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The Impact Of Organizational Goal Convergence, Information-communication Technology Utilization, And Inter-organizational Trust On Network Formation And Sustainability The Case Of Emergency Management In The United States

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THE IMPACT OF ORGANIZATIONAL GOAL CONVERGENCE, INFORMATION-COMMUNICATION TECHNOLOGY UTILIZATION, AND INTER-ORGANIZATIONAL TRUST ON NETWORK FORMATION AND SUSTAINABILITY: THE CASE OF EMERGENCY MANAGEMENT IN THE UNITED STATES

by

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ABSTRACT

With the increase of severity and scope of disasters, collaborative networks have become the main tool to tackle with complex emergencies. Networks, however, are mostly effective to the extent they are maintained over time. This study analyzes whether organizational goal convergence, information-communication technology utilization, and inter-organizational trust impacts network sustainability. The main research questions of the study are: (1) How are organizational goals, technical/technological capacity of organizations, and trust among organizations of a network are related to the sustainability of collaborative network relationships? (2) Which of the above-mentioned factors plays the most significant role in affecting network sustainability? Covering the context of emergency management system in the United States, this study utilized a self-administered survey that was electronically distributed to county emergency managers across the country. The data consisting of 534 complete responses was analyzed in Statistical Package for the Social Sciences (SPSS) Inc. software's PASW (Predictive Analytics SoftWare) Statistics version 18.0 and transferred to Amos 18.0 software for structural equation modeling (SEM) analysis. The findings suggest that organizational goal convergence, information-communication technology utilization, and inter-organizational trust have positive and statistically significant relationships with network sustainability; and, inter-organizational trust is the strongest factor followed by information-communication technology utilization and organizational goal convergence. The study contributes to the literature on network sustainability with specific suggestions for emergency management practitioners.

I dedicate this study to my mom,

whose devotion, love and continuous support

brought this endeavor to completion…

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LIST OF ACRONYMS/ABBREVIATIONS

A	Assumption
AGFI	Adjusted Goodness of Fit Index
AK	Alaska
AL	Alabama
AR	Arkansas
ARC	American Red Cross
AZ	Arizona
BA	Bachelor of Arts
CA	California
CEMP	Comprehensive Emergency Management Plan
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CMIN	Minimum Chi-square
CO	Colorado
COTY	County Type
CPNM	Center for Public and Nonprofit Management
CR	Critical Ratio
CT	Connecticut
d	Measurement Error
DE	Delaware
DF	Degree of Freedom
DHS	Department of Homeland Security
e	Error Term (Disturbance)
EMAC	Emergency Management Assistance Compact
EOC	Emergency Operation Center
EPA	Environmental Protection Agency
ESF	Emergency Support Function
FDEM	Florida Department of Emergency Management
FEMA	Federal Emergency Management Agency
FL	Florida
FRP	Federal Response Plan
GA	Georgia
GFI	Goodness of Fit Index
H	Hypothesis
HazMat	Hazardous Materials
HI	Hawaii
HSPD	Homeland Security Presidential Directive
IA	Iowa
ICS	Incident Command System
ICT	Information-Communication Technology

ID	Idaho
IFI	Incremental Fit Index
IL	Illinois
IN	Indiana
IOT	Inter-Organizational Trust
IRB	Institutional Review Board
KS	Kansas
KY	Kentucky
LA	Louisiana
LEPC	Local Emergency Planning Committee
MA	Massachusetts
MACS	Multi-Agency Coordination System
MD	Maryland
ME	Maine
MI	Michigan
MN	Minnesota
MO	Missouri
MOU	Memorandum of Understanding
MPA	Master of Public Administration
MS	Mississippi
MT	Montana
NC	North Carolina
ND	North Dakota
NE	Nebraska
NFI	Normed Fit Index
NGO	Non-Governmental Organization
NH	New Hampshire
NIC	National Integration Center
NIMS	National Incident Management System
NJ	New Jersey
NM	New Mexico
NNFI	Nonnormed Fit Index
NRF	National Response Framework
NRP	National Response Plan
NS	Network Sustainability
NV	Nevada
NVOAD	National Voluntary Organizations Active in Disaster
NY	New York
OGC	Organizational Goal Convergence
OH	Ohio
OK	Oklahoma
OR	Oregon

P	Significance Level
PA	Pennsylvania
PASW	Predictive Analytics SoftWare
PCLOSE	P Value of Close Fit
RFI	Relative Fit Index
RI	Rhode Island
RMSEA	Root Mean Square Error of Approximation
SC	South Carolina
SCO	State Coordinating Officer
SD	South Dakota
SE	Standard Error
SEM	Structural Equation Modeling
SERT	State Emergency Response Team
SPSS	Statistical Package for the Social Sciences
SRMR	Standardized Root Mean Square Residual
SRW	Standardized Regression Weight
TLI	Tucker-Lewis Index
TN	Tennessee
TX	Texas
UCF	University of Central Florida
URW	Unstandardized Regression Weight
US	United States
UT	Utah
VA	Virginia
VT	Vermont
WA	Washington
WI	Wisconsin
WV	West Virginia
WY	Wyoming

CHAPTER 1. INTRODUCTION

This section of the study provides an overview of the study focusing on the problem definition, the purpose of the study, the significance of the study, the main research questions addressed, the proposed conceptual framework, and the analytical approach utilized to analyze the data and relationships among the latent constructs.

Overall, this study builds on and contributes to the previous research on network sustainability in emergency management field. While earlier studies have examined network sustainability in other disciplines, they did not focus on how emergency management networks are sustained across time. As such, this study provides additional insight into local-level emergency management sustainability in the United States. The local collaborative efforts are analyzed in light of network perspective. Theory-wise, this study contributes to the research on networks and collaborations. The main goal of the study is to understand how organizational preferences, technical capacity and inter-organizational trust impacts overall network of organizations responsible for emergency management at the county level. Although earlier studies on collaborative networks in emergency management have identified that structural and contingency factors impact network sustainability, little analytic attention has been paid to the factors affecting network sustainability in emergency management field. This study addresses this issue by analyzing how organizational goals, technology utilization, and inter-organizational trust relates to network sustainability in the field of emergency management with specific focus on the United States context.

1.1. Statement of the Problem

Networks become more and more utilized in today's emergency management field especially with the increase of severity and scope of disasters. The changing nature of disasters forces organizations from different sectors and jurisdictions to work together with the purpose to overcome overwhelming problems a single organization cannot solve on its own. Since traditional hierarchical structure and methods no longer offer effective disaster management solutions (Bier, 2006; Klijn & Koppenjan, 2007), collaborative efforts have received much attention from academic world and practitioners, and proved viable as well as helpful in terms of being a method to cope with complexity, uncertainty and time-sensitive cases.

According to Kamensky et al. (2004), "[c]ollaboration occurs when people from different organizations produce something together through joint effort, resources, and decision making, and share ownership of the final product or service" (p. 8). While collaborative efforts are not a new way of dealing with disasters, their appearance and implementation in the form of networks is relatively a new phenomenon (Kamensky, Burlin, & Abramson, 2004). The use of formal and informal networks in emergency management is a relatively new concept in the field, which requires further understanding and insight about the topic to produce effective results. The most effective results of network utilization in emergency management, however, are largely dependent on the sustainability of networks over time (Weber, 2003), which is dependent on several internal and external, structural and relational factors related to organizational environment. The organizational goals and objectives, the use of technology as well as inter-

organizational trust are among the factors playing a role in determining the success of networks in general, and emergency management networks in particular.

Accordingly, it is mainly the level of sustained and common-issue relationships, whether formal or informal, maintained and sustained through technological tools especially in the absence of disasters that determines the success of future emergency management operations. Institutionalization of networked governance (Milward & Provan, 2000b) as well as focusing on the design, development, and sustainability of multi-faceted networks should be a primary goal of emergency management officials (Trotter, Briody, Sengir, & Meerwarth, 2008). Organizations that lack capacity to maintain continuous relationships with other organizations working towards a common goal are prone to be isolated from their respective network and become dysfunctional if/once their capacity is overwhelmed. Therefore, organizations need to seek and invest into effective tools to establish, develop and sustain network relationships for their own as well as for overall community benefit. The main goal of this research is to analyze and identify the factors that affect emergency/disaster management network sustainability. Understanding what factors impact network sustainability might help improve network design for a more effective and more efficient disaster response.

1.2. Purpose of the Study

Since collaborative practices have become the cornerstone of successful emergency management practices today, it is important to develop long-term relationships fostering cooperation and partnerships among organizations responsible for emergency response. According to Katz and Lazer (2002), sustainability of such relationships is partly dependent on

the level of trust developed during previous collaborative practices. Gillespie et al. (1993) argue that network relationships are sustained if there is an active problem to be addressed that would foster professional relationships and interactions among organizations. In addition, technological changes and innovations are critical for the establishment and maintenance of the networks (Snow, Lipnack, & Stamps, 1999). Kapucu (2009) claims that it is also the level of complexity in networks that would affect network structure and process, which is defined as an interdependence and multiplicity of actor relationships working together to achieve a common goal. It is multiplicity of actors and interactions that eventually affects or determines the later stages of the network processes (Axelrod & Cohen, 1999). The main argument is that complexity arising from inter-dependence of actors who have different identities, structures, values, norms and preferences would affect the level of sustainability of emergency management networks.

Research analyzing the impact and importance of the organizational goals, use of technology and inter-organizational trust on network sustainability is scarce, however. There is scarcity in terms of the research studying how organizational goals structure network relationships. Bryson, Crosby and Stone (2006) argue that competing organizational goals and institutional logics affect the level of collaboration that actors would be involved in. Burckhardt and Brass (1990), for example, discuss the effects of technology on network structure, and conclude that technology adoption does affect the structure of network in terms of the centrality and power of the actors. The main tenet of previous studies is that technology fosters, facilitates and enhances network relationships, thus contributing to inter-organizational relationships in general, and to inter-organizational collaboration in particular. Lastly, there is a need for analysis of the impact of inter-organizational trust on the level and nature of collaborations between

different parties. Bryson, Crosby and Stone (2006) argue that trust is result of previous experience and relationships as well as a prerequisite for further inter-organizational collaboration. Organizations that develop trust-based relationships among each other tend to be more productive and cooperative. The purpose of this study, therefore, is to analyze how above mentioned factors contribute to the collaborative practices among organizations. In other words, the study intends to analyze how differences in organizational goals, technology utilization and inter-organizational trust affect collaborative network sustainability in emergency management. The main goal is to increase collaborative inter-organizational practices through understanding factors contributing to them.

1.3. Significance of the Study

This study intends to provide insight about emergency management collaborative network relationships and practices, which would enhance network structure, processes and results. Since emergency management network organizations mostly interact on the basis of disaster frequency, it is important that network relationships are also sustained in the absence of disasters. The absence of disasters should be an opportunity for emergency management organizations to develop their relationships in the form of partnerships and cooperation so that those organizations are more prepared when a disaster strikes.

While organizations in emergency management networks come together for the general purpose to save property and lives of those affected by disasters, their relationships during disasters are more of an adhoc nature. In other words, during disasters different organizations work together out of necessity of the situation. In this regard, organizations representing different

sectors as well as providing different services would not collaborate during other times. Those organizations that do collaborate, however, are often tied to each other by goal commonality. It is important, therefore, to see what effect the goal commonality produces on sustained relationships. On the other hand, technology also plays an important role for the effective emergency management practices through the sustained relationships within the related collaborative network. Serving as the gateway for increased relationships and more efficient outcomes, technology becomes more and more utilized to increase collaborative network performance. Inter-organizational relations characterized by trust and mutual acceptance, on the other hand, are crucial for stronger, fair and equity-based relationships. Organizations generally act based on their previous experience with other organizations; thus, trust plays an important role in determining the strength, the direction as well as the possibility of further collaborative relationships.

Focusing mainly on the literature of networks, this study contributes to the literature of networked governance in emergency management as well as provides insight about the impact of organizational goals, technology utilization/dependence and inter-organizational trust on collaborative network sustainability. Since the use of networks in emergency management field is a relatively new concept, it is important to understand and improve the working of inter-organizational relationships with the emphasis on making those relationships stable, legitimate, effective and efficient. In other words, network performance, effectiveness and efficiency are very much dependent on the way relationships are established, developed and maintained. This study, thus, intends to provide more insight about the relationship between network structure, processes and outcomes.

1.4. Research Questions

There is evidence in some research that organizations with different mission, goals and objectives tend to be reluctant in terms of collaborating with others (Bryson, Crosby, & Stone, 2006). In other words, the more the gap between organizational goals and culture, the less possible organizations would come together for a collaborative effort. This is understandable, because organizations generally collaborate on issues having commonality. On the other hand, the previous literature also emphasizes the importance of technology on the structure of networks (Burkhardt & Brass, 1990). Technology in organizations is essential not only for intra-organizational, but also for inter-organizational relationships. When collaboration is imperative as part of achieving a common goal, technology plays a critical role in coordination and sustenance of collaborative practices. Organizations having technological capacity for inter-organizational communication and coordination have relatively more alternatives to accomplish their goals when compared to those lacking such resources. In addition, technology plays an important role in terms of time and resource saving. Specifically speaking, technology is assumed to increase the centrality of the actors utilizing it, thus increasing alternatives for information and resources exchange.

Lastly, inter-organizational trust is argued to have impact on inter-organizational collaboration by creating an environment characterized by mutual acceptance and understanding. Actors that are expected to work together under certain network rules are more cooperative and tolerant towards each other, thus, nurturing further relationships for collaboration. The three factors, namely organizational goals, technology utilization and inter-organizational trust, are

overall expected to enhance and facilitate collaboration among organizations working towards a common goal. In other words, collaborative network stability and sustainability are expected results of the concordance of the above-mentioned factors. Network stability and sustainability is partly a function of how actors are positioned within a network (Baum, Shipilov, & Rowley, 2003); network structure, however, is partly a result of how organizations accommodate their goals within the larger system of relationships, how they use technology and how trustworthy their relationships are. Based on the data from survey responses from county emergency managers across the United States, this study seeks to answer the following questions:

1) How are organizational goals related to the sustainability of network relationships? Does organizational goals convergence increase collaborative network sustainability?

2) How is technology utilization or dependence on technology related to the sustainability of collaborative network relationships? Does technology utilization increase collaborative network sustainability?

3) How is inter-organizational trust related to the sustainability of network relationships? Does inter-organizational trust increase collaborative network sustainability?

4) Is there any relationship among organizational goals, technology utilization and inter-organizational trust?

The questions mentioned above will help analyze if there is any relationship between organizational goals, the use of technology, and inter-organizational trust, and collaborative network stability/sustainability at the inter-organizational level. The main assumptions or

expectations in this study are: 1) that organizations having common goals, objectives and culture would tend to maintain their network relationships over time; 2) that organizations utilizing and benefiting from technology would have more chances to maintain and stabilize their network relationships, which would be impossible or less frequent otherwise; and, 3) that organizations having strong and trust-based relationships among each other tend to increase collaboration within the whole collaborative network.

1.5. Analytical Approach

A survey research instrument was used to assess county emergency managers' perceptions about sustainability of the emergency management networks they engage during and after disasters. The survey was designed online using the web-based surveying tool www.surveymonkey.com, and the link of the survey was electronically mailed to the county emergency managers across the United States. The data collected from the responses was analyzed using Statistical Package for the Social Sciences (SPSS) Inc. software's PASW (Predictive Analytics SoftWare) Statistics version 18.0 for the purposes of descriptive statistics and analysis of inter-item correlations as well as internal reliability of the instrument items. The Amos 18 package of the SPSS Inc., on the other hand, was used to validate the measurement models of the latent constructs via confirmatory factor analysis (CFA) and to analyze the covariance structure model of the study via structural equation modeling (SEM).

1.6. Organization of the Study

Chapter I provides an overview of the study focusing on the problem definition, the purpose of the study, the significance of the study, the main research questions addressed, the proposed conceptual framework, and the analytical approach utilized to analyze the data and relationships among the latent constructs.

Chapter II of the study focuses on the literature review presenting previous research in regard to the study constructs. Specifically speaking, research on network governance and sustainability as well as the factors affecting network formation and sustainability are summarized. The literature on the main factors that are assumed to impact network sustainability, namely organizational goal convergence, technology utilization, and inter-organizational trust, is also presented and summarized.

Chapter III provides the context of the study focusing on emergency management in the United States. Specifically, this chapter explains the emergency/disaster management system in the United States, and how the study goal fits into the overall picture of the system. The rationale behind conducting this study is explored in detail in this section.

Chapter IV focuses on the methodology of the study and sets out the main research hypotheses along with the explanation of how the study sample was chosen, and how the data was collected and analyzed.

Chapter V presents the study findings with appropriate statistical results in the form of tables and figures. Confirmatory factor analysis (CFA) and structural equation modeling (SEM) analysis results are presented, explained and interpreted.

Finally, Chapter VI focuses on the theoretical, policy and managerial implications as well as limitations of the study. An overall discussion on the topic studied is provided, and the topics for further research are articulated.

CHAPTER 2. LITERATURE REVIEW

This section of the study focuses on the literature review presenting previous research in regard to the study constructs. Specifically speaking, research on network governance and sustainability as well as the factors affecting network formation and sustainability are summarized. The literature on the main factors that are assumed to impact network sustainability, namely organizational goal convergence, information-communication technology utilization, and inter-organizational trust, is also presented and summarized.

2.1. Network Governance

The field of public administration has evolved significantly over the last century. The changes have been so dramatic that the processes have often been called as the paradigm shift. A paradigm shift occurs when the ideas and concepts of specific realm are analyzed from a different perspective and focus. The public administration, in this regard, has undergone several paradigmatic changes through which new phenomena were presented and applied in the field. The first notable change occurred at the beginning of the 20th century under the notion of Politics/Administration Dichotomy, when the scholars agreed on the need to separate politics from administration. Later, between 1940s and 1970s, there was a shift towards the Science of Administration, which emphasized scientific tools to organize and govern administrative activities. The Science of Administration was further criticized for inefficiency and wasteful bureaucracy, which paved a way for New Public Administration. The New Public Administration, in turn, focused on normative and moral standards of the field, and specifically called for public administration's independence from political science and management (Henry,

2007). Yet another shift occurred with the global changes in 1970s when the New Public Management was introduced by David Osborne and Ted Gaebler through their classical book *Reinventing Government*. The New Public Management emphasized the need to utilize market-like tools to deliver public services – further step to minimize inefficiency and bureaucratic red-tape (Kamarck, 2003). In 1990s, on the other hand, Janet and Robert Denhardt proposed a different approach to public administration, which is known today as the New Public Service. This approach emphasized the importance of civic/public participation in the policy-making and decision-making processes (Reddel, 2002; Abramson, Breul, & Kamensky, 2006) mainly due to the fact that citizens are not and should not be treated as customers but as stakeholders (Denhardt & Denhardt, 2000).

While there have been many debates and criticism about calling above-mentioned shifts in perspectives as paradigm shift, most of the field academicians and practitioners agree on one specific issue: there have been significant social, political, economic and historic factors that brought about above-mentioned changes in the way public administration was executed. Yet the global conditions and locality-based specifics today are still not fully embraced and addressed by administrative changes covered above. The fast changes and developments in information technology and globalization in the new age led public administrators to look for new approaches and perspectives. The variety and scope of the societal issues resulted in the new ways of public service delivery and intra-organizational/inter-organizational relationships.

One of the related and mostly used concepts in the field is the notion of *governance*. While governance has not been successful to explain all the changes and reforms in the field of

public administration over the last decades especially due to the rapid globalization process and information age, it is the most comprehensive approach that fits today's societal conditions. While the governance concept may overlap with some of the previous paradigms, there are still unique characteristics distinguishing it from previous approaches.

Having been used interchangeably with the terms new governance, collaborative governance, and network governance, the concept of governance has been defined in several ways in the literature. According to Ansel and Gosh (2007), governance is a "governing arrangement where one or more public agencies directly engage non-state stakeholders in a collective decision-making process that is formal, consensus-oriented, and deliberative and that aims to make or implement public policy or manage public programs or assets" (p. 2). Milward and Provan (2000a), however, have a simpler definition, according to which governance is an arrangement of rules and relationships in such a way that fosters collective action. Yet Rhodes (1996) defines the concept merely as the new way of governing the society through which the meaning of government changes as well. Accordingly governance is not different from government in its results, but only in the way they are achieved (Stoker, 1998). Whatever the approach, the governance term indicates a new way of delivering public services and addressing public issues through a collective action of multiple actors from different sectors and levels of government.

In light of the above-mentioned definitions, several tenets arise in regard to the term governance. First of all, when governance is analyzed in terms of the *actors* perspective, it appears that it covers the range of different levels of government, namely tribal, local, state, and

federal governments, as well as different sectors, namely public, non-profit and for-profit organizations, including ordinary citizens (Klitgaard & Treverton, 2004). In this regard, variety of actors is not a hindrance but an advantage for the overall process, since it also means variety of perspectives and solutions for public/social problems. Second, when governance is analyzed in terms of the *structure* perspective, it presents a more decentralized and non-hierarchical approach with specific emphasis on the autonomy of stakeholders involved (Kamarck, 2003; Kettl, 2005). The horizontal and egalitarian relationships without traditional command and control and top-down arrangements are the main characteristics of the governance structure (Abramson, Breul, & Kamensky, 2006; Agranoff, 2006). Third, when governance is examined in terms of the *focus* perspective, it appears that the term puts emphasis on the processes rather than actors or structure. In a sense, the main questions is "how?" rather than "who?" or "what?" Accordingly, inter-organizational, cross-sector and inter-governmental relationships are crucial (Sehested, 2003) to determine the way an issue is being addressed and which tools will be developed to deliver specific service (Salamon, 2002). Fourth, when governance term is analyzed in terms of the *process* perspective, it may take several forms of collaboration ranging on a continuum from traditional cooperation and coordination mechanisms to networks and partnerships (Kamensky, Burlin, & Abramson, 2004). Based on the organizational goals and preferences, and, thus, on level of commitment the process may be less simple and more informal for the former, and more complex and more formal for the latter end of the continuum. Fifth, when governance is analyzed in terms of the end *product* perspective, it appears that the term entails an end product of a collective action of several actors rather than a single organization or agency. Again, as Stoker (1998) notes, it is not the end result that changes but the

way it is delivered when governance is concerned. Sixth, when governance is examined in terms of the *tools* perspective, several service delivery tools of collective and distributed action appear to be mostly related. In this regard, Salamon (2002) identifies thirteen tools a government can utilize to deliver its services based on the governance approach: direct government, social regulation, economic regulation, contracting, grants, direct loans, loan guarantees, insurance, tax expenditures, fees/charges, liability law, government corporations, and vouchers. The main tenet of the governance's tools perspective is that the public services are or may be delivered through multiple sources of different sectors and levels of government (Abramson, Breul, & Kamensky, 2006). Seventh, when governance is considered in terms of the *skills* perspective, Salamon's (2002) approach is of great importance. Salamon (2002) argues that governance emphasizes enablement skills as opposed to management skills in previous paradigms. In other words, having multiple actors and relationships requires facilitation and fostering of inter-organizational activities and operations for a more seamless and effective delivery of services. It is how relationships are formed, developed and monitored, thus, that is more important when governance is considered. Eighth, when governance is considered in terms of the *decision-making* perspective, it offers a balanced and egalitarian approach. In other words, decision-making in governance is shared, inclusive, and democratic (Abramson, Breul, & Kamensky, 2006). This is especially true because of the fact that governance is characterized by horizontal relationships. Ninth, when governance is analyzed in terms of *performance evaluation*, it is clear that the term suffers from having everything shared. In other words, performance evaluation in governance is often impossible and ineffective because it focuses on broader impacts and results (outcomes) rather than on specific outputs. This issue leads us to the last issue related to

governance, namely *accountability*, which reveals problematic sides of the concept. Specifically, due to the fact that service delivery is provided mainly through a collective action, accountability is shared. Nevertheless, this appears as a weakness because of the lack of effective tools to correct system-wide errors because no specific agency or organization is totally responsible for the end result or sometimes due to the unclear roles (Sehested, 2003).

Overall, in today's age when traditional tools and methods of public administration have become obsolete due to ever-changing social, economic and political conditions and demands of the citizens, governance stands as a temporary panacea. It is clear and already accepted by many scholars and in practice that hierarchical, rigid and centralized structures of traditional government are ineffective to solve societal problems (Bier, 2006; Carley & Lin, 1997). Therefore, a shift toward governance tools and methods is inevitable.

In this regard, one of the most important concepts closely related to what governance term represents is the concept of collaboration. Collaboration is deemed as a tool to deliver better services in public sphere (Klitgaard & Treverton, 2004). The tool mainly focuses on joint efforts, resources and decision-making to produce a common product (Kamensky, Burlin, & Abramson, 2004). Collaboration, though, may have different forms depending on the level of commitment, organizational preferences, structural restraints, and/or contextual factors. For instance, while cooperation might be enough to accomplish certain knowledge-based initiative, large-scale, long-run and relatively formal engagements through combining resources and information exchange may be only effective and viable through collaborative partnerships and networks (Agranoff,

2006). In this regard, the level at which organizations will collaborate is basically the result of organizational capacity and goal assessment by respective entities.

One of the most widely used forms of governance is network governance or collaboration through networks. They allow for coordination of social action and management of inter-organizational links (Rhodes, 1996). They are human and non-human entities (Kapucu, 2009) "connected in ways that facilitate achievement of a common goal" (Provan, Fish, & Sydow, 2007, p. 482). The main rationale behind utilization of networks for service delivery has been the fact that organizations are inter-dependent actors whose results depend on the results of the others – no single organization is capable of achieving its goal without collaborating with others (Bingham, O'Leary, & Carlson, 2008; Kapucu, 2006; Klijn & Koppenjan, 2000). Rhodes (1996) states that networks are autonomous and self-organizing arrangements of interdependent actors from different sectors and levels of government with continuing interactions rooted in trust and regulated by rules and norms agreed upon by respective network actors.

In practice networks may be formal (Milward & Provan, 2006) or informal (Bardach, 2001). However, Keast et al. (2004) focus only on the formal side of the networks and argue that network is an arrangement of interdependent inter-organizational relationships that are formalized through a form of coordination to achieve each actor's own goal. Kilduff and Tsai (2003) take the same approach and assume networks are goal-oriented inter-organizational arrangements formalized and governed by an agreement among network participants. In other words, it is a matter of organizational commitment to the overall process that determines the

level of formality/informality of networks as well as the level of interdependency and responsibility (Kamensky, Burlin, & Abramson, 2004).

The literature identifies several types of networks. Brown and Keast (2003) identify three types of network, namely cooperative, coordinative, and collaborative. *Cooperative* networks entail establishment of usually informal and short-run inter-organizational relationships to share information or space with no effort to create a unified goal for direction. Accordingly, such networks comprise organizations that remain relatively autonomous and independent but still take into consideration what others in the network do. In addition, such network is considered a low-risk and less strategic approach at the lower levels of organizations. *Coordinative* networks, on the other hand, are established when organizations come together with strategies for information sharing, joint planning and decision-making, and collective action. While being still separate entities, organizations in coordinative networks agree on a set of rules regulating their actions, thus, losing some autonomy. In addition, due to the increased shared risks and benefits, the representatives of the organizations would be usually higher-level personnel. Lastly, *collaborative* networks are characterized by more formal and long-term inter-organizational relationships with comprehensive and multi-level planning and clear communication channels directed towards achieving a common goal. Such networks entail high risk and require comprehensive commitment with an understanding that each single network participant is not autonomous but a part of the general and common mission (Brown & Keast, 2003).

Agranoff (2004), on the other hand, specifies four types of inter-organizational networks, namely, informational, developmental, outreach, and action. *Informational* networks entail

exchange of policies, programs or technologies via voluntary participation. Exploration of possible solutions and actions without formal decision-making process is the main purpose of such networks. *Developmental* networks, on the other hand, entail exchange of information and technical tools with the purpose to increase internal organizational capacity to solve certain problems. Having more of a steering role, developmental networks comprise organizations that rely on other organizations' capacity to implement their own strategies. *Outreach* networks in turn is a more elaborate form of the former two networks, thus, focusing not only on information and technologies exchange, but also on enlarging access and resource opportunities with the ultimate goal of designing new programs of action. As in previous forms, this type of network does not envision collective and interdependent action, but leaves the decision to implement to organization themselves. Lastly, the *action* networks entail inter-organizational arrangements to implement a joint and formal course of action to deliver specific service. Being the most comprehensive way of collaboration among network participants, the action network envisions shared decision-making as well as accountability for the end results (Agranoff, 2004).

2.2. Networks in Emergency Management

Network governance is of crucial importance in many fields of the realm of public affairs. One of such fields is emergency and disaster management, for which networks are crucial to obtain necessary resources, information or capital during disasters and emergencies characterized by time pressure, uncertainty and complexity. Over the last decades, emergency management has specifically focused on collaborative practices. It has become an inevitable, let alone indispensible, method to tackle complex disasters and extreme events (Waugh & Streib,

2006). The main goal of collaborative emergency management is to combine and coordinate resources, human capital, efforts and decision-making to produce a more unified and effective action in a timely manner.

It is for these field-related time and resources sensitivities that inter-governmental, inter-sector and inter-jurisdictional networks are imperative to provide for better and more effective disaster and emergency management. Disasters like September 11 and Hurricane Katrina proved the failure of the traditional approach to emergency management (Kettl, 1997; Ward & Wamsley, 2007). One of the critical reasons for the above-mentioned failures has been insufficient organizational capacity, lack of flexibility, and unprepared organizations responsible for emergency response operations (Farazmand, 2007; Government Accountability Office, 2008; Kapucu & Van Wart, 2006). This has led to the need to revise existing emergency management tools and approaches, and to focus on collaborative practices, namely networks. Chisholm (1989) argues that informal networks are more important than formal and traditional structures in terms of producing end results, more specifically in terms of acquisition of necessary resources, efforts, information, and capital.

On the other hand, establishing, developing, managing and maintaining networks is especially critical due to the nature of emergency management, because disasters are mostly unforeseen and uncontrollable, thus, requiring constant and uninterrupted collaboration of agencies responsible for managing the emergencies. One should also note that such collaborative networks are created and developed differently. The way a network is shaped determines the nature of the network, which in turn impacts overall network success. Therefore, it is important

to focus on the initial conditions and predictors, namely on the factors playing role at the stage of network formation and development. The following section covers these aspects of networks and seeks to explore the dynamics behind network formation, development, and sustainability.

2.3. Network Formation, Development, and Sustainability

Networks are dynamics structures, which necessitates their analysis in terms of several stages. This section elaborates on network dynamics with the focus on network formation, development, and sustainability.

2.3.1. Network Formation

Networks are affected by several factors in the stage of formation. Bryson, Crosby and Stone (2006) argue that collaborations are formed based on environmental, market and antecedent factors. Among the environmental reasons for collaboration are the tendencies to minimize transactional costs (Williamson, 1975), minimize organizational dependence on other organizations in terms of resources (Pfeffer & Salancik, 1978), decrease environmental uncertainty and increase organizational stability (Gulati & Gargiulo, 1999). There are institutional (such as normative, legal, and regulatory factors) as well as competitive pressures (such as economic policies) that affect how collaborations would be structured and managed. Market forces, on the other hand, are argued to be some kind of sector failure, which triggers collaborative practices (Keast, Mandell, Brown, & Woolcock, 2004). If certain services are delivered inefficiently and/or ineffectively by specific sector, thus, collaborative networks emerge to correct the situation. Lastly, antecedent forces include previous collaborative

experience, agreement on problem definition, and some kind of brokering actors that foster address of a specific community problem (Bryson, Crosby, & Stone, 2006).

While network research has not produced an all-encompassing and inclusive network theory to explain why and how networks emerge, several interdisciplinary theories have contributed to the overall explanation on the topic. One of the most prevalent ones is the *social exchange* theory, which posits that organizations would form collaborative networks with the anticipation of mutually reinforcing benefits, either material or non-material (Cook, 1977). *Resource dependency* theory, on the other hand, states that organizations engage in networks to secure external resources not available to them (Pfeffer & Salancik, 1978). Such an approach is also important to create stability in terms of planning, resources and operations (Oliver, 1990). In turn, such relationships create power relationships that are not always balanced (Huxham, 2003). Yet *transaction costs* theory posits that organizations establish networks to minimize their costs through pooled expertise and trust (Graddy & Chen, 2006; Williamson, 1975). Of specific importance is Simon's (1991) theory of *bounded rationality* that stresses the inability of one single actor to have complete and perfect information for decision-making, thus emphasizing dependence and reliance on external sources of information. In addition, the *institutional theory* stresses the importance of legitimacy for organizations; thus, organizations become part of a network to gain approval of others as well as to replicate best practices and minimize uncertainties (DiMaggio & Powell, 1983). Whatever the approach, the theories attempting to explain the reasons of inter-organizational networks formation fall into the broader spectrum of *open systems* theory, which states that organizations are entities that would look for external sources of capital, resources and information for survival (Scott, 2003). The theory, thus, focuses

on boundary-spanning inter-organizational activities (Williams, 2002) that lead to organizational survival and more effective/efficient end results. Oliver (1990) summarizes above-mentioned tenets of inter-organizational networks in the form of six predictive contingencies for relationships formation, namely necessity (to meet certain regulatory or legal norms imposed by a higher authority), asymmetry (to impose power over others especially in terms of resources and information), reciprocity (to pursue mutually beneficial goals), efficiency (to reduce costs and to maximize benefits), stability (to reduce uncertainty and to increase predictability), and legitimacy (to justify organizational existence and actions).

Keast et al. (2004) distinguish between the concepts related to networks, namely *networking*, *networks*, and *network structures*. Accordingly, networking is a general term used to express inter-actor linkages for specific purposes via meetings or technology-based communications. These linkages are essentially informal in nature. Such relationships turn into networks only if the linkages are formalized among the actors. The formalization, in this regard, is an attempt or relational arrangement to address issues in a more coordinated and rule-based way. However, network in this sense is merely a set of interdependent though autonomous actors. Their relationships become a network structure when they rearrange their relationships into a collective action of participants, each contributing its own piece to the overall picture. Therefore, a network structure is characterized by "a broad mission and joint, strategically interdependent action" (Keast, Mandell, Brown, & Woolcock, 2004, p. 364).

2.3.2. Network Development

One of the main characteristics of inter-organizational networks is its dynamic nature. Provan and Kenis (2007) argue that networks are subject to evolution and are inherently flexible; when there is a discrepancy between the governance form and critical contingencies like trust or size of the network, it is necessary to adjust the network components. Dynamism is an inherent characteristic of networks, to paraphrase (Gulati & Gargiulo, 1999). The extent to which network structure is adjustable, though, depends mostly on the level of formalization of the network governance. In other words, the more formalized the structure, the more inertia there would be against change. In a sense, the "change from one form of governance to another is predictable, depending on which form is already in place" (Provan & Kenis, 2007, p. 246).

Bryson Crosby and Stone (2006) consider the stage of development in networks as a broader set of structural and operational adjustments comprising three elements, namely 1) process, 2) structure and governance, and 3) contingencies and constraints. The process element consists of forging agreements (getting more formalized); building leadership (establishing authority to guide the network); building legitimacy (establishing mutual acceptance and rationale for existence); building trust (establishing goodwill, mutual acceptance and understanding); managing conflict (attempts to make everybody happy), and planning (setting deliberate/emergent goals and actions). The structure and governance element, on the other hand, consists of structural, managerial and administrative part of networks. The authors argue that due to ever-changing membership, expectations, and size, the network will adjust to the newer forms of governance to maintain effectiveness/efficiency and account for changing power relationships

(Provan & Kenis, 2007). Lastly, the contingencies and constraints include the factors related to the way institutional preferences, types of service delivery, and power imbalances are managed to provide an all-encompassing and all-inclusive network process (Bryson, Crosby, & Stone, 2006). While the stages mentioned above are related to how networks are developed and managed, they inevitably and quite naturally overlap with the initial as well as further stages of network governance. In addition, due to more complex and multi-faceted goals and environments networks are utilized in today, simultaneous as well as mixed modes of network governance structures and processes. Accordingly, network participants may limit their involvement to networking (cooperation), expand formalization to the level of network (coordination), and end up creating a network structure (collaboration) (Brown & Keast, 2003). The great part of network development process and format, thus, is a matter of initial conditions, namely values, norms, expectations, goals and contingency factors (Brown, Potoski, & Van Slyke, 2006). Inevitably, this also means that the governance structure, or more specifically, how the network was formed and developed, affects and/or determines the lifespan of the collaboration as well as its success. Network stability and sustainability is crucial to benefit from long-term, effective and efficient results, which is discussed in the following section.

2.3.3. Network Sustainability

Network relationships are meaningful to the extent they are maintained over time. Network sustainability, thus, plays an important role in emergency management, which can affect the overall performance of network actors (Weber, 2003). Because inter-organizational network actors are mostly geographically dispersed, and operate in different settings and time,

thus, having non-rigid and less formal structures, it is imperative to invest into development and maintenance of networks for the purposes of establishing a common culture, values and norms (Trotter, Briody, Sengir, & Meerwarth, 2008). According to Gillespie et al. (1993), networks are effective to the extent network relationships are maintained over time through good inter-personal relationships and existence of agenda to be addressed. This study assumes the same: networks are developed and utilized to the extent the actors maintain their relationships, either formally or informally.

This study takes Wind's (2005) definition of network sustainability as the main definition to guide the study. Accordingly, network sustainability means that "network continues to function until it achieves its goals, or until its members are no longer willing or able to continue, or until it becomes irrelevant" (p. 7). Therefore, the main tenet of network sustainability is the continuation of network activities without interruption to achieve the goal at hand. Wind (2005) analyzes the concept of network sustainability in terms of four dimensions, namely time, resources, relationships, and relevance. The time dimension is related to network life-span, time frame for network establishment, and the evolution and development of networks, and the author argues that these factors will largely depend on the purpose of networks as well as on the quality of relationships among network participants. The resources dimension is related to the idea that networks are structures requiring financial input for existence, thus, for their sustainability. This, in turn, will depend on the level of commitment the network participants show. The relationships dimension is related to the idea that network relationships are dynamic and flexible, thus, requiring adjustments when membership changes. However, the quality of the relationships is more important than the quantity, the author argues. Lastly, the relevance dimension indicates

that networks need to have a clear issue to address as well as solidarity about what should be done to achieve network goals. In addition, networks should be relevant to participants' goals and stakeholders' needs in order to be sustainable (Wind, 2005).

Agranoff (2006) argues that sustained collaborative networks are an advantage that should be utilized effectively despite flexibility and adaptability of networks that poses threat to network stability. The key to network sustainability, according to author, is performance, which in turn is dependent on whether network activities add public value (Bryson, Crosby, & Stone, 2006). In this regard, network sustainability is a function of adding public value both to internal and external stakeholders so that administrative efforts for collaboration are not undermined. The author also points to the importance of 'champions' in networks who are powerful and prestigious members capable of organizing and sustaining the network (Agranoff, 2006).

Agranoff and McGuire (2001) argue that networks are sustainable only if network managers use managerial techniques to frame and synthesize network activities. Their primary goal of framing is to shape or re-establish values, norms and perceptions of network participants, while synthesizing targets at "creating the environment and enhancing the conditions for favorable, productive interaction among network participants" (Agranoff & McGuire, 2001, pp. 299-300). Such an approach would help integrate all parts of a network into a meaningful whole with more effective and more efficient address of the issues at hand.

As stated previously, Bryson, Crosby and Stone (2006), on the other hand, focus on environmental factors affecting network sustainability. The authors argue that networks are subject to driving as well as constraining institutional and competitive forces that test capacity

and strength of the network. However, the authors argue that institutional forces (like funding, internal support, etc.) are more important than competitive forces in determining the level and the life-span of networks. In addition, being prepared to membership changes and turnover increases sustainability of collaborative networks (Agranoff & McGuire, 2001). The change in leadership or a drop-out of an important actor is factors that might be detrimental if network participants are caught unprepared. The authors also argue that service delivery partnerships are easier and more sustainable when compared to network collaborations aimed at system-level changes and reforms. Lastly, networks that are more resilient to failures and are capable of adaptation tend to be more sustainable (Bryson, Crosby, & Stone, 2006).

In light of Wind's (2005) definition, this study views network sustainability as an ability and capacity of network actors to maintain their relationships, whether formally or informally, over extended period of time. In other words, the concept of network sustainability in this study primarily focuses on the continuous and non-interrupted network activities adjusted and strengthened over time. While there are several internal and external factors affecting the extent to which networks would be stabilized and sustained over time (Bryson, Crosby, & Stone, 2006), this study specifically analyzes the impact of organizational goals, technology utilization, and inter-organizational trust on the collaborative network sustainability. The following sections elaborate on these factors in more detail.

2.4. Organizational Goal Convergence

When inter-organizational collaboration is considered, the extent to which organizations are tied around a common goal plays an important role in determining the route of their

relationships. As a general rule, organizations that have common background, similar goals and analogous tools to reach those goals are relatively more prone to initiate and sustain collaborative practices. The main reason for this, according to literature, is that similar-goal organizations tend to increase efficiency by utilizing multiple sources of resources, information and capital. This notion is similar to what Provan and Kenis (2007) specifically mention as "goal-directed" collaborative networks that are purposefully created to serve specific community goal. Goal consensus, thus, plays an important role in determining the effectiveness of the collaborative networks. In addition, relationships with the like organizations are less burdensome due to smaller gaps in terms of organizational culture, values and norms when compared to organizations from different domains and backgrounds. Therefore, organizations that have more in common would have stronger consensus around issues constituting the cornerstones of those organizations. Such a consensus is generally characterized by common understanding of the problems at hand as well as by relatively similar tools and approaches to those very problems.

The general trend in the literature, thus, is that the more similar organizations in terms of their organizational missions, goals and objectives, the more possibility there is for a collaboration to be initiated and sustained over time (Rivera, Soderstrom, & Uzzi, 2010). The main term describing the concept is goal convergence/divergence, which specifies to what extent organizations are tied around similar/different organizational goals with the purpose to serve the community. Bryson, Crosby, and Stone (2006) state that organizations should pay attention to the planning process, which should identify and delineate the goals as well as the roles and responsibilities of the stakeholders of the collaborative process. It is, therefore, imperative for any collaborative network to focus on the relationships of organically similar organizations that

would bring about more efficiency and result in more effectiveness. Considering that "collaborative ties between actors with complementary attributes are often short term" (Rivera, Soderstrom, & Uzzi, 2010, p. 97), it is imperative to focus on more homogenous relationships with the purpose to increase network sustainability.

Based on the literature review, this study assumes that organizational goal divergence is one of the factors that would impede collaborative network relationships across time; conversely goal convergence would help organizations sustain longer relationships for more efficient and more effective results. Accordingly, the following hypothesis is derived to be tested in this study:

H_1: Organizational Goal Convergence (OGC) is positively associated with network sustainability.

2.5. Information-Communication Technology Utilization

The use of technology is, first of all, indispensible, and secondly, inevitable part of collaborative networks. Due to the information age we experience (Snow, Lipnack, & Stamps, 1999) and the technological innovations in communication (Mowshowitz, 1997), technology has become part of day-to-day practices across all organizations. The use of information and communication technologies (ICT) has a special importance to mobilize, enable and manage collective/collaborative action to achieve common goals through a more unified and solidarity-based approach (Cooper, Bryer, & Meek, 2006).

The use of technology for collaborative approaches is a concept closely related to the concept of 'virtual organizations' and/or 'virtual teams (Snow, Lipnack, & Stamps, 1999), which

envisions reliance on information and communication technologies to achieve network goals. In other words, virtual teams or networks are effective to the extent they overcome time/temporal, location/geographic and organizational boundaries – all of which are solved through the use of ICTs. Thus, DeMarie (2000) argues, "availability of technologies such as e-mail, common network platforms, telephone conferencing, and videoconferencing now make feasible the effective collaboration of workers in disparate locations" (p. 3). Burckhardt and Brass (1990) argue that technology is a tool to change the structure of networks. More specifically, information and communication technologies increase participants' power through more central positions in the network, and, thus change the patterns of relationships and hierarchy.

Technology-based communication contributes to the effectiveness of collaborative practices through minimization of costs, increased efficiency, flexibility in and rapidness of decision-making process (den Hengst & Sol, 2001; Walsh & Maloney, 2003). Especially due to the fact the network organizations are most of the times geographically dispersed, reliance on information and communication technologies helps to overcome hierarchical barriers, bureaucratic red-tape and to enhance horizontal relationships (Kelly & Stark, 2002).

Agranoff (2006) argues that network sustainability is fostered by collaborative practices utilizing electronic decision-making tools, which is a benefit and a public value for all participants and stakeholders of the network. Ahuja and Carley (1999) also point to the importance of information exchange and communication through the use of technology for the overall stability and sustainability of networks.

In the specific context of emergency management networks, the use of technology is specifically important for communication and information exchange purposes (Dawes & Eglene, 2004). Overcoming such barriers is highly important during emergency situations due to complexity of situation and limited time for decision-making (Haynes, Schafer, & Carroll, 2007). Comfort (2007) argues that without "a well-defined, functioning information infrastructure supported by appropriate technology, the collective response of a community exposed to serious threat will fail" (p. 197).

In light of the literature review, this study assumes that technology use facilitates the use of networks and collaborative practices. In other words, collaborative networks are more sustainable if and when network participants utilize ICT with the purpose of coordination and streamlining their shared activities. Accordingly, the following hypothesis is derived to be tested in this study:

H_2: Information-Communication Technology (ICT) utilization is positively associated with network sustainability.

2.6. Inter-Organizational Networks and Trust

Trust has been considered a dimension of social capital in the literature, and has been generally analyzed at individual level (Coleman, 1988; Cox, 1997; Lemmel, 2001; Putnam, 1993; Putnam, 2000). Intra-organizational ties are often analyzed in terms of individual relationships, therefore. When collaborative network relationships are considered, however, it is mainly organizational-level representation that is important in terms of trust. While inter-

organizational trust is still a result of individuals representing those organizations, the concept is more related to an aggregate organizational identity. By this token, inter-organizational trust is a function of inter-personal relationships at the organizational level, which is characterized by certain previous experience with respective agencies (Kapucu, 2006a). In this regard, inter-organizational trust is considered a cornerstone of successful collaborative practices (Bryson, Crosby, & Stone, 2006).

Provan and Kenis (2007) also point to the fact that successful networked governance is based on several factors one of which is mutual trust. The authors argue that networked collaboration is effective to the extent trust is pervasive throughout the network. Katz and Lazer (2002) also claim that networks are of little help if trust has not become central to them. However, there should be put a distinction between trust developed before and during collaborative practices (Bryson, Crosby, & Stone, 2006). Previous experience is considered an advantage for future partnerships, while newly established relationships are characterized by low level of inter-organizational trust, which should be improved over time (Provan, Fish, & Sydow, 2007). While trust is also considered a prerequisite for network establishment (Lane & Bachmann, 1998), it is mainly the trust developed after network formation that matters. Development of trust through interaction and communication in the developmental stages of networks is essential for successful collaborative networks (Huxham, 2003).

Trust-building, however, is and should be an ongoing process nurturing relationships among network participants, which in turn results in longer, more effective and more productive results (Bryson, Crosby, & Stone, 2006). Das and Teng (1997) similarly argue that trust building

process eliminates pitfalls and hindrances stemming from diversity of actors – a reality of collaborative networks.

Dodgson (1993) suggests that trust is a must for the sustainability of network collaborations. Accordingly, the concept of inter-organizational trust includes the idea "that the relationship will necessarily be long-term. In order to jointly develop new products and processes, and to match tacit and firm-specific skills and knowledge, a long-term perspective is necessary. A long-term commitment allows for adaptability in objectives, and is conducive to learning" (p. 85). The author also states that trust is imperative to create a viable environment for communication, organizational learning and innovation.

Newell and Swan (2000) present defining characteristics and typology of inter-organizational trust in networked collaboration. According to them, there are three types of trust, namely *companion trust*, *competence trust*, and *commitment trust* (Newell & Swan, 2000). Companion trust is based on inter-personal friendship, and suggests that parties would engage in an open, honest, harmless and tolerant way. Such approach envisions a continuing and reciprocal communication and exchange of ideas. Competence trust is based on parties' perceptions about others' ability, capacity and competence to carry out a task/job pertaining to the collaborative and collective process. Thus kind of trust is mainly reliance on others' reputation and capacity to complete their own share of job. Commitment trust, on the other hand, is the idea that each party can feel comfortable to deliver their resources and efforts in anticipation of mutual benefits, which is also a more formalized approach to trust and is solidified through inter-organizational

contracts. This kind of trust is another way of saying that parties will with no doubt commit to deliver their share as specified in contracts (Newell & Swan, 2000).

Overall, thus, inter-organizational trust is considered a factor that positively contributes to collaborative network sustainability. This study assumes that network sustainability would be higher if collaborative network relationships are nurtured and developed by mutual trust and understanding. Collaborative networks without sufficient levels of trust are prone to dissolve the moment the goal is attained. Accordingly, the following hypothesis is derived to be tested in this study:

H_3: Inter-Organizational Trust (IOT) is positively associated with network sustainability.

In addition to above-mentioned three hypotheses, this study developed an assumption regarding the relative importance of the three factors in affecting network sustainability. Based specifically on the literature review that shows relatively more research on inter-organizational trust but less on organizational goal convergence and information-communication technology utilization, this study assumes that inter-organizational trust is the most significant factor to impact network sustainability. The least cited factor, on the other hand, was organizational goal convergence, which was assumed to be the least significant factor to impact network sustainability in the context of this study. Accordingly, the following assumption was developed to be tested in this study based on the findings:

Assumption: inter-organizational trust is the strongest factor to impact network sustainability, followed by information-communication technology utilization and organizational goal convergence.

2.7. Conceptual Framework and Study Hypotheses

Based on the literature review a conceptual framework was developed. The base of the framework is networked governance, in which inter-organizational and inter-governmental relationships are the main tenets of this study. The framework suggests that collaborative network sustainability is, along other possible factors not explained this study, a function of organizational goal divergence/convergence, the extent to which organizations utilize technology for the purposes of communication and coordination, and the inter-organizational trust. If organizational goals are considered in terms of convergence rather than divergence, all of the relationships are assumed to be positively directed. The Figure 1 below describes the assumed relationships between the concepts discussed above:

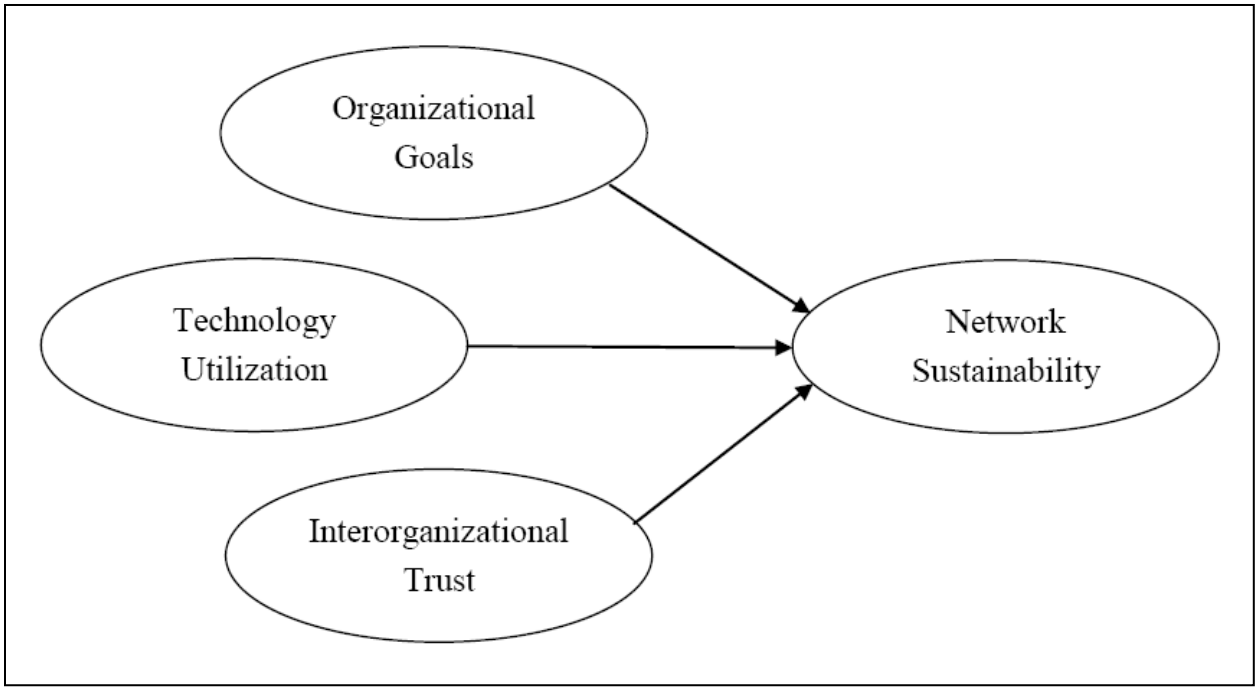

Figure 1: Conceptual Framework of the Study

The framework summarizes the study hypotheses enlisted below:

H_1: Organizational Goal Convergence (OGC) is positively associated with network sustainability.

H_2: Information-Communication Technology (ICT) utilization is positively associated network sustainability.

H_3: Inter-Organizational Trust (IOT) is positively associated with network sustainability.

According to the hypotheses, the sustainability of emergency management networks is assumed to be higher if organizational goals are similar (H_1), if organizations involved in the network utilize information-communication technologies (H_2), and if there is trust among those

organizations (H_3). In turn, the higher the network on these parameters, the more sustainable the network would be.

This chapter covered the review of literature related to the main constructs of the study, and presented related hypotheses to be tested through data analysis. Previous research suggests that organizational goal convergence, information-communication technology utilization, and inter-organizational trust are positively correlated with network sustainability. The following chapter discusses the context under which the study constructs will be discussed and analyzed.

CHAPTER 3. STUDY CONTEXT

This section provides the background of the study with the focus on the study context. Specifically, this chapter explains the emergency/disaster management system in the United States, and how the study goal fits into the overall picture of the system. The rationale behind conducting this study is explored in detail in this section.

3.1. Emergency Management in the United States

To understand the collaborative nature of emergency management in the United States today, it is essential to analyze the history of the emergency management field in last two centuries. The field of emergency management in the United States has undergone several stages of changes and reforms especially over the 20th century. The changes have been in several ways ranging from structural to managerial as well as policy and strategic issues. The main driving force of the respective reforms has been what Birkland (1997) calls the "focusing events" – major historic disasters that dramatically affect and shape public policies. These are the events of high magnitude and visibility, affecting communities in unusual times and locations.

Based on the changes in line with such focusing events, Rubin (2007) divides the history of emergency management in the United States into four stages. The main tenet of these developments is that there has been a gradual increase in Federal Government's involvement in emergency management. Overall, there was limited federal support and involvement in 19th century, and the only significant policy development was federal government's provision of support to the Portsmouth fire victims in New Hampshire in 1803 through a legislation approved

by the Congress. Through the rest of the century, it was mostly charity and local organizations that provided disaster relief. Disasters were mainly seen as the "acts of God" during this period, and such approach continued until early 20th century. The focusing event of this period such as Great Chicago Fire of 1871 and Johnstown Flood of 1889 continued during the first stage of Rubin's classification, namely between 1900 and 1927, which once again showed that local and charity organizations are not a panacea for devastating disasters on their own. The Galveston Hurricane of 1900 and the San Francisco Earthquake of 1906 were other triggers for change in approach by federal government. For example, the federal government chartered American National Red Cross in 1905 to provide humanitarian assistance to individuals and communities. In addition, the federal government was involved in some structural arrangements such as construction of dams and levees (Rubin, 2007).

The second stage covers the period between 1927 and 1950, which overlaps with Franklin D. Roosevelt's presidency. The federal government's involvement in disaster management increased dramatically during this period with national government being more responsive after the disasters (Butler, 2007). The main tenet of government's emergency management policy was that it was a national centralized approach with decentralized execution (Rubin, 2007). Specific attention was given to accumulation of scientific knowledge that would help minimize the impact of disasters.

The third stage covers the period between 1950 and 1978, during which federal government's visibility in emergency preparedness and response substantially increased. A series of legislation were passed in these years with the main purpose to put central government at the

core of emergency management. In 1950, two important laws were passed, namely the Federal Disaster Relief Act and the Civil Defense Act (Bea, 2007). The former was unique in that the national government became formally obliged to assist state and local communities in times of disaster including not only during response but also preparedness and recovery stages. This approach was hand-in-hand with the civil defense approach that was envisioned by the Civil Defense Act as a response to Cold War threats after the World War II. This dual policy was problematic in terms of having different agencies responding to overlapping problems. Meanwhile, the disaster relief specifically was provided by seven federal agencies, which mainly resulted in poor coordination efforts (Sylves, 2007). The Disaster Relief Act of 1974 put decision-making over disaster at the national level under the President's control. Efforts to overcome coordination problems ultimately resulted in creation of Federal Emergency Management Agency (FEMA) in 1979 under Jimmy Carter's presidency.

With the creation of FEMA at the end of 1970s the fourth stage of developments began. This period after 1979 is marked by creation of several agencies and laws that envisioned a more streamlined disaster relief with the focus on "all-hazard" approach in the disaster cycle comprising mitigation, preparedness, response and recovery (Sylves, 2007). Reforms continued with the Robert T. Stafford Disaster Relief and Emergency Assistance Act (also known as Stafford Act) of 1988 which specified the way federal government would assist state and local governments in responding to disasters. The Act required the FEMA director to prepare a Federal Response Plan (FRP) that would embody the implementation of the Stafford Act. The disasters of early 1990s, and more specifically the Hurricane Andrew of 1992, showed that disaster response is still far from effective. The Clinton Administration appointed James Lee

Witt as the new FEMA director and gave him a cabinet-level position. The rest of the 1990s was characterized by efforts to implement an all-hazard approach at the planning level, thus placing attention on disaster mitigation, which culminated in the Project Impact – an attempt to create resilient communities through partnership with private sector. These efforts were augmented by the Disaster Mitigation Act of 2000 under Bush Administration.

A completely new era began with the aftermath of the September 11, 2001 terrorist attacks on World Trade Center, which resulted in a series of reforms. The failure to prevent the event as well as to respond to it in an effective manner has been explained by the lack of coordinative and collaborative approach in emergency management. To overcome this problem, the Homeland Security Act of 2002 was passed, which resulted in creation of the Department of Homeland Security (DHS) in 2003 (Bullock, Haddow, & Coppola, 2005). The Act merged 22 federal agencies under the Department, and absorbed FEMA leaving it with limited budget and authority over emergency management policy (Sylves, 2007). These reforms also resulted in a new comprehensive National Response Plan (NRP) of 2003 that was codified in parallel with the National Incident Management System (NIMS) of 2004, the former of which entailed provision of framework, structure and mechanism of federal involvement in emergency management, and the latter of which provided a template for a collaborative response among different sectors and levels of government. The hurricane season of 2004 and 2005, and specifically the Hurricane Katrina of 2005 showed that the NRP and NIMS are still weak approaches to deal with disasters. The Post-Katrina Emergency Management Reform Act of 2006 was an attempt to revitalize FEMA and praise its overlooked role in disaster management. The last comparatively substantial reform came with the National Response Framework (NRF) that replaced NRP and placed

additional attention on collaboration and partnerships among different levels of government as well as different sectors and jurisdictions, provided a more detailed and comprehensive response framework, and expanded the network of responding organizations.

All of the historical reforms in the emergency management field described above mark a significant trend towards a more comprehensive, all-inclusive, responsive, and participatory approach that emphasizes a coordinated and unified action in response to disasters. In other words, there has been a gradual improvement in the way governments at all levels tackle with disasters with a major understanding that emergency management today has become an interdisciplinary, inter-governmental and inter-sector issue requiring attention and input from multiple actors (Kapucu, 2009). This trend is especially evident in the developments that occurred since 1990s when federal government started to embody emergency management principles and mechanisms through respective national-level plans. The following section analyzes evolution of emergency management approaches as embodied in the respective plans, namely Federal Response Plan (FRP), National Response Plan (NRP), and National Response Framework (NRF).

3.2. Historical Evolution of Collaborative Approach at the National Level

Collaborative practices and approach in the realm of emergency management in the United States is not an overnight invention. It took several decades before the federal government realized a strong need for not only coordination of but also collaboration among organizations responsible for disaster response and recovery. The government's embrace of respective changes is most evident in creation of nation-level plans that formalized the attempts

to bring about more effective emergency management practices through collaboration. While some efforts before 1990s have also contributed to the overall picture today, it is mostly the initiative starting with the creation of the Federal Response Plan (FRP) in early 1990s that resulted in paradigmatic changes in the field.

3.2.1. Federal Response Plan (FRP)

Over years, it has become clear that traditional emergency management approaches characterized by rigidity, bureaucratic red-tape and top-down management are no longer effective in today's conditions. The need for change was felt and acknowledged back in 1990s when Federal Response Plan (FRP) was created to address these problems. The Plan was mainly created to implement the Stafford Act, especially after the problematic experience with the Hurricane Hugo in 1989. The FRP was created as a solution to tackle disasters of national significance, during which local and state capacity and capabilities become exhausted and overwhelmed. It envisioned involvement of several federal-level agencies and delivery of federal assistance to state and local communities to cope with devastating disasters (FEMA, 1992).

The plan consisted of main concepts, policies and principles for coordinated action, and comprised 12 Emergency Support Functions (ESF) specifying roles and responsibilities of respective federal bodies in disaster. The ESF-based system is a structural, relational and functional arrangement of resources and capabilities of agencies with the purpose to increase efficiency and effectiveness of emergency response and recovery system. Thus, the agencies responsible for law enforcement, for example, are classified under one ESF, while those responsible for mass care or transportation would be grouped under different ESF. Both primary

and support agencies were specified for related ESFs under the FRP, with primary agencies being the coordinator of operations pertaining to its ESF.

The FRP also envisioned an all-hazard approach, which entailed unifying different plans into one so that all disasters and emergencies, regardless of time, place, scope and type of disasters, are tackled with through one single perspective. The main purpose of the plan was to set a systematic and coordinated inter-agency and inter-governmental action to effectively deliver federal assistance to the affected communities. The implementation of the FRP was dependent on the President's declaration of a disaster as a national disaster. The first test of the FRP was the Hurricane Andrew of 1992, during which the federal government failed to properly respond to the disaster. The plan was updated in 1997 to add the Terrorism Incident Annex, and in 1999, which was latest version to direct the response operations after the September 11, 2001 terrorist attacks. The FRP was revised in the aftermath of the attacks to incorporate several previous and interim plans to provide a unified, inter-disciplinary and all-hazard approach in regard to prevention, preparedness, response, and recovery stages of the emergency management, which resulted in the creation of the National Response Plan (NRP) of the 2004.

3.2.2. National Response Plan (NRP)

The National Response Plan (NRP) was mainly a reaction to the failures under the FRP during the September 2001 terrorist attacks. While the main focus of the FRP was coordination, the main focus of the NRP was coordination, collaboration, and communication. The NRP emphasized the need for the single comprehensive national emergency and disaster management approach around mitigation/prevention, preparedness, response and recovery, which would

ensure that all levels of government, representatives of different sectors as well as other stakeholders work together. The plan also envisioned a unified approach to crisis and consequence management; integrated DHS components like critical infrastructure protection; and, provided a mechanism of clearer communication among all stakeholders. The NRP was based on existing plans (Federal Response Plan, National Contingency Plan, etc.) and described how federal assistance would supplement, not replace, the state and local efforts.

Being an all-hazard and all-discipline approach to emergency management, the NRP consisted of 15 ESFs the main coordinator of which was the DHS, as opposed to 12 ESFs under the FRP which were coordinated by FEMA. The transformation resulted in increased number of ESFs and agencies as well as complexity of interactions among agencies involved. One of the most important changes was inclusion of voluntary and nonprofit organizations within the national framework, thus, emphasizing their role in emergency management. Accordingly, the National Voluntary Organizations Active in Disaster (NVOAD) – a national coalition of voluntary sector organizations created in 1970 to coordinate activities of nonprofit organizations in times of disasters – was given a primary role under the NRP to provide support to the affected communities. The NVOAD, along with the American Red Cross (ARC), are expected to collaborate with emergency responders to provide physical and emotional aid before, during, and after disasters when other resources are not available.

The NRP also introduced National Incident Management System (NIMS) to ensure that inter-agency emergency response is compatible, standard and applicable to all settings based on a common incident management template. While the NRP was a renewed plan with hopes to

tackle inter-agency coordination and collaboration problems, the hurricane seasons of 2004 and 2005 showed that the national emergency management systems is still problematic. The Hurricane Katrina of 2005 was the culmination point of the failures of the NRP, which set substantive reason to reform the plan for more effective results. The changes in the following years brought about the National Response Framework (NRF) in 2008.

3.2.3. National Response Framework (NRF)

The Hurricane Katrina played a consequential role to show the need for a more effective policy for dealing with disasters. The National Response Framework (NRF) of 2008 was the result of such attempts, which established a more comprehensive plan with enhanced emphasis on collaboration and partnerships. While the FRP and NRP focused on better alignment of inter-governmental relationships and practices, the NRF focused on enhanced partnerships among organizations from different sectors and levels of government, as well as citizens (Kapucu, 2009).

With further agencies added to the overall response framework, the NRF today proposes an integrated cross-sector, inter-governmental and citizens-based approach covering a wide range of disasters with improved and more systematic planning, capacity, coordination mechanisms and decision-making tools. The NRF in practice, however, is expected to work along with National Incident Management System (NIMS), which was established based on the FRP and NRP as a template to deal with disasters. In other words, the NRF is a plan, while NIMS is a template describing how to implement that plan. The NRF today has also 15 ESFs that

delineate roles and responsibilities of federal-level agencies; it is a model for state and local governments to structure their emergency management systems (DHS, 2008).

Because disasters are mostly local, and since it is mostly local governments that are responsible for preparing for, responding to and recovering from disasters (Kapucu, 2009), it is imperative that local governments act in line with the NRF and NIMS for better local disaster management approach. The main understanding behind the changes and adjustments in the above-mentioned policy documents was to advocate for better inter-governmental and cross-sector collaborations to minimize the single-agency burden and increase effectiveness and efficiency. In a sense, the NRF proposes a networked approach to disaster management. Thus, each local government is expected to coordinate the network of local private and nonprofit organizations as well as of individual citizens if/when an emergency strikes. The practice across the United States today shows that it is mainly county and city governments that establish and coordinate emergency management networks during disasters. Since this study focuses on county emergency management organizations, appropriate structure will be analyzed.

3.3. National Incident Management System (NIMS)

When the National Response Plan (NRP) was created and accepted, the federal government put forward additional requirements for stakeholders at all levels of government. The Homeland Security Presidential Directive (HSPD)-5 titled *Management of Domestic Incidents* that came along with the creation of DHS, issued in 2004 a template – National Incident Management System (NIMS) – for more effective and efficient dealing with disasters. The goal of the NIMS is to provide "a consistent nationwide template to enable Federal, State,

tribal, and local governments, nongovernmental organizations (NGOs), and the private sector to work together to prevent, protect against, respond to, recover from, and mitigate the effects of incidents, regardless of cause, size, location, or complexity" (DHS, 2008, p. i). Having been updated throughout the years after its introduction based on the best practices, previous failures and lessons learned, the NIMS today is a document clarifying the roles of all stakeholders in a disaster, explaining the main concepts, fundamentals and terminology of emergency management and incident command, and tying these principles to the National Response Framework (NRF). It is a set of concepts and common understanding in the form of all-hazards approach with the purpose of more effective, efficient, coordinated, unified, and collaborative incident/disaster management. The adoption of NIMS by all levels of government has been also set as a requisite in order to get disaster preparedness assistance from the federal government in the form of grants, resources, agreements, and other initiatives.

The NIMS mainly fosters two ideas of flexibility and standardization (DHS, 2008). The former envisions promotion of guidelines and principles that can be utilized for disaster preparedness and response for a variety of incidents, while the latter emphasizes the importance of having a standard operational structure that would enhance coordination and collaboration (Lester & Krejci, 2007). In addition, NIMS specifies five components that should be taken as criteria for effective incident management system. The first component is *preparedness*, which stresses developing maximum local intra-organizational and inter-organizational capacity to tackle with disasters. All of the stakeholders are also expected to integrate the NIMS principles into their organizational incident management systems. The second component is *communications and information management*, which entails creation of specialized technology

and structures for a unified approach during incidents. Specific emphasis is put on such concepts as inter-operability, scalability, resiliency, portability, and redundancy of communication mechanisms to ensure enhanced and sophisticated information communication and management in times of emergencies. The third component of the NIMS is *resource management*, which specifies how resources including personnel, facilities, equipment, supplies, and finances would be managed during incidents. This component clarifies all steps to be taken to ensure required resources are properly requested, distributed, tracked, and reimbursed. The fourth component is *command and management*, which envisions flexible and standardized incident management structure to ensure effective and efficient preparedness and response to the incidents. This component is based on three legs, namely Incident Command System (ICS), multiagency coordination systems (MACS), and public information. The last component of the NIMS, namely *ongoing management and maintenance*, includes the sub-components of National Integration Center (NIC) and supporting technologies. While the former is a body overseeing the implementation and compliance with the NIMS requirements at federal, state and local levels, the latter intends to provide direction and strategic support to develop appropriate and up-to-date technological structures for effective incident management (DHS, 2008).

While NIMS is a template for managing emergencies, Incident Command System (ICS) added to NIMS is a mechanism of implementing the NIMS principles. The main goal of ICS is to provide an organizational incident management structure that would ensure efficient use of resources and coordinated action on the scene of incidents. The System is useful especially when multiple agencies are involved requiring coordinated planning, decision-making and implementation. The ICS is based on five fundamental elements, namely command (unified

command by a single commander), operations (operations to minimize damage and loss of lives as well as actions to control the situation and restore it back to normal), planning (dissemination of evaluated incident information to other branches as well as provision of direction for further steps to be taken), logistics (provision of services, transportation, personnel, facilities, resources, supplies, food to the scene of incident), and finance (compensation, contracts management, cost analysis, reimbursements, etc.) (DHS, 2008). Supported by the multiagency coordination system (MACS) under NIMS command and management branch, the ICS mainly envisions cross-functional collaboration with a relatively centralized and unified command and control through emergency operation centers (EOC) at the local level.

While ICS-supported NIMS was proposed as a panacea for coordination, communication and collaboration problems observed during the September 11, 2001 event, it was soon criticized for its inability to foster the change it envisioned. The Hurricane Katrina was a test for NIMS, which resulted in belated and poorly coordinated emergency response. Ward and Wamsley (2007) argue that NIMS was a failure due to the fact that NIMS-based formal structures were a hindrance for effective informal collaborations and networks historically developed at the local level, thus paralyzing existing local emergency response systems depriving them from "flexibility and adaptability in favor of a closed, highly structured, and rigid system" (p. 213). Lester and Krejci (2007), on the other hand, argue that NIMS itself is not problematic in nature; it is the lack of leadership and effective authority that was the main problem behind ineffective implementation of the System during Hurricane Katrina. Accordingly, "collaborative mechanisms were in place and NIMS has laid out some good technical goals, but the hard questions centering on leadership were avoided, thus providing a false sense of cooperation"

(Lester & Krejci, 2007, p. 86). Despite criticism, however, NIMS today, coupled with the NRF, stands as the main framework for federal, state and local governments as well as for-profit and nonprofit sectors to implement disaster prevention, mitigation, preparedness, and response operations in the most effective and efficient way (Kapucu, 2009). State and local governments, in turn, are the main stakeholders to benefit from the NIMS structure, which is discussed in the following sections.

3.4. States in Emergency Management in the United States

The characteristics of the United States' national government structure are reflected on all tiers of government. Emergency management is also among the fields that have replicated a mainly three-level structure, namely, federal, state and local. As stated in previous sections, the federal government is the main rule-maker regarding emergency management at the national level, whose principles, guidelines and actions are expected to be replicated and practiced at the lower levels of government. Having established the National Response Framework (NRF) supported by NIMS and ICS as the roadmap for state and local governments, the federal government provides necessary direction and resources especially for disaster preparedness purposes, and, when needed, to support response to disasters. The role of states in emergency management, in turn, is being the mediator between the local and federal governments (Cigler, 2009). In a sense, states are the coordinators of emergency management interactions and activities between national and local levels.

Cigler (2009) emphasizes four key roles of state governments within overall emergency management system. The first role encompasses states' activities that aim at facilitation of

disaster prevention/mitigation at the local level, especially through legislative and regulatory tools. States, in this regard, provide information as well as financial and administrative support to fiscally constrained local governments so that they pursue balanced mitigation strategies to minimize the effects of possible disasters. The second role of the states in emergency management is preparing public and respective local government leaders for possible disaster events. This is to be done through continuous education of related stakeholders about the risk they face and provision of direction to create resilient communities. The third role of the state governments is to facilitate capacity-building at the local government and community levels, and the fourth role is to shape the behavior of local governments towards correct implementation of emergency management principles. Accordingly, most of the states' roles lie within the realm of mitigation and capacity building of local governments and communities, which involves legal and financial issues (Cigler, 2009; Waugh, 1994).

In addition to their role before disasters, states are also important actors to coordinate local-national interaction during the disasters, especially during the response phase. The current system of emergency management in the United States basically relies on local capabilities (DHS, 2008). However, when local capacity and capabilities are exhausted, the local governments may request support from the state governments. The state government in turn, along with the regional FEMA office, assesses the impact, scope and severity of the disaster as well as the level of assistance required to tackle the incident, and decide whether the disaster is of national significance. The events of national significance may result in state-level declaration of "state of emergency," which is often followed by financial and technical support as well as assistance by National Guard of the respective state. In addition, the federal assistance is sought,

and if approved, the state government becomes the main coordinator of communication and operations between the federal and local levels of government (Waugh, 1994). The state is also responsible for coordination and implementation of inter-state agreements like Emergency Management Assistance Compact (EMAC) seeking support from other states when local capabilities are overwhelmed (Kapucu, Augustin, & Garayev, 2009).

An example of how state is generally involved in emergency management might be the mechanism employed by the State of Florida. Pursuant to Chapter 252 of the Florida Statutes, the State has a Comprehensive Emergency Management Plan (CEMP) that defines the roles and responsibilities of all levels of government as well as sectors and community in managing all types of disasters. Having a parallel structure with NRF and being NIMS-compliant, the CEMP incorporates ICS principles with the purpose to provide unified and coordinated response in times of disasters. The state emergency response team (SERT) that comprises organizations from different sectors and levels of government, in turn, is responsible for implementation of CEMP through the functional approach similar to one at the federal level. While the NRF has 15 emergency support functions (ESF), the Florida CEMP has 18 ESFs, each of which is headed by a primary state agency that works with the same ESF representatives at the federal and local levels. The state representative of specific ESF is the respective emergency coordination officer (ECO) who coordinates related activities at the state emergency operation center (EOC) activated during disasters. The state and federal assistance, in turn, is provided to impacted local communities through the SERT under the auspice of the state coordinating officer (SCO), on behalf of the State Governor. Depending on the severity and scope of the disasters, certain ESFs

may have greater role and responsibility than others, though the CEMP is always in effect (FDEM, 2010).

All in all, the state governments have a role of facilitation and coordination of interaction and activities between federal and local governments. This role is especially evident in times of disasters when local resources are exhausted and state and federal assistance is required. The way local emergency management is structured in the United States is explained in the next section.

3.5. Local Emergency Management

Local emergency management in the United States comprises mainly villages, towns, cities, parishes, boroughs, and counties. These governments have respective emergency management offices/departments responsible for incident management before, during, and after disasters. Local emergency management entities are generally responsible for guiding resource acquisition and allocation as well as coordination of those resources during emergencies. They are also the bodies responsible for coordination of inter-governmental relationships, mutual aid agreements, and inter-jurisdictional collaboration at the local level. In short, local governments are at the center in terms of emergency management responsibility, because all disasters are local and the first response is mostly local in nature (Cigler, 2009). This argument is in line with the argument that effective emergency management is the one designed bottom-up with local governments being the main responders before other levels of government are involved (Kapucu, 2008).

Local emergency management is generally guided by state laws which may be permissive or mandatory (FEMA, 2006). Permissive laws allow local governments for flexibility in terms of deciding on the most appropriate form of emergency management system, while mandatory laws specify certain requirements that define and shape the way emergency management will be conducted. Most local governments are small, and financially and technically restrained (Cigler, 2009); thus, they might have emergency managers/directors employed on voluntary, part-time, or full-time basis. In most cases, the local emergency management consists of local law enforcement, fire, and emergency medical personnel activated at the initial stages of the emergencies.

Despite several types of government at the sub-state level, however, it is mainly the county governments that are considered local organizations in rhetoric. Waugh (1994) argues that county governments are the most appropriate tools for emergency management at the sub-state level, because they "(1) are geographically close to environmental problems, (2) have larger resource bases than municipalities, (3) have ambiguous administrative structures that encourage cooperation, (4) are local agents of state administrations, (5) have close administrative ties to state government, (6) provide forums for local-local cooperation, and (7) already serve role as general purpose local governments representing broad constituencies and having strong local identification. Most importantl, a county organization may avoid inappropriate command-and-control structures in favor of more collaborative and cooperative approaches to emergency management" (Waugh, 1994, p. 258).

When authorized by the law, the counties establish an office/department responsible for incident management, which is generally headed by an officer elected, depending on the type of government, by County Council, County Board, or County Commissioners. County-level emergency management office is responsible for advising and reporting to county chief executive on emergency management operations; advocating for related disaster management laws, policies, regulations and legislations; coordinating and supporting emergency response activities; maintain emergency operation center (EOC); developing county comprehensive emergency management plan; developing mutual aid agreements; designing and implementing emergency preparedness and response trainings and exercises; contacting community to increase public awareness of possible threats and get stakeholder feedbacks; conducting regular hazard and threat analyses; and, following current emergency management research, issues and agenda (FEMA, 2006).

As state above, one of the most important roles performed by county governments is coordination of local resources from different agencies for the purpose of unified response to an emergency incident. While incidents of small scale may be easily managed by first responders on their own, the large-scale events overwhelming the capacity and capability of single agencies are managed through collaborative approach among organizations from different sectors and levels of government. A county-level comprehensive emergency management plan (CEMP) is a fundamental document specifying the main vulnerabilities of a community and the overall way respective county emergency management authorities would respond to them, including the actors, resources, timeframe, and the structure of the emergency management system.

Generally speaking, the county emergency management agencies in the United States follow either an Emergency Support Function (ESF)-based or the Incident Command System (ICS)-based template when responding to disasters. The former relies upon coordinated effort through emergency support functions replicated from state and federal governments, mainly ranging between 15 and 20 in number. These ESFs are mainly grouped around such functions as transportation, public works, firefighting, information and planning, mass care, resources, health and medical issues, search and rescue, hazardous materials (HazMat), food and water, energy, military, public information, volunteer management and donations, law enforcement and security, animal protection, community and business, damage assessment, and utilities. An example of such an approach is the Orange County in the State of Florida. Orange County CEMP consists of the Basic Plan, the Emergency Support Functions Annexes, and Support Annexes. A total of twenty ESFs were identified in the County's CEMP, which are: ESF#1 – Transportation, ESF#2 – Communications, ESF#3 – Public works and engineering, ESF#4 – Firefighting and EMS, ESF#5 – Information and planning, ESF#6 – Mass care, ESF#7 – Resource support, ESF#8 – Health and medical, ESF#9 – Search and Rescue, ESF#10 – Hazardous materials, ESF#11 – Food and water, ESF#12 – Energy, ESF#13 – Military support, ESF#14 – Public information, ESF#15 – Volunteers and donations, ESF#16 – Law enforcement and security, ESF#17 – Veterinary/animal protection, ESF#18 – Community and business, ESF#19 – Damage assessment, and ESF#20 – Public utilities (Orange County Emergency Management Office, 2009). While the titles and the number of ESFs may differ from county to county in different states, the main trend is to design ESFs in line with the federal guidelines in NRP or NRF.

The latter approach, however, is designed around the ICS' functional designations, namely, five fundamental elements, namely command, operations, planning, logistics, and finance. The ICS-based structure is different in that it is more command-and-control oriented and vertically coordinated, while the ESF-based is based more on horizontal relationships. The ESFs specified under ESF-based system are grouped under the above-mentioned five sections in the ICS-based system. An example of the ICS-based county emergency management system is the Duval County in the State of Florida (Duval County Emergency Preparedness Division, 2010).

Whatever the approach, the county is responsible for coordination of emergency response operations, which mainly occurs at the emergency operations center (EOC) of the respective counties. Regardless of the approach utilized and the system established, county emergency management systems are the hubs of coordination of inter-agency collaboration in times of large-scale events. Therefore, the county emergency managers, directors or coordinators who have the responsibility of bringing together the stakeholders and coordinating the incident response are the most knowledgeable persons in terms of the network structure, processes and results when a disasters strikes. It is for this reason that this study focuses on surveying county emergency managers as the main experts in collaborative emergency management networks. County emergency managers are the direct persons observing, analyzing and reporting network-based relationships and processes.

This chapter covered the specific context under which study constructs will be discussed and analyzed. The study focuses on the local-level emergency management in the United States with specific government type chosen as county. The following chapter explains the

methodology utilized in this study to collect data, the summary of the variables to be employed in this study, as well as the study hypotheses to be tested.

CHAPTER 4. METHODOLOGY

This section focuses on the methodology of the study and sets out the main research hypotheses along with the explanation of how the study sample was chosen, and how the data was collected and analyzed.

4.1. Research Questions and Hypotheses

Emergency management has been restructured over past decades into multi-disciplinary and collaborative governance characterized by network relationships to address complex and multi-faceted problems of emergencies and disasters (Weber & Khademian, 2008). These relationships are mostly horizontal, egalitarian, non-hierarchical, free of red-tape, and flexible, allowing for structural and relational adjustments when/if required. In addition, these networked relationships are catalyzed by several internal/organizational and external/environmental factors that make networked governance work. This study specifically sought to analyze how convergence/similarity in terms of organizational goals, information-communication technology (ICT) utilization, and inter-organizational trust impacts network sustainability in emergency management context.

The literature review suggests that there is a relationship between goal convergence, technology utilization, inter-organizational, and the sustainability of network relationships. This study's primary goal was to test these relationships based on the data collected from county emergency managers at the national level.

4.1.1. Research Questions

The following research questions are the main tenets to be analyzed in this study:

1) How are organizational goals related to the sustainability of network relationships? Does organizational goals convergence increase collaborative network sustainability?

2) How is technology utilization or dependence on technology related to the sustainability of collaborative network relationships? Does technology utilization increase collaborative network sustainability?

3) How is inter-organizational trust related to the sustainability of network relationships? Does inter-organizational trust increase collaborative network sustainability?

4) What is the relative importance of each of the factors, namely organizational goals, information-communication technology utilization, and inter-organizational trust, on emergency management network sustainability?

The research questions above been transformed into hypotheses hat are outlined in the following section.

4.1.2. Hypotheses

The first main assumption of the study is that organizations having similar goals and objectives tend to maintain their relationship even in the absence of disasters or between disasters as opposed to those that have little in common. By this token, for example, two law enforcement agencies are more probable to sustain their network relationships as opposed to a

situation in which a law enforcement agency and a mass care nonprofit are considered. The reverse is true as well: Organizations having little in common tend to collaborate less. In other words, organizations diverging in terms of their organizational goals, objectives and missions would be reluctant to maintain and strengthen their relationships with other agencies in the network (Bryson, Crosby, & Stone, 2006; Rivera, Soderstrom, & Uzzi, 2010). The following hypothesis was developed based on the preliminary literature review:

Hypothesis 1: Organizational goal convergence is positively correlated with network sustainability.

Technology, on the other hand, plays a facilitating role in regard to network sustainability (Dawes & Eglene, 2004; Kelly & Stark, 2002; Mowshowitz, 1997; Snow, Lipnack, & Stamps, 1999). There are various studies showing the important of technology during disaster. Information communication and management is one of the most essentials parts of emergency management, which is quite eased by the use of technology. In the absence of disasters or between the disasters, however, organizations utilize technology for such purposes like web-conferencing, electronic communication and information/knowledge exchange. Technology, in a sense, increases efficiency and promotes communication, thus network relationships, that would be impossible or relatively more difficult otherwise. The following hypothesis was developed based on the preliminary literature:

Hypothesis 2: Information-communication technology utilization is positively correlated with network sustainability.

Finally, the literature suggests that agencies having good relationships tend to maintain and further their relationships across time. Specific emphasis is put upon the importance of inter-organizational trust that is characterized by mutual understanding, mutual acceptance, denser relationships and mutual reliability. Such relationships characterized by positive synergy for collaboration, therefore, play an important positive role in enhancing collaborative practices and mutual cooperation in the network of agencies working towards a common goal (Bryson, Crosby, & Stone, 2006; Katz & Lazer, 2002; Provan, Fish, & Sydow, 2007; Provan & Kenis, 2007). The study hypothesizes the following:

Hypothesis 3: Inter-organizational trust is positively correlated with network sustainability.

The study also came up with an assumption about the relative importance of the above-mentioned exogenous factors in affecting network sustainability. Because of vast literature specifically on inter-organizational trust to affect network sustainability, this study makes the following assumption of exploratory nature:

Assumption: Inter-organizational trust has the strongest impact on network sustainability followed by ICT utilization and organizational goal convergence.

Rather than conducting a confirmatory analysis based on the literature, the study seeks to explore the relative impact of each variable on network sustainability.

4.2. Study Variables

This study has three exogenous (independent) and one endogenous (dependent) variable. Organizational goal convergence, information-communication technology (ICT) utilization, and inter-organizational trust are the exogenous variable, while network sustainability is the endogenous variable of the study. Study variables in the form of latent constructs were measured through several indicators. Based on the literature review, Table 1 was developed to describe exogenous (independent) and endogenous (dependent) as well as control variables of the study with respective indicators:

Table 1: Operational Definitions of Study variables

Attribute	Latent	Indicators		Measurement
ENDOGENOUS	Network Sustainability	Organizations in the network periodically contact each other to discuss issues pertaining to EM	NS1	Ordinal
		Organizations constantly develop long-run relationships among each other	NS2	Ordinal
		Success of our EM network is dependent on the level of inter-organizational relationships	NS3	Ordinal
		In the absence of disasters, organizations are involved in collaborative practices (such as exercises, drills)	NS4	Ordinal
		The network sustains inter-organizational relationships for better results in further disasters	NS5	Ordinal
		Short-run inter-organizational relationships are less effective	NS6	Ordinal
		Organizations in our network constantly communicate and exchange information	NS7	Ordinal
		Denser inter-organizational relationships make our network more effective in managing emergencies	NS8	Ordinal
		The organizations in our network seldom, if any, collaborate in the absence of disasters (REVERSED)	NS9	Ordinal
EXOGENOUS	Organizational Goal Convergence	Organizations in the network have different organizational priorities (REVERSED)	OGC1	Ordinal
		There is a gap between organizational goals in the network (REVERSED)	OGC2	Ordinal
		Organizations working together have little in common (REVERSED)	OGC3	Ordinal
		Diversity of organizations in the network means fewer common organizational preferences (REVERSED)	OGC4	Ordinal
		Variety of organizations results in multiple contrasting goals (REVERSED)	OGC5	Ordinal
		Collaboration is challenging due to multiplicity of differing organizational backgrounds (REVERSED)	OGC6	Ordinal
		Emergency management requires collaborating with organizations having different expectations (REVERSED)	OGC7	Ordinal
		Diverging organizational goals is the reality of emergency management networks (REVERSED)	OGC8	Ordinal
		Organizations are hardly related in terms of their organizational missions (REVERSED)	OGC9	Ordinal
EXOGENOUS	Information-Communication Technology (ICT) Utilization	In terms of collaboration, organizations rely on the use of information and communication technology	ICT1	Ordinal
		The network's operations are streamlined by technological tools of communication and coordination	ICT2	Ordinal
		Organizations in the network have sufficient technical & technological capacity for emergency management	ICT3	Ordinal
		The use of information and communication technology facilitates the operations of the network	ICT4	Ordinal
		Inter-organizational operations in the network are supported by emergency information management systems	ICT5	Ordinal
		The network would fail without technological capacity used for communication and coordination	ICT6	Ordinal
		If our networked emergency management is effective, it is mainly due to the use of ICT	ICT7	Ordinal
		Technology makes our collaboration more efficient	ICT8	Ordinal
		Inter-organizational collaboration in EM network is impossible without ICT	ICT9	Ordinal
EXOGENOUS	Inter-Organizational Trust	The organizations comprising our emergency management network have open communication	IOT1	Ordinal
		The organizations in our emergency management network are reliable partners	IOT2	Ordinal
		Honesty is the cornerstone of inter-organizational collaboration in our network	IOT3	Ordinal
		Inter-organizational relationships in our network are characterized by mutual understanding	IOT4	Ordinal
		Organizations in the network keep their commitment	IOT5	Ordinal
		Mutual acceptance is the important part of inter-organizational collaboration in our network	IOT6	Ordinal
		There is a common belief across the network that each actor is capable of contributing to the overall picture	IOT7	Ordinal
		Inter-organizational collaboration is characterized by mutual respect in our emergency management network	IOT8	Ordinal
		Organizations in the network collaborate with a sense of fairness towards each other	IOT9	Ordinal
CONTROL	CEMP	Does your county have a Comprehensive Emergency Management Plan (CEMP)?	CEMP	Dichotomous
	COTY	Which one best describes your county? Urban vs. Non-Urban	COTY	Dichotomous

The main assumption in this study is that exogenous variables, namely organizational goal convergence, information-communication technology utilization, and inter-organizational trust, are positively correlated with the endogenous variable, namely network sustainability. Whether county emergency management agencies have a comprehensive emergency management plan (CEMP), and the type of county (urban vs. non-urban) were included as control variables in this study. While exogenous and endogenous variables are latent constructs in the study, control variables were included as single variables in the model. The exact number of indicators for each latent construct was determined upon analysis of the data collected using reliability analysis tools of the Statistical Package for Social Science (SPSS) analytical software program.

4.3. Power Analysis

Power analysis is essential before proceeding to statistical analysis. Power analysis is a tool to identify the highest probability to reject the null hypothesis. The power of the study is generally considered the probability of rejecting the null hypothesis in case it is false (Zhang & Wang, 2009). Power analysis is mainly dependent on Alpha value and sample size. Alpha is the probability of rejecting the null hypothesis while the null hypothesis is true. This study uses the set value of .05 for Alpha. The sample size for the study, on the other hand, is discussed in the following section.

4.4. Sampling and Sample Size Justification

The unit of analysis of this study is the network of county emergency management organizations. The sample for this study comprises individual county emergency management agencies across the United States. All of the agencies that were contacted in this study, thus, are public agencies, namely county emergency management agencies/offices/departments. With some county governments being abolished or having just geographic designations, there are approximately 3000 counties in the United States, all of which constitute the population of this study. More specifically, a total of 3060 counties were identified to be contacted, and no other governments or tribal communities and US territories were examined in this study. The author of the study conducted a thorough search of federal, state, and local government documents on the internet to find the recent and updated lists of county emergency managers/directors/coordinators in each state. Some of such documents were readily available on respective states' emergency management websites, while others were requested from respective public information offices of the states; yet still others were completed by search through single counties' websites.

Therefore, the total population in this study is assumed to be 3060. While the required sample size for this study with .95 confidence level and 5 confidence interval is 341, the survey instrument was sent to the whole population. The reason for such an approach was to get highest possible response rate of already relatively small population. In order to ensure representativeness of the respondents, Federal Emergency Management Agency's (FEMA) officially designated ten geographical regions were taken as main criterion. FEMA's ten regions are administered by respective FEMA headquarters to ensure each region is served in line with

its regional geographic, structural, and demographic expectations. Table 2 specifies the ten FEMA regions with respective number of counties:

Table 2: FEMA's Ten Geographic Regions

Region	State		# of Counties
I	CT	Connecticut	8
	ME	Maine	16
	MA	Massachusetts	6
	NH	New Hampshire	10
	RI	Rhode Island	5
	VT	Vermont	14
II	NJ	New Jersey	21
	NY	New York	62
III	DE	Delaware	3
	MD	Maryland	23
	PA	Pennsylvania	66
	VA	Virginia	95
	WV	West Virginia	55
IV	AL	Alabama	67
	FL	Florida	67
	GA	Georgia	156
	KY	Kentucky	119
	MS	Mississippi	82
	NC	North Carolina	100
	SC	South Carolina	46
	TN	Tennessee	93
V	IL	Illinois	102
	IN	Indiana	91
	MI	Michigan	83
	MN	Minnesota	87
	OH	Ohio	88
	WI	Wisconsin	72
VI	AR	Arkansas	75
	LA	Louisiana	60
	NM	New Mexico	33
	OK	Oklahoma	77
	TX	Texas	254
VII	IA	Iowa	99
	KS	Kansas	104
	MO	Missouri	114
	NE	Nebraska	93
VII	CO	Colorado	64
	MT	Montana	56
	ND	North Dakota	53
	SD	South Dakota	64
	UT	Utah	29
	WY	Wyoming	23
IX	AZ	Arizona	15
	CA	California	57
	HI	Hawaii	5
	NV	Nevada	16
X	AK	Alaska	13
	ID	Idaho	44
	OR	Oregon	36
	WA	Washington	39

Based on the Table 2, the number of survey responses received was analyzed proportionally based on the number of counties in each region with the total number exceeding the required threshold 341. In addition to the required sample size for representativeness purposes, there are also requirements in terms of the number of cases required for statistical analysis to be run. While Boomsma and Hoogland (2001) argue that structural equation modeling (SEM) is possible and reliable with 200 cases, Kline (2005) states that the minimum required number of cases is the number of parameters in the covariance structure model multiplied by 10. This study takes Bentler and Chou's (1987) formula as the criterion, which states that the sample size should be the number of parameters multiplied by 5. The number of parameters in this study was counted as 47, and in line with Bentler and Chou's (1987) formula, a total of 235 cases would be enough for SEM in this study.

4.5. Data Collection

The data collection method consisted of a self-administered survey. It is important that the survey instrument utilized in a study meets certain criteria for results to be valid and reliable. This section addresses how the survey was constructed and administered as well as the validity and reliability of the tool.

4.5.1. Survey Construction, Reliability and Validity

The self-administered survey of this study has been never utilized in any study and was designed independently from the beginning. While this might be a limitation or disadvantage in terms of reliability, it is also an opportunity to test the newly developed tool. The survey was developed under the auspices of the director of Center for Public and Nonprofit Management

(CPNM) at the University of Central Florida (UCF), and the Institutional Review Board (IRB) approval for the survey was received in December of 2010 under CPNM supervision. The data, however, was collected after the defense of the dissertation prospectus by the author in January of 2011.

The author of this study has been one of the researchers under CPNM responsible for development of the survey. Specific attention was given to selection of survey questions based on the literature review items in order to meet the criteria of construct validity. Construct validity is an important statistical concept measuring the extent to which the operationalized items reflect the construct intended to be measured (Trochim, 2001). The self-administered survey is attached as Appendix A at the end of the study.

4.5.2. Survey Administration

The survey was created using the website Survey Monkey (www.surveymonkey.com), and consisted of five main sections, namely, introduction, four sub-sections with questions related to the main exogenous and endogenous constructs of the study, a section on the characteristics of collaboration, a section with demographic questions, and a section with open-ended questions (See Appendix A for details). The introduction section specifically provided an overall description of the study as well as sought to get informed consent from the survey participants. The survey participants could proceed with or exit the survey at any time. The survey takes approximately 15 minutes to complete, and all responses were kept confidential with the results of the study made available to the participants upon request.

The survey was electronically mailed to county emergency managers across the United States, the contact info of which has been collected from States Emergency Management websites as well as through request of public information from appropriate state agencies. There are 3060 counties in the United States; however, there are certain counties that have different structures and systems. Such differences have been accounted for by analyzing the emergency management system of the respective states or counties. Based on the search over the internet, a total of 2902 contacts of county emergency managers, having both first/last names and e-mail addresses, were identified across the United States.

The survey was electronically e-mailed to county emergency managers using the website Constant Contact (www.constantcontact.com). Constant Contact is a web-based company allowing for e-mail marketing, event marketing, and online survey designs for high-volume outreach. The tool allows sending out single e-mail to several thousand contacts with additional options to track the overall process, including identification of invalid e-mail addresses, specification of the number of contacts who reported e-mail as spam, specification of contacts who opted-out further receipt of the e-mail, specification of people who opened the e-mail, and those who clicked on the link to proceed with the survey.

The first e-mail was sent to the contacts on January 25, 2011 and the survey was closed on April 20, 2011. The survey was resent nine times to the contacts that were determined by Constant Contact to have not opened the e-mail. By the end of the survey collection period a total of 1427 contacts had opened the e-mail with survey link sent to them, out of which 46 contacts opted-out not receive the e-mail in the future again. According to the Survey Monkey

statistics, a total of 794 contacts clicked on the survey link and started it, and a total of 560 contacts completed the survey.

4.6. Data Analysis

This section describes the statistical tools utilized and analyses conducted in the study. The overall analysis comprises three major stages, namely, provision of descriptive statistics, confirmatory factor analysis (CFA), and structural equation modeling (SEM).

4.6.1. Descriptive Analysis

The descriptive analysis of the study is presented by frequency tables for all variables separately to illustrate the distributional characteristics of survey data. Respective tables include correlation matrixes for each latent construct and further analysis outputs as observed relationships between indicators and control variables developed.

Specific attention was given to identification of multicollinearity, if any, among indicators of latent constructs. Multicollinearity occurs when variables are highly correlated with each other. If a correlation coefficient matrix illustrates correlations of .90 or higher among study variables, there can be a sign of multicollinearity (Kline, 2005). Therefore, efforts to eliminate multicollinearity issues were addressed by viewing results of the Spearman Rho correlation test. This test clearly identifies high correlations having more than .90 coefficient values.

4.6.2. Confirmatory Factor Analysis (CFA)

Confirmatory Factor Analysis (CFA) will be performed to construct and validate measurement models for each latent construct in the study. Latent constructs are developed due

the fact that certain concepts cannot be measured by a single predictor and require combination several indicators. CFA is a powerful tool to validate measurement models of latent constructs (Wan, 2002). Accordingly, there are four latent constructs in the study, namely organizational goals convergence, information communication technology (ICT) utilization, inter-organizational trust, and network sustainability. CFA was performed a three-step method by Wan (2002), namely, by 1) checking the appropriateness of indicators for each latent construct; 2) overall model evaluation; and, 3) model adjustment based on the modification indices proposed by the model analysis.

Appropriateness of indicators under measurement models is determined by checking the critical ratio at the confidence level .05, which should be higher than +1.96 and lower than -1.96 (Byrne, 2006). Statistically insignificant indicators that did not meet this requirement were removed from the measurement models of the latent constructs. This process was conducted for each latent construct separately. The second stage consists of model evaluation by comparing the CFA outputs produced via Amos 18.0 software with the goodness-of-fit criteria chosen for this study. The goodness-of-fit statistics let identify whether the measurement models fir the data at hand. The third stage involves adjustment of measurement models based on the modification indices statistics provided by Amos 18.0 after CFA analysis is conducted. This stage aims at improving the model by adding constraints between construct indicators (Wan, 2002).

This study has four latent variables, four exogenous and one endogenous latent constructs. The first exogenous construct is organizational goals convergence (Figure 2), which is to be measured by nine indicators (See Table 1 for detailed list of indicators for this latent construct).

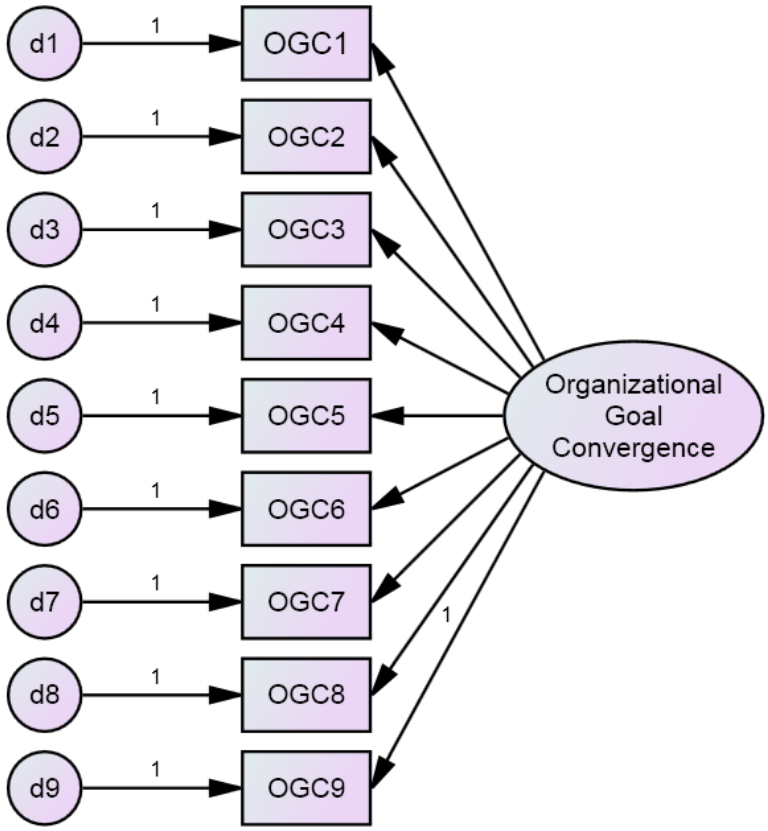

Figure 2: Measurement Model of Organizational Goal Convergence

The second exogenous construct is information-communication technology (ICT) utilization/dependence (Figure 3), which is to be measured by nine indicators (See Table 1 for detailed list of indicators for this latent construct).

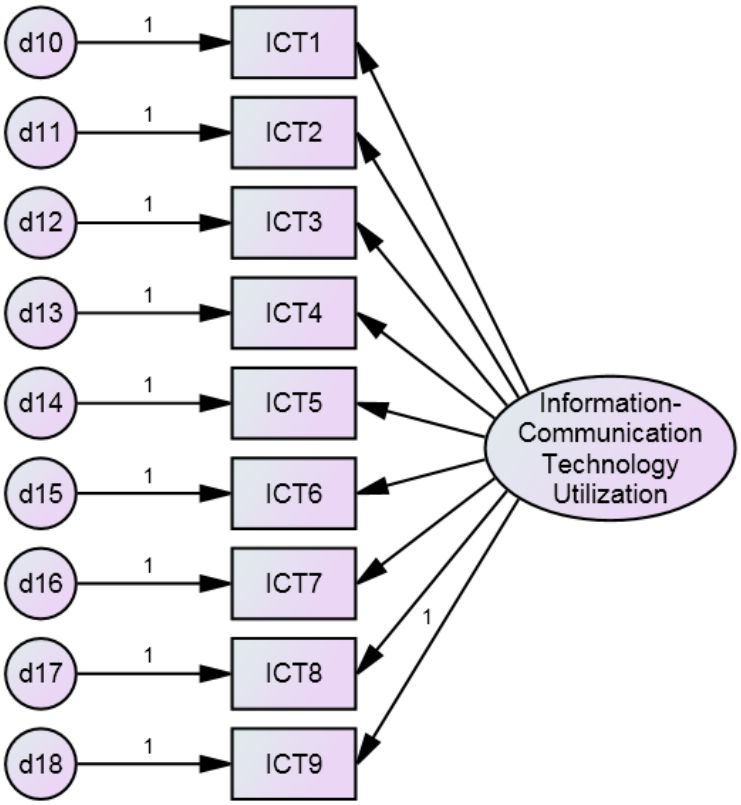

Figure 3: Measurement Model of Information-Communication Technology Utilization

The third exogenous construct is inter-organizational trust (Figure 4), which is to be measured by nine indicators (See Table 1 for detailed list of indicators for this latent construct).

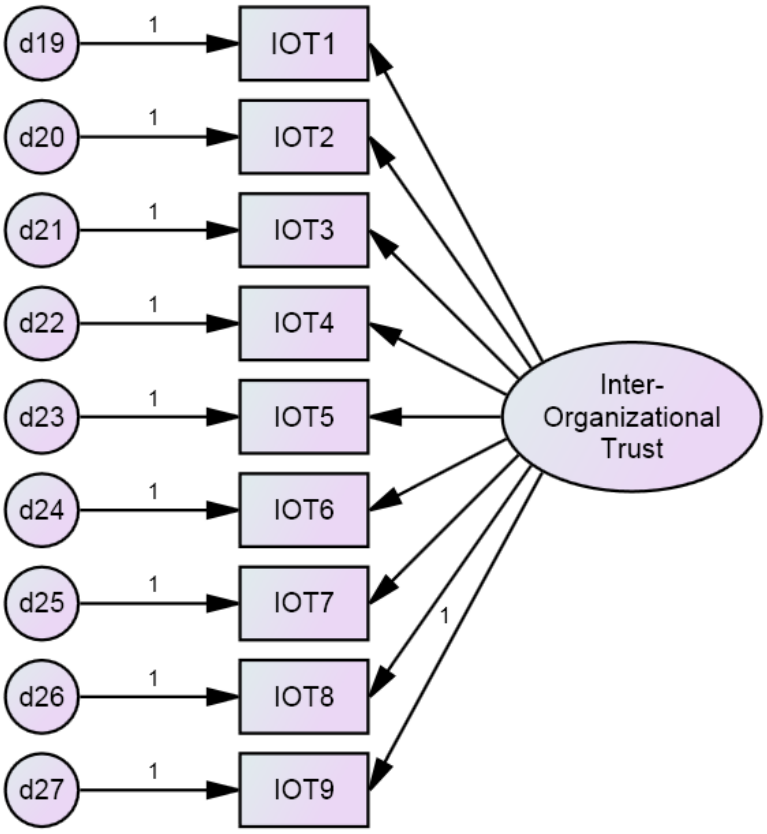

Figure 4: Measurement Model of Inter-Organizational Trust

The endogenous construct in this study is network sustainability (Figure 5), which is also to be measured by nine indicators (See Table 1 for detailed list of indicators for this latent construct).

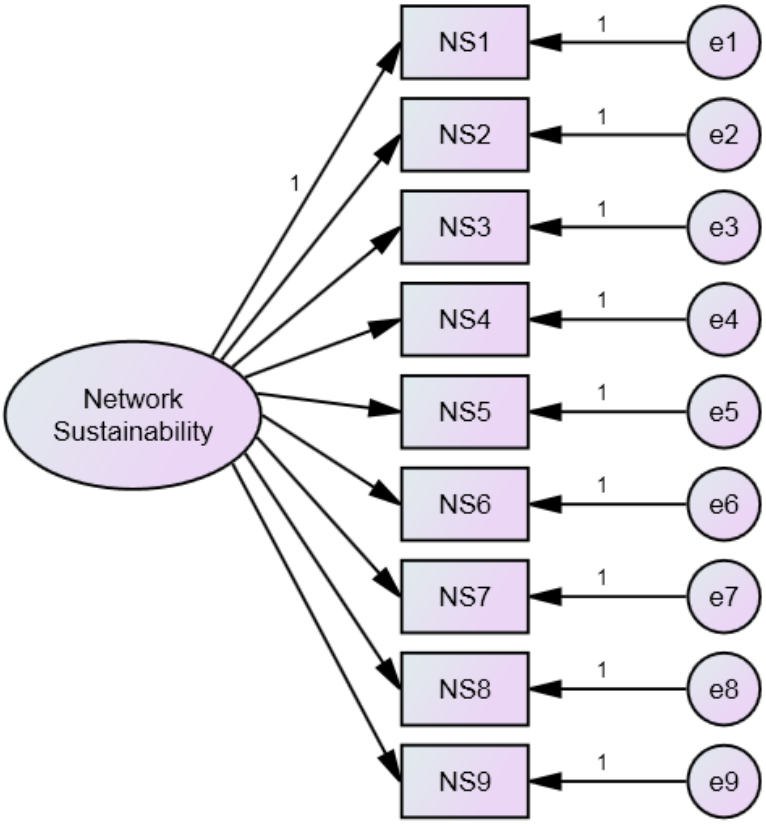

Figure 5: Measurement Model of Network Sustainability

4.6.3. Structural Equation Modeling (SEM)

The last part of statistical analysis is structural equation modeling (SEM). SEM consists of analysis of the relationships between measurement models in one combined model. It is also a tool to analyze whether the data at hand fits the theory-driven model. The tool is known for its strength in accurately predicting inter-variable relationships by accounting for measurement errors of observed variables (Byrne, 2006).

For the purposes of this study, SEM was used to analyze the relationship between the latent variables of organizational goals convergence, information-communication technology

(ICT) utilization, inter-organizational trust, and network sustainability. The combined model has exogenous, endogenous, and control variables with structural relationships analyzed by Amos 18.0 software. The ultimate covariance structure model developed for this study is shown below in Figure 6.

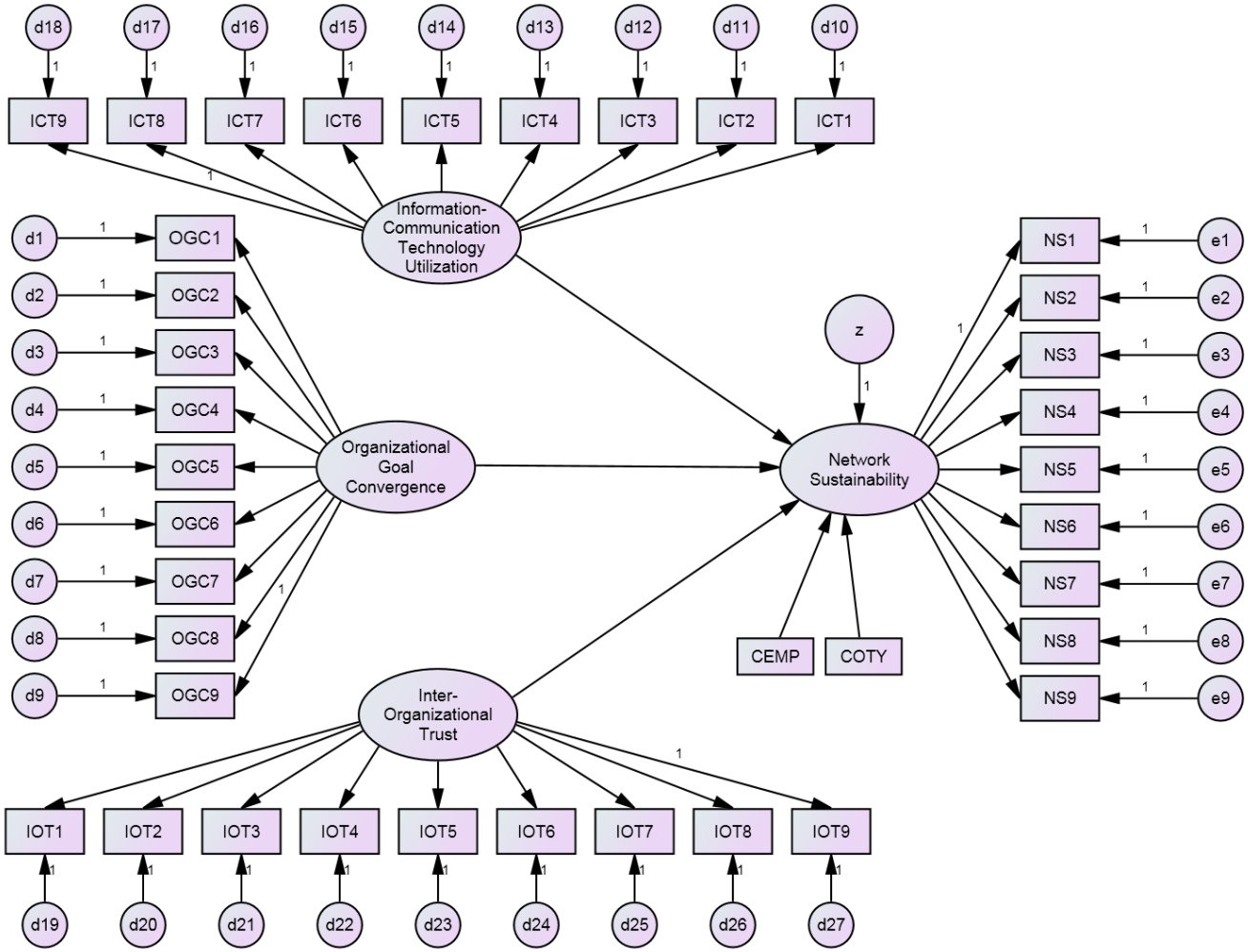

Figure 6: Covariance Structure Model for Network Sustainability

4.6.4. Statistical Analysis Criteria

This section explains the criteria that guide the evaluation of statistical outputs provided by Amos 18.0 software. The major criteria utilized by this study are related to multicollinearity, index reliability, statistical significance level, regression weights threshold, and goodness-of-fit statistics.

As stated earlier in this chapter, the multicollinearity issue is related to the extent several observed variables measure the same concept. Observed variables having correlation value of .90 or greater are considered to have multicollinearity problem (Kline, 2005), and thus, are needed to be removed from the latent construct. The issue of multicollinearity was analyzed using the Spearman Rho statistical analysis in the Predictive Analysis Software (PASW) Statistics 18 software program with the above-mentioned threshold of .90, and all indicators with correlation values greater that the threshold were treated by removing one of those indicators.

In terms of index reliability, a widely-used technique of Cronbach‟s Alpha coefficient score was utilized for this study. The tool was utilized to analyze the extent to which survey instrument items are internally consistent to measure same concept (Cronbach, 1951). The general trend in the literature is that the values greater than .70 are acceptable, values greater than .80 are good, and values greater than .90 are excellent (George & Mallery, 2006; Kline, 2005). The same approach was taken in this study as well, and the indicators with values greater than .70 were kept in the measurement models. While CFA does test internal consistency of the observed variables under measurement models, the Cronbach's Alpha coefficient score technique was utilized to support CFA results.

Statistical significance level for statistical outputs is the third criterion to be utilized when interpreting results. The measure indicates the probability of rejecting the null hypothesis when the researcher needs to reject it due to its being false. In other words, it shows the probability of being correct about rejecting the false null hypothesis. It is expressed either in the form of probability to be correctly rejecting the null hypothesis, and the most widely-used level is .95; or in the form of the probability of having the results by chance, which would be the former subtracted from 1, namely .05. Called in statistical terminology as p value, the value gives an estimate of being correct with other samples from the population studies; thus, the p value of .05 would mean that there is only 5% chance that the results would be significantly different in other samples drawn from the population. For the purposes of this study, any output having a p value greater than .05 were deemed statistically insignificant, and thus, removed or treated.

Regression weights threshold is the fourth criterion to consider in SEM (Hoe, 2008). These parameters specify the strength of relationships between observed variables and the overall latent construct, as well as among other variables in the covariance structure model. The general rule of thumb for regression weights (or factor loadings) threshold is that values greater than .30 or .40 are appropriate for further analysis and should be kept in the model (Portney & Watkins, 2000). Hair et al. (1998), on the other hand argues that values greater than .40 are very important, and those greater than .50 have practical significance. For the purposes of this study a threshold of .40 was accepted as criterion; thus, values below .40 were excluded from the models.

The last important criterion for SEM analysis is to check for goodness-of-fit statistics. Goodness-of-fit statistics specify the extent to which the theoretically driven model fits the data at hand, and, thus, should be accepted, improved, or rejected. The rejection of the model (if any), however, would not mean the theory leading to the model is falsified; the only scholarly implication in this regard would be the claim that the data at hand does not show parametric characteristics to fit the theoretically driven model. In addition, the path coefficients and regression weight in the model have meaning only to the extent the goodness-of-fit statistics meet the threshold criteria (Garson, 2011).

The threshold indices and criteria for SEM outputs vary across the related literature and research, and there is no consensus over the standard. While Kline (1998) proposes the use of Normed Fit Index (NFI) or Comparative Fit Index (CFI), Nonnormed Fit Index (NNFI), and Standardized Root Mean Square Residual (SRMR), Garson (2011) recommends reporting minimum chi-square ($\chi 2$ or CMIN), its respective p value, relative minimum chi-square (CMIN/DF, which is chi-square divided by degrees of freedom), and Root Mean Square Error of Approximation (RMSEA) as minimum, and one of the following measures: Normed Fit Index (NFI), Relative Fit Index (RFI), Incremental Fit Index (IFI), Tucker-Lewis Index (TLI or NNFI), and Comperative Fit Index (CFI). While there is a disagreement about the usefulness of Goodness of Fit Index (GFI), and Adjusted Goodness of Fit Index (AGFI) due their alleged inability to accurately estimate complex models and their sensitivity to sample size (Garson, 2011; Hu & Bentler, 1999), Fan, Thompson, and Wang (1999) recommend use of GFI and AGFI along with RMSEA. Lastly, there is a recommendation to use Hoelter's critican N measure that accounts for the adequacy of the sample size for the analysis (Garson, 2011; Wan, 2002).

Based on the above-mentioned recommendations from the literature and for the purposes of this study minimum chi-square (CMIN), its respective p value, relative chi-square (CMIN/DF), Root Mean Square Error of Approximation (RMSEA), Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and Hoelter's critical N measures were chosen as the criteria for goodness-of-fit statistics.

The CMIN, which is also known as the likelihood ratio that shows the difference of the developed model with the population model, should be as small as possible. The CMIN test argues that the difference is statistically insignificant; thus, a p value greater than .05 is pursued not to reject the null hypothesis of the CMIN test that claims the sample and population covariance matrices are equal. The threshold for CMIN/DF value, which seeks to minimize the impact of sample size, is recommended to be below 2 (Ullman, 2001), below 3 (Kline, 1998), or below 4 (Wan, 2002), and this study takes the threshold 4 as the standard. In terms of RMSEA, which looks at the extent to which the developed model is close to the population model, the proposed threshold values are .08 (Wan, 2002), .06 (Hu & Bentler, 1999), or .05 (Wan, 2002), and values below these threshold are a sign of good model fit. For the purposes of the study, the threshold of .06 was accepted as the criterion. In addition, when RMSEA is concerned, it is important to look at p value of RMSEA, which is tested by the null hypothesis that RMSEA is no greater than .05. If the null hypothesis is rejected, that is, if the PCLOSE value of the test is less than .05, we would conclude that the model is not fit (Garson, 2011). In other words, this study looks to achieve a PCLOSE value of .05 or greater.

In terms of the GFI (accounting for discrepancy between developed and population covariance), AGFI (which is a GFI adjusted for model complexity), CFI (an index assuming no correlation between observed and latent variables), and TLI (accounting for degrees of freedom in null and proposed models) – all of which are meant to show the extent to which the developed model is fit, and range between 0 and 1 as an absolute value – are recommended to be greater than .90 for acceptable, and greater than .95 for excellent model fit (Bentler & Chou, 1987; Fan, Thompson, & Wang, 1999; Garson, 2011; Maruyama, 1998). The threshold criterion for all of these values was accepted as .90 for the purposes of this study. Lastly, the Hoelter's critical N value, which specifies the required sample size for meaningful statistical results, is recommended to be 200 or higher (Garson, 2011). The same threshold was chosen as the criterion for this study. Table 3 below summarizes the criteria chosen for goodness-of-fit statistics within the scope of this study:

Table 3: Goodness-of-Fit Criteria and Threshold Values

Index	Shorthand	Threshold
Chi-Square	$\chi 2$ or CMIN	Smallest
Chi-Square related p value	p	$\geq .05$
Chi-square / Degree of Freedom	$\chi 2$ / df	≤ 4
Root Mean Square Error of Approximation	RMSEA	$\leq .06$
RMSEA-related p value	PCLOSE	$\geq .05$
Goodness of fit index	GFI	$\geq .90$
Adjusted goodness of fit index	AGFI	$\geq .90$
Comparative fit index	CFI	$\geq .90$
Tucker-Lewis Index	TLI	$\geq .90$
Hoelter's critical N	Hoelter Index	≥ 200

4.7. Human Subjects

Since human subjects were involved in this survey, required Institutional Review Board (IRB) approval was sought prior to initiation of the study. All participants were informed that participating in the study is voluntary. There was no possible risk for the subjects' rights and interests since participants were not forced to be involved in this study and their answers were kept confidential. Informed consent form was obtained in the form of the statement right at the first page of the online survey, where participants could quit if they did not want to participate in the study.

On the other hand, the study did not involve direct analysis of personal or individual characteristics, values, norms or beliefs. It is the organizations and overall organizational performance that was being analyzed and reported. Only aggregate data was analyzed and reported. Responders, namely county emergency managers, had to respond only about general trends and characteristics of network of agencies responsible for emergency management in respective counties, and no personal data asked in the survey is related to the main content and purpose of the study. In order to provide confidentiality of the information obtained from the responders, participants' identity was kept anonymous. The survey did not ask any questions regarding personal information but questions to measure their perceptions on specific issues.

This chapter covered the methodology of the study, namely, the study instrument, the study variables, and respective analytical tools and criteria to be utilized in data analysis. The following chapter presents statistical findings based on data analysis.

CHAPTER 5. FINDINGS

This section presents the study findings with appropriate statistical results in the form of tables and figures. Descriptive and demographic statistics of the respondents, Confirmatory factor analysis (CFA), and structural equation modeling (SEM) analysis results are presented, explained and interpreted. The main hypotheses presented at the beginning of the study are tested at the end of this section based on the output of the statistical analysis.

5.1. Descriptive Statistics

The survey designed for this study on Survey Monkey website was distributed through e-mail marketing website Constant Contact to county emergency managers, coordinators or directors across the United States. A total of 534 out of 560 completed surveys from 794 started surveys were identified as valid after deleting responses with completion of less than 50% of survey questions. The missing values across the data were replaced with the mode value of the respective variables. The highest number of missing values for a variable was 16.

Responses were analyzed in terms of five demographic variables, namely, years respondents have been in current position, years respondents have been in the field of emergency management, the highest education attained, age and gender. Table 4 below summarizes responses to these questions in the form of frequency distributions. No missing values were replaced, and the statistics is presented in the raw format to provide for exact overview of the respondents' demographics; thus, the total number of respondents for each variable varies.

The first demographic variable, namely, years in current position, was aimed to understand the background of respondents. For example, this information might show how well the respondents are familiar with their respective county's structure, operations, community and environment. Specifically, it might help see whether respondents are familiar with issues of emergency management in their specific jurisdiction to the furthest extent possible. The general assumption would be that emergency managers that have been in their current position for a longer time would provide more informative, precise, and knowledgeable responses. According to the data, out of 534 responses a total of 357 respondents have been in their current position for 10 or less years. A total number of respondents that have been in their current position more than 20 years, on the other hand, is 67 corresponding to 12.5% of the respondents.

When respondents are analyzed in terms of the years they have worked in emergency management field, namely, in terms of their tenure, there are only 77 respondents that have been in emergency management field for 5 years or less. This number corresponds to 14.4% of the total of 534 respondents. The highest number of responses was received for the option "more than 20" with the total of 214 respondents choosing that response. Overall, this distribution shows that the respondents are professionals of their respective field, which in turn means that they are familiar with the field at the professional level. This fact is a strong support for the responses received, meaning that the survey jargon and characteristics are more understandable and readable for the respondents who in turn would provide most relevant and informative responses.

Table 4: Demographic Characteristics of Respondents

		Frequency	Percent	Cumulative Percent
Years in Current Position	5 years or less	223	41.8	41.8
	6-10	134	25.1	66.9
	11-15	64	12.0	78.8
	16-20	46	8.6	87.5
	More than 20	67	12.5	100.0
	Total	534	100.0	
Years in Emergency Management	5 years or less	77	14.4	14.4
	6-10	98	18.4	32.8
	11-15	69	12.9	45.7
	16-20	76	14.2	59.9
	More than 20	214	40.1	100.0
	Total	534	100.0	
Highest Education	High School	132	24.7	25.8
	College	177	33.1	60.4
	Bachelor	122	22.8	84.2
	Master's	77	14.4	99.2
	Doctoral	4	.7	100.0
	Total	512	95.9	
Age	under 35	20	3.7	3.9
	35-44	82	15.4	20.0
	45-54	172	32.2	53.8
	over 54	235	44.0	100.0
	Total	509	95.3	
Gender	Female	95	17.8	18.6
	Male	415	77.7	100.0
	Total	510	95.5	

In terms of highest education achieved, majority of respondents fall within three categories, namely high-school, college, and bachelor degrees, with the highest number of responses received for the college category. Only 81 respondents corresponding to approximately 16% of the total of 512 responses have a master's or doctoral degree. The reason for most of the respondents' being in first three categories might be the fact that emergency management field is a relatively technical field that requires basic level of education, and in most cases some college or university degree is being enough.

In terms of age, the highest number of respondents was received for the category "over 54" – a total of 235 responses out of 509. This category is followed by the category "45-54" corresponding to some 34% with 172 responses. Both of the categories constitute 80% of the responses. Only 20 respondents were aged below 35. This distribution shows that emergency management field is mainly directed by employees with a relatively higher age average.

When age is considered, majority of respondents are males – a total of 415 respondents constituting around 81% of 510 respondents to the question. This kind of gender distribution might be due to the fact that emergency management has been historically male-dominated field requiring technical, labor-intensive and physical approach. While the trend has been changing over the past decades, emergency management seems to be still a male-dominated field especially at the level of directors and coordinators.

In terms of the sample size, according to Bentler and Chou's (1987) rule of thumb, a total of 235 cases would be enough for structural equation modeling (SEM) in this study. Since the number of collected responses is 534, the criterion is met. The criterion is met even in terms of Kline's (2005) rule, according to which the minimum required number of cases is the number of parameters in the covariance structure model multiplied by 10.

One of the methodological concerns for this study is whether the respondents constitute a representative sample in the context of the United States. Since the whole population of 3060 county emergency managers was the target of this study, a different approach was chosen as criterion in terms of representativeness. Based on the sample size calculation methodology, a sample size of 341, with confidence level of 95% and confidence interval of 5, was required.

Table 5: Frequency Distribution of Respondents by State and FEMA Regions

Region		State	# of Counties	# of	State %	Region %
I	CT	Connecticut	8	1	12.5%	10.2%
	ME	Maine	16	5	31.3%	
	MA	Massachusetts	6	0	0.0%	
	NH	New Hampshire	10	0	0.0%	
	RI	Rhode Island	5	0	0.0%	
	VT	Vermont	14	0	0.0%	
II	NJ	New Jersey	21	0	0.0%	8.4%
	NY	New York	62	7	11.3%	
III	DE	Delaware	3	1	33.3%	10.3%
	MD	Maryland	23	0	0.0%	
	PA	Pennsylvania	66	10	15.2%	
	VA	Virginia	95	10	10.5%	
	WV	West Virginia	55	4	7.3%	
IV	AL	Alabama	67	9	13.4%	19.6%
	FL	Florida	67	29	43.3%	
	GA	Georgia	156	21	13.5%	
	KY	Kentucky	119	28	23.5%	
	MS	Mississippi	82	13	15.9%	
	NC	North Carolina	100	20	20.0%	
	SC	South Carolina	46	6	13.0%	
	TN	Tennessee	93	17	18.3%	
V	IL	Illinois	102	11	10.8%	19.5%
	IN	Indiana	91	21	23.1%	
	MI	Michigan	83	17	20.5%	
	MN	Minnesota	87	16	18.4%	
	OH	Ohio	88	21	23.9%	
	WI	Wisconsin	72	16	22.2%	
VI	AR	Arkansas	75	13	17.3%	14.4%
	LA	Louisiana	60	1	1.7%	
	NM	New Mexico	33	1	3.0%	
	OK	Oklahoma	77	8	10.4%	
	TX	Texas	254	49	19.3%	
VII	IA	Iowa	99	21	21.2%	14.9%
	KS	Kansas	104	15	14.4%	
	MO	Missouri	114	16	14.0%	
	NE	Nebraska	93	9	9.7%	
VII	CO	Colorado	64	24	37.5%	20.4%
	MT	Montana	56	11	19.6%	
	ND	North Dakota	53	9	17.0%	
	SD	South Dakota	64	4	6.3%	
	UT	Utah	29	4	13.8%	
	WY	Wyoming	23	7	30.4%	
IX	AZ	Arizona	15	6	40.0%	28.0%
	CA	California	57	19	33.3%	
	HI	Hawaii	5	1	20.0%	
	NV	Nevada	16	0	0.0%	
X	AK	Alaska	13	0	0.0%	22.7%
	ID	Idaho	44	7	15.9%	
	OR	Oregon	36	9	25.0%	
	WA	Washington	39	14	35.9%	
TOTAL			**3060**	**531**	**17.4%**	

Note: Out of 534 completed responses, 3 respondents did not specify their state

341 respondents would constitute around 11 percent of the total of 3060 county emergency managers. Rather than randomly targeting 341 respondents, the researcher preferred to survey the whole population, but still retain the sample size requirement in the form of percentage. In other words, taking 11% as the requirement for representativeness, the survey was still sent to 2902 county emergency managers/coordinators/directors whose contact information could be identified. This percentage requirement was set as a standard for FEMA regions; thus, regions with 11% or more responses would be considered adequately represented. FEMA regional percentages were calculated as the number of responses for the region divided by the number of counties the region encompasses.

A total of 315 e-mail addresses were identified as invalid when the survey was sent to 2902 e-mail addresses collected for this study. Thus, the potential number of respondents was 2586. Since there was a total of 560 completed surveys, the response rate for the survey is 21.7%. Overall, due to the fact that this study researched a very small population of 3060 counties, the maximum number of responses was targeted regardless of conventional sampling methods used for representativeness purposes. This issue is to be noted as a limitation of this study.

Table 5 above shows the percentage distributions at the state and regional levels. According to the table, the first, second, and third regions were under-represented with first and third being very close to 11%. Interestingly enough, under-representation is mainly in the northeastern region of the United States, which is parallel with a study by Environmental Protection Agency (EPA) (2008), which surveyed county Local Emergency Planning Committees (LEPCs) across United States and reached a response rate of 39.8% (939 responses),

finding that northeastern region was underrepresented, while southeastern, southwestern, and northwestern regions were overrepresented. This study's results are similar, and the highest response rate, namely 28%, is from the ninth FEMA region comprising Arizona, California, Hawaii, and Nevada, followed by the tenth and eighth FEMA regions.

It is important to note that northeastern region of the United States is known for New England states (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont) that reported to have no county-level emergency management during this study. Connecticut is of special case; the county government was abolished in the state in mid-twentieth century and counties are utilized only for geographic designation purposes; the single response from the state was provided by the city government responsible for emergency management within the geographical boundaries of the county. Despite these characteristics of the region, the researcher of this study located respective county-level emergency management representatives for the respective states and e-mailed the survey. This information regarding the region, however, should help understand the region's underrepresentation issues, especially when FEMA Region I is considered.

In addition to descriptive statistics about respondents, frequency distribution of responses to questions comprising the main latent constructs of this study was analyzed. There are three exogenous (organizational goal convergence (OGC), information-communication technology utilization (ICT), and inter-organizational trust (IOT)) and one endogenous latent construct (network sustainability (NS)) in this study.

Table 6: Frequency Distribution of Items for Organizational Goal Convergence

		Frequency	Percent	Cumulative Percent
OGC1 (Organizations in the network have different organizational priorities)	Strongly Disagree	9	1.7	1.7
	Disagree	90	16.9	18.5
	Neither agree/Nor disagree	65	12.2	30.7
	Agree	319	59.7	90.4
	Strongly Agree	51	9.6	100.0
	Total	534	100.0	
OGC2 (There is a gap between organizational goals in the network)	Strongly Disagree	14	2.6	2.6
	Disagree	157	29.4	32.0
	Neither agree/Nor disagree	143	26.8	58.8
	Agree	204	38.2	97.0
	Strongly Agree	16	3.0	100.0
	Total	534	100.0	
OGC3 (Organizations working together have little in common)	Strongly Disagree	84	15.7	15.7
	Disagree	353	66.1	81.8
	Neither agree/Nor disagree	62	11.6	93.4
	Agree	32	6.0	99.4
	Strongly Agree	3	.6	100.0
	Total	534	100.0	
OGC4 (Diversity of organizations in the network means fewer common organizational preferences)	Strongly Disagree	24	4.5	4.5
	Disagree	262	49.1	53.6
	Neither agree/Nor disagree	169	31.6	85.2
	Agree	76	14.2	99.4
	Strongly Agree	3	.6	100.0
	Total	534	100.0	
OGC5 (Variety of organizations results in multiple contrasting goals)	Strongly Disagree	23	4.3	4.3
	Disagree	215	40.3	44.6
	Neither agree/Nor disagree	131	24.5	69.1
	Agree	160	30.0	99.1
	Strongly Agree	5	.9	100.0
	Total	534	100.0	
OGC6 (Collaboration is challenging due to multiplicity of differing organizational backgrounds)	Strongly Disagree	23	4.3	4.3
	Disagree	176	33.0	37.3
	Neither agree/Nor disagree	91	17.0	54.3
	Agree	223	41.8	96.1
	Strongly Agree	21	3.9	100.0
	Total	534	100.0	

		Frequency	Percent	Cumulative Percent
OGC7 (Emergency management requires collaborating with organizations having different expectations)	Strongly Disagree	5	.9	.9
	Disagree	17	3.2	4.1
	Neither agree/Nor disagree	18	3.4	7.5
	Agree	328	61.4	68.9
	Strongly Agree	166	31.1	100.0
	Total	534	100.0	
OGC8 (Diverging organizational goals is the reality of emergency management networks)	Strongly Disagree	6	1.1	1.1
	Disagree	32	6.0	7.1
	Neither agree/Nor disagree	81	15.2	22.3
	Agree	341	63.9	86.1
	Strongly Agree	74	13.9	100.0
	Total	534	100.0	
OGC9 (Organizations are hardly related in terms of their organizational missions)	Strongly Disagree	30	5.6	5.6
	Disagree	278	52.1	57.7
	Neither agree/Nor disagree	145	27.2	84.8
	Agree	77	14.4	99.3
	Strongly Agree	4	.7	100.0
	Total	534	100.0	

All of the latent constructs were designed to have question items with the responses varying from “Strongly Disagree” to “Strongly Agree” on a 5-point Likert Scale having “Neither Agree/Nor Disagree” at the mid-point. No “Other” option was provided for these questions, since respondents were expected to fall within one of the five categories. For convenience purposes, the categories were provided in ascending order from left to right as: (1) Strongly Disagree; (2) Disagree; (3) Neither Agree/Nor Disagree; (4) Agree; (5) Strongly Agree.

Table 6 above shows the frequency distribution of the indicators for the first exogenous latent construct organizational goal convergence (OGC). The literature review provides insight into relationship between organizational goal convergence and network sustainability. Accordingly, organizations having more commonalities in terms of organizational goals, preferences, values, and norms – which is defined as organizational goal convergence in this study – would retain their relationships for longer periods of time (Rivera, Soderstrom, & Uzzi, 2010). Provan and Kenis (2007) point to this fact by mentioning “goal-directed” collaborative networks that are established to serve specific goal, thus, focusing on more relevant and field-related actors for participation. Such an approach would result in concentrated expertise, abilities, and skills around an issue to be addressed, leading to a more effective and efficient networked collaborative approach.

Nine indicators were specified for the purposes of this study. It should be noted that the indicators for OGC in the survey were asked in the form that represents organizational goal divergence as opposed to convergence. Therefore, these indicators were reversed in the process

of codification into SPSS spreadsheet to reflect organizational goal convergence instead of divergence.

Table 7: Frequency Distribution of Items for ICT Utilization

		Frequency	Percent	Cumulative Percent
ICT1 (In terms of collaboration, organizations rely on the use of information and communication technology)	Strongly Disagree			
	Disagree	12	2.2	2.2
	Neither agree/Nor disagree	28	5.2	7.5
	Agree	371	69.5	77.0
	Strongly Agree	123	23.0	100.0
	Total	534	100.0	
ICT2 (The network's operations are streamlined by technological tools of communication and coordination)	Strongly Disagree	1	.2	.2
	Disagree	28	5.2	5.4
	Neither agree/Nor disagree	80	15.0	20.4
	Agree	358	67.0	87.5
	Strongly Agree	67	12.5	100.0
	Total	534	100.0	
ICT3 (Organizations in the network have sufficient technical & technological capacity for emergency management)	Strongly Disagree	14	2.6	2.6
	Disagree	214	40.1	42.7
	Neither agree/Nor disagree	111	20.8	63.5
	Agree	189	35.4	98.9
	Strongly Agree	6	1.1	100.0
	Total	534	100.0	
ICT4 (The use of information and communication technology facilitates the operations of the network)	Strongly Disagree	3	.6	.6
	Disagree	19	3.6	4.1
	Neither agree/Nor disagree	56	10.5	14.6
	Agree	392	73.4	88.0
	Strongly Agree	64	12.0	100.0
	Total	534	100.0	
ICT5 (Inter-organizational operations in the network are supported by emergency information management systems)	Strongly Disagree	11	2.1	2.1
	Disagree	66	12.4	14.4
	Neither agree/Nor disagree	97	18.2	32.6
	Agree	306	57.3	89.9
	Strongly Agree	54	10.1	100.0
	Total	534	100.0	
ICT6 (The network would fail without technological capacity used for communication and coordination)	Strongly Disagree	22	4.1	4.1
	Disagree	198	37.1	41.2
	Neither agree/Nor disagree	115	21.5	62.7
	Agree	182	34.1	96.8
	Strongly Agree	17	3.2	100.0
	Total	534	100.0	

		Frequency	Percent	Cumulative Percent
ICT7 (If our networked emergency management is effective, it is mainly due to the use of ICT)	Strongly Disagree	17	3.2	3.2
	Disagree	130	24.3	27.5
	Neither agree/Nor disagree	137	25.7	53.2
	Agree	235	44.0	97.2
	Strongly Agree	15	2.8	100.0
	Total	534	100.0	
ICT8 (Technology makes our collaboration more efficient)	Strongly Disagree	3	.6	.6
	Disagree	18	3.4	3.9
	Neither agree/Nor disagree	47	8.8	12.7
	Agree	388	72.7	85.4
	Strongly Agree	78	14.6	100.0
	Total	534	100.0	
ICT9 (Inter-organizational collaboration in EM network is impossible without ICT)	Strongly Disagree	39	7.3	7.3
	Disagree	196	36.7	44.0
	Neither agree/Nor disagree	118	22.1	66.1
	Agree	159	29.8	95.9
	Strongly Agree	22	4.1	100.0
	Total	534	100.0	

Table 7 above shows the frequency distribution for the second exogenous latent construct information-communication technology utilization (ICT). The literature review points to the importance of ICT utilization in daily practices of organizational environment (Snow, Lipnack, & Stamps, 1999). ICT has been an enabler of collaboration through networks allowing geographically distant organizations and agencies to work together towards a common goal (DeMarie, 2000). The use of ICT in networks has been also cited in literature as a factor contributing to stability and sustainability of networks (Agranoff, 2006; Ahuja & Carley, 1999).

Nine indicators were chosen for ICT latent construct. As with all latent constructs in this study, ICT had also response options varying from "Strongly Disagree" to "Strongly Agree" on the 5-point Likert Scale. The content of the questions mainly focuses on the extent respondent organizations are dependent or relying on the use of technology in their day-to-day practices. The respondents, in turn, were expected to reply within the context of emergency management field, which heavily relies on technological tools for coordination and information sharing purposes. Without any further analysis at this stage, the responses seem to concentrate around response categories affirming the need and importance of information-communication technologies (ICT) in emergency management field.

Table 8 below, on the other hand, shows the frequency distribution of the third exogenous latent construct inter-organizational trust (IOT). Trust in inter-organizational networks has been widely cited in literature, usually cited in parallel with trust at inter-personal level. Trust has been considered as the cornerstone of and catalyst for successful inter-organizational collaboration (Bryson, Crosby, & Stone, 2006).

Table 8: Frequency Distribution of Items for Inter-Organizational Trust

		Frequency	Percent	Cumulative Percent
IOT1 (The organizations comprising our emergency management network have open communication)	Strongly Disagree	2	.4	.4
	Disagree	20	3.7	4.1
	Neither agree/Nor disagree	59	11.0	15.2
	Agree	387	72.5	87.6
	Strongly Agree	66	12.4	100.0
	Total	534	100.0	
IOT2 (The organizations in our emergency management network are reliable partners)	Strongly Disagree	1	.2	.2
	Disagree	7	1.3	1.5
	Neither agree/Nor disagree	47	8.8	10.3
	Agree	370	69.3	79.6
	Strongly Agree	109	20.4	100.0
	Total	534	100.0	
IOT3 (Honesty is the cornerstone of inter-organizational collaboration in our network)	Strongly Disagree			
	Disagree	3	.6	.6
	Neither agree/Nor disagree	58	10.9	11.4
	Agree	341	63.9	75.3
	Strongly Agree	132	24.7	100.0
	Total	534	100.0	
IOT4 (Inter-organizational relationships in our network are characterized by mutual understanding)	Strongly Disagree			
	Disagree	5	.9	.9
	Neither agree/Nor disagree	44	8.2	9.2
	Agree	400	74.9	84.1
	Strongly Agree	85	15.9	100.0
	Total	534	100.0	
IOT5 (Organizations in the network keep their commitment)	Strongly Disagree	2	.4	.4
	Disagree	17	3.2	3.6
	Neither agree/Nor disagree	116	21.7	25.3
	Agree	343	64.2	89.5
	Strongly Agree	56	10.5	100.0
	Total	534	100.0	
IOT6 (Mutual acceptance is the important part of inter-organizational collaboration in our network)	Strongly Disagree			
	Disagree	5	.9	.9
	Neither agree/Nor disagree	62	11.6	12.5
	Agree	398	74.5	87.1
	Strongly Agree	69	12.9	100.0
	Total	534	100.0	

		Frequency	Percent	Cumulative Percent
IOT7 (There is a common belief across the network that each actor is capable of contributing to the overall picture)	Strongly Disagree			
	Disagree	8	1.5	1.5
	Neither agree/Nor disagree	54	10.1	11.6
	Agree	372	69.7	81.3
	Strongly Agree	100	18.7	100.0
	Total	534	100.0	
IOT8 (Inter-organizational collaboration is characterized by mutual respect in our emergency management network)	Strongly Disagree			
	Disagree	5	.9	.9
	Neither agree/Nor disagree	58	10.9	11.8
	Agree	380	71.2	83.0
	Strongly Agree	91	17.0	100.0
	Total	534	100.0	
IOT9 (Organizations in the network collaborate with a sense of fairness towards each other)	Strongly Disagree	2	.4	.4
	Disagree	24	4.5	4.9
	Neither agree/Nor disagree	96	18.0	22.8
	Agree	352	65.9	88.8
	Strongly Agree	60	11.2	100.0
	Total	534	100.0	

Being an aggregate of inter-personal relations at the organizational level, inter-organizational trust is established and nurtured by previous experience (Kapucu, 2006a). It is when trust becomes the central tenet of relationships among organizations that brings about successful and effective results at the network level (Katz & Lazer, 2002). Provan, Fish and Sydow (2007) state that inter-organizational trust would be low if no previous experience regarding collaboration exists; such situation would require time to build trust. Thus, it should be nurtured by constant interaction and communication (Huxham, 2003) before, during and after collaboration (Bryson, Crosby, & Stone, 2006).

Inter-organizational trust latent construct has also 9 indicators in its initial generic model. As stated previously, the responses for the indicators of IOT vary from "Strongly Disagree" to "Strongly Agree" on a 5-point Likert Scale. The frequency distribution at this stage shows that responses to the questions concentrate around categories that affirm the existence of inter-organizational trust within collaborative emergency management networks of respective counties.

Table 9 below shows the frequency distribution of responses for indicators of the last latent construct, namely, network sustainability (NS), which is also the single endogenous latent construct of this study. Weber (2003) argues that the extent to which network relationships are maintained may affect the overall network performance. Sustained network relationships are the cornerstone of network effectiveness, therefore (Gillespie, Colignon, Banerjee, Murty, & Rogge, 1993; Trotter, Briody, Sengir, & Meerwarth, 2008). Network sustainability should be achieved if inter-organizational collaboration to bring long-run and effective results.

Table 9: Frequency Distribution of Items for Network Sustainability

		Frequency	Percent	Cumulative Percent
NS1 (Organizations in the network periodically contact each other to discuss issues pertaining to EM)	Strongly Disagree	1	.2	.2
	Disagree	26	4.9	5.1
	Neither agree/Nor disagree	53	9.9	15.0
	Agree	382	71.5	86.5
	Strongly Agree	72	13.5	100.0
	Total	534	100.0	
NS2 (Organizations constantly develop long-run relationships among each other)	Strongly Disagree			
	Disagree	14	2.6	2.6
	Neither agree/Nor disagree	107	20.0	22.7
	Agree	340	63.7	86.3
	Strongly Agree	73	13.7	100.0
	Total	534	100.0	
NS3 (Success of our EM network is dependent on the level of inter-organizational relationships)	Strongly Disagree	1	.2	.2
	Disagree	7	1.3	1.5
	Neither agree/Nor disagree	32	6.0	7.5
	Agree	352	65.9	73.4
	Strongly Agree	142	26.6	100.0
	Total	534	100.0	
NS4 (In the absence of disasters, organizations are involved in collaborative practices (such as exercises, drills))	Strongly Disagree			
	Disagree	20	3.7	3.7
	Neither agree/Nor disagree	28	5.2	9.0
	Agree	392	73.4	82.4
	Strongly Agree	94	17.6	100.0
	Total	534	100.0	
NS5 (The network sustains inter-organizational relationships for better results in further disasters)	Strongly Disagree			
	Disagree	7	1.3	1.3
	Neither agree/Nor disagree	52	9.7	11.0
	Agree	389	72.8	83.9
	Strongly Agree	86	16.1	100.0
	Total	534	100.0	
NS6 (Short-run inter-organizational relationships are less effective)	Strongly Disagree	4	.7	.7
	Disagree	65	12.2	12.9
	Neither agree/Nor disagree	168	31.5	44.4
	Agree	261	48.9	93.3
	Strongly Agree	36	6.7	100.0
	Total	534	100.0	

		Frequency	Percent	Cumulative Percent
NS7 (Organizations in our network constantly communicate and exchange information)	Strongly Disagree	2	.4	.4
	Disagree	44	8.2	8.6
	Neither agree/Nor disagree	121	22.7	31.3
	Agree	310	58.1	89.3
	Strongly Agree	57	10.7	100.0
	Total	534	100.0	
NS8 (Denser inter-organizational relationships make our network more effective in managing emergencies)	Strongly Disagree	2	.4	.4
	Disagree	21	3.9	4.3
	Neither agree/Nor disagree	150	28.1	32.4
	Agree	304	56.9	89.3
	Strongly Agree	57	10.7	100.0
	Total	534	100.0	
NS9 (The organizations in our network seldom, if any, collaborate in the absence of disasters)	Strongly Disagree	98	18.4	18.4
	Disagree	295	55.2	73.6
	Neither agree/Nor disagree	57	10.7	84.3
	Agree	73	13.7	97.9
	Strongly Agree	11	2.1	100.0
	Total	534	100.0	

Similar to the exogenous latent constructs, the endogenous latent construct of network sustainability consisted of 9 indicators measured on a 5-point Likert scale varying from "Storngly Disagree" to "Strongly Agree." Based on the preliminary analysis of above-mentioned frequency distributions, majority of the responses concentrate around the categories affirming the existence of sustained collaborative network relationships. This trend is similar to the trend in other latent constructs, the statistical significance of which was tested through structural equation modeling (SEM).

In addition to latent construct variables, there are two control variables, namely, the question that asked respondents whether they had a comprehensive emergency management plan (CEMP), and whether the respondent's county was urban or rural (COTY). Both of the variables were coded as dichotomous variables, the former with responses "Yes" and "No," and the latter with responses "Urban," "Rural," and "Other." Specifically the latter was recoded and entered into SPSS spreadsheet as "Urban" and "Non-Urban." The frequency distribution of the responses for the control variables is shown below in Table 10.

Table 10: Frequency Distribution of Control Variables

		Frequency	Percent	Cumulative Percent
CEMP (Does your county have a Comprehensive Emergency Management Plan?)	No	26	4.9	4.9
	Yes	508	95.1	100.0
	Total	534	100.0	
COTY (Which one best describes your county?)	Non-Urban	390	73.0	73.0
	Urban	144	27.0	100.0
	Total	534	100.0	

According to the table, some 95% of the counties have a comprehensive emergency management plan (CEMP) that directs emergency management in respective jurisdictions. The

main assumption in this study regarding CEMP variables was that having comprehensive emergency management plan would enhance, foster, facilitate or increase networked collaboration, especially because of CEMPs' nature and tendency to specify and break down the roles and responsibilities of stakeholders in respective jurisdictions. In other words, counties that have a CEMP bringing all stakeholders together would have a more effective collaborative emergency management network. This assumption was tested through SEM in the following sections.

On the other hand, only one-fourth of 534 respondents identified their county as urban, which is quite normal in the context of United States consisting mainly of rural jurisdictions when county governments are considered. No assumptions were made about the county type for the purposes of this study, and analysis of COTY variable's effect on network sustainability is for exploratory purposes only. The county type variable was also tested in through SEM, which is explained in upcoming sections.

In addition to descriptive statistics in the form frequency distribution, analysis of multicollinearity was performed to ensure indicators representing specific latent construct are not overly correlated, namely, to ensure different indicators do not measure exactly the same thing. Multicollinearity occurs when there is a high correlation among indicators. Kline (2005) states that multicollinearity exists when correlation coefficient is above .90, while Meyers, Gamst and Guarino (2006) argue that the threshold for interpretation should be .70. Table 11 and Table 12 below show inter-item correlations for indicators of the organizational goal convergence (OGC) and ICT utilization (ICT) latent constructs respectively.

Table 11: Correlation Matrix of Organizational Goal Convergence

		OGC1	OGC2	OGC3	OGC4	OGC5	OGC6	OGC7	OGC8	OGC9
OGC1 (Organizations in the network have different organizational priorities)	Correlation Coefficient	1.000								
	Sig. (2-tailed)	.								
	N	534								
OGC2 (There is a gap between organizational goals in the network)	Correlation Coefficient	.454	1.000							
	Sig. (2-tailed)	.000	.							
	N	534	534							
OGC3 (Organizations working together have little in common)	Correlation Coefficient	.178	.342	1.000						
	Sig. (2-tailed)	.000	.000	.						
	N	534	534	534						
OGC4 (Diversity of organizations in the network means fewer common organizational preferences)	Correlation Coefficient	.177	.309	.388	1.000					
	Sig. (2-tailed)	.000	.000	.000	.					
	N	534	534	534	534					
OGC5 (Variety of organizations results in multiple contrasting goals)	Correlation Coefficient	.261	.369	.293	.410	1.000				
	Sig. (2-tailed)	.000	.000	.000	.000	.				
	N	534	534	534	534	534				
OGC6 (Collaboration is challenging due to multiplicity of differing organizational backgrounds)	Correlation Coefficient	.256	.417	.309	.310	.422	1.000			
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.			
	N	534	534	534	534	534	534			
OGC7 (Emergency management requires collaborating with organizations having different expectations)	Correlation Coefficient	.256	.137	-.018	.052	.155	.199	1.000		
	Sig. (2-tailed)	.000	.001	.670	.233	.000	.000	.		
	N	534	534	534	534	534	534	534		
OGC8 (Diverging organizational goals is the reality of emergency management networks)	Correlation Coefficient	.305	.170	.047	.068	.215	.225	.468	1.000	
	Sig. (2-tailed)	.000	.000	.281	.118	.000	.000	.000	.	
	N	534	534	534	534	534	534	534	534	
OGC9 (Organizations are hardly related in terms of their organizational missions)	Correlation Coefficient	.121	.174	.342	.247	.287	.234	.011	.134	1.000
	Sig. (2-tailed)	.005	.000	.000	.000	.000	.000	.794	.002	.
	N	534	534	534	534	534	534	534	534	534

Table 12: Correlation Matrix for Information-Communication Technology Utilization

		ICT1	ICT2	ICT3	ICT4	ICT5	ICT6	ICT7	ICT8	ICT9
ICT1 (In terms of collaboration, organizations rely on the use of information and communication technology)	Correlation Coefficient	1.000								
	Sig. (2-tailed)	.								
	N	534								
ICT2 (The network's operations are streamlined by technological tools of communication and coordination)	Correlation Coefficient	.523	1.000							
	Sig. (2-tailed)	.000	.							
	N	534	534							
ICT3 (Organizations in the network have sufficient technical and technological capacity for emergency management)	Correlation Coefficient	.215	.302	1.000						
	Sig. (2-tailed)	.000	.000	.						
	N	534	534	534						
ICT4 (The use of information and communication technology facilitates the operations of the network)	Correlation Coefficient	.376	.487	.215	1.000					
	Sig. (2-tailed)	.000	.000	.000	.					
	N	534	534	534	534					
ICT5 (Inter-organizational operations in the network are supported by emergency/disaster information management systems)	Correlation Coefficient	.207	.284	.221	.295	1.000				
	Sig. (2-tailed)	.000	.000	.000	.000	.				
	N	534	534	534	534	534				
ICT6 (The network would fail without technological capacity used for communication and coordination)	Correlation Coefficient	.097	.061	.013	.102	.042	1.000			
	Sig. (2-tailed)	.025	.157	.768	.019	.336	.			
	N	534	534	534	534	534	534			
ICT7 (If our networked emergency management is effective, it is mainly due to the use of information and communication technologies)	Correlation Coefficient	.175	.116	.125	.143	.065	.482	1.000		
	Sig. (2-tailed)	.000	.007	.004	.001	.134	.000	.		
	N	534	534	534	534	534	534	534		
ICT8 (Technology makes our collaboration more efficient)	Correlation Coefficient	.346	.406	.086	.412	.262	.125	.256	1.000	
	Sig. (2-tailed)	.000	.000	.048	.000	.000	.004	.000	.	
	N	534	534	534	534	534	534	534	534	
ICT9 (Inter-organizational collaboration in emergency management network is impossible without technological tools of communication and coordination)	Correlation Coefficient	.032	.074	.082	.063	.052	.584	.451	.171	1.000
	Sig. (2-tailed)	.456	.089	.058	.148	.227	.000	.000	.000	.
	N	534	534	534	534	534	534	534	534	534

According to Table 11, there is no sign of multicollinearity among indicators of organizational goal convergence (OGC). The highest correlation coefficient appears to be between OGC7 and OGC8, which is .468, followed by .454 between OGC1 and OGC2, and .422 between OGC5 and OGC6. The lowest correlation, on the other hand, is between OGC7 and OGC9, which is .011. Except one, all correlation coefficients are of positive sign; the correlation between OGC3 and OGC7 is -.018. Having the values below .90 these values meet the criterion of having no multicollinearity; the values even meet Meyers et al.'s (2006) criterion of .70. Therefore, no indicator was removed from the generic measurement model of OGC during confirmatory factor analysis (CFA).

The values of inter-item correlations for information-communication technology (ICT) utilization latent construct in Table 12 have similar results. The highest correlation coefficient among indicators appears to be between ICT1 and ICT2, which is .523, followed by .487 between ICT2 and ICT4, and .482 between ICT6 and ICT7. The lowest correlation, on the other hand, is between ICT3 and ICT6, which is .013. All of the ICT indicators are positively correlated with each other. According to both criteria of Kline (2005) and Meyers et al. (2006), the values for ICT indicators are free of multicollinearity problem. Therefore, no indicator was removed from the generic measurement model of ICT during confirmatory factor analysis (CFA) in the following sections.

Table 13 and Table 14 below show correlation matrices for latent constructs of inter-organizational trust (IOT) and network sustainability (NS). Both of the constructs have nine indicators.

Table 13: Correlation Matrix for Inter-Organizational Trust

		IOT1	IOT2	IOT3	IOT4	IOT5	IOT6	IOT7	IOT8	IOT9
IOT1 (The organizations comprising our emergency management network have open communication)	Correlation Coefficient	1.000								
	Sig. (2-tailed)	.								
	N	534								
IOT2 (The organizations in our emergency management network are reliable partners)	Correlation Coefficient	.659	1.000							
	Sig. (2-tailed)	.000	.							
	N	534	534							
IOT3 (Honesty is the cornerstone of inter-organizational collaboration in our network)	Correlation Coefficient	.374	.453	1.000						
	Sig. (2-tailed)	.000	.000	.						
	N	534	534	534						
IOT4 (Inter-organizational relationships in our network are characterized by mutual understanding)	Correlation Coefficient	.514	.606	.535	1.000					
	Sig. (2-tailed)	.000	.000	.000	.					
	N	534	534	534	534					
IOT5 (Organizations in the network keep their commitment)	Correlation Coefficient	.446	.538	.373	.475	1.000				
	Sig. (2-tailed)	.000	.000	.000	.000	.				
	N	534	534	534	534	534				
IOT6 (Mutual acceptance is the important part of inter-organizational collaboration in our network)	Correlation Coefficient	.342	.385	.417	.482	.421	1.000			
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.			
	N	534	534	534	534	534	534			
IOT7 (There is a common belief across the network that each actor is capable of contributing to the overall picture)	Correlation Coefficient	.420	.500	.361	.505	.433	.478	1.000		
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.		
	N	534	534	534	534	534	534	534		
IOT8 (Inter-organizational collaboration is characterized by mutual respect in our emergency management network)	Correlation Coefficient	.438	.481	.459	.601	.455	.557	.618	1.000	
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.	
	N	534	534	534	534	534	534	534	534	
IOT9 (Organizations in the network collaborate with a sense of fairness towards each other)	Correlation Coefficient	.531	.485	.425	.551	.528	.451	.549	.620	1.000
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.
	N	534	534	534	534	534	534	534	534	534

Table 14: Correlation Matrix for Network Sustainability

		NS1	NS2	NS3	NS4	NS5	NS6	NS7	NS8	NS9
NS1 (Organizations in the network periodically contact each other to discuss issues pertaining to emergency management)	Correlation Coefficient	1.000								
	Sig. (2-tailed)	.								
	N	534								
NS2 (Organizations constantly develop long-run relationships among each other)	Correlation Coefficient	.588	1.000							
	Sig. (2-tailed)	.000	.							
	N	534	534							
NS3 (The success of our emergency management network is dependent on the level of inter-organizational relationships)	Correlation Coefficient	.423	.421	1.000						
	Sig. (2-tailed)	.000	.000	.						
	N	534	534	534						
NS4 (In the absence of disasters, organizations are involved in collaborative practices (such as exercises, drills))	Correlation Coefficient	.437	.493	.360	1.000					
	Sig. (2-tailed)	.000	.000	.000	.					
	N	534	534	534	534					
NS5 (The network sustains inter-organizational relationships for better results in further disasters)	Correlation Coefficient	.411	.499	.447	.561	1.000				
	Sig. (2-tailed)	.000	.000	.000	.000	.				
	N	534	534	534	534	534				
NS6 (Short-run inter-organizational relationships are less effective)	Correlation Coefficient	.034	.104	.134	.042	.154	1.000			
	Sig. (2-tailed)	.439	.016	.002	.337	.000	.			
	N	534	534	534	534	534	534			
NS7 (Organizations in our network constantly communicate and exchange information)	Correlation Coefficient	.546	.569	.306	.504	.450	.113	1.000		
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.009	.		
	N	534	534	534	534	534	534	534		
NS8 (Denser inter-organizational relationships make our network more effective in managing emergencies)	Correlation Coefficient	.282	.320	.279	.236	.370	.205	.374	1.000	
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.	
	N	534	534	534	534	534	534	534	534	
NS9 (The organizations in our network seldom, if any, collaborate in the absence of disasters)	Correlation Coefficient	.347	.297	.241	.339	.347	.058	.344	.265	1.000
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.179	.000	.000	.
	N	534	534	534	534	534	534	534	534	534

According to Table 13, there is no sign of multicollinearity among indicators of inter-organizational trust (IOT). The highest correlation appears to be between IOT1 and IOT2, which is .659, followed by .620 between IOT8 and IOT9, and .618 between IOT7 and IOT8. The lowest correlation, however, is between IOT1 and IOT6, which is .342. On the average, the inter-item correlation values for IOT are greater than the inter-item correlation values for OGC and ICT latent constructs. At the same time all of the values are of positive sign. Similar to results for OGC and ICT latent constructs, all of the correlation coefficients meet the criteria set by Kline (2005) and Meyers et al.'s (2006), and are below .90 and .70 respectively, showing no sign of multicollinearity. Therefore, no indicator was removed from the generic measurement model of IOT during confirmatory factor analysis (CFA).

Lastly, according to Table 14, there appears to be no sign of multicollinearity among indicators of network sustainability (NS) latent construct. The highest correlation appears to be between NS1 and NS2, which is .588, followed by .569 between NS2 and NS7, and .561 between NS4 and NS5. The lowest correlation, on the other hand, is between NS1 and NS6, which is .034. All of the indicators are positively correlated among each other, showing no inverse relationships among indicators. Again, having the values below .90 and even below .70 and satisfying the criteria set by Kline (2005) and Meyers et al.'s (2006) respectively, the inter-item correlations show no sign of multicollinearity; thus, no indicator was removed from the generic measurement model of network sustainability (NS) latent construct in CFA analysis in upcoming section.

Because none of the latent constructs in this study have multicollinearity problem among their respective indicators chosen for confirmatory factor analysis (CFA) of measurement models, all of them were decided to be used in further analyses. The next section discusses the issue of reliability or internal consistency of indicators constructing the latent constructs of this study.

5.2. Internal Consistency

Reliability of the construct indicators is one of the issues to be considered when dealing with scale variables. Evaluating the extent to which scale items constructed from ordinal data measure the same concept (Cronbach, 1951), Cronbahc's Alpha value was utilized in this study. It is important to note that while confirmatory factor analysis (CFA) is already a method to evaluate constructs' internal consistency, analysis of reliability using Cronbach's Alpha values was performed to additionally support further steps.

While George and Mallery (2006) argue that for excellent, good and acceptable internal consistency a value of .90 and above, .80 and above, and .70 and above should be achieved respectively, Kline (2005) argues that a value of .70 and above would be enough to guarantee acceptable level of internal consistency. For the purposes of this study, the threshold of .70 was chosen as the criterion for internal consistency of items comprising latent constructs of this study. Table 15 below shows the Cronbach's Alpha values calculated by SPSS for group of indicators of organizational goal convergence (OGC), information-communication technology utilization (ICT), inter-organizational trust (IOT), and network sustainability (NS).

Table 15: Cronbach's Alpha Reliability Coefficients for Latent Constructs

Latent Construct	Cronbach's Alpha (α)	# of Items
Organizational Goal Convergence (OGC)	.757	9
Information-Communication Technology Utilization (ICT)	.709	9
Inter-Organizational Trust (IOT)	.885	9
Network Sustainability (NS)	.780	9

According to the table, all of the four constructs satisfy the criterion of .70 with the lowest α value of .709 for information-communication technology utilization (ICT), and the highest α value of .885 for inter-organizational trust (IOT). Therefore, all of the indicators assumed for CFA analysis were preserved and included in generic measurement models of the latent constructs. The next section discusses findings related to confirmatory factor analysis (CFA) of the measurement models of exogenous and endogenous latent constructs of this study.

5.3. Confirmatory Factor Analysis (CFA)

Confirmatory factor analysis (CFA) is a statistical method to evaluate the extent to which theory-driven indicators of a latent construct are the valid measure of that specific construct (Byrne, 2006). CFA is a technique to evaluate whether factor loadings of the indicators measuring specific construct are in accordance with the theory (Garson, 2011). The three exogenous and one endogenous variable were evaluated through CFA method using Amos 18.0 statistical software. As stated previously in methodology section, the CFA analyses were performed based on the three-step method by Wan (2002), which entails 1) checking the appropriateness of indicators for each latent construct; 2) overall model evaluation; and, 3) model adjustment based on the modification indices proposed by the model analysis.

The criteria regarding the appropriateness of indicators were chosen as follows: (1) the indicators whose critical ratios were statistically insignificant at the level of .05 are to be removed from the model; (2) the indicators with the regression weight value below .40 are to be removed from the model.

The criteria set for evaluation of fit of measurement models were set as following: (1) the smallest Chi-square value possible; (2) the Chi-square related p value equal to or greater than .05; (3) the ration of to Chi-square to degrees of freedom equal to or smaller than 4; (4) the root mean square error of approximation (RMSEA) value of .06 or smaller; (5) the RMSEA related p value equal to or greater than .05; (6) the goodness of fit (GFI), adjusted goodness of fit (AGFI), comparative fit index (CFI), and Tucker-Lewis index (TLI) values equal to or greater than .90, and (7) the Hoelter's index value equal to or greater than 200. Due to some authors' concerns regarding the reliability of Chi-square related values, and GFI and AGFI indices, some flexibility was shown in terms of satisfying these measures. Specific attention was given to satisfying criteria regarding the root mean square error of approximation (RMSEA), the RMSEA related p value, comparative fit index (CFI), Tucker-Lewis index (TLI), and Hoelter's index. Maximum effort was made to decrease the Chi-square/degrees-of-freedom ratio to the value before 4.

Figure 7 below shows the generic measurement model of organizational goal convergence (OGC) exogenous latent construct. OGC consists of nine indicators measuring the extent to which organizational goals are similar across the network organizations (see Table 1 for complete list of indicators for this latent construct). The results of the initial CFA analysis, namely, goodness-of-fit statistics and parameter estimates are shown in Table 16 and Table 17

respectively. Based on the first step requiring analysis of appropriateness of indicators, there appear to be no indicators with statistically insignificant critical ratios; however, there are three indicators, namely, OGC7, OGC8, and OGC9, that have regression weights below set threshold of .40 (Table 17). These indicators were removed from the model; no other indicator was removed from the model during further steps until desired model fit was achieved.

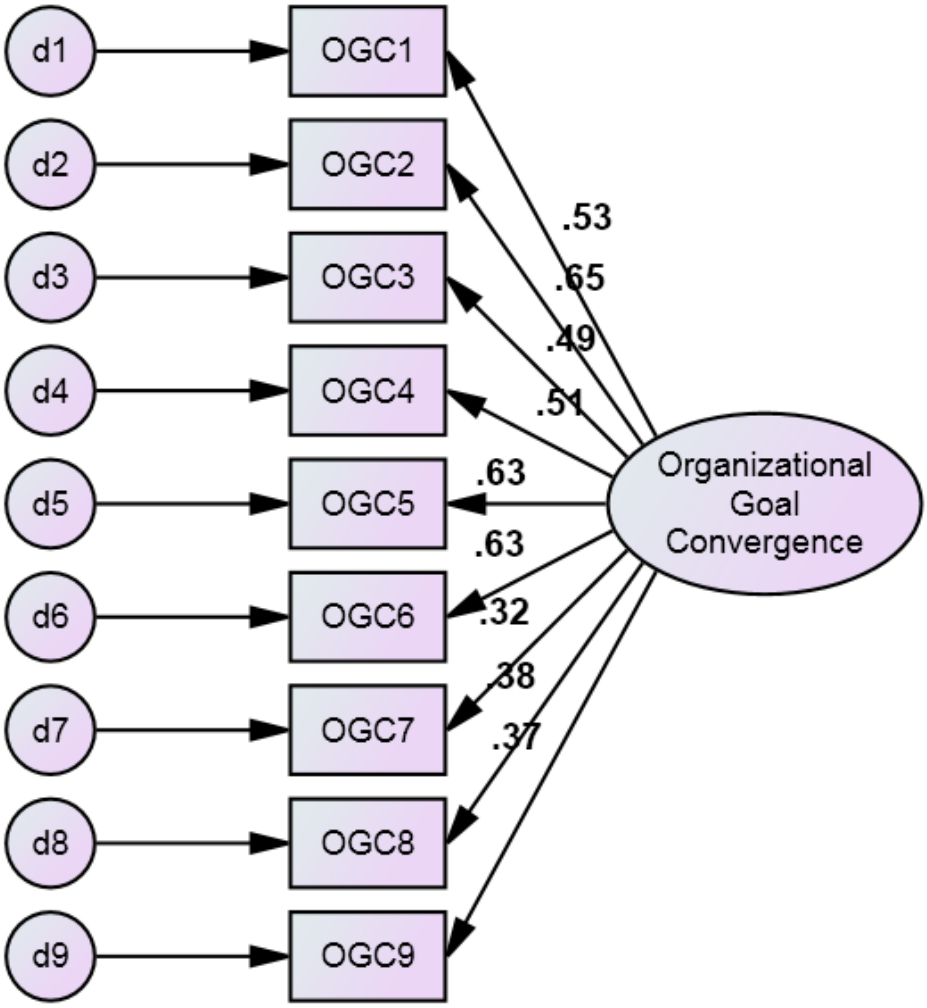

Figure 7: Generic Measurement Model of Organizational Goal Convergence

All of the remaining indicators had statistically significant critical ratio and regression weight after deletion of OGC7, OGC8, and OGC9. Analysis of goodness-of-fit statistics was performed next. While Table 16 shows the initial goodness-of-fit statistics before deletion of the three indicators, there was still poor fit after deletion was performed. Subsequent steps comprise changes based on the suggestions by the modification indices statistics provided by Amos software in the output. Accordingly, two pairs of measurement errors were correlated to achieve model fit. Figure 8 below shows the revised measurement model of organizational goal convergence (OGC) latent construct.

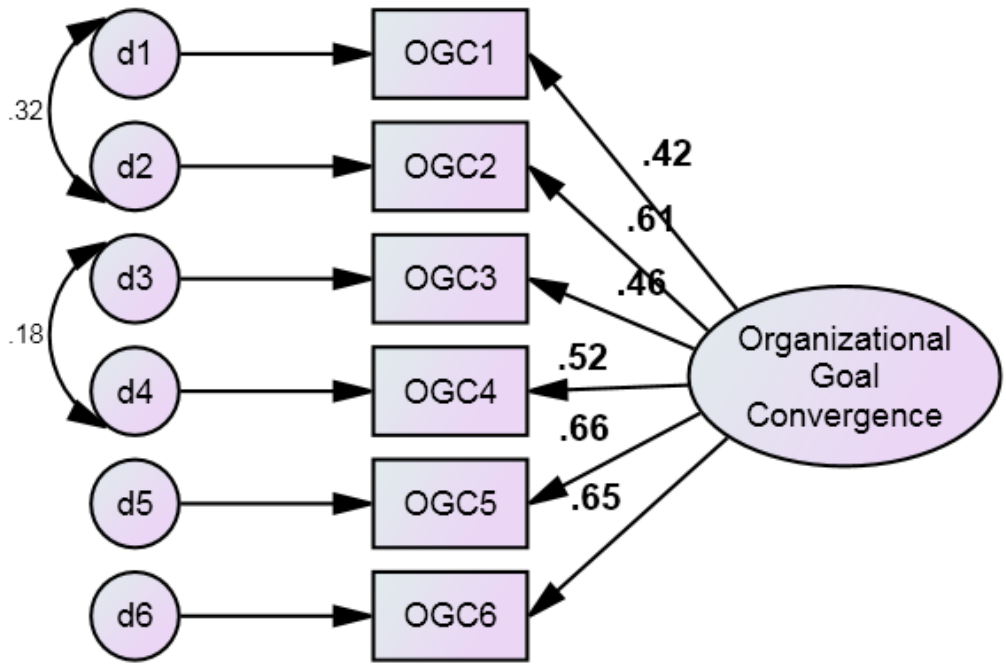

Figure 8: Revised Measurement Model of Organizational Goal Convergence

The goodness-of-fit and parameter estimates of both generic and revised models are shown in Table 16 and Table 17. Accordingly, only Chi-square related p value was not satisfied in the final model, which can be attributed to its sensitivity to sample size.

Table 16: Goodness-of-Fit Statistics of Organizational Goal Convergence

Index	Shorthand	Threshold	Generic Model	Revised Model
Chi-Square	$\chi 2$ or CMIN	Smallest	221.391	15.612
Chi-Square related p value	p	$\geq .05$	.000	.029
Chi-square / Degree of Freedom	$\chi 2$ / df	≤ 4	8.200	2.230
Root Mean Square Error of Approximation	RMSEA	$\leq .06$	.116	.048
RMSEA-related p value	PCLOSE	$\geq .05$	.000	.489
Goodness of fir index	GFI	$\geq .90$	.912	.990
Adjusted goodness of fit index	AGFI	$\geq .90$	.854	.971
Comparative fit index	CFI	$\geq .90$	.787	986
Tucker-Lewis Index	TLI	$\geq .90$	.716	971
Hoelter's critical N	Hoelter Index	≥ 200	97	481

All other indices criteria were satisfied. In addition, all indicators as well as correlated pairs of measurement errors are statistically significant.

Table 17: Parameter Estimates of Organizational Goal Convergence

INDICATOR	GENERIC MODEL					REVISED MODEL				
	URW	SRW	SE	CR	P	URW	SRW	SE	CR	P
OGC9	1.000	.375								
OGC8	.952	.383	.163	5.837	***					
OGC7	.750	.325	.142	5.288	***					
OGC6	2.092	.632	.289	7.233	***	1.742	.655	.236	7.368	***
OGC5	1.909	.635	.264	7.244	***	1.594	.660	.216	7.379	***
OGC4	1.309	.506	.196	6.685	***	1.080	.520	.159	6.774	***
OGC3	1.160	.487	.176	6.574	***	.887	.463	.139	6.399	***
OGC2	1.960	.649	.269	7.288	***	1.492	.614	.169	8.816	***
OGC1	1.571	.526	.231	6.788	***	1.000	.417			
d2 <--> d1						.201	.319	.036	5.647	***
d4 <--> d3						.081	.178	.024	3.423	***

Note: URW = Unstandardized Regression Weights; SRW = Standardized Regression Weights; SE = Standard Error; CR = Critical Ratio; *** = Correlation is significant at .01 level

Lastly, all regression weights of indicators are above .40 varying from the lowest .42 to the highest .66 (Table 17). Overall, three indicators were deleted, and two pairs of measurement errors were correlated to achieve desired model fit for organizational goal convergence (OGC) latent construct.

Figure 9 below shows the generic measurement model of information-communication technology utilization (ICT) exogenous latent construct. ICT consists of nine indicators measuring the extent to which organizations utilize technological tools for networked collaboration (see Table 1 for complete list of indicators for this latent construct). The results of the initial CFA analysis, namely, goodness-of-fit statistics and parameter estimates are shown in Table 18 and Table 19 respectively. Based on the first step requiring analysis of appropriateness of indicators, there were no indicators with statistically insignificant critical ratios; however, there were four indicators, namely, ICT3, ICT6, ICT7, and ICT9, that have regression weights below set threshold of .40 (Table 19). These indicators were removed from the model; no other indicator was removed from the model during further steps until desired model fit was achieved.

All of the remaining indicators had statistically significant critical ratio and regression weight after deletion of ICT3, ICT6, ICT7, and ICT9. Analysis of goodness-of-fit statistics was performed next. While Table 18 shows the initial goodness-of-fit statistics before deletion of the four indicators, there was still poor fit after deletion was performed. No further steps were needed to be taken based on the suggestions by the modification indices to improve the model fit.

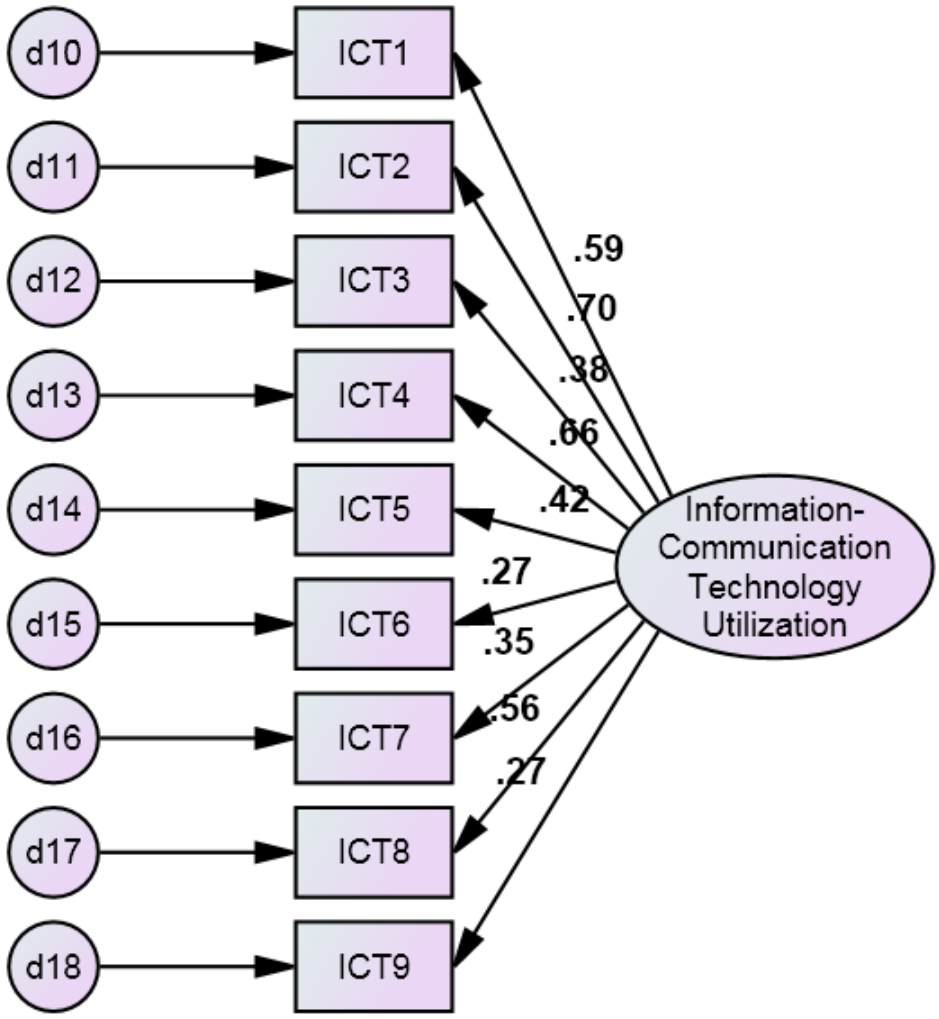

Figure 9: Generic Measurement Model of Information-Communication Technology Utilization

Figure 10 below shows the revised measurement model of information-communication technology utilization (ICT) latent construct. The goodness-of-fit and parameter estimates of both generic and revised models are shown in Table 18 and Table 19. Accordingly, similar to OGC latent construct, only Chi-square related p value was not satisfied in the final model, which can be attributed to its sensitivity to sample size. No further steps were taken to improve the model fit.

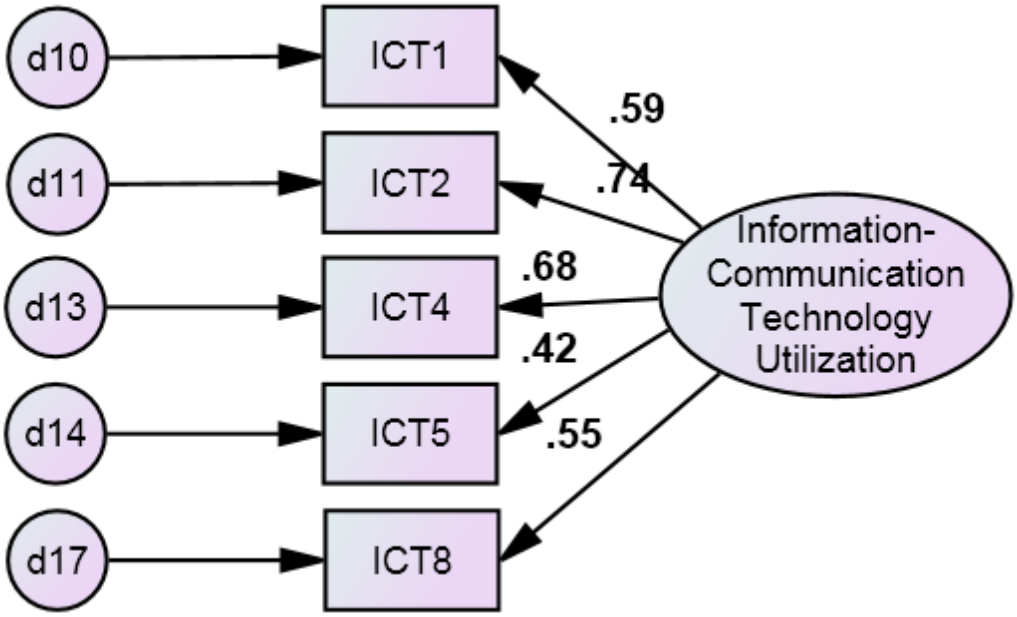

Figure 10: Revised Measurement Model of Information-Communication Technology Utilization

Despite the unsatisfied Chi-square related p value, however, all other criteria were met.

Table 18: Goodness-of-Fit Statistics of Information-Communication Technology Utilization

Index	Shorthand	Threshold	Generic Model	Revised Model
Chi-Square	$\chi 2$ or CMIN	Smallest	436.093	11.550
Chi-Square related p value	p	$\geq .05$	.000	.041
Chi-square / Degree of Freedom	$\chi 2$ / df	≤ 4	16.152	2.310
Root Mean Square Error of Approximation	RMSEA	$\leq .06$	.169	.050
RMSEA-related p value	PCLOSE	$\geq .05$	.000	.447
Goodness of fir index	GFI	$\geq .90$	.833	.991
Adjusted goodness of fit index	AGFI	$\geq .90$	.721	.973
Comparative fit index	CFI	$\geq .90$	.607	.987
Tucker-Lewis Index	TLI	$\geq .90$	.477	.974
Hoelter's critical N	Hoelter Index	≥ 200	50	511

Lastly, all regression weights of indicators in the revised measurement model are above .40 varying from the lowest .42 to the highest .74 (Table 19). Overall, four indicators were deleted, and no pairs of measurement errors were correlated to achieve desired model fit for information-communication technology utilization (ICT) latent construct.

Table 19: Parameter Estimates of Information-Communication Technology Utilization

INDICATOR	GENERIC MODEL					REVISED MODEL				
	URW	SRW	SE	CR	P	URW	SRW	SE	CR	P
ICT9	.574	.266	.108	5.316	***					
ICT8	.748	.563	.071	10.605	***	.691	.547	.067	10.327	***
ICT7	.671	.347	.098	6.858	***					
ICT6	.563	.274	.103	5.465	***					
ICT5	.786	.425	.095	8.283	***	.747	.425	.090	8.262	***
ICT4	.871	.661	.073	11.978	***	.854	.682	.071	12.037	***
ICT3	.739	.379	.099	7.460	***					
ICT2	1.000	.700				1.000	.737			
ICT1	.723	.591	.066	11.035	***	.683	.587	.062	10.941	***

Note: URW = Unstandardized Regression Weights; SRW = Standardized Regression Weights; SE = Standard Error; CR = Critical Ratio; *** = Correlation is significant at .01 level

Figure 11 below shows the generic measurement model of inter-organizational trust (IOT) exogenous latent construct. IOT consists of nine indicators measuring the extent to which organizations perceive their networked collaboration is based on trust (see Table 1 for complete list of indicators for this latent construct). The results of the initial CFA analysis, namely, goodness-of-fit statistics and parameter estimates are shown in Table 20 and Table 21 respectively. Based on the first step requiring analysis of appropriateness of indicators, there were no indicators with statistically insignificant critical ratios. In addition, there were no indicators with regression weights below .40; therefore, no indicators were deleted (Table 21).

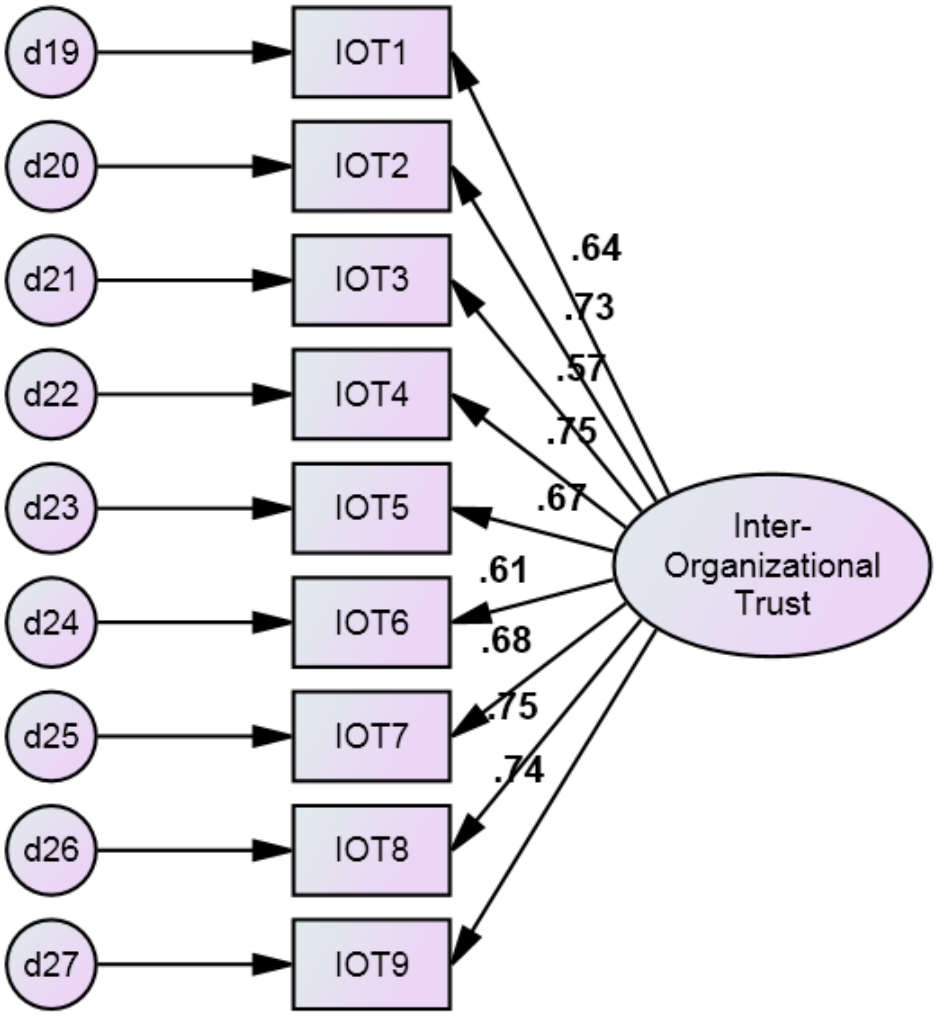

Figure 11: Generic Measurement Model of Inter-Organizational Trust

Analysis of goodness-of-fit statistics was performed next. According to Table 20 there was a poor model fit during the initial run of the CFA analysis. Based on suggestions by the modification indices output, six pairs of measurement errors were correlated to improve the model fit.

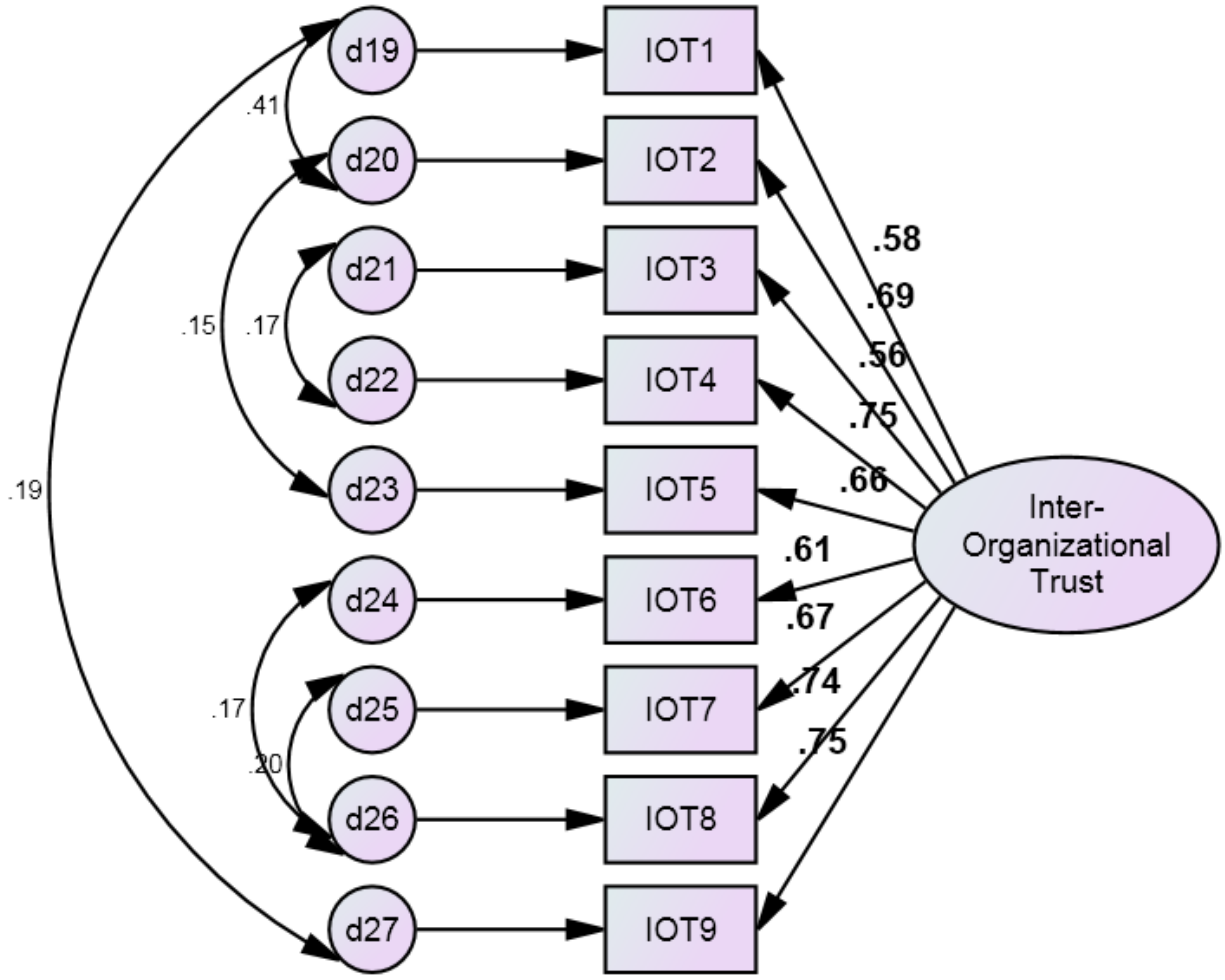

Figure 12: Revised Measurement Model of Inter-Organizational Trust

Figure 12 above shows the revised measurement model of inter-organizational trust (IOT) latent construct. The goodness-of-fit and parameter estimates of both generic and revised models are shown in Table 20 and Table 21. Accordingly, similar to OGC and ICT latent constructs, only Chi-square related p value was not satisfied in the final model, which can be attributed to its sensitivity to sample size. No further steps were taken to improve the model fit especially with the purpose not to make the model more complex by correlating more pairs of measurement errors.

Table 20: Goodness-of-Fit Statistics of Inter-Organizational Trust

Index	Shorthand	Threshold	Generic Model	Revised Model
Chi-Square	$\chi 2$ or CMIN	Smallest	220.125	61.535
Chi-Square related p value	p	$\geq .05$	.000	.000
Chi-square / Degree of Freedom	$\chi 2$ / df	≤ 4	8.153	2.930
Root Mean Square Error of Approximation	RMSEA	$\leq .06$	.116	.060
RMSEA-related p value	PCLOSE	$\geq .05$	.000	.155
Goodness of fir index	GFI	$\geq .90$	.912	.976
Adjusted goodness of fit index	AGFI	$\geq .90$	.854	.949
Comparative fit index	CFI	$\geq .90$	.908	.981
Tucker-Lewis Index	TLI	$\geq .90$	.877	.967
Hoelter's critical N	Hoelter Index	≥ 200	98	283

Table 21: Parameter Estimates of Inter-Organizational Trust

INDICATOR	GENERIC MODEL					REVISED MODEL				
	URW	SRW	SE	CR	P	URW	SRW	SE	CR	P
IOT9	1.000	.744				1.000	.748			
IOT8	.819	.751	.048	16.967	***	.808	.744	.050	16.089	***
IOT7	.780	.683	.051	15.355	***	.765	.673	.053	14.564	***
IOT6	.629	.608	.046	13.602	***	.624	.606	.048	13.097	***
IOT5	.872	.669	.058	15.041	***	.856	.661	.060	14.354	***
IOT4	.767	.751	.045	16.976	***	.765	.752	.047	16.404	***
IOT3	.663	.567	.053	12.631	***	.648	.556	.054	11.924	***
IOT2	.840	.725	.051	16.363	***	.792	.689	.053	14.998	***
IOT1	.802	.642	.056	14.401	***	.719	.577	.052	13.711	***
d20 <--> d19						.093	.412	.011	8.124	***
d27 <--> d19						.047	.193	.011	4.079	***
d26 <--> d25						.033	.204	.009	3.756	***
d26 <--> d24						.027	.169	.008	3.310	***
d23 <--> d20						.032	.149	.010	3.161	.002
d22 <--> d21						.029	.167	.009	3.142	.002

Note: URW = Unstandardized Regression Weights; SRW = Standardized Regression Weights; SE = Standard Error; CR = Critical Ratio; *** = Correlation is significant at .01 level

Despite the unsatisfied Chi-square related p value, however, all other criteria were met. Lastly, all regression weights of indicators in the revised measurement model are above .40 varying from the lowest .56 to the highest .75 (Table 21). Overall, no indicators were deleted, and six pairs of measurement errors were correlated to achieve desired model fit for inter-organizational trust (IOT) latent construct.

The last variable in this study is the endogenous latent construct network sustainability (NS). Figure 13 below shows the generic measurement model of network sustainability (NS) endogenous latent construct. NS consists of nine indicators measuring the extent to which organizations retain their networked collaboration over time (see Table 1 for complete list of indicators for this latent construct). The results of the initial CFA analysis, namely, goodness-of-fit statistics and parameter estimates are shown in Table 22 and Table 23 respectively.

Based on the first step requiring analysis of appropriateness of indicators, there were no indicators with statistically insignificant critical ratios. On the other hand, there were two indicators, namely NS6 and NS9, with regression weights below .40 (Table 21). These indicators were removed from the model, and no other indicators were removed from the model during further steps until desired model fit was achieved.

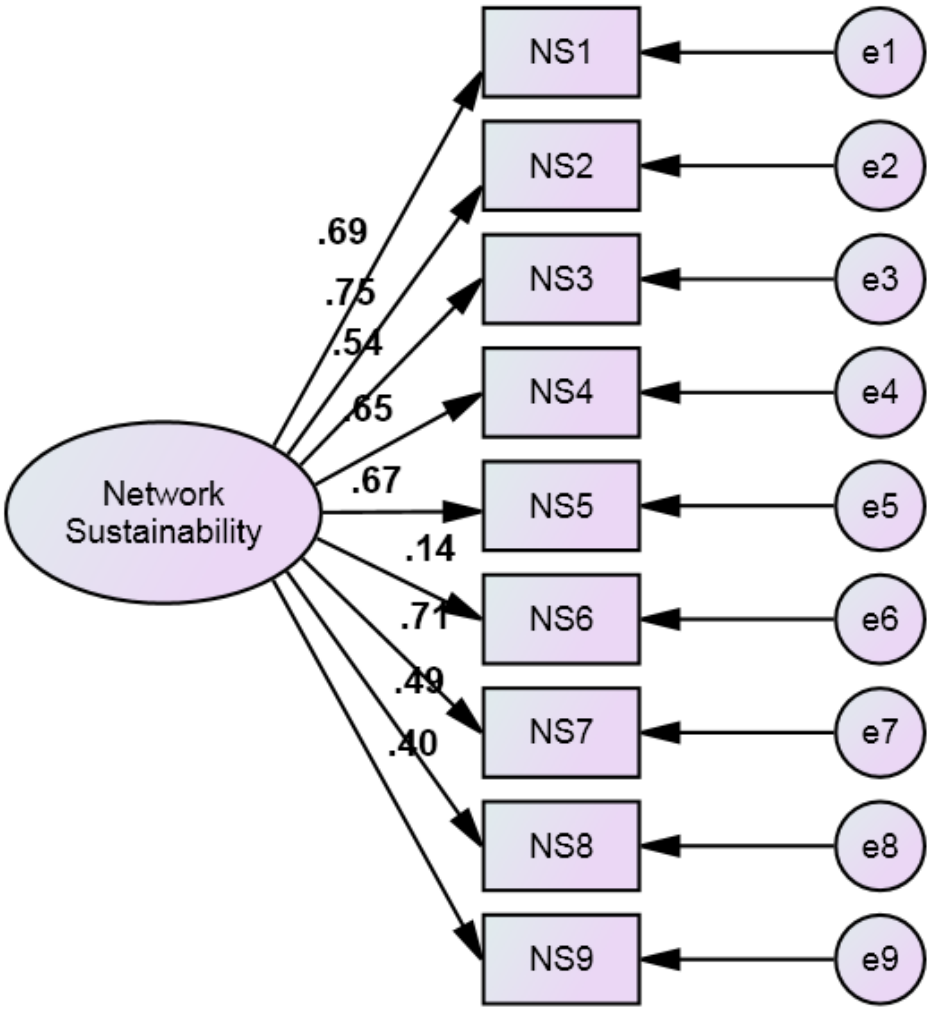

Figure 13: Generic Measurement Model of Network Sustainability

All of the remaining indicators had statistically significant critical ratio and regression weight after deletion of NS6 and NS9. Analysis of goodness-of-fit statistics was performed next. While Table 22 shows the initial goodness-of-fit statistics before deletion of the two indicators, there was still poor fit after deletion was performed. Further changes were suggested by the modification indices output to improve the generic model. Accordingly, five pairs of measurement errors were correlated to improve the model fit.

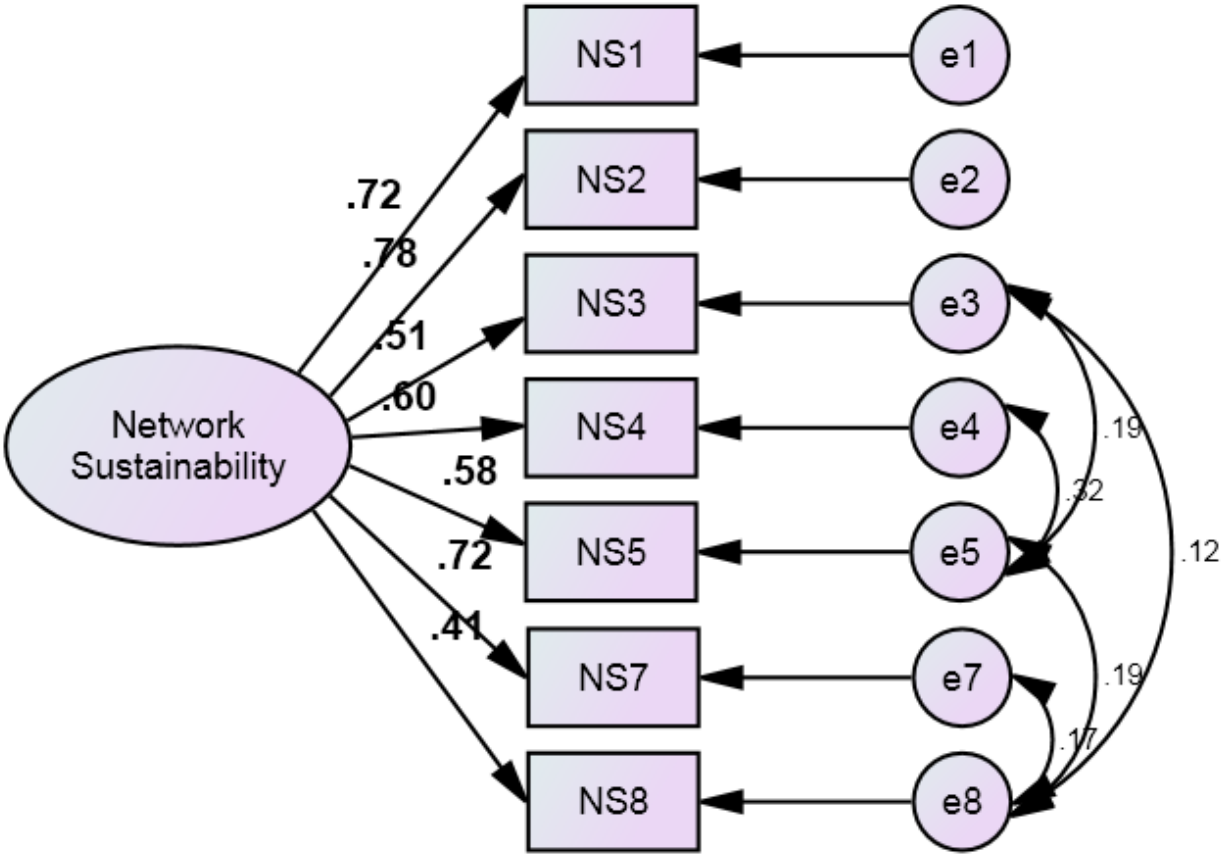

Figure 14: Revised Measurement Model of Network Sustainability

Figure 14 above shows the revised measurement model of network sustainability (NS) latent construct. The goodness-of-fit and parameter estimates of both generic and revised models are shown in Table 22 and Table 23. Accordingly, similar to OGC, ICT and IOT latent constructs, only Chi-square related p value was not satisfied in the final model, which can be attributed to its sensitivity to sample size. No further steps were taken to improve the model fit due to the fact that there were no changes suggested by modification indices output by Amos.

Table 22: Goodness-of-Fit Statistics of Network Sustainability

Index	Shorthand	Threshold	Generic Model	Revised Model
Chi-Square	$\chi 2$ or CMIN	Smallest	134.428	18.045
Chi-Square related p value	p	$\geq .05$	.000	.035
Chi-square / Degree of Freedom	$\chi 2$ / df	≤ 4	4.979	2.005
Root Mean Square Error of Approximation	RMSEA	$\leq .06$	.086	.043
RMSEA-related p value	PCLOSE	$\geq .05$	.000	.603
Goodness of fir index	GFI	$\geq .90$	.946	.991
Adjusted goodness of fit index	AGFI	$\geq .90$	.910	.971
Comparative fit index	CFI	$\geq .90$	.917	.992
Tucker-Lewis Index	TLI	$\geq .90$	.889	.982
Hoelter's critical N	Hoelter Index	≥ 200	160	500

Table 23: Parameter Estimates of Network Sustainability

INDICATOR	GENERIC MODEL					REVISED MODEL				
	URW	SRW	SE	CR	P	URW	SRW	SE	CR	P
NS1	1.000	.688				1.000	.725			
NS2	1.077	.752	.072	14.878	***	1.066	.784	.069	15.481	***
NS3	.714	.540	.064	11.118	***	.634	.505	.061	10.450	***
NS4	.878	.654	.066	13.225	***	.767	.602	.062	12.370	***
NS5	.819	.673	.060	13.557	***	.671	.582	.056	11.899	***
NS6	.246	.137	.084	2.909	.004					
NS7	1.220	.714	.085	14.266	***	1.174	.724	.080	14.627	***
NS8	.762	.488	.075	10.102	***	.612	.413	.073	8.341	***
NS9	.850	.397	.102	8.308	***					
e4 <--> e5						.071	.323	.011	6.406	***
e3 <--> e5						.045	.191	.011	4.207	***
e5 <--> e8						.054	.185	.013	4.275	***
e7 <--> e8						.059	.168	.018	3.293	***
e3 <--> e8						.041	.120	.016	2.611	.009

Note: URW = Unstandardized Regression Weights; SRW = Standardized Regression Weights; SE = Standard Error; CR = Critical Ratio; *** = Correlation is significant at .01 level

Despite the unsatisfied Chi-square related p value, however, all other criteria were met. Lastly, all regression weights of indicators in the revised measurement model are above .40 varying from the lowest .41 to the highest .78 (Table 21). Overall, two indicators were deleted, and five pairs of measurement errors were correlated to achieve desired model fit for network sustainability (NS) endogenous latent construct.

Overall, three indicators from organizational goal convergence (OGC), four indicators from information-communication technology utilization (ICT), and two indicators from network sustainability (NS) measurement models were removed throughout the CFA analysis process due to their below-threshold factor loadings. No indicators were removed from inter-organizational trust (IOT) scale. The next section describes the structural equation modeling (SEM) process combining above-mentioned revised measurement models into a covariance structure model.

5.4. Structural Equation Modeling (SEM)

This section analyzes the last stage of statistical analyses, namely, structural equation modeling (SEM). SEM is an analytical method useful to analyze causal relationships among several variables in a combined structural model (Wan, 2002). It is known for its ability to account for measurement errors of indicators comprising latent constructs (Byrne, 2006). Covariance structure model is a combined model of latent and control variables, and their theory-driven relationship paths among them to be tested in the form of hypotheses (Kaplan, 2000).

SEM was used in this study to evaluate the covariance structure model consisting of three exogenous and endogenous latent constructs. The endogenous latent construct in this study was

network sustainability (NS), while three exogenous latent constructs were organizational goal convergence (OGC), information-communication technology utilization (ICT), and inter-organizational trust (IOT). The indicators of the latent constructs comprised questions with ordinal-data responses varying from "Strongly Disagree" to "Strongly Agree," having "Neither Agree/Nor Disagree" at the mid-point. There were also two control variables, namely, whether county emergency management departments have comprehensive emergency management plan (CEMP), which was coded as dichotomous variable with "Yes" and "No" categories, and the type of county (COTY), which was coded as a dichotomous variable with "Urban" and "Non-Urban" categories. The generic covariance structure model for this study is shown below in Figure 15.

.

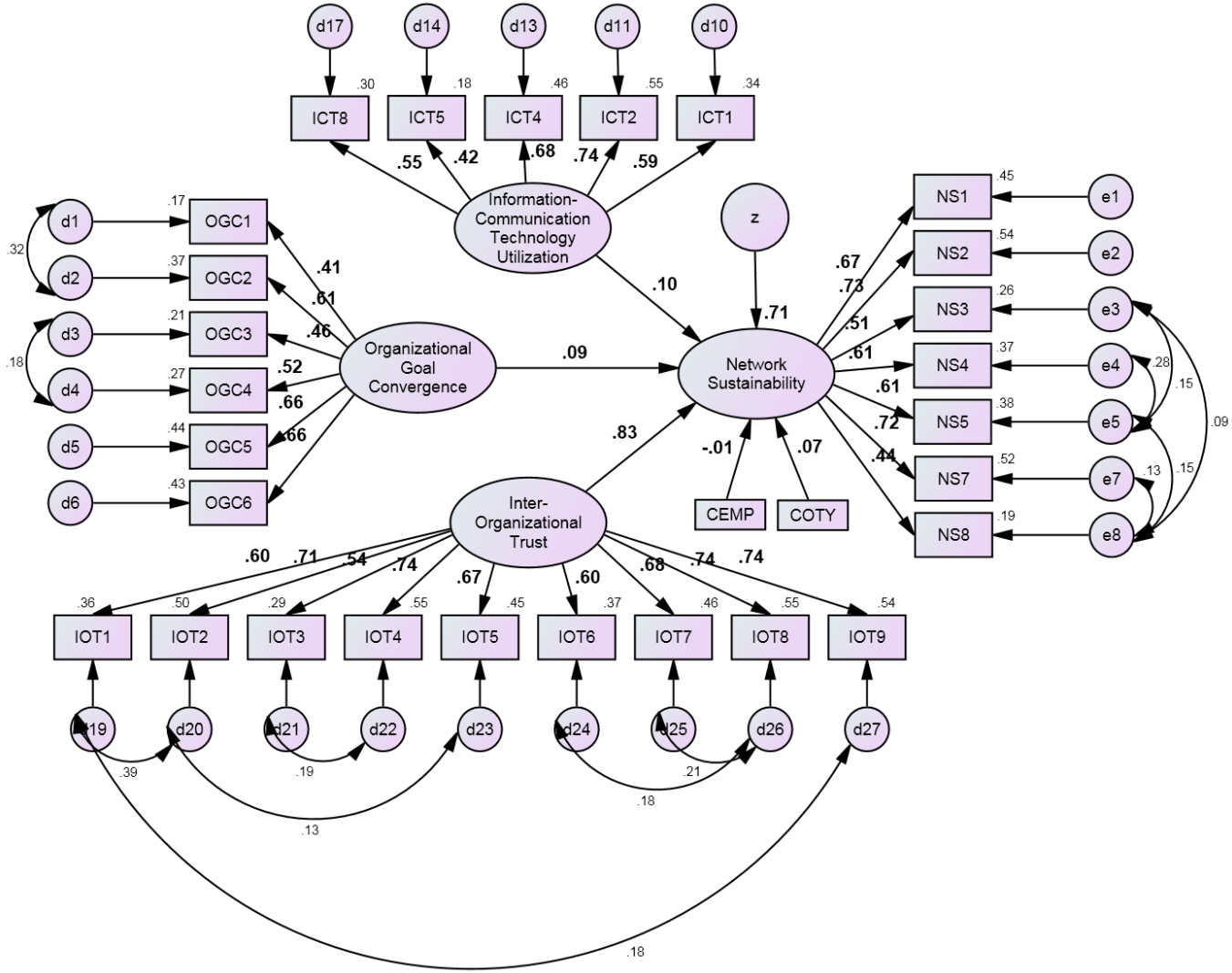

Figure 15: Generic Covariance Structure Model

Similar to the methodology in CFA analysis, the three-step analysis technique suggested by Wan (2002) was utilized to evaluate statistical outputs provided by Amos 18.0 software. Accordingly, (1) the appropriateness of indicators for further analysis was checked first; (2) then goodness-of-fit statistics were evaluated; and, (3) lastly, changes in the model were implemented based on the suggestions provided by modification indices statistics in the output. In terms of the first stage, all indicators and correlated pairs of measurement errors should be removed from the model if the absolute value of critical ratios is equal to or smaller than +1.96, thus, if they are statistically insignificant. In that accordance, only control variable CEMP and the correlation between measurement errors e3 and e8 were statistically insignificant, and, thus, removed from the model after initial run. No indicators or correlations between measurements of errors were identified as statistically insignificant in the further steps of the analysis until the model fit was achieved.

The next step was to look at the goodness-of-fit statistics of the overall model. It should be noted that no other changes were implemented after deletion of control variable CEMP and correlation between measurement errors e3 and e8; therefore, there was only one set of changes implemented after generic model was revised to achieve the desired model fit. The deletion of above-mentioned indicators resulted in the final model accepted as fit for the purposes of this study. The revised covariance structure model is shown in Figure 16 below.

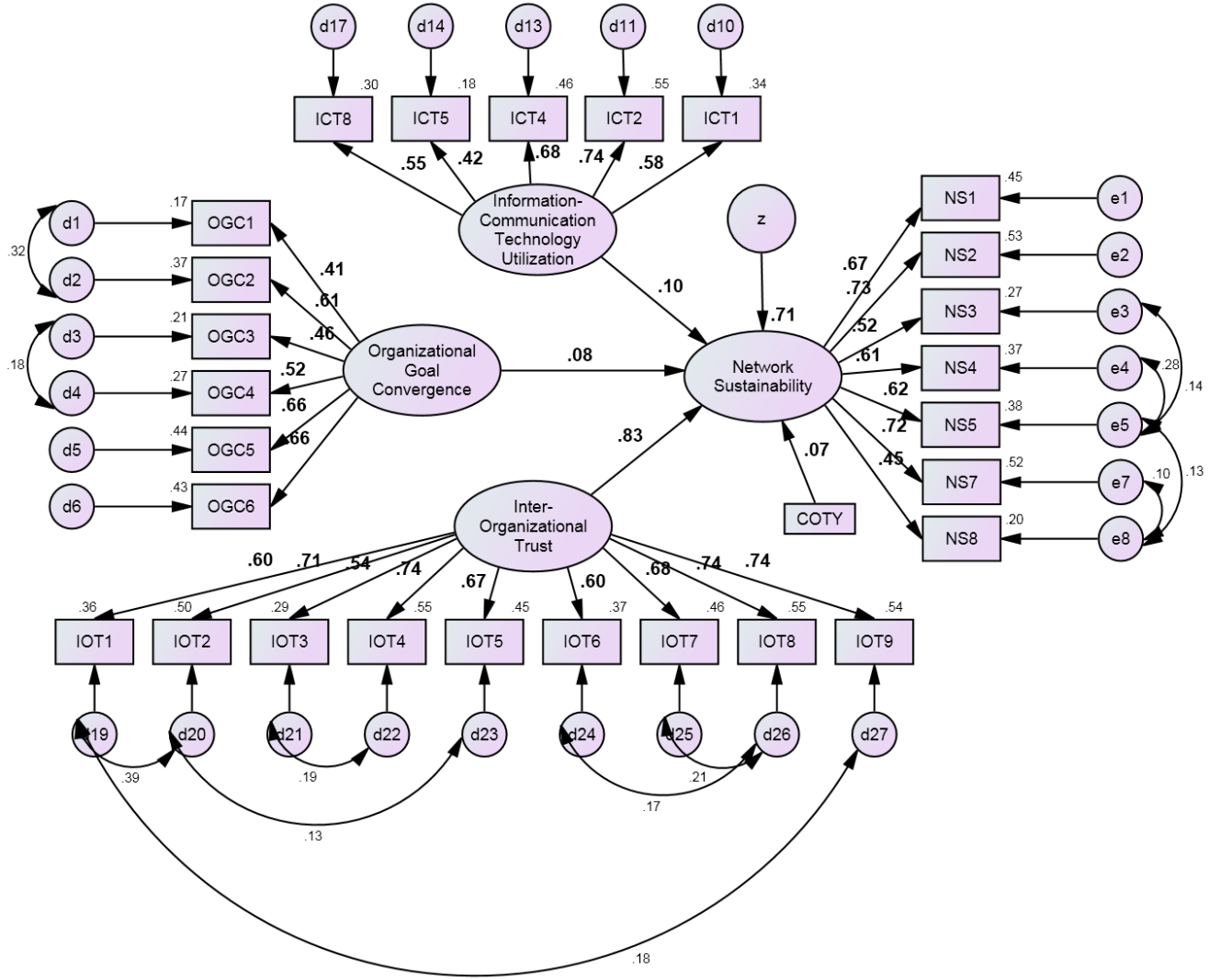

Figure 16: Revised Covariance Structure Model

The goodness-of-fit statistics of the revised covariance structure model are not significantly different from the generic one: the Tucker-Lewis index (TLI) was the only change which resulted in improvement of TLI from .896 to .900. The Chi-square related p value in both models remained unsatisfied, and this may be attributed to its sensitivity to sample size. Therefore, this statistics may be overlooked especially because the sample size of the study is greater than 200 (Garson, 2011). In addition, the AGFI index also was unsatisfied in both models, but this may be again attributed to the index's sensitivity to sample size (Garson, 2011; Hu & Bentler, 1999), and, thus, overlooked. As stated previously, the outmost attention was given to satisfying criteria regarding the root mean square error of approximation (RMSEA), the RMSEA related p value, comparative fit index (CFI), Tucker-Lewis index (TLI), and Hoelter's index. In addition, maximum effort was made to decrease the Chi-square/degrees-of-freedom ratio to the value before 4. The goodness-of-fit statistics for generic and revised structural equation models are shown below in Table 24.

Table 24: Goodness-of-Fit Statistics of Covariance Structure Model

Index	Shorthand	Threshold	Generic Model	Revised Model
Chi-Square	$\chi 2$ or CMIN	Smallest	845.022	798.010
Chi-Square related p value	p	$\geq .05$	.000	.000
Chi-square / Degree of Freedom	$\chi 2$ / df	≤ 4	2.341	2.382
Root Mean Square Error of Approximation	RMSEA	$\leq .06$	.050	.051
RMSEA-related p value	PCLOSE	$\geq .05$	.470	.363
Goodness of fir index	GFI	$\geq .90$	.901	.903
Adjusted goodness of fit index	AGFI	$\geq .90$	.881	.882
Comparative fit index	CFI	$\geq .90$	.907	.911
Tucker-Lewis Index	TLI	$\geq .90$	.896	.900
Hoelter's critical N	Hoelter Index	≥ 200	257	253

On the other hand, all parameter estimates in the revised structural equation model are statistically significant at the .05 level, and are above .40 varying from the lowest .41 to the highest .75 (Table 25). When hypothesized paths between exogenous and endogenous latent constructs are analyzed, all of them appear to be statistically significant. More specifically, organizational goal convergence (OGC) is positively correlated with network sustainability with correlation coefficient of .08 (p=.043); information-communication technology utilization (ICT) is positively correlated with network sustainability with correlation coefficient of .10 (p=.012); and, inter-organizational trust (IOT) is positively correlated with network sustainability with correlation coefficient of .83 ($p \leq .001$). These three paths are of positive sign meaning that increase in these variables would lead to increase in network sustainability. In addition, the variable county type (COTY) is also a statistically significant factor influencing network sustainability with correlation coefficient of .07 (p=.041). Though some are very low, these factors were confirmed to contribute to network sustainability in overall picture. These findings are also consistent with the arguments from relevant literature, thus, supporting positive relationships among exogenous and endogenous latent constructs.

The overall model specifies that the three exogenous latent constructs organizational goal convergence (OGC), information-communication technology utilization (ICT) and, inter-organizational trust (IOT), along with the control variable of county type (COTY) account for 71% of variation in network sustainability, with inter-organizational trust being prevailingly strongest factor. This specific finding leads to a strong conclusion that network sustainability is mainly a matter of inter-organizational trust.

Table 25: Parameter Estimates of Covariance Structure Model

INDICATOR			GENERIC MODEL					REVISED MODEL				
			URW	SRW	SE	CR	P	URW	SRW	SE	CR	P
Network Sustainability	<---	ICT Utilization	.083	.098	.034	2.476	.013	.084	.099	.033	2.501	.012
Network Sustainability	<---	Organizational Goal Convergence	.101	.089	.047	2.151	.032	.094	.083	.046	2.019	.043
Network Sustainability	<---	Inter-Organizational Trust	.710	.828	.054	13.040	***	.711	.831	.054	13.058	***
Network Sustainability	<---	CEMP	-.013	-.007	.069	-.191	.848					
Network Sustainability	<---	COTY	.067	.068	.034	1.993	.046	.069	.070	.034	2.043	.041
OGC6	<---	Organizational Goal Convergence	1.765	.658	.240	7.345	***	1.764	.657	.240	7.344	***
OGC5	<---	Organizational Goal Convergence	1.615	.662	.220	7.355	***	1.614	.662	.219	7.354	***
OGC4	<---	Organizational Goal Convergence	1.096	.523	.162	6.764	***	1.095	.523	.162	6.763	***
OGC3	<---	Organizational Goal Convergence	.893	.462	.140	6.370	***	.893	.462	.140	6.371	***
OGC2	<---	Organizational Goal Convergence	1.488	.607	.170	8.758	***	1.489	.608	.170	8.759	***
OGC1	<---	Organizational Goal Convergence	1.000	.413				1.000	.413			
ICT8	<---	ICT Utilization	.690	.548	.066	10.386	***	.690	.549	.066	10.389	***
ICT5	<---	ICT Utilization	.741	.424	.090	8.262	***	.742	.424	.090	8.263	***
ICT4	<---	ICT Utilization	.848	.680	.070	12.074	***	.848	.680	.070	12.074	***
ICT2	<---	ICT Utilization	1.000	.740				1.000	.740			
ICT1	<---	ICT Utilization	.677	.585	.062	10.944	***	.677	.585	.062	10.941	***
IOT9	<---	Inter-Organizational Trust	1.000	.738				1.000	.738			
IOT8	<---	Inter-Organizational Trust	.813	.739	.050	16.266	***	.813	.739	.050	16.273	***

INDICATOR			GENERIC MODEL					REVISED MODEL				
			URW	SRW	SE	CR	P	URW	SRW	SE	CR	P
IOT7	<---	Inter-Organizational Trust	.779	.675	.052	14.846	***	.778	.675	.052	14.852	***
IOT6	<---	Inter-Organizational Trust	.631	.604	.048	13.246	***	.631	.605	.048	13.262	***
IOT5	<---	Inter-Organizational Trust	.882	.672	.060	14.779	***	.883	.672	.060	14.794	***
IOT4	<---	Inter-Organizational Trust	.766	.744	.047	16.449	***	.766	.743	.047	16.452	***
IOT3	<---	Inter-Organizational Trust	.638	.540	.054	11.772	***	.638	.540	.054	11.778	***
IOT2	<---	Inter-Organizational Trust	.826	.708	.053	15.610	***	.826	.708	.053	15.618	***
IOT1	<---	Inter-Organizational Trust	.757	.598	.053	14.363	***	.756	.598	.053	14.358	***
NS1	<---	Network Sustainability	1.000	.673				1.000	.672			
NS7	<---	Network Sustainability	1.260	.724	.089	14.167	***	1.261	.723	.089	14.153	***
NS8	<---	Network Sustainability	.707	.436	.080	8.830	***	.727	.449	.080	9.132	***
NS2	<---	Network Sustainability	1.068	.732	.075	14.302	***	1.067	.730	.075	14.284	***
NS3	<---	Network Sustainability	.697	.511	.067	10.420	***	.705	.516	.067	10.542	***
NS4	<---	Network Sustainability	.837	.608	.069	12.192	***	.838	.607	.069	12.189	***
NS5	<---	Network Sustainability	.768	.615	.063	12.268	***	.772	.617	.063	12.311	***
d2 <--> d1			.206	.323	.036	5.775	***	.206	.323	.036	5.768	***
d4 <--> d3			.081	.178	.024	3.412	***	.081	.178	.024	3.410	***
d20 <--> d19			.085	.390	.011	7.747	***	.085	.391	.011	7.762	***
d27 <--> d19			.043	.178	.011	3.878	***	.043	.179	.011	3.894	***
d26 <--> d25			.034	.206	.008	3.985	***	.034	.206	.008	3.994	***

INDICATOR	GENERIC MODEL					REVISED MODEL				
	URW	SRW	SE	CR	P	URW	SRW	SE	CR	P
d26 <--> d24	.028	.175	.008	3.569	***	.028	.175	.008	3.564	***
d23 <--> d20	.027	.130	.010	2.811	.005	.027	.130	.010	2.801	.005
d22 <--> d21	.034	.192	.009	3.781	***	.034	.193	.009	3.787	***
e4 <--> e5	.058	.283	.010	5.695	***	.059	.285	.010	5.710	***
e3 <--> e5	.034	.154	.010	3.383	***	.031	.140	.010	3.132	.002
e5 <--> e8	.042	.153	.012	3.464	***	.036	.133	.012	3.064	.002
e7 <--> e8	.042	.127	.017	2.553	.011	.034	.102	.016	2.057	.040
e3 <--> e8	.028	.085	.015	1.871	.061					

Note: URW = Unstandardized Regression Weights; SRW = Standardized Regression Weights; SE = Standard Error; CR = Critical Ratio; *** = Correlation is significant at .01 level

The next section discusses hypothesis testing with concluding remarks about statistical analysis chapter of this study.

5.5. Hypothesis Testing

The purpose of this study was to analyze the relationships between organizational goal convergence (OGC), information-communication technology utilization (ICT), and inter-organizational trust (IOT) as exogenous variables, on the one hand, and network sustainability (NS) as endogenous variable, on the other. In addition, the effects of the control variables, namely, whether county emergency management agencies have a comprehensive emergency management plan (CEMP), and the county type as being urban vs. non-urban (COTY), were analyzed. Based on theoretical background, the following hypotheses were formulated and tested in this study:

Hypothesis 1: Organizational goal convergence is positively correlated network sustainability.

The first hypothesis of this study was supported by the analysis results. The results show that organizational goal convergence has a positive and statistically significant effect on network sustainability ($\beta = .083$, $p < 0.05$). With an unstandardized regression coefficient of .094, the relationship suggests that one standard deviation increase in organizational goal convergence would lead to a .09 increase in network sustainability.

Hypothesis 2: Information-communication technology utilization is positively correlated with network sustainability.

This hypothesis of the study was also supported. The results show that information-communication technology utilization has a positive and statistically significant impact on network sustainability ($\beta = .099$, $p < 0.05$). With an unstandardized regression coefficient of .084, the relationship suggests that one standard deviation increase in information-communication technology utilization would lead to a .08 increase in network sustainability.

Hypothesis 3: Inter-organizational trust is positively correlated with network sustainability.

The third hypothesis of the study was also supported. The results show that inter-organizational trust has a positive and statistically significant influence on network sustainability ($\beta = .831$, $p < 0.05$). With an unstandardized regression coefficient of .711, the relationship suggests that one standard deviation increase in inter-organizational trust would lead to a .71 increase in network sustainability.

In addition to above-mentioned hypotheses, this study intended to analyze the relative impact of the exogenous latent constructs on network sustainability. The following assumption was established for the purposes of this study to be examined:

Assumption: Inter-organizational trust has a greater impact on network sustainability than ICT utilization followed by organizational goals convergence.

In light of the findings, the assumption that inter-organizational trust (SRW=.831) has the strongest impact on network sustainability when compared to information-communication technology utilization (SRW=.099) and organizational goal convergence (SRW=.083) was

supported. In addition, the second part of the assumption was also supported. Thus, the above-mentioned assumption was completely supported and verified. The summary of the hypothesis testing results is presented in table below:

Table 26: Summary of Hypothesis Testing Results

	HYPOTHESES / ASSUMPTIONS	RESULTS
H1	Organizational goal convergence is positively correlated with network sustainability	SUPPORTED
H2	Information-communication technology utilization is positively correlated with network sustainability	SUPPORTED
H3	Inter-organizational trust is positively correlated with network sustainability	SUPPORTED
A1	Inter-organizational trust has the strongest impact on network sustainability followed by ICT utilization and organizational goal convergence	SUPPORTED

This chapter covered statistical analysis and respective findings with a rough evaluation of the results through hypothesis testing. All of the hypotheses and assumptions established at the beginning of the study were supported by the study findings. Accordingly, organizational goal convergence, information-communication technology utilization, and inter-organizational trust are positively associated with network sustainability; and, inter-organizational trust has the strongest impact on network sustainability followed by ICT utilization and organizational goal convergence. The next chapter discusses the implications derived from the findings, and concludes the study with suggestions for further research.

CHAPTER 6. DISCUSSION, IMPLICATIONS, AND LIMITATIONS

This section focuses on the theoretical, policy and managerial implications as well as limitations of the study. An overall discussion on the topic studied is provided, and the topics for further research are articulated. The section ends with an overall conclusion of the study.

6.1. Discussion

Emergency management has become a field that requires collaborative practices to tackle disasters and emergencies. The main reason for this is the fact that no single agency or community is capable of responding to severe and large-scale disasters on its own. This reality pushed jurisdictions and communities to focus on networked approach to emergency management, in which organizations from different sectors and levels of government mobilize and share resources, information, personnel and expertise to address the common problem at hand.

The networked approach in emergency management has taken a unique form in the context of the United States. The developments of the twentieth century resulted in increasingly collaborative approach to dealing with disasters, which ultimately entails involvement of governments, different sectors, and individuals in the response framework. Local emergency management, in this regard, plays a vital role, since disasters are mostly local, requiring initial response by local authorities including emergency medical services, firefighters, police and related agencies.

On the other hand, county emergency management plays a central role in organization and implementation of local emergency management services (Waugh, 1994). Being the most appropriate mechanism for emergency management at local level, county governments in the United States are the main coordinators of emergency operations during emergencies in disasters. Most of the county governments have an emergency operation center (EOC) specifically designed for coordination of emergency situations in collaborative setting. When emergency strikes, agencies from different sectors and expertise come together under this umbrella mechanism for a common purpose to deal with emergency and minimize threat and damages to life and property of respective communities.

When disaster is over, the agencies collaborating in a networked format during emergencies return to their non-emergency status – a situation resulting in decreased collaboration and partnership. This situation, however, urges for increased network activities that would provide for a non-disrupted mechanism of collaboration for future disasters and emergencies. In other words, the network relationships are to be developed and sustained over time in the absence of disasters so that when an emergency strikes again, all organizations are prepared and ready to collaborate.

With the above-mentioned picture in mind, this study intended to analyze the impact of organizational goal convergence, information-communication technology utilization, and inter-organizational trust on network sustainability in emergency management. More specifically, this study intended to ask the following questions:

1) Does organizations' similarity in terms of goals and missions lead to sustained network relationships?

2) Does organizations' utilization of information-communication technologies contribute to sustained network relationships?

3) Does trust between organizations lead to sustained network relationships?

4) Of the three factors specified above, which is the one contributing the most to network sustainability?

Accordingly, this study derived three distinct hypotheses claiming that there is a positive association between organizational goal convergence, information-communication technology utilization, and inter-organizational trust, on the one hand, and network sustainability, on the other. These hypotheses assumed that an increase in the former exogenous constructs would result in an increase in the latter endogenous constructs – the claims derived from related literature to various extents. In addition, based on prevalent occurrence in the literature, the study assumed that inter-organizational trust would have the strongest influence on network sustainability, followed by relatively concrete factor of information-communication technology utilization, and relatively abstract factor of organizational goal convergence. All of these assumptions were tested via statistical analysis using structure equation modeling (SEM).

Based on the analysis results, all of the above-mentioned hypotheses and assumptions were supported. Firstly, based on the final revised structural equation model, it was found that organizational goal convergence has a positive association with network sustainability with the

regression weight of .083. While relatively low, this coefficient means that organizations having more commonalities and similarity in terms of their goals and missions would have longer network relationships. This finding was also supported by a scarce literature on the topic (Bryson, Crosby, & Stone, 2006; Rivera, Soderstrom, & Uzzi, 2010).

The information-communication technology utilization, on the other hand, had a slightly higher coefficient, namely a regression weight of .099. Being comparatively low, this relationships means that organizations in a network that utilize information-communication technology for communication, sharing and coordination purposes would have longer network relationships when compared to those with limited technical capacity. Again, this finding was also supported by the literature on the topic (Ahuja & Carley, 1999; Burkhardt & Brass, 1990; DeMarie, 2000; Kelly & Stark, 2002).

The latent construct inter-organizational trust, in turn, showed an unexpectedly high correlation with network sustainability. More specifically, inter-organizational trust has a positive association with network sustainability with the standardized regression weight of .831 – the prevailingly strongest factor in the SEM model. This relationship means that network sustainability, namely the extent to which organizations in a network would maintain their relationships over time, is mostly a matter of how much they trust each other. This finding, in turn, was supported by extensive literature citing trust as the cornerstone of inter-personal and inter-organizational relationships (Bryson, Crosby, & Stone, 2006; Huxham, 2003; Katz & Lazer, 2002; Lane & Bachmann, 1998; Provan, Fish, & Sydow, 2007).

The relative importance of the factors affecting network sustainability in the model, lastly, was also analyzed. The findings suggest that the assumption of the study is supported. In other words, inter-organizational trust has the strongest impact on network sustainability (SRW=.831), followed by information-communication technology utilization (SRW=.099) and organizational goal convergence (SRW=.083). While there is not much difference between the latter two, there is a great discrepancy in terms of the impact inter-organizational trust has on network sustainability. These differences in terms of influence should guide several practical and theoretical applications, which is discussed in the implications section below.

In addition to the relationships among latent constructs mentioned above, this study also examined the impact of two control variables on network sustainability. The first control variable was the question asking whether county emergency management departments playing substantial role in establishment, development and maintenance of inter-organizational emergency management networks have a comprehensive emergency management plan (CEMP) that would establish a mechanism for operations and overall coordination of emergency management activities in times of emergencies. The assumption of the study was that those counties with CEMP would be better organized for networked governance of emergencies and disasters, while the findings proved otherwise. The control variable CEMP appeared to a statistically insignificant factor (p=.848), bearing no evidence of influence on network sustainability. This finding means that the extent to which inter-organizational networked relationships are sustain is not a function of the comprehensive emergency management plan (CEMP) that prescribes the roles, responsibilities, expectations and mechanism of coordination and collaboration during possible emergencies.

The second control variable, on the other hand, namely the type of county – whether a county is urban vs. non-urban – has a statistically significant (p=.041) positive relationship with the endogenous latent construct network sustainability. The coefficient of the relationship was .070 according to the final revised covariance structure model, and the relationship means that being an urban county, which was coded as 1, has a positive impact on network sustainability, thus, leading to longer relationships among emergency management organizations. While the coefficient is low, the relationship is still informative of some structural characteristics that bring about more sustainable networks in urban context.

Overall, the findings in regard to relationships of above-mentioned latent constructs and control variables with the endogenous latent variable network sustainability are of substantial significance in several aspects. Several implications may be derived from this study, which are described in the following section.

6.2. Implications

This study analyzed the impact of organizational goals convergence, information-communication technology utilization, and inter-organizational trust on network sustainability in emergency management context in the United States. The implications derived from this study may be discussed under four headings, namely, theoretical, methodological, policy, and managerial.

6.2.1. Theoretical

The theoretical framework that guided this study was created based on the previous literature. While there was no study, to the best knowledge of the author, specifically analyzing factors affecting network sustainability, this study presents a unique framework that brings together conceptual (organizational goal convergence), structural/technical (information-communication technology utilization), and relational (inter-organizational trust) factors into one single picture to analyze their impacts on network sustainability. Being separately but scarcely cited in related literature, these factors have been argued to impact network sustainability in positive way. This study supports the theoretical assumptions of previous research and re-affirms that network sustainability, along other possible explanatory factors, is a function of how much organizations are alike, the extent to which they utilize information-communication technology, and the extent they develop trust among each other.

In addition to the general theoretical implications specified above, there a specific implication that concerns the field this study was applied to. The network sustainability concept in this study was tested in the context of emergency management field, which means that the studies in different fields may yield different results. In other words, this study has most relevance in emergency management context, while it is definitely a contribution to the literature on network sustainability overall.

Lastly, it is important to note that within the context of the specified structure equation model (SEM), the most influential factor to affect network sustainability appears to be inter-organizational trust, with a prevailingly high coefficient of .831 as opposed to other two

exogenous latent constructs of organizational goal convergence and information-communication technology utilization that have regression weights of .083 and .099 respectively. This means that while the latter two constructs might be questionable to theoretically impact network sustainability, inter-organizational trust appears to be a relatively unquestionable factor in the overall model, thus, showing the strength of the theoretical assumptions that would be derived from this finding for further research. The following section discusses methodological implications of the study.

6.2.2. Methodological

The first important methodological implication derived from this study is that perceptions of network actors acting as main coordinators may be utilized to understand the overall network characteristics, relationships and dynamics. For the purposes of this study, county emergency managers/coordinators/directors were surveyed to get idea about the network of actors they bring together and collaborate with. While certain specific actors may not be aware or have a bird-view perspective of the network dynamics, the focal actors like county emergency managers and coordinators who establish, facilitate and oversee inter-agency collaborations are good sources of information to analyze and study networks. This approach may be replicated in further related studies.

The second methodological implication is that studying counties might be the most appropriate level of government when emergency management is considered. Having relatively standard structures and approaches cross the United States when compared to smaller counterparts as cities, towns, or villages, county governments present an opportunity for more

homogenous analysis, and, thus, more generalizable findings. In addition, the county governments constitute a relatively manageable number of population that is easier to reach and survey.

Lastly, this study presents that online survey distribution is one of the easiest and fastest ways to reach the target population for research purposes. In addition, the costs are comparatively low when compared to other methods of survey administration. Lastly, it is the conclusion of the author that e-mail marketing companies are a good way to conduct research and distribute a self-administered survey with the most efficient and precise tracking and analysis techniques. With increasingly widened use of internet and technology, such techniques stand as an opportunity for efficient and effective research.

6.2.3. Policy

The findings of this study suggest that current emergency management system across the United States is mostly dependent on how local emergency management, and more specifically, how county emergency management is structured and operates. If the effectiveness of emergency management is to be increased and improved, which is very much dependent on the level of sustained network relationships for future emergencies and disasters, investment should be made into the most influential factor according to this study. Thus, emergency management practices that foster inter-organizational trust should be enhanced and increased. Ironically enough, however, inter-organizational trust is also a matter of previous experience of collaborative practices – the more people engage in collaborative practices over time, the more trust is developed. This study, on the other hand, assumes a situation in which network organizations are

interacting from time to time based on emergency situations and their scope. Therefore, it is not a matter of whether they start off their relationships, but whether they improve them beyond certain formal procedures. In other words, inter-organizational trust in this study is presented as a catalyst for further relationships maintained for the purposes of more effective and efficient emergency response and recovery in times of disasters. This means that policies are needed to be designed or re-designed in such a way that facilitates, enhances and develops collaborative approach, which in turn would result in mutual trust and more informal relationships. Common trainings and exercises, partnership-oriented approach, and inter-disciplinary perspectives are examples of off-emergency situations that would nurture trust and vice versa. The main implication, thus, is that this is a two-way process – network relationships nurture trust, and trust fosters network relationships.

The other two latent constructs, namely organizational goal convergence and information-communication technology utilization, have also policy implications. In terms of organizational goal convergence, while not all organizations in emergency management network are alike, which is quite normal, there is a need to increase awareness about the vulnerability of all stakeholders, which would ultimately lead to understanding that there is one single goal – to protect lives and property from the impacts of disasters. In addition, investment into technical and technological capacity of organizations is imperative to increase network sustainability. Therefore, network organizations should have a common and inter-operable set of technologies that would enhance coordination of not only emergency but also post-emergency communication and interaction.

6.2.4. Managerial

There are also managerial implications to be derived from this study. Generally speaking, network coordinators or gatekeepers should monitor network relationships and establish mechanisms that contribute to trustful relationships among network actors. It is up to network gatekeepers who have a central role to promote and enhance collaboration to identify the best tools to promote relationships characterized by mutual understanding, mutual acceptance, and fair treatment towards each other.

Specifically speaking in the context of emergency management, on the other hand, it is important to go beyond relationships arising on an adhoc basis when/if emergency strikes; additional activities and collaborative initiatives should be in place to ensure trust is developed to prevent and/or minimize possible conflicts, misunderstandings or misperceptions in future events. For this reason, agencies responsible for emergency management should be structured more suitable for horizontal rather than vertical model of management. Flexibility in inter-organizational and intra-organizational relationships should be fostered as well as allowed and enhanced.

In addition, since the findings suggest that information-communication technology utilization is important for network sustainability, it is important that organizational structures are adjusted to accommodate inter-operable technologies with enhanced communication among organizations as the main purpose for that. Not only should there be investment into technical capacity, but also into capacity that would be standard and of high quality across organizations comprising network.

Lastly, since having comprehensive emergency management plan (CEMP) was found as unimportant factor in affecting network sustainability, it does not mean it is unnecessary. The conclusion to be drawn in this regard is that CEMP has to be more of a guide for inter-organizational relationships and structure as well as overall mechanism of networked approach in emergency management. The county CEMPs have to be accessible, comprehensive, understandable and written in relatively plain language so that all agencies in the network benefit from it, regardless of their background.

6.3. Limitations

The main limitation of this study is that the survey was not distributed to agencies comprising emergency management networks of respective counties, but to emergency managers, directors and coordinators to reflect on the network characteristics and dynamics. This may be criticized by the fact that they may not represent the whole network. However, the main purpose was to survey a more homogenous group rather than agencies from different sectors in different states and counties. In addition, county emergency management agencies mostly act as the coordinators of emergency management activities and operations, thus, being in central position to observe and know their respective network the most and the best. Yet further s

The second limitation is related to the representation of the population issue, since no conventional sampling method was utilized. Survey responses were collected online, which means that there might be states or counties that are more comfortable completing survey in other formats. In addition, it is also unknown whether the survey was completed by the intended addressees or was delegated to other staff in the agency. Internet usability or accessibility is also

a question, because different people might have different habits; some people may be checking their e-mails less frequently when compared to other tools as fax, phone or pagers. In addition, the northeastern region of the United States was underrepresented, while other regions overrepresented in this study, which should be a sign of caution for those who wish to generalize the study findings in the United States.

The third limitation is related to the design and conceptual framework of the study. This study focuses only on three exogenous latent constructs that are assumed to correlate with endogenous latent construct of network sustainability. Accordingly, this study does not test any relationships among the three exogenous predictors or their possible role in mediation/moderation between exogenous and endogenous latent constructs.

Lastly, there is an issue of study generalizability. Since this study was conducted in the context of the United State emergency management system, the results may be applicable only in those countries similar in terms of emergency management system. The findings of this study, thus, should be adjusted or manipulated when being generalized to other countries, localities and/or contexts.

6.4. Future Research

This study focused on the impacts of organizational goal convergence, information-communication technology utilization, and inter-organizational trust on emergency management network sustainability in the context of the United States. Therefore, the main focus was on conceptual, technical, and relational factors affecting network sustainability. Further research is

needed to elaborate on structural factors of networks that might affect network sustainability. Inclusion of other control variables related to network characteristics might be also an option to extend study findings.

Another suggestion relates to the study design; further studies might replicate or adjust this study to formulate a two-level analysis, using the multilevel modeling approach. This approach would include individual, organizational, and/or community/network level data aggregated for the purposes of more precise representation at lower levels. Such an approach would eliminate the drawbacks of surveying only agency leaders with the purpose of representing a network as it was done in this study.

In addition, this study should be replicated in other countries where emergency management system may or may not be similar to that of the United States. This might give an idea of applicability of the study findings in different contexts. It would also be helpful to replicate this study in the context of emergency management systems that encounter disasters different from those experienced in the United States. Controlling for the type of disaster, thus, and focusing on specific regions or geographic localities might provide more specific and more applicable results.

6.5. Conclusion

This study analyzed the impacts of organizational goal convergence, information-communication technology utilization, and inter-organizational trust as exogenous variables on network sustainability as an endogenous variable in the context of emergency management

system of the United States. The three hypothesized positive relationships among the exogenous and endogenous latent constructs were supported by study findings with inter-organizational trust being the strongest and prevailingly important factor among the three to affect network sustainability. The assumption that inter-organizational trust is the most important factor followed by information-communication technology utilization and organizational goal convergence was also supported.

The results of the findings suggest that network sustainability, namely, the extent to which relationships among emergency management organizations are maintained over time is mainly a matter of how much they trust each other. Inter-organizational trust, therefore, is to be taken seriously by organization leaders and managers. In addition, the study contends that information-communication technology utilization should be fostered to increase network sustainability. This suggestion is especially meaningful in today's conditions characterized by the need for multiplicity and complexity of relationships that need to be coordinated in the most effective and efficient manner. The finding that similarity or commonality of organizations in terms of goals and missions would lead to longer relationships is also to be taken seriously; organizations should find ways and invest into tools that minimize discrepancies arising from goal divergence and other incompatibilities.

APPENDIX A: SURVEY INSTRUMENT

Survey of County Emergency Managers across United States

This survey examines county emergency managers' perceptions about the network development and sustainability in emergency management. Since local emergency management agencies are expected to work with a number of public, private and nonprofit agencies in times of disasters, they engage in networked collaboration. The ideal situation is that these collaborative practices are maintained across time, even in the absence of disasters, for more effective and efficient results during future emergencies/disasters. This survey was designed to analyze collaborative practices of county emergency management agencies across the United States, and understand how sustainability of collaborative networks is affected by the organizational, technical, and cultural factors.

The survey takes about 15 minutes to complete. Your responses will be kept confidential, and will not be revealed to any party without your consent; only aggregate results will be made available. You can quit the survey at any time. We would be happy to make a copy of final results available to you. If you have any questions please do not hesitate contacting us.

Thank you very much for your cooperation and time!

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Section 1: Please, answer the following questions pertaining to you and the county you operate in:

Which state are you located in? _____

What is the name of your county? _____

What is your position/title? _____

Does your county have a Comprehensive Emergency Management Plan (CEMP)? [ ] Yes [ ] No

Which one best describes your county? [ ] Urban [ ] Rural [ ] Other (please specify): _____

What is the most frequent disaster your jurisdiction encounters? _____

What kind of coordination mechanism does your county utilize?

[ ] ESF-based [ ] ICS-based [ ] Other (Please, specify)

What type of collaborative agreement are you involved in?

[ ] EMAC [ ] NIMS [ ] Other (Please, specify)

Note: Most of the county governments in the United States have comprehensive emergency management plans (CEMP) that specify how government will respond to disasters. Accordingly, the CEMPs usually specify the roles of different public, nonprofit, and private sector organizations that are expected to collaborate during emergencies. The county emergency management agency/department is usually the coordinator of those collaborative networks. When answering the questions in the following sections, please consider in mind that very network of organizations that work together before, during AND after the disasters.

Section 2: Please rate each of the following statements based on the scale provided:

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
5	4	3	2	1

[ ] Organizations in the network have different organizational priorities.

[ ] There is a gap between organizational goals in the network.

[ ] Organizations working together have little in common.

[ ] Diversity of organizations in the network means fewer common organizational preferences.

[ ] Variety of organizations results in multiple contrasting goals.

[ ] Collaboration is challenging due to multiplicity of differing organizational backgrounds.

[ ] Emergency management requires collaborating with organizations having different expectations.

[ ] Diverging organizational goals is the reality of emergency management networks.

[ ] Organizations are hardly related in terms of their organizational missions.

Section 3: Please rate each of the following statements based on the scale provided:

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
5	4	3	2	1

[ ] In terms of collaboration, organizations rely on the use of information and communication technology.

[ ] The network's operations are streamlined by technological tools of communication and coordination.

[ ] Organizations in the network have sufficient technical and technological capacity for emergency management.

[ ] The use of information and communication technology facilitates the operations of the network.

[ ] Inter-organizational operations in the network are supported by emergency/disaster information management systems (WebEOC, E-Team, etc.).

[ ] The network would fail without technological capacity used for communication and coordination.

[ ] If our networked emergency management is effective, it is mainly due to the use of information and communication technologies.

[ ] Technology makes our collaboration more efficient.

[ ] Inter-organizational collaboration in emergency management network is impossible without technological tools of communication and coordination.

[ ] Investment into technological capacity by organizations has been not enough so far.

Section 4: Please rate each of the following statements based on the scale provided:

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
5	4	3	2	1

[ ] The organizations comprising our emergency management network have open communication.
[ ] The organizations in our emergency management network are reliable partners.
[ ] Honesty is the cornerstone of inter-organizational collaboration in our network.
[ ] Inter-organizational relationships in our network are characterized by mutual understanding.
[ ] Organizations in the network keep their commitment.
[ ] Mutual acceptance is the important part of inter-organizational collaboration in our network.
[ ] There is a common belief across the network that each actor is capable of contributing to the overall picture.
[ ] Inter-organizational collaboration is characterized by mutual respect in our emergency management network.
[ ] Organizations in the network collaborate with a sense of fairness towards each other.
[ ] Inter-organizational trust is evident in our emergency management network.

Section 5: Please rate each of the following statements based on the scale provided in regard to your organization's activities when/if an emergency strikes:

Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
5	4	3	2	1

[ ] Organizations in the network periodically contact each other to discuss issues pertaining to emergency management.
[ ] Organizations constantly develop long-run relationships among each other.
[ ] The success of our emergency management network is dependent on the level of inter-organizational relationships.
[ ] In the absence of disasters, organizations are involved in collaborative practices (such as exercises, drills).
[ ] The network sustains inter-organizational relationships for better results in further disasters.
[ ] Short-run inter-organizational relationships are less effective.
[ ] Organizations in our network constantly communicate and exchange information.
[ ] Denser inter-organizational relationships make our network more effective in managing emergencies.
[ ] The organizations in our network seldom, if any, collaborate in the absence of disasters.
[ ] The more organizations in our network sustain their relationships across time, the more effective they manage disasters.
[ ] Local, statewide, regional, and/or national agreements (e.g. EMAC, MOUs) are enhancing our long-term collaboration.

Section 6: Collaboration Characteristics:

What is the purpose of collaboration among organizations in your emergency management network (Check all that apply)?

[ ] Joint Planning [ ] Exercises [ ] Joint Training [ ] Other (please specify)

What is the main reason for inter-organizational collaboration in your emergency management network (Check all that apply)?

[ ] Finance [ ] Personnel [ ] Facility [ ] Equipment [ ] Information [ ] Other (please specify):

On the average, how often do organizations in your emergency management network collaborate (Please check one)

[ ] Daily [ ] Weekly [ ] Biweekly [ ] Monthly [ ] Quarterly [ ] Annually [ ] Other (please specify)

What are the mostly used tools/methods of communication among the organizations in the network (Check all that apply)?
[ ] Face-to-face meetings [ ] E-mail [ ] Phone [ ] Web Conferences
[ ] Disaster Information Management System (WebEOC, E-Team, etc.) [ ] Other (please specify): _____

What are the most widely used disaster information management systems for inter-organizational collaboration (Check all that apply)?
[ ] WebEOC [ ] E-Team [ ] EMSystems [ ] Live Process [ ] Other (please specify): ____

Section 7: Demographics
How many years have you worked in your current position? _____ years
How many years have you worked in emergency management field? _____ years
Approximately, how many full-time employees work in your agency (office of emergency management)? (Please check one)
[ ] 1-3 [ ] 4-7 [ ] 8-11 [ ] 12-15 [ ] over 15
Approximately, what is the total budget allocated for your agency in this fiscal year? (Please check one)
[ ] $0-$100,000 [ ] $100,001-500,000 [ ] $500,001-$1,000,000 [ ] $1,000,001-$5,000,000 [ ] $5,000,001+ [ ] Other (Please specify) _____ [ ] Don't Know
What is your gender? [ ] Male [ ] Female
What is your age? [ ] under 35 [ ] 35-44 [ ] 45-54 [ ] over 54
What is your highest education degree? _____
In which field is your highest degree? _____

Section 8: Open-Ended Questions
1) What are your suggestions to sustain inter-organizational relationships across time, especially in the absence of disasters?
2) What is the role of technology in network relationships sustainability?
3) How does working with representatives from different sectors and levels of government affect overall collaboration process?
4) When you think about emergency management field, how important inter-organizational trust is and what are the ways to develop trust?

Thank you very much for your time!

APPENDIX B: INSTITUTIONAL REVIEW BOARD (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 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Approval of Exempt Human Research

From: **UCF Institutional Review Board #1**
FWA00000351, IRB00001138

To: **Naim Kapucu**

Date: **November 12, 2010**

Dear Researcher:

On 11/12/2010, the IRB approved the following activity as human participant research that is exempt from regulation:

Type of Review:	Initial Review
Project Title:	Network Sustainability in Emergency Management: Survey of County Emergency Managers across United States
Investigator:	Naim Kapucu
IRB Number:	SBE-10-07233
Funding Agency:	None

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB. **When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.**

In the conduct of this research, you are responsible to follow the requirements of the Investigator Manual.

On behalf of Joseph Bielitzki, DVM, UCF IRB Chair, this letter is signed by:

Signature applied by Janice Turchin on 11/12/2010 02:39:44 PM EST

Janice M Turchin

IRB Coordinator

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