etc.) before.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

2. There have been important events frequently up to now, which my organization should deal with.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

3. Intra-organizational education holds an important place in my organization.
- Strongly Agree
 - Agree
 - Neutral
 - Disagree
 - Strongly Disagree
4. My organization is open to change by any means.
- Strongly Agree
 - Agree
 - Neutral
 - Disagree
 - Strongly Disagree
5. I work with my coworkers to collectively solve the problems in the organization.
- Strongly Agree
 - Agree
 - Neutral
 - Disagree
 - Strongly Disagree
6. I have the chance to talk informally and visit the other employees.
- Strongly Agree
 - Agree
 - Neutral
 - Disagree
 - Strongly Disagree
7. I socialize with the coworkers outside of the workplace.
- Strongly Agree
 - Agree
 - Neutral
 - Disagree
 - Strongly Disagree
8. I trust many coworkers a great deal.
- Strongly Agree
 - Agree
 - Neutral
 - Disagree
 - Strongly Disagree
9. I do not feel any coworker is a true friend.
- Strongly Agree
 - Agree
 - Neutral
 - Disagree
 - Strongly Disagree
10. I formed strong friendships at work.
- Strongly Agree
 - Agree

- Neutral
- Disagree
- Strongly Disagree

11. I work for the organization because she/he is here.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

12. Friendships make the workplace a happier place.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

13. Friendships help to work cooperatively with each other at times of stress.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

14. The employees of my organization know that each extreme event (terrorist bombings, flood, winter storm, earthquake, hurricane etc.) is different. My organization has plans and operates differently in each different extreme event. For example, we would use a different operational procedure for a flood than we would a terrorist bombing.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

15. My organization is ready to operate any generic emergency management functions (evacuation, temporary housing, alternative communication tools, warnings etc.).

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

16. My organization has plans to mobilize personnel (authorized employees and volunteers) and resources effectively. By effectively, I mean needed personnel and resources are well-identified in the crisis, they are located quickly and brought to bear correctly, and they are appropriate to the problems generated by the disaster.

- Strongly Agree
- Agree
- Neutral
- Disagree

Strongly Disagree

17. My organization has a certain job definition during an extreme event. My organization's employees do not get involved in other kinds of labor during an extreme event different than the professionalization of my organization.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

18. Information is processed adequately within my organization during a disaster. Communication tools and communicated material are satisfactory.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

19. Information is processed adequately between my organization and other responding organizations during a disaster. Communication tools and communicated material are satisfactory.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

20. Information is processed adequately between my organization and affected citizens during a disaster. Communication tools and communicated material are satisfactory.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

21. My organization keeps exercising decision-making properly in the crisis time as well. The organizational jurisdiction differences within or outside of the organization cannot be a problem; emergent groups and my organization do not have a conflict on organizational domains. Responsibility for new disaster tasks is not a problem that we cannot resolve easily.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

22. My organization's employees work coordinative with the other organization employees in the crisis scene. Leadership in critical phases is not a problem. Since community good is more important to us, the willingness to de-emphasize organizational claims of leadership is high in my organization.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

23. My organization has plans to include the emerging resources into the organizational labor during a disaster. I and my other colleagues believe that volunteers and other emergent stakeholders are important sources to bring the social order back. My organization employees do not think that the emergent resources are useless because they are not controllable as we are.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

24. My organization supports the developments of relationships that are acceptable and beneficial to the responding organizations, the mass media and citizens in general. During extreme events, citizens are satisfied with the relatively accurate picture of what is going on via our broadcasting systems or press.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

25. My organization works with an emergency operation center (EOC) during disasters. We are represented in EOC in the highest level possible, we work co-operatively with the other responders, we benefit from it since we know what the others are doing and how we can help them.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

Please give names and email addresses of at least 3 (three) other employees that took part in recovery efforts at WTC Attacks from your organization that can help us with this study to improve emergency management efforts.

1 Name

1 Email

2 Name

2 Email

3 Name

3 Email

4 Name

4 Email

5 Name

5 Email

6 Name

6 Email

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Thank You!
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Thank you for taking our survey. Your response is very important to us.

5.4.2 Survey for Emergency Management Organizations (Turkey)

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Acil Durum Yönetimi Çalışmalarında Bulunan Kurumlar için Anket

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ARAŞTIRMAYA RIZAYLA KATILIM FORMU

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Araştırmacı Bilgileri: : Bahadır Sahin
Department of Public Affairs
bahadir@mail.ucf.edu
+ (1) 646-220-0628 (cep)

I. Proje Başlığı: Afet Yönetimi Kurumlarının Verimliliğini Etkileyen Nedenler: Karsılaştırmalı bir Yaklaşım

II. Giriş: Sayıları artmakta olan doğal ve insan-kaynaklı afetler, kanun koyucuları daha verimli afet yönetim politikaları geliştirmeye zorlamaktadır. Afet yönetimi yalnızca bir kurum tarafından gerçekleştirilemediğinden, ilk müdahaleyi yapan devlet kurumları, kar amacı gütmeyen afetle mücadele kuruluşları ve diğer kamu ve özel kuruluşların müşterek olarak gerçekleştirdiği bir faaliyettir. Arama-Kurtarma çalışmalarını düzenleyen verimsiz kriz yönetimi politikaları, kamu ve özel yapılara büyük zararlar doğuracak ve yüksek miktarda can kaybına yol açacaktır. Afetler, gelecekte artan miktarda meydana gelmeye devam edecektir (mesela Haziran 2008'deki Iowa Selleri). Kriz yönetim politikaları ve kurumları, gelecekteki afetlerde daha verimli olmak ve daha fazla can kaybıyla maddi zararı engelleme amacıyla daha kötü durumlar için hazır olmalıdır.

Bilimsel kaynaklardaki bu bilgilerin ışığında size kurumsal durumunuzla ilgili 25 soru sorulacaktır. Anket muhtemelen 10 dakikanızı alacaktır. Katılımınız nedeniyle müteşekkirimiz. İstemeniz halinde (postayla, e-posta ile, ya da telefonla), araştırmacı size bu formun bir kopyasını tedarik edecektir.

III. Gizliliğiniz korumaaltındadır.

Eğer bu araştırmaya katılımla ilgili bir sorunuz varsa, bunu bu adres ve telefona yapabilirsiniz; UCF Environmental Health & Safety, Risk and Insurance Office, P.O. Box 163500, Orlando, FL 32816-3500 (407) 823-6300.

IV. Eğer başka bir sorunuz varsa, ayrıca birincil araştırma sorumlusuyla da görüşebilirsiniz:

Thomas Wan
Profesor and Direktor
Doctoral Program in Public Affairs
twan@mail.ucf.edu
+ (1) 407-823-3678

Bu formu okudum ve bilgileri anladım. 18 yaşında ya da daha büyüğüm. "Afet Yönetimi Kurumlarının Verimliliğini Etkileyen Nedenler: Karşılaştırmalı bir Yaklaşım" başlıklı araştırmada yer almayı kabul ediyorum.

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Acil Durum Yönetimi Çalışmalarında Bulunan Kurumlar için Anket

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Bu anket İstanbul-2003 Terörist saldırıları esnasında uygulanan acil durum yönetimi çalışmalarının verimliliğini araştırmaya yöneliktir. Anketin tamamlanması yaklaşık 15 dakika sürecektir. Cevaplarınız gizli tutulacak, ve sizin rızanız haricinde kesinlikle açıklanmayacaktır; sadece toplu anket sonuçları araştırma bitiminde kamuyla paylaşılacaktır. Araştırma sonuçlandıktan sonra neticeler, size de ayrıca duyurulacaktır.

Çalışanın Kurumu:

- Sağlık
- Emniyet
- Arama-Kurtarma Timi
- Kızılay
- Eğitim Kurumu
- İtfaiye
- Afet Koordinasyon Merkezi

Çalışanın Pozisyonu:

- Müdür
- Müdür Yardımcısı
- Orta Kademe Yönetici
- Tim Lideri
- İşçi/Memur
- Kurumun Olay Yeri Sorumlusu

Cinsiyeti:

- Erkek
- Bayan

Yaş :

Önemli Not: Aşağıdaki sorular 2003'teki İstanbul Saldırılarının ÖNCESİNDEKİ kurumsal durumunuz gözönüne alınarak sorulacaktır. Lütfen sorulara kurumunuzun 2003 İstanbul Saldırılarından ÖNCEKİ durumu itibariyle cevap veriniz.

1. Bu saldırı öncesinde, kurumumda önemli bir afet (Sel, terörist saldırı, fırtına, yangın, deprem vs..) nedeniyle önemli değişiklikler (yapısal değişiklikler, kurumun amacında ya da kurallarında meydana gelen değişiklikler) yaşandı.

- Kesinlikle katılıyorum
- Katılıyorum
- Ne katılıyorum, ne katılmıyorum
- Katılmıyorum
- Kesinlikle katılmıyorum

2. Saldırı öncesine kadar kurumumun uğraşması gereken önemli afet olayları sıklıkla gerçekleşmekteydi.

- Kesinlikle katılıyorum
- Katılıyorum
- Ne katılıyorum, ne katılmıyorum
- Katılmıyorum
- Kesinlikle katılmıyorum

3. Hizmet-içi eğitim kurumumda önemli bir yer tutar.

- Kesinlikle katılıyorum
- Katılıyorum
- Ne katılıyorum, ne katılmıyorum
- Katılmıyorum
- Kesinlikle katılmıyorum

4. Kurumum her yönüyle değişime açıktır.

- Kesinlikle katılıyorum
- Katılıyorum
- Ne katılıyorum, ne katılmıyorum
- Katılmıyorum
- Kesinlikle katılmıyorum

5. Kurumumdaki problemleri işyerindeki arkadaşlarımla beraberce çalışarak çözüyorum.

- Kesinlikle katılıyorum
- Katılıyorum
- Ne katılıyorum, ne katılmıyorum
- Katılmıyorum
- Kesinlikle katılmıyorum

6. İstedğim zaman diğer çalışanlarla gayri resmi olarak görüşebiliyorum ve onları ziyaret edebiliyorum.

- Kesinlikle katılıyorum
- Katılıyorum
- Ne katılıyorum, ne katılmıyorum
- Katılmıyorum
- Kesinlikle katılmıyorum

7. Diğer çalışanlarla işyeri dışında ilişkilerimi devam ettiriyorum.

- Kesinlikle katılıyorum
- Katılıyorum
- Ne katılıyorum, ne katılmıyorum
- Katılmıyorum
- Kesinlikle katılmıyorum

8. İşyerindeki çoğu mesteklaşım önemli oranda güveniyorum.

- Kesinlikle katılıyorum
- Katılıyorum
- Ne katılıyorum, ne katılmıyorum
- Katılmıyorum
- Kesinlikle katılmıyorum

9. Benim, bu kurumda gerçek anlamda arkadaşım yok.

- Kesinlikle katılıyorum
- Katılıyorum

- Ne katılıyorum, ne katılmıyorum
- Katılmıyorum
- Kesinlikle katılmıyorum

10. Bu kurumda güçlü arkadaşlıklar edindim.

- Kesinlikle katılıyorum
- Katılıyorum
- Ne katılıyorum, ne katılmıyorum
- Katılmıyorum
- Kesinlikle katılmıyorum

11. O (arkadaşım) burada olduğu için bu kurumdayım.

- Kesinlikle katılıyorum
- Katılıyorum
- Ne katılıyorum, ne katılmıyorum
- Katılmıyorum
- Kesinlikle katılmıyorum

12. Arkadaşlıklar bu kurumu daha huzur verici bir yer yapıyor.

- Kesinlikle katılıyorum
- Katılıyorum
- Ne katılıyorum, ne katılmıyorum
- Katılmıyorum
- Kesinlikle katılmıyorum

13. Arkadaşlıklar, gergin anlarda dahi birbirimizle koordineli çalışmamıza olanak sağlıyor.

- Kesinlikle katılıyorum
- Katılıyorum
- Ne katılıyorum, ne katılmıyorum
- Katılmıyorum
- Kesinlikle katılmıyorum

14. Kurumumun çalışanları, afetlerin (Terörist saldırılar, sel baskınları, fırtınalar, depremler, vb.) birbirinden farklı olduğunu bilirler. Kurumumun her farklı afet için bir planı vardır ve biz kurum olarak her değişik olayda farklı hareket ederiz. Mesela bir sel baskını için takip ettiğimiz prosedür ile bir terörist bombalama sırasında takip ettiğimiz prosedür birbirinden farklıdır.

- Kesinlikle katılıyorum
- Katılıyorum
- Ne katılıyorum, ne katılmıyorum
- Katılmıyorum
- Kesinlikle katılmıyorum

15. Kurumum temel acil durum yönetimi prosedürlerini (insanları toplu bir şekilde bir yerden başka bir yere tahliye, geçici iskan sağlama, alternatif iletişim cihazları kurup kullanabilme, erken uyarı sistemleriyle halkı uyarma, vb.) ihtiyaç duyulduğunda icra edebilir.

- Kesinlikle katılıyorum
- Katılıyorum
- Ne katılıyorum, ne katılmıyorum
- Katılmıyorum
- Kesinlikle katılmıyorum

16. Kurumum, istendiğinde, görevli personeli (kendi personeli ve gönüllüler) ve diğer kaynakları etkin bir biçimde seferber edecek planlara sahiptir. Etkin bir biçimde ifadesinden kasıt, ihtiyaç duyulan insan gücünün ve diğer kaynakların kriz esnasında doğru belirlenmesi, hızlıca buldukları yerden doğru ihtiyaç sahiplerine ulaştırılmaları, ve gönderilen bu kaynakların ihtiyaç sahiplerinin afetten doğan ihtiyaçlarını karşılayabilecek seviyede olmalarıdır.

- Kesinlikle katılıyorum
- Katılıyorum
- Ne katılıyorum, ne katılmıyorum
- Katılmıyorum
- Kesinlikle katılmıyorum

17. Kurumum acil bir durum karşısında daha önceden belirlenmiş iş tanımına göre hareket eder. Kurumdaki meslektaşlarım acil bir durum esnasında kurumumun uzmanlık alanının dışında başka bir işlerle meşgul olmaz.

- Kesinlikle katılıyorum
- Katılıyorum
- Ne katılıyorum, ne katılmıyorum
- Katılmıyorum
- Kesinlikle katılmıyorum

18. Afet yönetimi esnasında, bilgi (enferyasyon) kurum-içinde yeterli şekilde değerlendirilir. Bu amaçla kullanılan iletişim araçları ve iletilen bilgiler tatmin edicidir.

- Kesinlikle katılıyorum
- Katılıyorum
- Ne katılıyorum, ne katılmıyorum
- Katılmıyorum
- Kesinlikle katılmıyorum

19. Afet yönetimi esnasında, bilgi (enferyasyon) kurumum ve diğer kurumlar arasında yeterli şekilde değerlendirilir. Bu amaçla kullanılan iletişim araçları ve iletilen bilgiler tatmin edicidir.

- Kesinlikle katılıyorum
- Katılıyorum
- Ne katılıyorum, ne katılmıyorum
- Katılmıyorum
- Kesinlikle katılmıyorum

20. Afet yönetimi esnasında, bilgi (enferyasyon) kurumum ve afetten etkilenmiş vatandaşlar arasında yeterli şekilde değerlendirilir. Bu amaçla kullanılan iletişim araçları ve iletilen bilgiler tatmin edicidir.

- Kesinlikle katılıyorum
- Katılıyorum
- Ne katılıyorum, ne katılmıyorum
- Katılmıyorum
- Kesinlikle katılmıyorum

21. Kurumum, kriz zamanında da karar-üretim mekanizmasını düzenli bir şekilde uygulamaya devam eder. Kurum-içi ya da diğer kurumlarla kurumum arasında görevsel ya da bölgesel yetki kargaşası yaşanmaz; ayrıca olay yerinde kendiliğinden oluşan gruplarla kurumum arasında da kurumsal yetki konusunda karışıklık olmaz. Afetle ilgili ortaya çıkan yeni problemlerin sorumluluğunun kime ait olacağı üstesinden gelinemeyecek zor bir problem değildir.

- Kesinlikle katılıyorum
- Katılıyorum
- Ne katılıyorum, ne katılmıyorum
- Katılmıyorum
- Kesinlikle katılmıyorum

22. Olay yerinde kurumumun ve diğer kurumların görevlileri koordine şekilde çalışırlar. Kritik safhalardaki bu kollektif çalışmaya kimin liderlik edeceği problem oluşturmaz. Kamu yararı daha ön planda tutulduğu için, kurumsal anlamda liderliği öne çıkarmamaya yönelik isteklilik, kurumumda had safhadadır.

- Kesinlikle katılıyorum
- Katılıyorum
- Ne katılıyorum, ne katılmıyorum
- Katılmıyorum
- Kesinlikle katılmıyorum

23. Kurumumun olay yerinde kendiliğinden ortaya çıkan insan gücü kaynağını kendi kaynaklarına dahil etmeye dair planları vardır. Ben ve diğer meslektaşlarım, gönüllülerin ve kendi kendine ortaya çıkan yardım gruplarının kamu düzenini tekrar sağlamada çok önemli kaynaklar olduğuna inanırız. Meslektaşlarım, bu grupların bizim kadar kontrol edilebilir olmamasından ötürü gereksiz olduklarını düşünmezler.

- Kesinlikle katılıyorum
- Katılıyorum
- Ne katılıyorum, ne katılmıyorum
- Katılmıyorum
- Kesinlikle katılmıyorum

24. Kurumum, diğer afet yönetimi kurumlarına, medyaya, ve genelde vatandaşlara yararlı olacak makul ilişkilerin geliştirilmesini destekler. Afetler esnasında, vatandaşlar, bizim ya da basının yayınları dolayısıyla genel itibariyle nelerin meydana gelmiş olduğunu doğru bir şekilde öğrenirler.

- Kesinlikle katılıyorum
- Katılıyorum
- Ne katılıyorum, ne katılmıyorum
- Katılmıyorum
- Kesinlikle katılmıyorum

25. Kurumum, afet esnasında, bir afet yönetim merkeziyle çalışır. Kurumum, bu merkezde en üst seviyede temsil edilir, diğer ilk-müdahale ekipleriyle beraber çalışırız. Biz bundan yararlanırız çünkü böylece hem diğer kurumların ihtiyaçlarını, hem de bizim onlara nasıl yardım edebileceğimizi biliriz.

- Kesinlikle katılıyorum
- Katılıyorum
- Ne katılıyorum, ne katılmıyorum
- Katılmıyorum
- Kesinlikle katılmıyorum

Lütfen bize bu anketi doldurmak suretiyle yardım edebilecek kurumunuzda 2003'teki saldırılar itibariyle görevli bulunan en az 3 meslektaşınızın isimlerini ve e-posta adreslerini bildirin.

1 Adı

1 Email Adresi

2 Adı

2 Email Adresi

3 Adı

3 Email Adresi

4 Adı

4 Email Adresi

5 Adı

5 Email Adresi

6 Adı

6 Email Adresi

=====

Tesekkurler!!

=====

Anketimize katildiginiz icin tesekkurler. Katiliminiz bizim icin cok onemlidir.

5.4.3 Survey for Emergency Management Organizations (Spain)

=====
Encuesta para las Organizaciones que Manejan Emergencias
=====

=====
CONSENTIMIENTO PARA PARTICIPAR EN UN ESTUDIO DE INVESTIGACIÓN
=====

Información del investigador: Bahadir Sahin
Departamento de Asuntos Públicos
bahadir@mail.ucf.edu
+ (1) 646-220-0628 (Móvil)

I. Título del estudio: Factores que influyen en la eficacia de las redes de la gestión de crisis: Una perspectiva comparativa

II. INTRODUCCIÓN: El número creciente de desastres artificiales y naturales fuerza a los responsables políticos a hacer políticas más eficaces de la gestión de crisis. Puesto que la gestión de crisis no puede ser conducida por una sola entidad, es un esfuerzo de colaboración de la red entre organizaciones públicas del primer respondedor, instituciones no lucrativas de ayuda humanitaria y otras entidades del público y privadas. Ineficaz gestión de la crisis políticas coordinar la respuesta y esfuerzos de recuperación se traducirá en fracasos que costaron numerosas vidas humanas y grandes daños materiales a público y privado infraestructuras. Los desastres se producirán en un mayor aumento de la tasa en el futuro (por ejemplo, Inundaciones en Iowa en junio de 2008). La gestión de las crisis políticas y organizaciones debe estar lista para peor condiciones para ser más eficaces y salvar más vidas humanas y dificultar más daños a la propiedad en futuros desastres.

Sobre la base de esta información de la literatura, se le pedirá 25 preguntas sobre las condiciones de organización usted está en. Se tardará 10 minutos de su tiempo. Su participación es muy apreciada. Si usted le pidió que (Por correo, e-mail o por teléfono), El investigador también proporcionará una copia del formulario de consentimiento a usted.

III. Su confidencialidad será vigilado.
Si tiene alguna pregunta acerca de su participación en este proyecto de investigación, Usted puede presentar una reclamación con UCF Environmental Health & Safety, Risk and Insurance Office, P.O. Box 163500, Orlando, FL 32816-3500 (407) 823-6300.

IV. Si usted tiene alguna otra pregunta, usted también puede contactar el Investigador principal:

Thomas Wan
Profesor y Director
Programa Doctoral de Asuntos Públicos
twan@mail.ucf.edu

+ (1) 407-823-3678

He leído y entendido la información en esta forma. Estoy más de 17 años de edad. Doy mi consentimiento para tomar parte en esta investigación titulada "Factores que influyen la eficacia de las redes de la gestión de crisis: Una perspectiva comparativa".

=====
Encuesta para las Organizaciones que Manejan Emergencias
=====

Esta revisión examina la eficacia de operaciones de la emergencia durante la matanza del 11M en Madrid. La revisión toma aproximadamente 15 minutos para completar. Sus respuestas son confidenciales, y no serán reveladas sin su consentimiento; sólo resultados agregados serán hechos disponibles. Somos felices hacer una copia de final le pasa disponible.

Organización del Empleado:

- Salud
- Aplicación de la Ley
- Equipo de Buscar y Rescatar
- Organización de Dirección de Emergencia No lucrativa (Cruz Roja...)
- Institución de Educación
- Cuerpo de Bomberos
- Centro de Crisis

Posición de Empleado:

- Supervisor
- Gerente Medio
- Gerente de Primera línea
- Asistente del Supervisor
- Líder de Equipo
- Trabajador de Primera línea

Género de Empleado:

- Masculino
- Femenino

Edad:

Aviso Importante: Todas las siguientes preguntas cubrirán el tiempo ANTES de que ocurriera la matanza del 11M en España. Por favor conteste las preguntas para la situación en su organización ANTES de la matanza del 11M.

1. Hubo cambio (s) importante en mi organización (estructura, objetivos, y reglas) debido a un acontecimiento (Inundación, ataque terrorista, huracán, fuego de arbusto, terremoto etc....) importante.

- Completamente de acuerdo
- De acuerdo
- Neutro
- Desacuerdo en parte
- No estoy de acuerdo

2. Hubo acontecimientos importantes con los cuales mi organización debería tratar con frecuencia hasta ahora.
- Completamente de acuerdo
 - De acuerdo
 - Neutro
 - Desacuerdo en parte
 - No estoy de acuerdo
3. La educación intraorganizativa sostiene un lugar importante en mi organización.
- Completamente de acuerdo
 - De acuerdo
 - Neutro
 - Desacuerdo en parte
 - No estoy de acuerdo
4. Mi organización está dispuesta a adaptar cualquier medio de cambios.
- Completamente de acuerdo
 - De acuerdo
 - Neutro
 - Desacuerdo en parte
 - No estoy de acuerdo
5. Trabajo con mis compañeros de trabajo para colectivamente solucionar los problemas en la organización.
- Completamente de acuerdo
 - De acuerdo
 - Neutro
 - Desacuerdo en parte
 - No estoy de acuerdo
6. Tengo la posibilidad de hablar y visitar a los otros empleados informalmente.
- Completamente de acuerdo
 - De acuerdo
 - Neutro
 - Desacuerdo en parte
 - No estoy de acuerdo
7. Socializo con los compañeros de trabajo fuera del trabajo.
- Completamente de acuerdo
 - De acuerdo
 - Neutro
 - Desacuerdo en parte
 - No estoy de acuerdo
8. Confío mucho en mis compañeros de trabajo.
- Completamente de acuerdo
 - De acuerdo
 - Neutro
 - Desacuerdo en parte
 - No estoy de acuerdo
9. No pienso que algún compañero de trabajo sea un amigo verdadero.
- Completamente de acuerdo

- De acuerdo
- Neutro
- Desacuerdo en parte
- No estoy de acuerdo

10. Formé grandes amistades en el trabajo.

- Completamente de acuerdo
- De acuerdo
- Neutro
- Desacuerdo en parte
- No estoy de acuerdo

11. Trabajo para la organización porque ella/él está aquí.

- Completamente de acuerdo
- De acuerdo
- Neutro
- Desacuerdo en parte
- No estoy de acuerdo

12. Las amistades hacen más feliz el lugar de trabajo.

- Completamente de acuerdo
- De acuerdo
- Neutro
- Desacuerdo en parte
- No estoy de acuerdo

13. Las amistades ayudan a uno trabajar cooperativamente durante tiempos de tensión.

- Completamente de acuerdo
- De acuerdo
- Neutro
- Desacuerdo en parte
- No estoy de acuerdo

14. Los empleados de mi organización saben que cada acontecimiento extremo (bombardeos terroristas, inundación, tormenta de invierno, terremoto, huracán etc.) es diferente. Mi organización tiene planes y actúa diferentemente en cada acontecimiento extremo. Por ejemplo, usaríamos un procedimiento operacional diferente para una inundación que para un bombardeo terrorista.

- Completamente de acuerdo
- De acuerdo
- Neutro
- Desacuerdo en parte
- No estoy de acuerdo

15. Mi organización está lista para cualquier función de manejos de emergencias (evacuación, alojamiento temporal, instrumentos de comunicación alternativos, advertencias etc.)

- Completamente de acuerdo
- De acuerdo
- Neutro
- Desacuerdo en parte
- No estoy de acuerdo

16. Mi organización tiene planes de movilizar el personal (empleados autorizados y voluntarios) y recursos con eficacia. Con eficacia, quiero decir que el personal y los recursos necesarios son bien identificados durante la crisis, son localizados y obtenidos rápidamente y correctamente, y son apropiados para los problemas generados por el desastre.

- Completamente de acuerdo
- De acuerdo
- Neutro
- Desacuerdo en parte
- No estoy de acuerdo

17. Mi organización tiene cierta definición de trabajo durante un acontecimiento extremo. Los empleados de mi organización no se envuelven en otros tipos de trabajo durante un acontecimiento extremo que sea diferente a la profesionalización de mi organización.

- Completamente de acuerdo
- De acuerdo
- Neutro
- Desacuerdo en parte
- No estoy de acuerdo

18. La información es procesada adecuadamente dentro de mi organización durante un desastre. Los instrumentos de comunicación y el material comunicado son satisfactorios.

- Completamente de acuerdo
- De acuerdo
- Neutro
- Desacuerdo en parte
- No estoy de acuerdo

19. La información es procesada adecuadamente entre mi organización y otras organizaciones que responden durante un desastre. Los instrumentos de comunicación y el material comunicado son satisfactorios.

- Completamente de acuerdo
- De acuerdo
- Neutro
- Desacuerdo en parte
- No estoy de acuerdo

20. La información es procesada adecuadamente entre mi organización y los ciudadanos afectados durante un desastre. Los instrumentos de comunicación y el material comunicado son satisfactorios.

- Completamente de acuerdo
- De acuerdo
- Neutro
- Desacuerdo en parte
- No estoy de acuerdo

21. Mi organización también sigue tomando decisiones correctamente durante el tiempo de crisis. Las diferencias de jurisdicción organizativas dentro de o fuera de la organización no pueden ser un problema; los grupos emergentes y mi organización no tienen conflicto en esferas organizativas. La responsabilidad de nuevas tareas de desastre no es un problema que no podemos resolver fácilmente.

- Completamente de acuerdo

- De acuerdo
- Neutro
- Desacuerdo en parte
- No estoy de acuerdo

22. Los empleados de mi organización trabajan juntos con los empleados de las otras organizaciones durante la crisis. El mando en fases críticas no es un problema. Como el bien de la comunidad es más importante para nosotros, el deseo de subrayar las reclamaciones organizativas del mando son altas en mi organización.

- Completamente de acuerdo
- De acuerdo
- Neutro
- Desacuerdo en parte
- No estoy de acuerdo

23. Mi organización tiene planes de incluir los recursos emergentes en el trabajo organizativo durante un desastre. Mis otros colegas y yo creemos que los voluntarios y los otros accionistas emergentes son fuentes importantes para devolver la orden social. Los empleados de mi organización no piensan que los recursos emergentes son inútiles porque no son controlables como somos nosotros.

- Completamente de acuerdo
- De acuerdo
- Neutro
- Desacuerdo en parte
- No estoy de acuerdo

24. Mi organización apoya el desarrollo de relaciones que son aceptables y beneficiosas para las organizaciones que responden, los medios de comunicación y los ciudadanos en general. Durante acontecimientos extremos, los ciudadanos están satisfechos con el retrato relativamente exacto proveído vía nuestros sistemas radiofónicos o de la prensa de lo que está ocurriendo.

- Completamente de acuerdo
- De acuerdo
- Neutro
- Desacuerdo en parte
- No estoy de acuerdo

25. Mi organización trabaja con un centro de dirección de emergencia (EOC) durante desastres. Somos representados en EOC en el nivel más alto posible, trabajamos cooperativamente con los otros respondedores, nos beneficiamos de ello ya que sabemos lo que los demás hacen y como podemos ayudarles.

- Completamente de acuerdo
- De acuerdo
- Neutro
- Desacuerdo en parte
- No estoy de acuerdo

Por favor dé nombres y direcciones de correo electrónico de al menos 3 (tres) otros empleados de su organización que puedan ayudarnos con este estudio a mejorar esfuerzos del manejo de emergencias.

=====

1 Nombre, Título

1 Correo electrónico

2 Nombre, Título

2 Correo electrónico

3 Nombre, Título

3 Correo electrónico

4 Nombre, Título

4 Correo electrónico

5 Nombre, Título

5 Correo electrónico

6 Nombre, Título

6 Correo electrónico

=====
Gracias
=====

¡Gracias por su ayuda! Le agradecemos sinceramente su participación.

5.4.4 Survey for Emergency Management Organizations (UK)

=====

RESEARCH USE INFORMED CONSENT FORM

=====

Researcher Information: Bahadir Sahin
Department of Public Affairs
bahadir@mail.ucf.edu
+ (1) 646-220-0628 (cell)

I. PROJECT TITLE: Factors Influencing Effectiveness of Crisis Management Networks: A Comparative Perspective

II. INTRODUCTION: Increased number of manmade and natural disasters forces the policy makers to make more effective crisis management policies. Since the crisis management cannot be conducted by one single entity, it is a collaborative network effort among first responder public organizations, non-profit disaster relief institutions and other public and private entities. Ineffective crisis management policies coordinating the response and recovery efforts will result in failures that cost numerous human lives and great material damages to public and private infrastructures. The disasters will occur in a more increasing rate in the future (e.g. Iowa Floods in June 2008). The crisis management policies and organizations should be ready for worse conditions to be more effective and to save more human lives and hinder more property damage in future disasters.

Based on this information from the literature, you will be asked 25 questions regarding the organizational conditions you are in. It will probably take 10 minutes of your time. Your participation is greatly appreciated. If you requested it (by mail, e-mail, or phone, the researcher will also provide a copy of consent form to you.

III. Your confidentiality will be guarded.
If you have any questions about participation into this research project, you may file a claim with UCF Environmental Health & Safety, Risk and Insurance Office, P.O. Box 163500, Orlando, FL 32816-3500 (407) 823-6300.

IV. If you have any other questions, you may also contact the principal investigator:

Thomas Wan
Professor and Director
Doctoral Program in Public Affairs
twan@mail.ucf.edu
+ (1) 407-823-3678

I have read and understood the information in this form. I am at least 18 years of age. I consent to take part in this research entitled "Factors

Influencing Effectiveness of Interorganizational Networks among Crisis Management Organizations: A Comparative Perspective"

=====
Survey for Emergency Management Organizations
=====

This survey examines the effectiveness of emergency operations during the Metro Bombings in London 2005. The survey takes about 15 minutes to complete. Your responses are confidential, and will not be revealed without your consent; only aggregate results will be made available. We are happy to make a copy of final results available to you.

Employee Organization:

- Health
- Law Enforcement
- Search and Rescue Team
- Non-profit EM (Red Cross...)
- Education Facility
- Fire Department
- Emergency Operation Centre

Employee Position:

- Supervisor
- Middle Manager
- Frontline Manager
- Assistant Supervisor
- Team Leader
- Frontline Worker

Gender

- Male
- Female

Age:

Important Note: All the questions below will be asked for the time before London Metro Attacks took place in the UK. Please answer the questions for the situation in your organization BEFORE the incident in 2005.

1. There has been important change(s) in my organization (structure, goals, and rules) because of an important event (Flood, terrorist attack, hurricane, bush fire, earthquake etc.) before.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

2. There have been important events frequently up to now, which my organization should deal with.

- Strongly Agree
- Agree
- Neutral
- Disagree

Strongly Disagree

3. Intra-organizational education holds an important place in my organization.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

4. My organization is open to change by any means.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

5. I work with my co-workers to collectively solve the problems in the organization.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

6. I have the chance to talk informally and visit the other employees.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

7. I socialize with the co-workers outside of the workplace.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

8. I trust many co-workers a great deal.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

9. I do not feel any co-worker is a true friend.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

10. I formed strong friendships at work.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

11. I work for the organization because she/he is here.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

12. Friendships make the workplace a happier place.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

13. Friendships help to work cooperatively with each other at times of stress.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

14. The employees of my organization know that each extreme event (terrorist bombings, flood, winter storm, earthquake, hurricane etc.) is different. My organization has plans and operates differently in each different extreme event. For example, we would use a different operational procedure for a flood than we would a terrorist bombing.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

15. My organization is ready to operate any generic emergency management functions (evacuation, temporary housing, alternative communication tools, warnings etc.).

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

16. My organization has plans to mobilize personnel (authorized employees and volunteers) and resources effectively. By effectively, I mean needed personnel and resources are well-identified in the crisis, they are located quickly and brought to bear correctly, and they are appropriate to the problems generated by the disaster.

- Strongly Agree
- Agree

- Neutral
- Disagree
- Strongly Disagree

17. My organization has a certain job definition during an extreme event. My organization's employees do not get involved in other kinds of labour during an extreme event different than the professionalization of my organization.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

18. Information is processed adequately within my organization during a disaster. Communication tools and communicated material are satisfactory.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

19. Information is processed adequately between my organization and other responding organizations during a disaster. Communication tools and communicated material are satisfactory.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

20. Information is processed adequately between my organization and affected citizens during a disaster. Communication tools and communicated material are satisfactory.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

21. My organization keeps exercising decision-making properly in the crisis time as well. The organizational jurisdiction differences within or outside of the organization cannot be a problem; emergent groups and my organization do not have a conflict on organizational domains. Responsibility for new disaster tasks is not a problem that we cannot resolve easily.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

22. My organization's employees work coordinative with the other organization employees in the crisis scene. Leadership in critical phases is not a problem. Since community good is more important to us, the

willingness to de-emphasize organizational claims of leadership is high in my organization.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

23. My organization has plans to include the emerging resources into the organizational labour during a disaster. I and my other colleagues believe that volunteers and other emergent stakeholders are important sources to bring the social order back. My organization employees do not think that the emergent resources are useless because they are not controllable as we are.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

24. My organization supports the developments of relationships that are acceptable and beneficial to the responding organizations, the mass media and citizens in general. During extreme events, citizens are satisfied with the relatively accurate picture of what is going on via our broadcasting systems or press.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

25. My organization works with an emergency operation centre (EOC) during disasters. We are represented in EOC in the highest level possible, we work co-operatively with the other responders, we benefit from it since we know what the others are doing and how we can help them.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

Please give names and email addresses of at least 3 (three) other employees that took part in recovery efforts at WTC Attacks from your organization that can help us with this study to improve emergency management efforts.

1 Name

1 Email

2 Name

2 Email

3 Name

3 Email

4 Name

4 Email

5 Name

5 Email

6 Name

6 Email

=====
Thank You!
=====

Thank you for taking our survey. Your response is very important to us.

APPENDIX B: RESPONDENTS' LOCATIONS



Figure 14. American Respondents Geographical Locations



Figure 15. Turkish Respondents Geographical Locations

APPENDIX C: EXTRA TABLES AND FIGURES

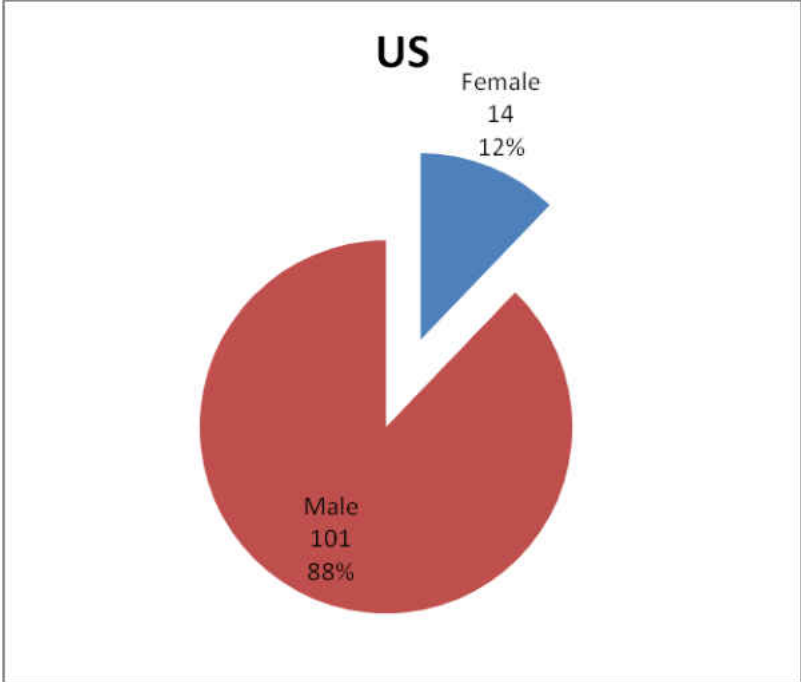


Figure 16. US Respondent Gender Descriptive Statistics

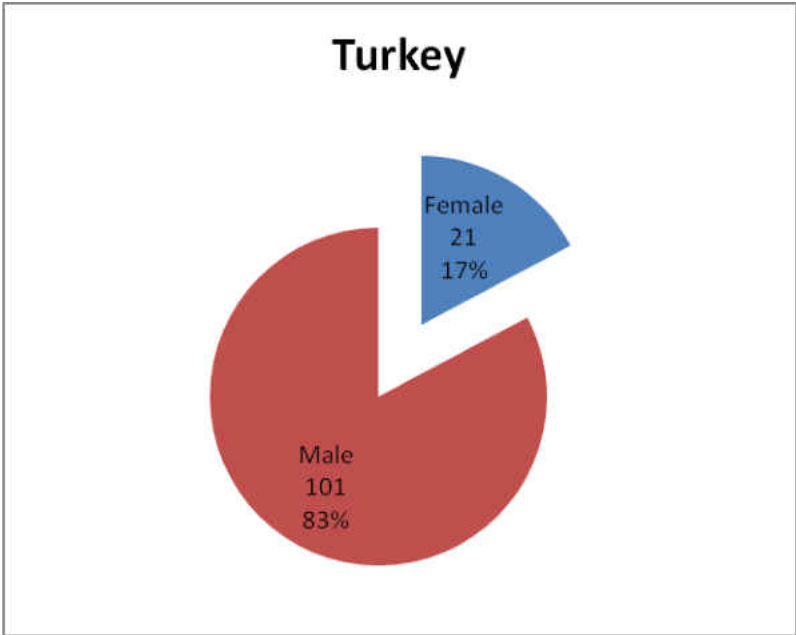


Figure 17. Turkey Respondent Gender Descriptive Statistics

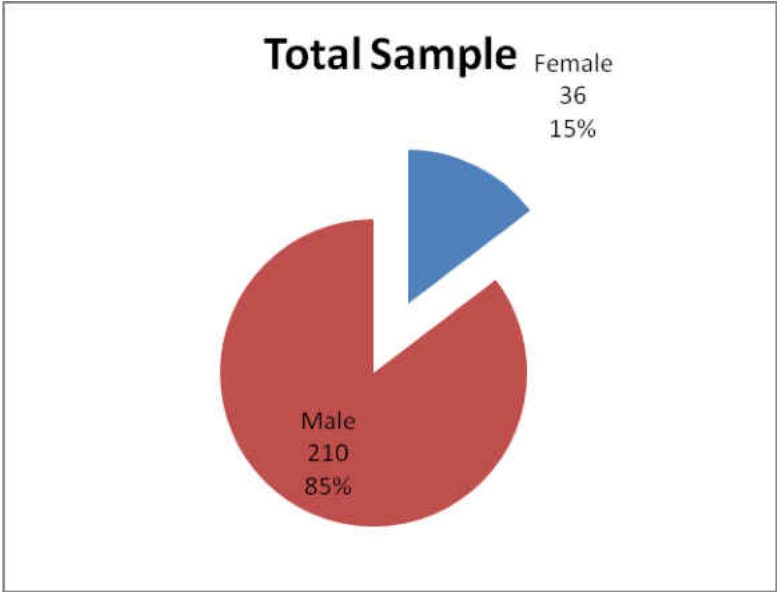


Figure 18. Total Respondent Gender Descriptive Statistics

Table 15. Correlation Statistics of CFA - Informal Relationships

Correlations			Modification indexes	Par Change
d3	<-->	d1	5.612	-0.139
d3	<-->	d2	9.909	0.169
d8	<-->	d3	4.342	-0.101
d9	<-->	d8	8.285	0.121
d5	<-->	d1	5.731	-.140

Table 16. Correlation Statistics of CFA - Perceived CM Network Effectiveness

Correlations			Modification indexes	Par Change
e8	<-->	e9	10.034	0.167
e7	<-->	e8	22.262	0.274
e6	<-->	e8	5.085	-0.121
e3	<-->	e9	4.087	-0.106
e3	<-->	e8	4.08	-0.11
e2	<-->	e9	4.633	-0.116
e2	<-->	e8	13.899	-0.207
e2	<-->	e7	4.056	-0.119
e2	<-->	e3	12.816	0.198
e1	<-->	e7	12.647	-0.221
e1	<-->	e3	7.75	0.162
e1	<-->	e2	9.146	0.18

Table 17. Correlation Statistics of CFA - Perceived CM Network Effectiveness

Correlations		Modification indexes	Par Change	
Q3	<-->	Q4	36.649	0.548
Q2	<-->	Q3	5.091	0.194
Q1	<-->	Q3	4.585	0.191
Q1	<-->	Q2	54.933	0.678
e5	<-->	Q4	14.729	0.229
e5	<-->	z1	11.389	-0.112
e2	<-->	Q4	6.455	-0.179
d1	<-->	Q4	7.426	0.206
d1	<-->	e7	4.817	0.123
d1	<-->	e5	4.331	-0.096
d1	<-->	e3	4.319	0.111
d1	<-->	e2	12.066	-0.189
d2	<-->	z2	9.07	0.099
d2	<-->	e5	4.487	0.09
d2	<-->	e3	4.063	-0.098
d3	<-->	e5	7.032	-0.114
d3	<-->	e3	9.505	0.153
d3	<-->	e2	4.648	-0.109
d4	<-->	e9	7.207	-0.122
d6	<-->	Q2	7.044	0.155
d6	<-->	e9	6.471	0.109
d6	<-->	e6	4.325	-0.093
d8	<-->	Q3	4.426	-0.123
d9	<-->	z2	4.632	0.064
d9	<-->	e2	5.411	0.105

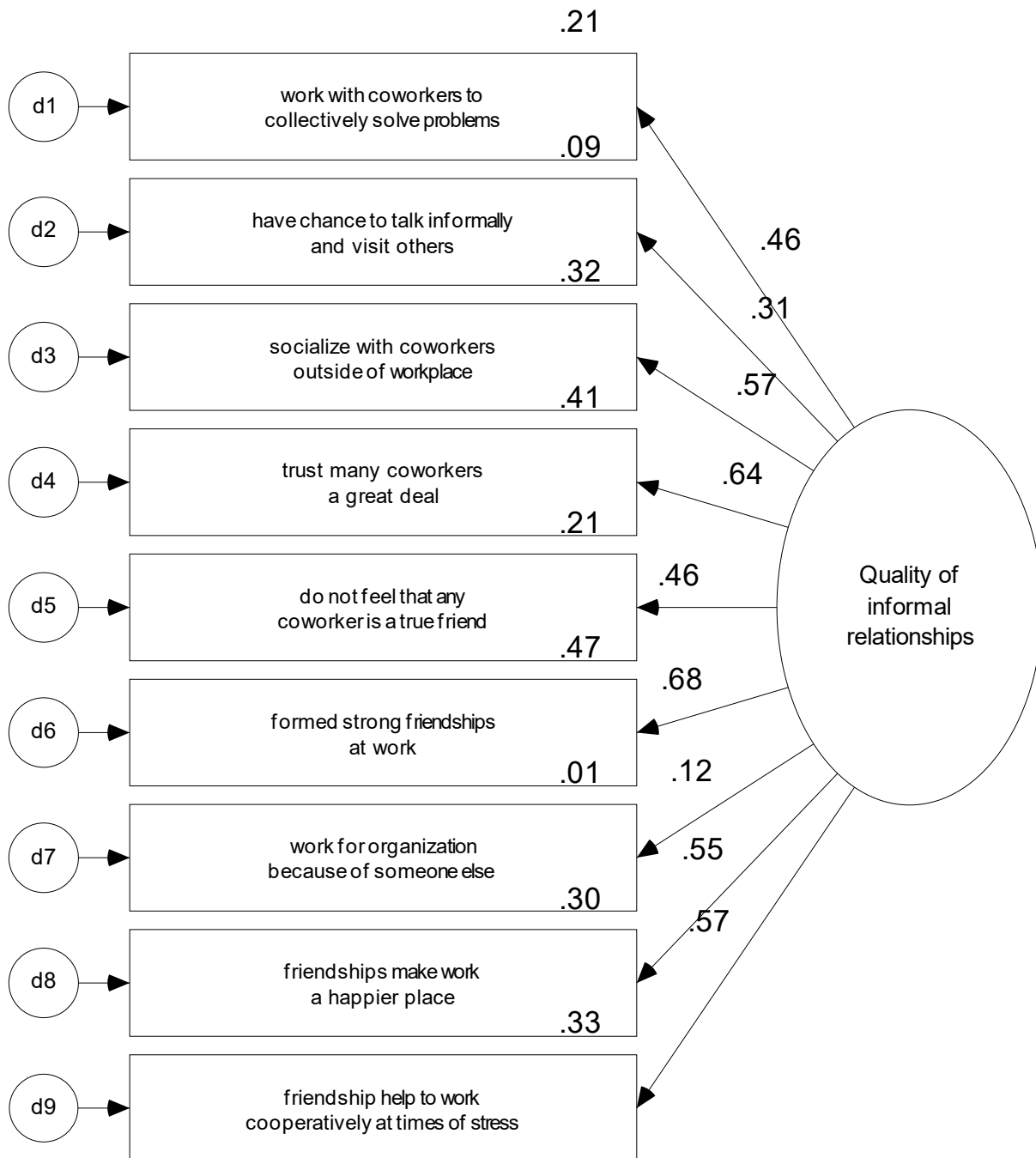


Figure 19. CFA Model for Quality of Informal Relationships

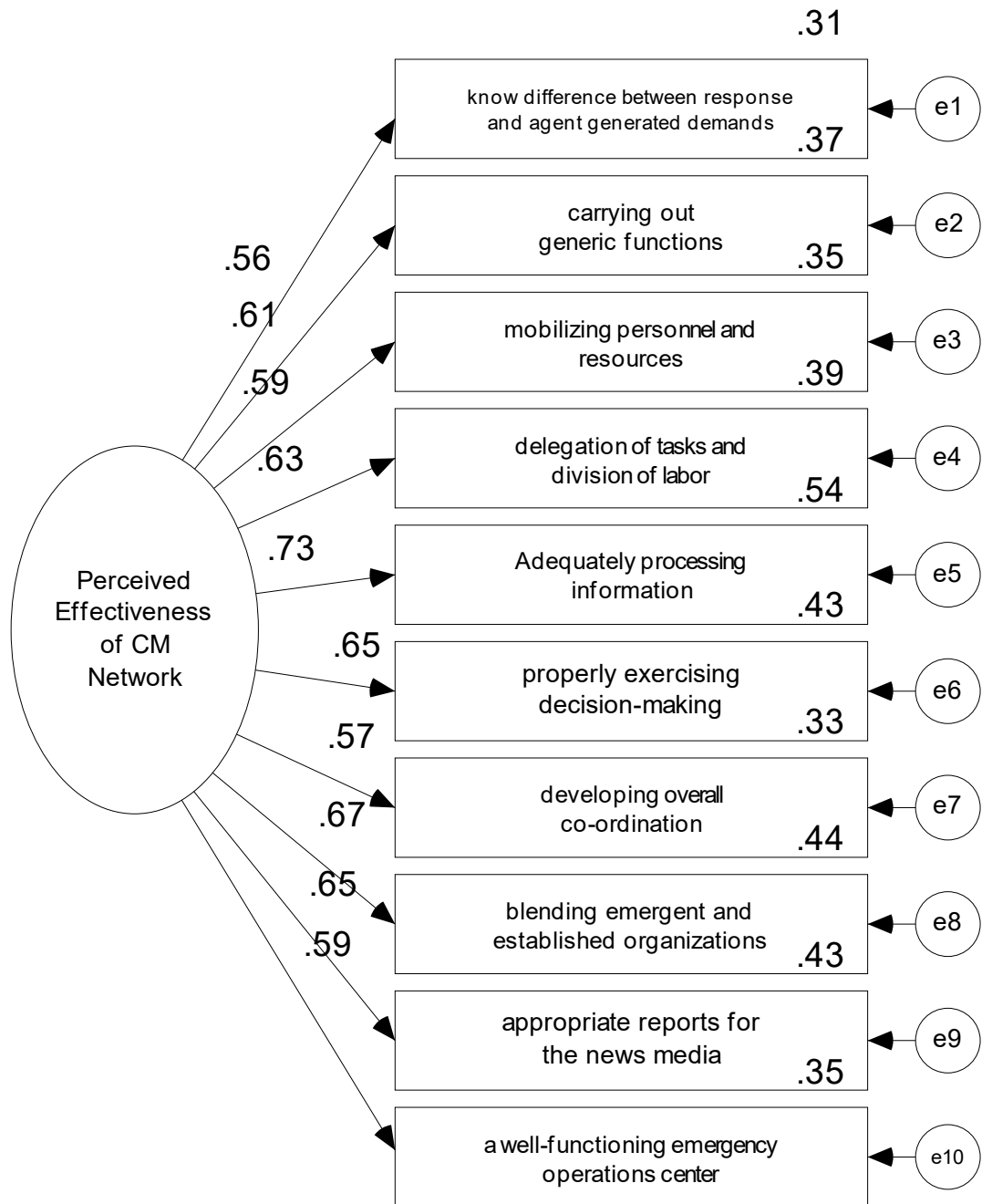


Figure 20. CFA Model of Perceived Effectiveness of CM networks

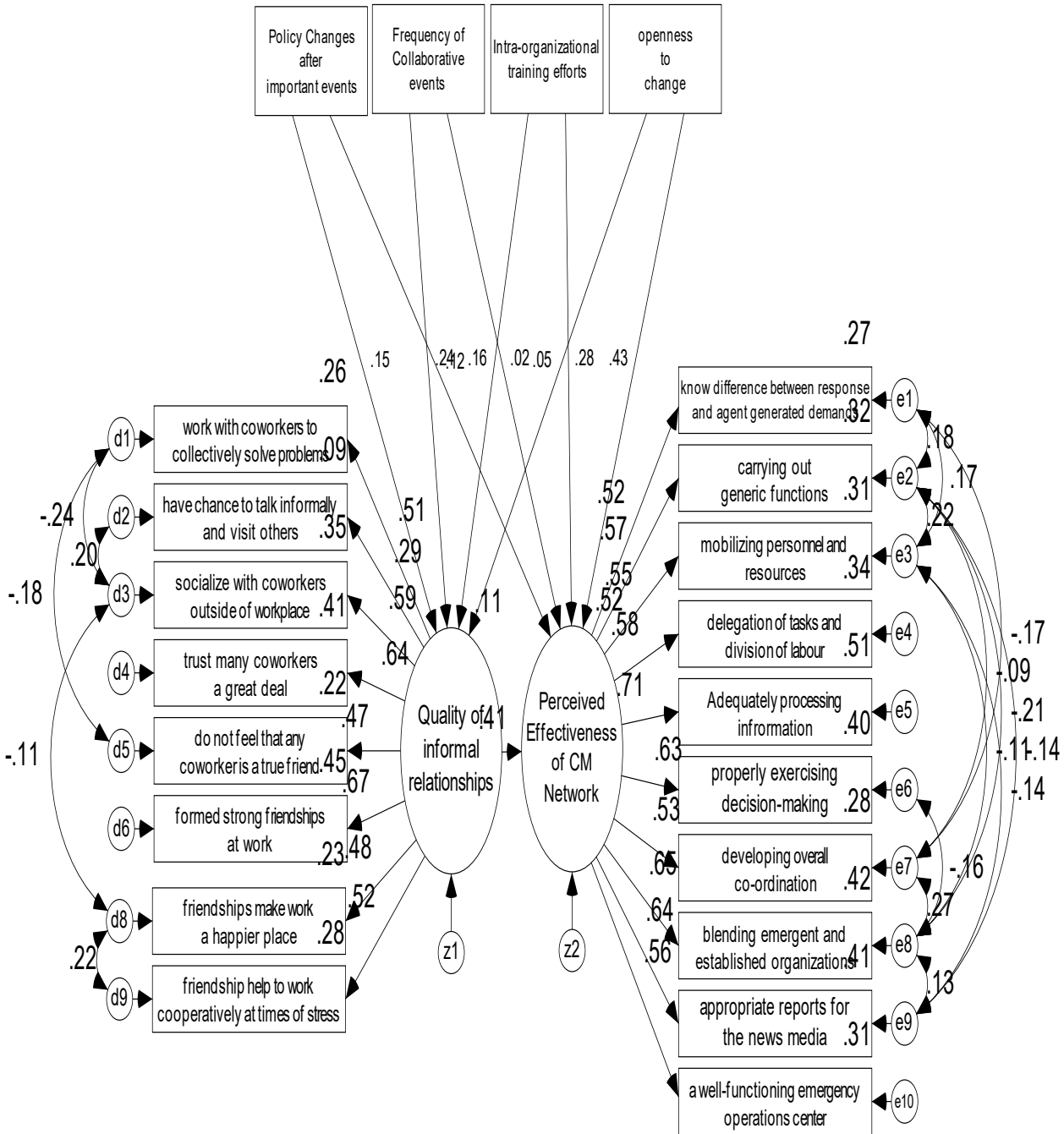


Figure 21. The Generic Structural Model

Table 18. Summary Information of Selected Countries

Countries	Government Type	Population/GDP per capita	Public Administration System	Coordinating Crisis Management Organization
United States	Federal constitutional republic	306,908,000/\$46,859*	Decentralized/States	FEMA (Federal Emergency Management Agency)
Turkey	Parliamentary republic	73,914,000/\$13,920*	Centralized/Cities	TEMAD (Turkey Emergency Management Directorate General)
Spain	Constitutional monarchy	46,661,950/\$35,331*	Decentralized/ Autonomous Regions	GDCDE (General Directorate of Civil Defense and Emergencies)
United Kingdom	Constitutional monarchy	61,612,300/ \$36,523*	Decentralized/National Administrations	CCS (Civil Contingencies Secretariat)

* IMF (2009)

APPENDIX D: IRB APPROVAL



University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901, 407-882-2012 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Notice of Expedited Initial Review and Approval

From : **UCF Institutional Review Board**
FWA00000351, Exp. 10/8/11, IRB00001138

To : **Bahadır Sahin**

Date : **December 19, 2008**

IRB Number: **SBE-08-05954**

Study Title: **Factors Influencing Effectiveness of Interorganizational Networks among Crisis Management Organizations: A Comparative Perspective**

Dear Researcher:

Your research protocol noted above was approved by **expedited** review by the UCF IRB Vice-chair on 12/18/2008. **The expiration date is 12/17/2009.** Your study was determined to be minimal risk for human subjects and expeditable per federal regulations, 45 CFR 46.110. The category for which this study qualifies as expeditable research is as follows:

7. Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

A **waiver of documentation of consent** has been approved for all subjects. Participants do not have to sign a consent form, but the IRB requires that you give participants a copy of the IRB-approved consent form, letter, information sheet, or statement of voluntary consent at the top of the survey.

All data, which may include signed consent form documents, must be retained in a locked file cabinet for a minimum of three years (six if HIPAA applies) past the completion of this research. Any links to the identification of participants should be maintained on a password-protected computer if electronic information is used. Additional requirements may be imposed by your funding agency, your department, or other entities. Access to data is limited to authorized individuals listed as key study personnel.

To continue this research beyond the expiration date, a Continuing Review Form must be submitted 2 – 4 weeks prior to the expiration date. Advise the IRB if you receive a subpoena for the release of this information, or if a breach of confidentiality occurs. Also report any unanticipated problems or serious adverse events (within 5 working days). Do not make changes to the protocol methodology or consent form before obtaining IRB approval. Changes can be submitted for IRB review using the Addendum/Modification Request Form. An Addendum/Modification Request Form **cannot** be used to extend the approval period of a study. All forms may be completed and submitted online at <http://iris.research.ucf.edu>.

Failure to provide a continuing review report could lead to study suspension, a loss of funding and/or publication possibilities, or reporting of noncompliance to sponsors or funding agencies. The IRB maintains the authority under 45 CFR 46.110(e) to observe or have a third party observe the consent process and the research.

On behalf of Tracy Dietz, Ph.D., UCF IRB Chair, this letter is signed by:

Signature applied by Joanne Muratori on 12/19/2008 08:47:10 AM EST

IRB Coordinator

Figure 22. IRB Approval

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