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NETWORK REBUILDING AFTER DISASTER:
A COMMUNICATION THEORY OF TRANSITIONAL SPACE

By

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ABSTRACT OF THE DISSERTATION

Network Rebuilding After Disaster:

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This dissertation develops a communication theory of transitional space. The focus of this theory is on how business leaders use communication to rebuild interorganizational networks following a large-scale disruption. The premise of a communication theory of transitional space is that a large-scale disruption creates a space in which conditions are neither what they were before the disruption nor where they need to be in order for business to resume with a sense of normalcy. The way business leaders communicate in this space leads to the creation of transitional networks, or networks that enable business leaders to navigate this space. Propositions are tested in the field and with an online survey of New Orleans' business and organizational leaders whose businesses and professional networks, and physical environments, were affected by Hurricane Katrina. The dissertation begins by establishing crisis as a context for transitional space. Next, an examination of social network theory and constitutive communication using Information and Communication Technologies (ICTs) provide the theoretical framework for the study. Data were analyzed using a combination of grounded theory and social network analysis. Patterns of communication and social structure emerged that reflect a two-stage transitional space, which is marked by an altered macro-structure and dysfunctional

communication infrastructure. Resource exchange and reconnecting with previous network members drives initial communication in a transitional space. This communication is facilitated by an alternative communication infrastructure developed by business leaders through the use of ICTs. Findings from this study further understanding of the lifecycle of networks by providing a longitudinal view of network development, as well as further network research in areas such as disaster recovery and organizational crisis. Theoretical implications include an emphasis on the importance of drawing a distinction between interaction and communication in social networks, as well as a theoretical context for the interplay of communication and structure following a disaster. The importance of ICTs in repairing communication infrastructures, as well as the importance of “helping” organizations in facilitating trust and collective action, both have theoretical and applied implications for social networks and disaster recovery.

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CHAPTER 1

Introduction

This study uses social network theory to develop a communication theory of transitional space, or the time between a state of disorganization and an established working order. First, the idea of a transitional space will be developed and defined as a subject of study. This definition will be contextualized within the framework of crisis, specifically looking at how organizations used communication to rebuild networks after Hurricane Katrina.¹ Data consist of interviews with organizational decision makers and a survey designed around themes that emerged from the interview content. Interview data were analyzed using grounded theory and content analysis, and network visualization using UCINET. Through this analysis, patterns of network development and structure emerged that reflect organizational attempts to recover from a crisis that left them physically dislocated and without many of their normal resources or relationships. From these patterns, the framework of a theory of network communication in a transitional space is developed and posited as a way to conceptualize post-crisis communication. Such a contribution will further the understanding of the lifecycle of networks, as well as further network research in areas such as disaster recovery, organizational crisis, and temporary organizational alliances.

Social network theory guides researchers to examine a variety of social and organizational issues with a focus on the reciprocal interplay between individual enactments of larger, often structural, issues, and how these enactments then support or reform the structure. Early organizational communication network literature primarily focused on how the informal communication patterns engaged in by employees often did

not follow the organizational chain of command, but rather created new, and sometimes more powerful, connections (Davis, 1953). Such emergent networks have been studied in terms of innovation, problem solving, and technological adaptation, and are considered valuable because they provide insight into real, rather than hypothesized, organizational behavior (Monge & Contractor, 2000). In 1990, Powell ushered in a new era of network research by declaring the network an organizational form, distinguishing it from both markets and hierarchies. Subsequently, networks have been studied in terms of their embeddedness, or the specialized nature of ties among network members (Granovetter, 1985); information sharing capabilities (Krackhardt, 1992), relation to power (Brass & Burkhardt, 1992; Burkhardt & Brass, 1990), and structure (Gargiulo & Benassi, 2000).

While these topics vary widely, similar to all of them is the notion of networks as flexible, relational in nature, and built around issues of trust and reciprocity. Typically, network communication evolves over time. It is likely to change as people's needs or interests change, but remain relatively stable. Communication within networks is built on repeated interaction that develops as relationships develop. This communication evolves as a natural progression. As this occurs, network communication and membership develop so that (a) participants already have an idea of what to expect and how the other partner works, (b) trust has already been established (or is anticipated if this is the initial interaction) so each party does not have to look out for opportunism and (c) participants are more willing to accommodate special requests/circumstances because of intended future interactions (Powell, 1990). Such networks could be characterized as developing in a "normal space."

What is missing from this collection of research is a perspective that examines networks as a temporary, rather than long-term, engagement of actors. Sometimes network communication is forced or compressed, changing sharply and unexpectedly. Such network development could be characterized as developing in a *transitional space*. A transitional space is preceded by any type of large-scale disruption in normal network patterns, such as natural or technological disasters, or other types of organizational or individual crises. Thus, in a transitional space, network members are not in a stable place; they are neither where they were nor where they ultimately need to be in order to survive. Organizations communicating within a transitional space are likely to be members of “normal” networks that were disrupted by the disaster or crisis that are now either unavailable or no longer useful.

Existing literature identifying networks as transitional is sparse. Conceptually similar is what Goodman and Goodman (1976) referred to as a temporary network, or a network of diverse individuals coming together to accomplish a task over a finite period of time. For example, Topper and Carley (1999) examined the emergency networks that emerged after the Exxon Valdez oil spill. These networks consisted of already existing organizations whose interactions were altered as a result of working together to respond to the Alaskan crisis. Some formed new alliances, while others altered their former relationships to fit the context of the new crisis. Such emergency interaction led to the creation of alternative network forms that best accommodated the parties involved. Additionally, Bigley and Roberts (2001) examined the incident command system, a multi-organizational response system established to fight California forest fires. This

again represents the finite interaction of organizations in which a natural disaster served as the catalyst.

While this small body of research does exist, many questions about such networks remain both unasked and unanswered. The answers to questions asked in this dissertation will serve to connect the scant temporary and transitional network literature by identifying common characteristics and themes, thus establishing transitional networks as an alternative network form. Doing so will advance network theory by providing a framework for understanding how people use communication to organize under exceptional circumstances.

For the purposes of this dissertation, *transitional space* is defined as the time in which individuals were physically displaced from their homes and businesses following Hurricane Katrina. While a transitional space could theoretically include any type of displacement, using *physical* displacement allows for an examination of this space with a definite beginning and end time. Hurricane Katrina provides a useful setting for this study, as there was a period of mandatory evacuation, which forced most residents to leave and businesses to close. Those who did stay found themselves in the middle of dangerous and devastating conditions. Therefore, it is reasonable to say that due to evacuation or extensive damage to property, all networks experienced some sort of physical disruption in the days and weeks following the storm. The time between when Hurricane Katrina struck and when displaced businesses made some sort of reentry into New Orleans can be characterized as the transitional space. The people they reached out to, methods they used to do so, and information and material resources that they exchanged characterize the network communication in this transitional space. Whether businesses returned to their

previous existence or established a new sense of normalcy is not relevant; it is the communication within the space between pre- and post-disaster that characterizes network interaction in a transitional space. The evolution of communication from the time before the crisis (a time of normalcy), through the beginning of the transitional space (a time of complete chaos) and the middle (a time of change and rebuilding) to the end of the transitional space (a time of reentry) yields important information about the evolution of networks, strategic communication, and social organization under extreme circumstances.

Since the interest is on how and why organizations engage with communication partners following a network disruption, this project employs theories on network development, emerging network structure, and resource dependency/exchange. Arguably, looking at network formation can provide the most direction as to how and why networks emerge in a transitional space. In many ways, it can be considered the most crucial phase for such networks. How and to whom organizations reach out during a transitional time sets the course for what resources will be available to them. Communication is situated as a constitutive act that enables individuals to recreate both relationships and the new, post-crisis contexts within which these relationships exist. Because of the emphasis on physical displacement during the transitional space, communication using ICTs is highlighted. Additionally, an overview of current disaster research will provide a context in which to place this examination of network communication. While much crisis literature does look at how entities work together in order to recover after a disaster, there is a paucity of work that examines the communication mechanisms through which they

do so. Doing so will establish a concrete context in which the idea of transitional space can be developed and illustrated.

CHAPTER 2

Establishing Crisis as a Transitional Space

This dissertation argues that a transitional space is one in which normal working conditions have been altered to the extent that networking and communication patterns must shift to accommodate this change. While all networks experience disruption of some sort, severe stresses such as those caused by large-scale changes necessitate unique communicative practices that allow for people to regain or possibly reinvent their social and professional networks. While all networks transition, being forced to do so by some sort of crisis or false catalyst is likely to change the way that network members attempt to regain their footing.² Defining this timeframe as something different than a time of routine network evolution allows that people will communicate differently in times of crisis or uncertainty than in times of status quo.

In order to better understand why this is so, it is necessary to understand what is meant by a transitional space. Transition has been defined as “movement, passage, or change from one position, state, stage, subject, concept, etc., to another” (Retrieved from <http://dictionary.reference.com/browse/transitional>, 17 May, 2008). Thus, a transitional space is one that marks the time during which this movement or passage takes place. This change can range from utter devastation, such as after a natural disaster or other large-scale crisis, to the change of a company’s product line, to the reorganization of departments within an organization. While each of these scenarios varies in degree of severity, each marks a disruption of one’s normal network relations. In each case, former network members will be, to some extent, absent or no longer in a position to offer the necessary exchange benefits.

While each of these types of change can serve as the context for a transitional space, it is perhaps most useful to conceptualize transitional space in terms of a large-scale crisis, such as a natural disaster, because studying disaster sheds light on the “origins, adaptive capacities, and survival” of social order (Kreps, 1984, p. 310). Studying disaster situations provides the opportunity to obtain a glimpse of the full lifecycle of social ordering, from the end of one type of order through the beginning and maintenance stages of another. It also allows for study of how entities use social ordering mechanisms, such as communication, to both adapt to and change their new environment. Essentially, disaster is likely to represent the most extreme sort of disruption to one’s networks, thus providing the starkest backdrop against which to study a transitional space.

In academic literature, crisis and disaster are often used interchangeably. A closer examination of the definitions and studies associated with each yields an understanding that disaster is actually a form of crisis. Colloquially, a crisis is considered to be “an unstable or crucial time in which a decisive change is impending, especially one with the distinct possibility of a highly undesirable outcome” (<http://www.merriam-webster.com/dictionary/crisis>, Retrieved 14 April, 2008). The emphasis is placed on the fact that the crisis is a sort of turning point in which one’s actions determine how he or she moves forward. Academically, crisis has been defined as “a major occurrence with a potentially negative outcome affecting the organization, company, or industry, as well as its publics, products, services, or good name. A crisis interrupts normal business transactions and can sometimes threaten the existence of the organization.” (Fearn-Banks, 2007, p. 8). It is more serious than a problem, and can include anything from product failure to contamination to a hurricane (Fearn-Banks, 2007). It interrupts the flow of

business, and as such, cannot be considered a “normal part of this flow” (Fearn-Banks, 2007). Thus, a crisis creates a new space, outside of the ordinary space within which a business normally operates.

A crisis is marked by events that are characterized by “high consequence, low probability, ambiguity, and decision-making time pressure” (Runyan, 2006, p. 13).

Because they are often characterized by a large number of stakeholders, the consequences are higher than if just a single entity was involved. Crises are often not expected, and therefore the affected entities are taken by surprise and have a low-level of preparedness. Ambiguity is often high precisely because entities were unprepared, as well as because many times the antecedents and consequences of the crises are difficult to immediately ascertain. These factors work together to make decision making difficult, compounded by the fact that the crises by nature require fast action, which truncates the already confused decision making process (Runyan, 2006).

As previously mentioned, natural disaster is one type of crisis. It could provide the impetus for the “unstable or crucial time” in which a crisis is embedded. It consists of “events, observable in time and space, in which societies or their larger subunits (e.g. communities, regions) incur physical damages and losses and/or disruption of their routine functioning. Both the causes and consequences of these events are related to the social structures and processes of societies or their subunits” (Kreps, 1984, p. 312). This definition emphasizes the role of events, impacts, social units, and responses on the relation between the disruption of normalcy and its effect on social order. Kreps (1984) further defines three “property spaces” or dimensions of disaster, which include temporal, social, and physical. Thus, each of the four properties of disaster (events, impacts, social

units, and responses) can be characterized in terms of the three dimensions (temporally, socially, or physically). The resulting taxonomy offers a view of the breadth and scope of the conceptualization of disaster for research purposes. For example, “events can be characterized by their energy release (physical), their periodicity (temporal), or their formal declaration as a disaster (social)...social units vary by location (physical), time of origin relative to the occurrence of the phenomenon (temporal), and degree of disruption (social)”(Kreps, 1984). Such an understanding of disasters points to the potential complexity and multiplicity of disaster-research efforts.

Conceptually, then, crisis fits the definition of a transitional space. Emphasis is placed on change, uncertainty, and high stake outcomes. The communication that takes place is altered by the very conditions that precipitate this space, in that crises force entities to rely on both conventional and alternative forms of association (Kreps, 1984). Affected individuals and organizations often must look outside the realm of expected organized relationships to other types of emergent relationships. Because of this complexity, it is valuable to study such events not only in terms of “commonsense categories” such as firms, government units, and voluntary agencies, but also in terms of “populations of social units that engage in similar domains and/or initiate, maintain, and suspend similar forms of association” (Kreps, 1984, 316). Kreps (1983) proposed a taxonomy by which emergent forms of associations can reflect sequences of one to four elements of social organization: domains, tasks, human and material resources, and activities. He theorized that the order in which each of these elements is enacted then determines the ways in which social units organize and emerge. Such an approach to understanding disasters points to looking at how communication networks are developed

during and after a disaster, or in a transitional space. This, in turn, provides a way to conceptualize crisis communication in terms of network theory, as well as expands the dialogue regarding what constitutes network communication.

CHAPTER 3

Social Network Theory

Overview

The idea of networks has been applied as theory, method, and even as a paradigm (Burt, 1987; Castells, 2000; Doerfel & Connaughton, 2004; Rice 1993). In fact, some scholars have noted the fact that the term “networks” is so widely used that it is losing its original meaning (Ebers, 1997). While the idea of networks is widely used in various forms of scholarship, there are several overlapping themes. Castells (2000) put forth the idea of a network society, which he defined as a form of social structure, or “organizational arrangement of humans in relationships of production/consumption, experience, and power, as expressed in meaningful interaction framed by culture” (p. 5). Key to the enactment of this social structure is information, connectivity, and flexibility. This enactment can be defined as a set of recurring ties among a set of nodes (Ebers, 1997, p. 15). Network ideas can be applied on both an interpersonal level (studying people through a network lens independent of organizations) or in an organizational context. Organizationally, networks can be studied within a single organization, or across organizational boundaries, coming to encompass a number of organizations that collaborate or form alliances in one or more facets of their businesses. Essentially, network forms organize and govern interactions between and among various individuals and organizations.

Studying individuals and groups of people in this context, it can be said that they are situated in a network setting or within their networks. Thus, utilizing network theory inherently acknowledges networks as a structure. That is, the process of studying people

in *terms* of their connections illuminates the *nature* and *consequences* of their connections. Thus, network theory assumes *a priori* the existence of networks, and the existence of networks makes possible the use of network theory. Within networks, individuals exist not alone but in relation to other individuals (Powell, 1990). Individuals do not exist apart from the other employees in their organization, just as organizations do not exist separate from other entities. Rather, they are part of an organizational network in which to be successful, one has to build reciprocal relationships, often based upon the expectation of future interactions. These social relations are particularistic, as opposed to universal, as they are built on repeated communication between and among entities within the same network.

Network theory, then, highlights the reciprocal interplay between individual enactments of larger, often structural, issues, and how these enactments then support or reform the structure. For example, employees can voice complaint up the official chain of command and reinforce the official organizational structure; or voice complaint laterally, which has the potential to undermine the existing organizational structure and redistribute power. By the broadest definition, network theory examines the micro-level enactment of macro-level structures. It attempts to understand organizational structures by looking at emergent meaning as engendered through interaction patterns, as well as patterns of organizing and processes (Doerfel & Connaughton, 2004). Thus, the relational nature of communication between and among individuals becomes the backbone of network theory (Doerfel & Connaughton, 2004).

Communication, interaction, and the relational nature of social networks

Social network theory generally examines the patterns of interaction among people (Blau, 1977; Burt, 1982, Granovetter, 1985) and posits these interactions as the building blocks of networks. In this sense, interaction implies communication. In fact, communication has been defined, at its simplest, as a “process by which individuals interact and influence each other” (Craig, 1999, p. 143). In network studies, this process is often examined in terms of “the patterns of contact between communication partners that are created by transmitting and exchanging messages” (Monge & Contractor, 2000, p. 440). It is through these patterns of contact that individuals extend their reach of interaction and influence. Variation of the patterns, or changes in to whom one is linked in the network, can directly affect the experiences and outcomes of network members. The process of message exchange is often studied in terms of who is involved in the exchange, rather than the content of the message itself. Thus, network studies often emphasize the nature of the connections between individuals as the root of interaction.

However, communication moves beyond simple contact and encompasses the creation of shared meaning. A constitutive point of view posits that communication is about creation. Communication involves the creation of meaning between; and the relationships, identities, and social realities of; the communicating parties (Craig, 1999). Thus, engaging in a communication network involves creating a series of connections with others through which shared meaning is negotiated. Aakhus (2007) asserted that communication could have both constitutive and instrumental possibilities. Communication can be mutually created, but it can also be intentionally directed. Much of this work is done naturally, as people rely on mutually shared language, context, and values. However, individuals also use a variety of “techniques, devices, and procedures

that aim to redesign interactivity and thus shape the possibilities for communication” (Aakhus, 2007, p. 112). Known as communication design, such a view of communication encompasses both what is said and the format in which it is said as instrumental to creating shared meaning.

This dissertation looks at network communication rather than just network interaction. Looking at network building in a transitional space simply in terms of patterns of interaction would encompass an examination of the connections made and how these connections served to help or hinder the process of reconstruction. However, this would not create a full picture of *what* and *how* people *communicate* in a transitional space. In order to understand how businesses worked to get back into operation, it is also important to consider what they talked about and what media they used to do so. This includes assigning agreed upon value to tangible resources, deciding the shared relevance of information, and devising methods and messages that leverage available resources. Thus, it is not elements of structure or information alone that equal network communication, but also how these elements were created and recreated by individuals in order to establish the shared values of an operational network.

Network theory identifies this communication among entities in terms of ties, or connections between “nodes.” Network ties are considered to be embedded ties. Embeddedness rests upon the idea that social influence, rather than being external and finite, is ongoing and socially (re)constructed during each interaction (Granovetter, 1985). Embeddedness guards against opportunism by building relationships based upon trust and reciprocity, as well a general knowledge of what one can expect from another partner. Heimer (1992) points to the tension created by the creation of networks, which are

inherently particularistic, embedded within the universalistic organization or market.

Particularism emphasizes a return to specific persons for repeated interactions, whereas a universalistic market emphasizes seeking out the most beneficial contact for each interaction, regardless of past acquaintance or history. Such particularism is inherent to networks, she argues, because existence in networks necessarily entails obligations to concrete others (p. 144). Once reciprocity and familiarity become the basis for repeated relationships, future action is often fueled, at least in part, by the information that these actors share because of joint history, rather than based upon an abstract set of rules of transaction.

This concept is often counterintuitive to the idea of doing business in market economies, where arm's length, or distant, ties have long been considered the norm. Arm's length ties are created when individuals disperse their business contacts and sample prices, looking for the best contact for the current situation (Uzzi, 1997). Conversely, particularistic, or embedded, ties take into account the social history and future of every interaction. Uzzi (1997), in a study about the textile industry in Modena, characterized this notion in a quote from a textile production manager as saying:

They [arm's length ties] go only by the letter and don't recognize my extra effort. I may come down to their factory on a Saturday or Sunday if there is a problem...I don't mean recognize with money. I mean with working things out to both our satisfaction (p. 43)

With embedded ties, trust and the expectation of future interactions drive behavior. Working problems out to mutual satisfaction takes on a meaning and importance that surpasses the exchange of money. Thus, embedded ties often provide access to resources

or services that arm's length ties do not (Uzzi, 1997). Accordingly, there is recognition of the exchange of these assets that is missing from arm's length ties. This underscores Granovetter's (1985) assertion that all transactions are shaped by a continually (re)constructed culture that both shapes its members and is shaped by them. Each particularistic interaction further establishes the ties within a network. Further, particularistic ties are less vulnerable to exploitation by outsiders, thus fostering more in-group trust and cooperation and in turn, strengthening the network (Macy & Skvoretz, p. 1998). Thus, networks simultaneously evolve and further embed relations with each interaction. In turn, issues such as culture, norms, influence, dependency, reciprocity, and trust are relationally negotiated through communication.

Structure and Social Networks

As membership and issues are negotiated through communication, this communication serves to create and reinforce the network structure. In the broadest sense, structure refers to the arrangement of people in regard to their relationships with each other. So macro-structure refers to the largest or most abstract arrangement of people or groups of people, based on their relationships to each other. Macro-structures often encompass the interrelation of several smaller networks, and as such, come to represent the prevailing set of relational conditions in which smaller, sub-units of relations exist. Examples of a macro-structure are a city or organization. Single networks can also be studied in terms of their structure, or *how* people are arranged in regard to their relationships with each other. Essentially, networks *are* structures in that they are social units based on the relationships among people; and they *have* structure, in that they way

these *nature* of the relationships among people can have relational implications for success, failure, influence and change within the social unit.

Blau's (1977) "macro-social theory of social structure" and Burt's (1982) "theory of structural action" are two theoretical approaches that explicate the interplay of network communication and structure. Inherent to both of these theories is the idea of structure as the social order resulting from repeated interaction among sets of people. While Blau (1977) posits this social order as positionally based, and a social structure as something that results from the interaction of people between and among positions, Burt (1982) posits this social order as relationally based, or something that results from the interdependence of individuals based on social influence regardless of position.

Blau's (1977) "macrosocial theory of social structure" conceptualizes social structure as "the distributions of a population among social positions in a multidimensional space of positions" (p.26). He presented a theory of social structure based on the distributions of people in social positions, and argued that the relations between and among people of different positions is influenced by the frequency distributions of these people in the macrostructure population (Blau, 1977). Indeed, he defined social structure as the differentiation among people, and macrostructure as the "multi-dimensional space of social positions among which people are distributed and affect their social relations" (Blau, 1977, p. 28). Thus, macrostructural inquiry is concerned with the *patterns of interaction* among people of many social positions, not simply the relations between individuals irrespective of these positions.

Based on this premise, Blau (1977) asserted that the focus of structural analysis is the derived variables that indicate the "degrees of differentiation" of societies on a

number of counts, and their subsequent implications for social interaction (p. 30).

Degrees of differentiation imply group memberships, and are broken down into two types of parameters: nominal and graduated. Nominal parameters are mutually exclusive categorizations: male or female, Catholic or Jewish. Graduated parameters imply a rank order; examples of these parameters are income or age. Heterogeneity and inequality are the two types of differentiation upon which groups and ranks are divided. For example, for any nominal population, there are many groups into which the population can be divided. While more divisions imply more heterogeneity, the very existence of such groups implies homogeneity in basic group formation. It is macrosocial integration, or the association between groups of different statuses, that creates social structure.

While Blau's (1977) theory of macrosocial interaction presented a positional approach in that each person in the network represents one or more groups and statuses, Burt's (1982) theoretical perspective of a structural theory of action examines both relational and positional motivations for social interaction. Burt's (1982) based his theory on the premise that action is purposive, and is based on actors motivated by resources offering the greatest utility based on an evaluation of the alternatives. These actors, alternatives, and actions are all patterned by the context in which they exist. Essentially, the theory posits, "actors are purposive under social structural constraint" (Burt, 1982, p. 330).

Burt's (1982) theory offers a bridge between the diametric points of atomistic and normative action, calling this structural action. While an atomistic perspective assumes that individuals make decisions without reference to other actors, normative action assumes that alternatives are evaluated in conjunction with others in the system having

interdependent interests as part of a socializing process (Burt, 1982). Structural action assumes that an actor evaluates the utility of alternatives based independently and in regard to others. According to Burt (1982) social structure defines social similarities, which colors actor's perceptions of their alternatives. Thus, individuals are constrained by the very structure that their choices serve to reinforce. While Blau's (1977) macrosocial theory only examined social structure as enacted through patterns of group and status based interaction, Burt's (1982) theory allows for two types of actor aggregation, relational and positional, which in turn allows for conceptualization of network interaction on both the individual (ego) and group level. His development of the positional view emphasizes the interactions within a system come to define one's *network position* as the network emerges. A positional approach to understanding networks considers that the actor is just one of many in a system, and that all interactions within which he or she is involved must be considered. Alternately, a relational approach is concerned with the intensity of the relationship between a pair or clique of actors, and is used to describe differentiation in terms of the "typical" relations in which actors are involved (Burt, 1982, p. 89). However, both unite the idea of interaction and structure as two integral, and intertwined, parts of network theory.

Social Network Analysis

The interaction of structure and communication in networks can be systematically examined to make statements about potential outcomes of network communication.

Burt's (1982) approach introduced concepts now standard in network studies, such as ego networks, cliques, the importance of network position (in terms of centrality and power), and tie strengths. He described relations between two network actors as having form and

content; form is the measure of the relation strength and content represents the type of relation (Burt, 1982). Form is measured by both strength and level of joint involvement. Jointly, these concepts allow relations between network members to be measured in a standard way, which allows for general statements and comparisons to be made between and among networks.

Centrality measures are one of the most commonly used ways to explain networks (Borgatti, Carley, & Krackhardt, 2006). Centrality is a concept that focuses one's connections within a network. It takes into account how one's position within the overall network structure can have implications for the power and importance of that individual. In terms of social influence, one who is high in centrality is likely to have contact with several source others, as well as fulfill the role of source other for coworkers. Centrality in a given network is usually positively associated with power and influence (Brass & Burkhardt, 1992). There are four different measures of centrality: degree, eigenvector, closeness, and betweenness (Borgatti et al., 2006; Borgatti & Everett, 1997). Degree centrality measures the number of adjacent links to and from an individual, and is based solely on direct measures, thus serving as a measure of activity (Brass & Burkhardt, 1992). In a typical network, this will represent the number of other people or organizations with which one has direct contact. Theoretically, the more degrees one experiences in a network, the more alternatives one has to increase his or her power. Eigenvector centrality represents the degree measure of a node in terms of the centrality of adjacent nodes (Borgatti & Everett, 1997). Thus, an individual is higher in eigenvector centrality if he or she is directly connected to others who are high in degree centrality.

Closeness measures account for how close one is to all other members of a network by summing the lengths of the shortest paths from an individual to all other network members (Brass & Burkhardt, 1992). Thus, closeness can be seen as an indicator of efficiency or independence; based on closeness, one can enjoy the benefits of being indirectly linked with powerful others by virtue of only a few direct connections. Finally, betweenness measures of centrality examine the extent to which individuals fall between other actors on the shortest paths that connect them. A person who is high in betweenness experiences power in that he or she can mitigate the relationship between the two individuals on either ends of the path.

Another network measure, proximity, measures the “distance” between nodes. There are three main types of proximity mechanisms: relational, positional, and spatial (Rice, 1993). Relational proximity refers to communication proximity, or the amount of communication that individuals enact with each other, which is related to the extent to which individuals are directly or indirectly linked (Rice, 1993). Positional proximity is concerned with the extent to which individuals share the same social role or position. Such communication is characterized by both formal (expertise related) and informal (social-role related) relations (Rice, 1993). Finally, spatial proximity involves one's physical nearness to another.

Proximity mechanisms involve two levels of sources: individual and group. Individual-level influences often culminate in a net influence from one's peers referred to as an “impact vector,” and depends on how proximate and valued each specific other is (Rice, 1993, p. 54). Group-level influences often provide a standard against which one can evaluate both self and others, and as such, often provide norms for approval, reward,

values, and negative sanctions (Rice, 1993. p. 55). In a relational network model, group influences often are part of a highly cohesive subset that includes all of those people with which one is proximate, which results in dense relationships that reinforce group norms (Rice, 1993). Group-level positional network models include sets of employees who, due to their role proximity, often share common attitudes, beliefs, and status (Rice, 1993). While these influences can sometimes be strong because of the commonalities among members, they can also be obligatory and therefore less influential. Finally, spatial clusters include all those people who are similarly close and distant from others. Thus, one's proximity to important source others can have a direct impact on the way they view the organization, and subsequently, the decision that they make.

The preceding definitions of centrality and proximity illustrate how it is possible to study a variety of issues using network theory. Put simply, network theory instructs us to look at how one's position within the enactment of larger communication processes has implications for power, trust, and social influence. For example, Burkhardt and Brass (1990) used a network lens to examine the effects of technology on organizational structures and power. By studying technological dissemination in terms of network centrality, they were able to ascertain how power related to early technological adaptation, and how this, in turn, changed slightly the overall power structure within the organization.

To picture an individual's network, then, provides insight into how the individual is connected to all of these others. The individual is referred to as the ego, and is the focal member of the any given network. Studying networks in terms of the ego has both benefits and drawbacks: "Ego-centric methods really focus on the individual, rather than on the network as a whole. By collecting information on the connections among the

actors connected to each focal ego, we can still get a pretty good picture of the "local" networks or "neighborhoods" of individuals. Such information is useful for understanding how networks affect individuals, and they also give a (incomplete) picture of the general texture of the network as a whole. (Hanneman & Riddle, 2005, http://faculty.ucr.edu/~hanneman/nettext/C1_Social_Network_Data.html). Thus, we are afforded insight into how an individual operates within a sub-section of the macro-structure that is relevant only to the individual. While this view does allow a glimpse of the sub-section in its entirety, we can only understand it as it relates to the ego.

A "typical" interorganizational network, from an ego point of view, is likely to consist primarily of associations that pertain to day-to-day business dealings. For example, the ego network of a restaurant would likely consist of ties to vendors; such as food, linen, alcohol, and cleaning supplies; other restaurants, to the city in which it exists for municipal issues such as zoning and a liquor license; public or private garbage collection; media outlets for advertising, and perhaps a corporate office. If this restaurant is part of a chain, it could also have ties to other branches of the same franchise. Depending on the extent to which this restaurant is involved in the community, it could also contain ties to restaurant or bar associations, community organizations, or even local schools. This network is likely to consist of a mix of embedded and arm's length ties. For example, they may exhibit a strong connection with each of their vendors, indicating a long reciprocal relationship, and at the same time, have only arm's length connections with the town licensing department, media outlets, and local schools.

If several egos in a population provide information about others in their business communication networks, affiliations among these others can be derived in order to

ascertain the most connected, or most central, other in the overall network. To keep with the above example, if all of the restaurants in a given town named the others or types of others in their networks, each one would probably name some variation of the alters, or other organizations, mentioned in the previous example. This data could then be transformed to create an overall picture of what types of others are most central to the overall Restaurant Network in that town. One might expect to find certain vendors or municipal offices playing a central role in this network. This information could then be used to ascertain issues such as dependency or influence.

While each ego network is unique, this hypothetical characterization allows for the visualization of organizational communication patterns occurring in a “normal” space. As this dissertation progresses, patterns of organizational communication in a transitional space will be developed, against which this hypothetical example can be compared.

Network Development

Looking at network formation can provide the most direction as to how and why networks develop in a transitional space. In many ways, it can be considered the most crucial phase for transitional networking. Understanding how those conditions compel certain individuals to come together will likely provide insight into both the maintenance and the lifecycle of the networks created therein. How effectively entities respond to crisis can be affected by both the crisis type and the amount of preparedness that affected parties possess (Gundel, 2005). For example, if an organization suffers a conventional crisis, or crisis that is predictable in both nature and impact, then it is reasonable that the party could have anticipated the crisis and would therefore have many of the contacts necessary for recovery already present within their network. However, if an organization

suffers an intractable crisis, or crisis that can be anticipated but not prevented, then it is likely that the party will have to expand or replace contacts within their ordinary networks just in order to cope with the impacts of the disaster (Gundel, 2005).

Additionally, organizations can invest the resources to maintain a high level of preparedness for any type of crisis, thus having at least a minimal amount of preparedness regardless of crisis type. Thus, in the wake of large-scale disasters, entities turn to both conventional and unconventional sources for help (Kreps, 1984; Runyan, 2006). Whom they turn to for help and how they go about building the contacts necessary to reestablish normalcy can be understood as network development.

Collective Action and Resource Dependency

As previously stated, some networks may be able to withstand a crisis with little disruption. However, others will have to seek out new contacts that possess the needed resources. To whom they turn can be influenced by a number of factors. These factors can be as simple as availability or proximity or can deal with the complex issues of trust and dependency. Traditionally, several schools of thought have been identified as relevant to understanding network development. Among those are theories of social capital, theories of mutual self-interest and collective action, and exchange and dependency theories (Monge & Contractor, 2000). Each of these theories examines a motivation for actors to engage in a network. As post-crisis organizational networks are most likely to develop under circumstances aimed towards the completion of a common goal; reestablishing their business; these theories would likely offer the most explanatory power. Theories of mutual self-interest and collective action are interested in the possible benefits that can be achieved through coordinated action. The premise of collective action

states that the extent to which people are interconnected in communication networks increases their willingness to support the collective good (Monge & Contractor, 2000).

Such a theoretical underpinning has been used to explain network emergence in terms of working together to advance the public domain, such as building, or rebuilding, bridges, parks or libraries. Gould (1991) found that collective action is most salient a motivational force when emergent networks do not cut across networks of previously existing formal ties. An example of collective action is represented in the interorganizational networks created by non-governmental agencies to promote democratic election in Croatia (Taylor & Doerfel, 2003). While the NGOs normally competed for monies from other agencies, they found that the benefits of promoting democracy in Croatia outweighed their individual needs for funding. Viewing network development from this perspective could then help to explain why formerly unconnected or even competitive businesses might come together to establish a new order in which the mutual benefits outweigh the singular benefits gained at the exclusion of the other parties. In the case of rebuilding after Hurricane Katrina, collective action could explain how businesses could benefit from providing free space, food, or water to other businesses that were also trying to rebuild. Such recipients of free aid could later become customers or suppliers, strategic partners, or simply new members of their information networks. Or simply taking the initiative to clean or rebuild public space could lead to a quicker physical recovery and subsequent return to normal business.

Benefits gained from this interaction could range from material resources such as money or supplies to intangible resources such as information or customers. It can be argued that engaging in communication with any business partners is enacted in hopes of

garnering resources necessary for survival. Such a notion establishes the idea of dependency, and more specifically resource dependency. Resource dependency is a crucial underpinning of network studies and has strong implications for issues of power, trust, and leadership. Resource dependency and exchange theories are rooted in the idea of exchanging valuable or needed resources, and posit that people will seek out and interact with others who have resources that they need. Such coupling leads to interorganizational linkages and coordination by networks (Monge & Contractor, 2000). The variety of ties with which one engages then provides opportunities for access to different resources, as well as opportunities to increase one's power or initiate trust between formerly non-connected or indirectly connected parties.

Powell (1990) identified as the basic assumption of network relations the idea that “one party is dependent on resources controlled by another, and that there are gains to be made by the pooling of resources” (p. 303). This dependency enters parties in a series of “reciprocal, preferential, [and] mutually supportive” interactions by which they are able to accomplish their own goals without sacrificing the goals of network partners (Powell, 1990, p. 303). Such parties see benefit in cultivating personal or firm-specific resources, but also recognize the utility of co-operation beyond traditional boundaries in order to access critical resources otherwise highly costly or unavailable. While this idea is relevant in traditional networks, it is also especially relevant in post-disaster situations. Resources are likely to be scarcer than under normal circumstances, thus making the stakes involved in resource sharing and information exchange even higher; access to such resources and information could mean the difference between successfully reestablishing one's business and not being able to reopen.

Central to both the idea of resource dependency and the benefits gained therein are the ideas of information transfer and the flexibility that comes with this transfer in the context of network relationships. The unit of gain in each of the previously outlined benefits is information. Ahuja (2000) identified two types of exchange associated with resource dependency: resource sharing and knowledge spillover. Resource sharing involves the sharing of knowledge, skills, and physical assets between individuals and organizations (Ahuja, 2000, p. 427). Knowledge spillovers serve as direct lines through which news of innovation, new insights, or lessons learned flow between network partners. Such flow can include skills and expertise, which Ahuja (2000) identified as “know how” or facts. Uzzi (1997) referred to such exchange as “fine grained information transfer” among embedded partners in that it increases the “breadth and ordering” of behavioral options. Such resource sharing and information transfer, in turn, leads directly to the flexibility that is so prevalent in network forms. Post-disaster, this flow could include such information as how to get back into the area before evacuation orders are officially lifted, the quickest way to access new cash flow, or simply where to get clean water and fresh produce.

Types of Networks

Different types of networks offer accessibility to different types of resources. Types of networks have been identified as communication networks, information networks, problem-solving networks, knowledge networks, access networks, friendship networks, trust networks, and advice networks (Brass & Burkhardt, 1992; Cross, Borgati, & Parker, 2002; Krackhardt, 1992). Essentially, types of networks can be broken down into a formal/informal dichotomy. Information, problem-solving, advice, and workflow

networks all have to do with who goes to whom for advice on work-related matters. These networks are often prescribed according to an official organizational chart, although employees can also create alternate versions of these networks by utilizing their informal contacts. Information in these networks usually pertains to getting the job done. The formal ties are considered position-centered, and rarely persist after an individual or business fills a specific role in the network (Podolny & Baron, 1997). Resources in these types of networks usually involve technical work expertise, thus people who are powerful in these networks would likely be highly skilled or tenured. However, this does not mean that they are well liked or respected. Other resources could include material or information that is specific to the network member based on their professional connections.

Alternately, there are friendship, communication, and trust networks. These are the most informal, but often strongest, networks because they are based on friendship and social liking. Information in these networks can range from idle chatter to personal information to “delicate political information” having to do with organizational matters (Krackhardt & Hanson, 1993, p. 105). People in these networks are often privy to information they wouldn’t gain through other types of networks or regular work channels, because of the open communication and personal trust inherent to these types of networks are not necessarily present in their formal counterparts. Ties are considered more “portable,” in that they are person -- rather than position -- centered, and often maintained even after one leaves a certain position in the company (Podolny & Baron, 1997). Additionally, members of friendship networks are more likely to support other members within their friendship or trust network than they are to support other types of network

members. Thus, being important in a friendship network can lead to great power and influence, as well as access to tangible resources that might not be shared in a more formal situation.

Post-Crisis Network Development

In a crisis situation, access to and utilization of membership in various types of networks can blur. As disasters often force organizations to engage in unconventional or alternative relationships that they would not normally choose, Kreps and Bosworth (1994) offered that the collective behavior and formal organizing present in post-disaster organizing are really “two ends of the same coin” (p. 26). They use Kreps’ (1984) previously discussed domains (D), tasks (T), human and material resources (R), activities (A) typology to illustrate this point, stating that all four aspects are individually necessary and collectively sufficient for organization to exist (Kreps & Bosworth, 1994). As each element is added to a situation, a new “form” exists. When all four are present, organization has been socially constructed. Depending upon the order in which they are enacted, there can be a “means-end” relationship, or an “end-means” relationship. A structural means-end relationship would be characterized by either domains or tasks initiating the sequence, whereas a structural end-means relationship would be characterized by resources or activities coming first (Kreps & Bosworth, 1994). For example, after a hurricane, a combination of private citizens and local businesses offer the mayor a variety of resources to aid emergency response (R). Using these resources, the mayor organizes an overall civil defense effort (D). This group of people and organizations, as mandated by the mayor, then respond to various disaster-related problems (A). Task structure then emerges and is coordinated among the core members

of this new network (T) (Kreps & Bosworth, 1994). In this situation, collective behavior is observed in that resources are being utilized before there is a set plan and activities are performed before a clear division of labor is established. However, formal organizing is also present in that these collective actions are quickly mandated by both an authority (the mayor) and a definitive task-structure that overrides the formerly *ad hoc* nature of the relationships.

Thus, depending on the ordering of organization after a crisis, network development can be viewed as a combination of collective action and formal order. This is relevant because it combines the idea of purposive ordering with the *ad hoc* nature of post-emergency net formations. An example of network development that combines both of these ideas is the Incident Command System (ICS), a temporary “organizational form” described by Bigley and Roberts (2001). Although the ICS is considered by Bigley and Roberts (2001) to be an organizational form as opposed to a network, the underlying logic speaks to network formation. The ICS consists of the assemblage of emergency and safety personnel to respond to large-scale emergencies (Bigley & Roberts, 2001). Formed through a cooperative effort among federal, state and local agencies in California, the ICS is a system developed to respond to many types of large-scale emergencies that require multiple resources, including natural disasters, riots, and terrorist attacks (Bigley & Roberts, 2001). The system is both bureaucratic and flexible, in that it consists of a hierarchical structure that adapts flexibly to each emergency situation. At the top of the hierarchy is the role of incident commander, which is always filled by the first responders. Four sections then report directly to the commander (Bigley & Roberts, 2001). Thus, while there is a pre-determined structure for emergency response, the network

configuration will be enacted differently within this structure for each emergency response.

Another such system is the integrated crisis management unit (ICMU), which is composed of “multiple highly interlocked organizations that nonetheless act more or less as a single entity to provide a coordinated response to disaster” (Topper & Carley, 1999). Some of these organizations are “chosen” for participation by nature of their organizational mission, such as when the US Coast Guard and the Department of Environmental Conservation responded to the Exxon Valdez crises in 1989. However, others joined the network in an *ad hoc* fashion, such as when Greenpeace joined the environmental salvage efforts during the same disaster (Topper & Carley, 1999). Though these organizations may have pre-existing relationships with each other, during each response they must alter these relationships and in some cases create new ones (Topper & Carley, 1999). These new forms are expected to respond quickly, accurately, and undergo constant reorganization in order to remain effective.

Topper and Carley (1999) applied three models of network emergence to the network organizing of emergency response organizations after the 1989 Exxon Valdez oil spill in an effort to learn more about the emergence of temporary organizations. The first model is a model of the spontaneous emergence of a coordinated group. This perspective posits that people spontaneously come together during crises and form a coordinating group that becomes crucial to the emergency crisis response. Such a group is thought to emerge due to a lack of contingency plans and the “appearance of unanticipated stakeholders” (Topper & Carley, 1999, p. 70). The second theoretical perspective posits a centralized system throughout the duration of the crisis. Network ties “rigidify and

centralize internally,” causing one (usually formal) entity to become central to the relief effort (Topper & Carley, 1999, p. 70). This serves to provide legitimacy and accountability, as well as to reduce uncertainty (Topper & Carley, 1999). Finally, the third perspective, called the distributed group perspective, asserts that there will initially be strong, central involvement of formal authorities, but that this will diminish over time as other organizations coordinate and respond laterally (Topper & Carley, 1999, p. 70).

Using network analysis based on official Coast Guard reports coupled with newspaper reports of the Exxon Valdez incident, Topper and Carley (1999) found that none of the perspectives described above completely explained ICMU emergence (p. 87). They found that there was a strong tendency towards centralization, but also found that as new tasks emerged that required new resources, formerly peripheral or absent organizations began to play a coordinating role. However, in this particular case study, there were formal organizations that held designated roles working in conjunction with other organizations (environmental groups such as Greenpeace) that held other useful resources and interests. Emergency recovery networks that emerge under contexts in which there is no designated authority may show more support for the coordinated group perspective, or, in fact, a reverse distributed group perspective in which participants originally come together via loose, lateral communication that later turns into a more centralized and formal organizations.

While these two examples illustrate temporary or transitional networks dealing with crisis response instead of rebuilding, they offer useful insight into how people organize post-disaster. Organizations used a combination of purposive and *ad hoc* ordering to negotiate new partnerships and accomplish their goals. Network development,

then, plays a crucial role in how network partnerships are formed and how these partnerships will be structured.

Structural Mechanisms

While network development provides insight into how and why entities engage in network communication, examining the structure of networks provides insight into how network communication is affected by each member, and subsequently, how each member is affected by network communication. While networks *are* a structure, in that they are a social unit composed of individuals bound by communication, networks can also be studied *in terms of* their structure, i.e. whether the individuals who compose the network are loosely or tightly bound. Studying networks *in terms of* their structure is commonly referred to simply as studying “network structure,” taking for granted the idea of networks as a structure and instead focusing on the implications of the social arrangements’ therein. Network structure has implications not only for the organization of relationships among network members, but also for the types of information passed among these members. Essentially, network structure helps define the context in which all network interaction takes place and can include such features as density, or the relative interconnectedness of each member; size; diversity in network membership; and composition, or characteristics of each member (Hulbert, Haines, & Beggs, 2000). Each of these structural characteristics has been linked to variation in social capital, innovation, job advancement, and social support (Garguilo & Benassi, 2000; Hulbert et al., 2000; Podolny & Baron, 1997).

Diversity in network membership has been linked to both more and less success in facilitating member access to resources and coordinating action (Garguilo & Benassi,

2000; Podolny & Baron, 1997). For example, network diversity has been shown to affect the degree to which information and resources can be beneficially obtained and leveraged by network members (Gargiulo & Benassi, 2000; Podolny & Baron, 1997). There are two competing views on what type of network structure provides the most benefit. Networks made up of members who are highly familiar, often similar, and have a long history of repeated interaction are considered to be cohesive and closed networks (Ahuja, 2000). McPherson, Smith-Lovin, and Cook (2001) posited that “similarity breeds connection” (p. 415). They refer to this phenomenon as the homophily principal, or the idea that similar individuals interact more frequently than do dissimilar individuals. This preference cuts across all types of ties, and is believed to affect issue-related communication, which can lead to more influence (McPherson et al., p. 428). Additionally, as homophilous ties are likely to hold the same attitudes, abilities, beliefs, and goals, it is likely that they will also hold similar resources. Network ties based on homophily can provide quick access to commonly used resources. Because we tend to trust similar others more readily than others who are different, it is possible that less relational work would have to be done to rapidly establish a relationship and thus access these resources. Thus, it can be assumed that people often turn to similar others for help and advice. In fact, Hulbert et al. (2000) found that homophilous relationships are beneficial in times of structural turbulence, and that such ties become more important during times of crisis. That is, individuals often turn to similar others within their networks for help before turning elsewhere, regardless of whether these others are in the best position to offer help. Such networks also facilitate trust and cooperative exchange, which in turn provides clear norms that lead to easy exchange and high cooperation. Members can then leverage this sense of belongingness

and cooperation to pursue individual interests. Information exchanged in these networks supports norms and reinforces network identity. While this may not lead to greater innovation, it can lead to greater decision-making power, as well as environment of trust in which members are more willing to take risks.

A second school of thought counters that such norms and reciprocity based on obligation may actually hinder access to information and resources, ultimately stymieing task accomplishment and member coordination. In other words, this point of view asserts that advantage lies in having an “open” network structure in which members are “connected to many actors who are themselves unconnected.” (Ahuja, 2000; Podolny & Baron, 1997). These relatively unconnected actors often span several networks but are not deeply embedded in any given network, thus offering unique resources. Such networks are often associated with greater flexibility and innovation, because they tend to contain more diverse members with less overlap of resources. Additionally, networks that are more open in structure contain less “amplified reciprocity,” or tendency for members to act against their own benefit out of a sense of obligation for past interactions, which in turn frees members to act in a way that promotes the current situation (Gargiulo & Benassi, 2000)

In fact, for the very same reasons that similar others are attractive network members (similarity of attitudes and resources), they can also be less helpful in a time of crisis or emergency. Communicating only with others who think and act like you limits opportunities for diverse information and resources, thus potentially decreasing innovation and problem-solving capacities. Thus, dissimilar others may have more to offer groups who come together in an attempt to problem solve or attain a goal that

requires diverse resources. For example, small businesses may be used to dealing with local suppliers or exchanging resources with local businesses. Because these sources are similar and familiar, it is easier to establish trust. However, in a disaster situation, these similar others are likely to suffer the same shortage of supplies. Those who are willing to look to unlikely or different sources in a time of need may be the most successful at getting back on their feet first. Thus, whether or not businesses form open or closed networks can have implications for development of trust and leverage social capital, which can affect how successful a business is in reestablishing itself in the post-disaster social order.

Temporary Networks

Applying social network theory to alternative contexts of organization, such as post-crisis or during and after emergency, is likely to yield both similarities and differences with traditional networking. Based on the previously discussed parameters of a transitional space, it becomes possible to make predictions about the network form developed in this space: the transitional network. Such a network could consist largely of already existing network members, of new contacts made necessary by the circumstances of the crisis or be a hybrid of old and new network members. While they are likely to share many of the developmental and structural characteristics of traditional networks, transitional networks may not share the embeddedness or trust found in traditional networks. As these networks develop out of the necessity to return to normalcy, or even operational conditions, there is likely a strong motivation to work together that serves as glue to hold the network together, even if it is only for temporary amount of time.

While research on short-term networks is scarce, it supports the idea that such networks could exist. Some of this research makes reference to the idea of temporary networks. Conceptually similar to the idea of a transitional network, a temporary network is one that consists of “a set of diversely skilled people working together on a complex task over a limited period of time” (Goodman & Goodman, 1976). While the same definition could be applied to a transitional network, a temporary network may or may not be one in which members are trying to regroup or regain a certain stature. Temporary networks can consist of people who come together for any temporary task with the intent of disbanding after it has been accomplished. This difference notwithstanding, reviewing the literature on temporary networks can illuminate some characteristics and concepts one could expect to find with transitional networks.

Weick (1990) referred to temporary networks as being an “odd mix of the mechanistic and the organic” (p. 587). That is, these networks are likely to exist within a larger established structure, but need to operate in an extremely flexible way. These structures are formed for a limited purpose and include members who have not necessarily worked together before, and may not work together again. Additionally, members of these networks represent a large diversity of either functions or skills. They are formed when a task arises that is so complex that it cannot be accomplished either singularly or by many people working on individual aspects of it side by side; rather, people must work interdependently in order to get the task accomplished. “The task is also unique, so that there are no existing procedures or teams already in place to deal with it...is usually of high importance, and defined in terms of specific goals or an overall mission that limits the network’s duration to the completion of this mission (Goodman &

Goodman, 1976). The goal of such a network is to bring insight in to a complex problem and to subsequently make a difference (Goodman & Goodman, 1976).

Myerson, Weick, and Kramer (1995) identified nine characteristics of what they term “temporary systems.” In addition to the traits of limited working history, indefinite prospect of future interaction, goal complexity, and interdependence, they offer the following characteristics of the task or goal at hand: tasks have a deadline, are non-routine and not well understood, tasks are consequential, and they require “continuous interrelating ... to produce an outcome” (p. 169). Because of the elaborate and unique nature of these tasks, temporary systems often involve high-risk outcomes. Networks assembled around such a task usually lack the formal structures essential to coordination and control (Myerson et al., 1995).

Despite the lack of formal structure, there are different types of cohesion that underlie the formation of temporary networks. The people assembled in a temporary network often come from a varying degree of talents or specialties. It is likely that they are part of the network precisely because of those specialties. They can be recruited as part of the network by “contractor” who chooses people with diverse skills to enact their expertise within the temporary network (Myerson et al., 1995). An example of such a person would be a movie or performance director, who chooses a cast and crew based upon the skills that they could bring to his or her production. Alternately, temporary networks can come together more organically; with people seeking each other out based on a mutual need for each other’s respective skills or specialties. An example of such a formation could include individuals or establishments coming together after some emergency. With their normal networks disrupted or disbanded, entities will be searching

for others to fill specific voids created by this network disruption. For example, individuals displaced by a natural disaster will not be able to rely on their usual neighborhood or civic networks for help; rather, they must rely on charitable aid organizations such as the Red Cross for food or clothing, the kindness of strangers for lodging, and government aid for money.

The task that underlies the formation of these networks will likely be closely related to the environment in which the network is created. Monge and Eisenberg (1987) asserted that different structural presentations are required to accommodate information-processing needs in different kinds of environments (p. 318). Thus, it is likely that prevailing conditions will call for the formation of a new network structure. While stable environments can usually be sustained in keeping with the status quo, or pre-existing, traditional structures; diverse and turbulent environments require flexible and adaptive arrangements (Monge & Eisenberg, 1987). While such a premise underlies network theory in general, it is particularly applicable to the idea of transitional networks. Times of turbulence or change are more likely to serve as the catalyst that brings together various groups of people towards a common goal. It is around this goal, then, that members build their network of relations.

Such an emphasis on goal attainment may initially serve as proxy for initial trust, as each member of the temporary network is there because of pre-existing interest in solving that goal. Thus, former issues of competition can be put aside as they work towards solving the problem. Additionally, although the interaction is finite, it is likely that members will still have a stake in performing well in that they come from either complementary or competing fields. Thus, their reputation will both precede and follow

work in this temporary network. Ring (1997) points out that fragile trust, or trust in another's capabilities to get the job done, is often enough to lay the foundation for a network. It is the development of resilient trust, or trust in one's social characteristics or moral integrity, that lays the foundation for extended and stable network interaction. In the case of temporary networks, perhaps fragile trust based on reputation is enough to get the work done. Or, perhaps the stakes involved in the shared goal, and the communication required to get it done in a finite period of time, leads to the accelerated development of resilient trust as network members learn to interact with and depend upon each other.

Myerson et al. (1995) developed this idea further through a concept called swift trust. Swift trust is more than just "conventional trust" on a temporary scale, but rather, is a "unique form of collective perception and relating that is capable of managing issues of vulnerability, uncertainty, risk, and expectations" (Myerson et al., 1995, p. 167). Inherent to swift trust is the idea that people who engage in swift trust are vulnerable in that they entrust goods such as reputations, conversation, health, investments, etc., to the other party with whom they engage in the trust (for our purposes hereafter referred to as other members of the temporary network). In a network of weak ties, there is less control over the diffusion of these goods, thus making them more vulnerable than when engaged in networks of strong ties, such as friends and family (Myerson et al., 1995, p. 167). Thus, in systems of high interdependence, such as those found in temporary networks, *everyone* is likely to be equally vulnerable, thus providing one basis on which swift trust can be developed.

Another basis for the development of swift trust is the finite nature of the task at hand. Because network members are likely working to meet a deadline or at the very least towards an acknowledged endpoint, they will be more inclined to deal with each other in terms of roles rather than as individuals (Myerson et al., 1995). Particularly when network members were joined by a contractor, expectations based on role are likely to be more stable than those tasks defined in terms of personal relations. Additionally, if one imports trust from pre-designated categories, one can adopt a sort of “depersonalized trust” based on these categorizations (Myerson et al., 1995). Put another way; “people under time pressure in temporary systems make greater use of category driven information, emphasizing speed and confirmation” (Myerson et al., 1995). This, in turn, leads to a faster reduction of uncertainty, which can (if good as opposed to ill will is engendered through this loss of uncertainty) lead to greater trust.

Finally, conceptualizing trust in terms of risk holds implications for the development of swift trust. Myerson et al. (1995) assert that trust presupposes risk and that trust connects risk and action in that one chooses between alternatives based on estimations of trust. Thus, trust, rather than rationale choice, is the impetus for action in temporary networks. Necessity for action, which translates into the necessity to take risk, is a final antecedent for the development of swift trust. Completing the cycle, swift trust allows for network members to engage in actions that engender more trust (Myerson et al., 1995). The very interdependence of temporary networks that could undermine the development of trust, then, in turn, serves to strengthen it.

Both fragile trust and swift trust encompass elements of cooperation, or “working or acting together for a common purpose or benefit”

(<http://dictionary.reference.com/browse/cooperation?qsrc=2888>, retrieved 7 April, 2009).

Indeed, cooperation can be understood as a premise for swift trust, as the temporary systems Myerson et al. (1995) described come together specifically for goal attainment. Harrison and Doerfel (2006) showed that within organizations “cooperative climates beget supportive and empathetic communication, trust, and openness” (p. 132). This study supported the idea that cooperation is an antecedent to trust, to the extent that it has the ability to transform a formerly competitive relationship into cooperative relationships. It makes sense, then, that cooperation could also beget trust in other tumultuous situations.

While the idea of formerly unconnected or loosely connected individuals coming together to work towards a common goal is not new, viewing it through a network lens provides new insight into a formerly underdeveloped area of research. It provides a new way of understanding the success and failure of both past and future ventures that can be understood as transitional networks. This framework, which would stress flexibility, reciprocity, and innovation based on diverse talents but shared goals, would then provide cues for the emergence of trust and cooperative communication among the agencies. Table 1 provides a breakdown of the proposed similarities and differences between traditional, temporary, and transitional networks.

CHAPTER 4

Communication and Post-Disaster ICT Use

In a scenario in which networks are disrupted and perhaps physically dislocated, it is likely that people would not rely only on face-to-face communication. Information and communication technology services (ICTs) have the potential to take on greater importance in such a situation. ICTs can alter temporal, physical, and social aspect of communication, thus allowing for communication-at-a-distance” (Aakhus, 2003; Rice, 1994, p. 168). These technologies separate social space from physical space, allowing for a definition of one’s situation to be negotiated regardless of the physical presence of either party (Aakhus, 2003). Such a concept allows people to “conduct business,” something often defined by working in an office or other such familiar setting, to take place anywhere that one makes the decision to conduct business. Whereas time or proximity can constrain communication opportunities, ICTs such as the mobile phone, e-mail, and the Internet can eliminate these constraints by allowing people to communicate either synchronously or asynchronously across geographical space. Additionally, technologies such as the Internet or other telecommunication networks allow access to formerly unconnected parties in a variety of locations (Rice, 1994).

ICTs have the capability to build alternative interpersonal communication and information infrastructures, depending on how and if people choose to integrate them into their current communication infrastructures (Aakhus, 2003). A crisis situation that disrupts the typical communication infrastructure, be it through physical or mental dispersion of people and their daily activities, creates an opportunity for new integration of ICTs into people’s lives. For example, on September 11, ICTs allowed for the creation

of “flexible and spontaneous networks of communication,” that allowed users to circumvent hierarchical systems of communication during and immediately after the crisis (Dutton & Nainoa, 2003, p. 77). Not only did people integrate ICTs into their communication patterns during the crisis, but they expanded their usage of these technologies to accommodate the new communicative context created by the crisis. Using ICTs in such a way can result in a reinforced sense of traditional communication patterns within networks, or the “institutionalizing of new organizational structures or changing the nature of interpersonal relations” (Rice, 1994, p. 167).

With increasing frequency, people are reporting reliance on communication technology during crisis. In addition to using the mass media such as television and radio to keep apprised of new information, people and institutions are also relying on person-to-person technology. After September 11, individuals reached out to others in their networks through the use of landwire telephones, mobile phones, pagers, and the Internet (Katz & Rice, 2002). Comparison to previous crises, such as the Kennedy assassination, show that these technologies are now used to gain access to a “wider range of information sources and communication with a wider network of people over a longer period of time” than ever before (Carey, 2002, p. 11). Disaster response teams increasingly rely on technology such as mobile information sharing devices called wireless peer networks in order to “coordinate and control” information sharing (Arnold, Levine, Manmatha, Lee, Shenoy, Tsai, Ibrahim, O’Brien, & Walsh, 2004, p. 206) The Incident Command System relies on peer networks in order to keep various members of the system apprised of both baseline and updated needs and assessments (Levine et al., 2004). In this way, the technology fills a communication management role that allows

members to stay in touch without having to physically stop and check in with a central person.

Cellular phones allow people to stay connected even when physically dislocated. Mobile phones have become increasingly omnipresent in the last decade, affecting the ways in which we communicate and network on a daily basis (Katz, 1997, 2006). They allow for the maintenance of ties at a distance, control over “far-flung” resources, and greater communicative availability (Katz, 1997). It is no surprise, then, that they can fill a number of purposes in a disaster. In studying telephone use during September 11, Katz and Rice (2002) found that “contact and reassurance communication with primary social group members” was a highest priority (p. 248). Many of these calls did not contain instrumental information; rather, they served the function of allowing people to “come together,” in some instances, for the last time (Dutton & Nainoa, 2003). Cell phones provided a crucial role in keeping people connected to other members of their networks (Carey, 2002). They allowed people to establish and maintain contact with family and friends when both parties were mobile (Carey, 2002; Katz & Rice, 2002). Thus, at a time when many people were not where they expected to be, they were still able to stay in touch. This allowed for a sense of immediacy in communication that might not have existed without the availability of mobile technology (Katz & Rice, 2002).

This act of coming together, enabled by ICTs, allowed for information sharing, as well as social and emotional support (Dutton & Nainoa, 2003). In addition to using mobile phones, other mobile communication technology, such as e-mail and the Internet, take on prominence during and post-disaster. Previous research on crisis communication has shown that the Internet was able to withstand the increased traffic that resulted from

up to six times the normal number of users on a given site (Carey, 2002). In fact, people turned to e-mail when phone lines were temporarily unavailable (Carey, 2002). Katz and Rice (2002) found that in a crisis, people develop “ad hoc” solutions using a variety of media in order to maintain contact with their network (p. 251). During September 11, a mother who was vacationing out of the country used a combination of phone and e-mail at an Internet café in order to ascertain that her daughter and extended family were safe (Katz & Rice, 2002). Using this combination of technology, she was able to communicate across international boundaries in order to make sure that her network, though geographically far-flung, was in tact. Dutton and Nainoa (2003) highlighted this “interdependence” of technology use in a disaster situation, implying that the usage of multiple ICTs is more beneficial than reliance on a single device. For example, people were able to inform loved ones trapped in the World Trade Center based on what they saw on television, and vice versa (Dutton & Nainoa, 2003).

People also turn to the World Wide Web (WWW) as a source of information during and after a disaster. This is done in a variety of ways, from simple information gathering with mass media outlets to communicating directly with both internal and external publics. The first way in which the WWW is used during a disaster involves the traditional one-way communication of mass media. Post 9/11, people turned to the Internet in order to get information from news sources such as CNN.com and MSNBC.com (Carey, 2002). People also used the Internet to ascertain information from a variety of government and other agencies, including the FBI, CIA, NYC Government, and the Federal Disaster Relief Agency (Carey, 2002). Though this does not constitute 2-way communication in the traditional sense, it is a step closer than traditional mass-media

information dissemination. Organizations, including governmental agencies, are increasingly using their web-sites as a vehicle for both sharing and soliciting information from the public (Perry, Taylor, & Doerfel, 2003). As the prevalence of the Internet as a source of information increases, so does people's tendency to go to official organizational sites for information (Perry et al., 2003). In addition to traditional crisis-management techniques such as press releases, organizational websites can also use interactive chat, threaded dialogue, and real-time video to communicate with publics (Perry, et al., 2003). Thus, as people visit websites and make queries using information technologies, organizations are able to adapt the information that they put out to the needs of their audiences. Thus, the use of websites during and after crisis has the potential to become a two-way asynchronous dialogue in which organizations can communicate with the general public, as well as selected internal and external publics that they have not been able to get in contact with otherwise.

As communication technology allows the line between interpersonal, small group, and mass communication to blur, people are actually able to extend their networks through the use of this technology. For example, after September 11, chat rooms and forums were used for a number of reasons, from talking about terrorism to expressions of support and sympathy (Carey, 2002). People were able to reach out to others experiencing the same feelings of anger, pain, or fear, thereby extending possibilities for support, information, and resources outside of their immediate networks. People also bonded around the use of technology; in a spirit similar to that of collective action, individuals shared resources and support (Katz & Rice, 2002). According to Katz and Rice (2002), studies of telephone service breakdown show that in times of need, people

often share limited resources with proximate others, thereby leading to new friendships and a sense of community spirit. Thus, as people use mobile technology to reach out to displaced members of their own networks, they do so by connecting with new acquaintances who, by chance or for some other reason, are now part of their geographically close networks.

This discussion of the use of mobile communication technology in disaster situations can be extended to Hurricane Katrina. Residents were forced by law to evacuate the city for approximately three and a half weeks. People returned to New Orleans at a staggered rate; some residents attempted to get back in before the evacuation was even lifted while others had nothing to which they could come back at all. However, it is likely that each of these types of reentrants had the need to stay connected with other members of their networks. In some cases, the only way to accomplish this was through a reliance on communication technology. Based on a review of ICT use during previous crises, it appears that ICT use is utilized for a variety of reasons, all of which led to increased and enhanced communication across a distance. By defining the role that communication technology played in network maintenance and rebuilding after Katrina, we can develop a better understanding of how networks can remain in tact or start anew even when face-to-face communication is not an option.

CHAPTER 5

Propositions and Research Questions

Applying tenets of social network theory to what is known about post-crisis and temporary networks sets up some expectation about networking in a transitional space, and as a result, a communication theory of transitional networks. Crises are events that cause disruption to the normal flow of business, resulting in a period of uncertainty and high consequence. How one communicates immediately after a crisis often sets the tone and opportunity for how an organization can recover from this crisis. Because of this altered space, Kreps (1984) argues that by studying disaster, we can view the full lifecycle of social ordering, from a time of disorder to a time of stability. Social network theory provides a way to understand social ordering by looking at who communicates with whom to what consequence. Such communication has consequence for both macro and micro-levels of social order. That is, the partners with whom one engages are dictated by the circumstances within which one exists. Thus, in a post-crisis transitional space, partner choices will logically be constrained by the environment created by the crisis.

P1: The limitations or opportunities posed by a crisis create a context in which organizations experience a disruption in normal communication patterns.

In a normal space, networks often develop around the idea of exchanging resources to the mutual benefit of all parties. These resources can include knowledge, skills, assets, or emotional support. In a post-crisis transitional space, access to resources is likely to be scarcer than in a normal space. Additionally, the environment created by the crisis will

also dictate a need for access to specific resources in order to reestablish a sense of normalcy and working order. Thus, individuals and organizations will have less opportunity and more need for attaining these resources. Because of the scarcity of resources and potentially limited opportunities for gaining these resources, organizations are likely to develop contacts based on gaining ability to such resources.

P2: Network development in a post-crisis transitional space will be aimed towards securing access to resources needed to overcome obstacles created by the crisis.

Social network research traditionally conceptualizes trust as a bond that evolves over time as network members become further embedded in the network. It becomes rooted in the prior communication of network members and the anticipation of future communication with these same members. However, as the premise of transitional networks includes a disruption that will likely lead to both loss and gain in network membership, it is likely that trust will be manifested differently than in traditional networks. Myerson et al. (1995) posit a form of trust that emerges in a situation born of potentially finite interaction and need for goal attainment. Such a conceptualization of trust does not resemble traditional notions of trust, but rather a trust born out of vulnerability, risk and forced interdependence.

P3: A need for goal attainment will create an interdependency among members of transitional networks that allows for quick trust among parties.

It is possible that in a post-crisis transitional space, no single entity will be able to produce or secure all of the resources necessary for recovery. In those cases, entities may decide to work together in order to benefit the overall environment in the hope that fixing

problems created by the crisis that are *non*-specific to them will benefit them in the long term.

P4: Network development in a post-crisis transitional space will include some partnerships that benefit the overall good rather than simply the good of the focal organization.

Research on post-crisis networking proposes that organizing will be a combination of purposive and informal action (Bigley & Roberts, 2001; Kreps & Bosworth, 1994; Topper & Carley, 1999). While there are likely to be formal recovery plans or other designated contacts available, it is also likely that entities will work together to find the best solution.

P5: Network development in a post-crisis transitional space will contain elements of *ad hoc* and formal ordering.

Existing literature on short-term or temporary networks suggests that the because of the nature of the task around which the network assembles, members are likely to represent a wide variety of skills or resources, with little overlap (Goodman & Goodman, 1976). Social network literature supports the idea that such networks would be useful when innovation is an important goal, as non-redundant and diverse ties are likely to bring more resources and knowledge, and therefore more solutions, to the table (Ahuja, 2000; Podolny & Baron, 1997). However, other literature points to the likelihood that in times of an emergency, closed, homophilous networks provide the most benefit (Hulbert et al., 2000). While they offer less diversity, the trust and emotional support engendered in such a network may outweigh the innovative opportunities offered by open networks. Because

empirical arguments have been made to support the presence of both types of network structures in a post-crisis transitional space, the following research question is offered:

RQ1: What types of structural diversity do the transitional networks reported by business owners post-crisis reflect?

While RQ 1 asks about the types of structural diversity exhibited in transitional networks, it is reasonable to assume that the more diverse an organization's normal network, the more access one will have to a variety of resources during a transitional space. Although organizations may not utilize these diverse contacts in the same way pre- and post-crisis, their mere presence in the pre-crisis network may provide opportunities for access to needed resources.

P6: Post-crisis transitional network structure will be affected by the diversity of the focal organization's normal network.

As Kreps (1984) states, disaster is likely to provide insight into the cycle of social ordering. Conceptualizing social ordering as part of a cycle insinuates that there will be different phases of development to post-disaster networking. To call a network "transitional" implies that there is a normal network both before and after this transitional space. To ascertain if this is so the following question is offered:

RQ2: What do interorganizational networks look like before, during, and after a crisis?

In addition to looking at how people organize in a transitional space, it is also important to look at what role communication played in this process. ICT use is an aspect of post-crisis communication that has received attention because of its ability to facilitate communication even when normal working conditions have been disrupted. In crisis

conditions, people have relied on ICTs for information sharing, social support, maintenance of contacts, and resource sharing (Carey, 2002; Katz & Rice, 2002.) It would make sense, then, that ICT use would play an important role in the development and maintenance of transitional networks. Based on previous research on ICT use, it is reasonable to classify “ICT use” as a combination of frequency of use, variety of ICT used, and purpose of use (support, information, etc.). The variety of possibilities for ICT use, then, lends itself to the following research question:

RQ3: How did focal organizations use ICTs to build and maintain transitional networks?

CHAPTER 6

Methods

Setting

On August 29, 2005, Hurricane Katrina ripped through the gulf coast, leaving casualties of life and property in its wake. The worst recorded damage was in New Orleans, Louisiana. The city is situated mostly below sea level and sits on the east bank of the Mississippi River, surrounded by Lake Pontchartrain. The force of the hurricane caused the lake, which is normally one foot above sea level, to rise as high as 8.5 feet above sea level (<http://www.cnn.com/2005/WEATHER/09/01/orleans.levees/index.html>, retrieved 10 February, 2008). The result was a breach in the levee system used to keep much of New Orleans and the surrounding area dry. The levees broke in three places, leaving eighty percent of the city underwater, some areas submerged as deep as twenty feet (Retrieved <http://www.cnn.com/2005/WEATHER/08/30/katrina.neworleans/index.html>, 10 February, 2008). There was no power, and food and drinking water were scarce. Helicopters were used to rescue people from the roofs of homes submerged under water; boats were used to navigate city streets and find survivors. Those areas that hadn't flooded were subject to looting. So complete was the devastation and lawlessness in the days immediately following the hurricane that one Jefferson Parish administrative officer commented, "Jefferson Parish is closed. It's just not a place to be" (Retrieved <http://www.cnn.com/2005/WEATHER/08/30/katrina.neworleans/index.html>, 10 February, 2008).

The days leading up to the hurricane brought some advanced warning of the severity of the storm. On August 28, Mayor Ray Nagin ordered a mandatory evacuation of the city. Residents were urged to relocate with friends and family in surrounding cities such as Atlanta and Houston, with the Superdome and the New Orleans Arena being offered as public shelters. Combined, they seat 86,000 people (Retrieved <http://www.cnn.com/2005/WEATHER/08/30/katrina.neworleans/index.html>, 10 February, 2008). In the days after the storm, they were filled to capacity. Limits on food, water, and building facilities caused a more widespread dispersion of evacuees from these buildings to other locations in the days following the hurricane.

While many people reported only packing for a three-day evacuation, citizens were not allowed to return to New Orleans until September 5 (<http://www.cnn.com/2006/US/01/10/katrina.evacuees/index.html>, retrieved 10 February, 2008). Many did not return right away, and those who did return could only check on their property and survey the damage. Many found that their homes and businesses were damaged and uninhabitable, causing them to leave again until they could figure out if and how they would return for good. Between August and the end of December 2005, the city remained under curfew, requiring that everyone be in before dark (<http://www.cnn.com/2006/US/01/10/katrina.evacuees/index.html>). As far out as December 2005, at least 30% of the city was without electricity and there were reports of contaminated soil, making it difficult to embrace a full return (<http://www.cnn.com/2005/US/12/03/katrina.townhall/index.htm>, retrieved 10 February, 2008). In this timeframe, the population declined from about 484,000 to approximately 200,000 --<http://www.cnn.com/2006/US/05/02/hurricane.plan/index.html>). In short, the

city was largely uninhabitable and not a place where businesses could easily reopen.

Additionally, it lacked the infrastructure necessary to help those inhabitants who did attempt to return during the first few months after the hurricane

(<http://www.cnn.com/2006/US/01/10/katrina.evacuees/index.html>). Thus, repopulation of the New Orleans was, and continues to be, a slow process, with many people reporting that they were not sure that they would return at all.

Prior to the Hurricane, New Orleans was a hotspot for tourism, with approximately 10 million visitors in 2004 alone

(<http://www.neworleansonline.com/pr/releases/releases/Why%20NO%20Important.pdf>).

The tourism industry supported a host of hotels, bed & breakfasts and small businesses.

The arts industry thrived, with a number of active galleries, museums, and performing arts venues, including the Louisiana Philharmonic. Additionally, New Orleans was host to one of the busiest ports in the United States, home to the country's second-largest fishing industry, and was the top ten largest producer of cotton, sugarcane, and rice in the US

(<http://www.neworleansonline.com/pr/releases/releases/Why%20NO%20Important.pdf>).

These industries created jobs that were crucial to New Orleans residents, and residents, in turn, were crucial to these industries. However, after Hurricane Katrina, each of these industries was devastated. Residents could not even access the city, let alone host tourists.

Without tourists, small businesses, hotels, restaurants, and arts centers could not generate revenue. Without revenue, they could not sustain being open. By December 2005, only

1,100 businesses were operational and approximately 700 food establishments open

(<http://www.cnn.com/2005/US/12/03/katrina.townhall/index.html>). This represented less

than half of the restaurants in Orleans parish, which does not even include surrounding parishes affected by Katrina. Even a full year later, in August 2006, only 1,239 out of 1,882 restaurants were open in Orleans parish

(<http://www.neworleansonline.com/pr/releases/releases/May%202006%20Update.pdf>).

While this number indicates that many had made it back and were able to reopen, it also points to the large number of businesses that remained closed or struggling to regain operational status.

Methodological Approach

In most research, the nature of the research problem dictates the method of study. In general, qualitative problems are driven by questions of “how or a what,” and are applied to a topic that needs to be explored, often in its natural setting (Creswell, 1998). The questions generated by the exploration are generally answered in great detail (Creswell, 1998). Qualitative research has been defined as a “multimethod,” “interpretive,” “naturalistic,” “sensemaking,” approach in which a researcher “builds a complex, holistic picture, analyzes words, reports detailed views of informants, and conducts the study in a natural setting,” while interpreting the subject at hand using the meanings imbued by the people who experience this phenomenon (Creswell, 1998, p. 15). This is compared to a quantitative approach, which answers questions of “why” and attempts to establish “association, relationship, or cause and effect” between or among a set of variables (Creswell, 1998, p.17). Qualitative and quantitative methodologies are not mutually exclusive and are optimally used in tandem to create a fuller picture of a research problem. Indeed, using qualitative methodologies, such as in-depth interviews,

can provide the direction for more targeted forms of quantitative inquiries. Such was the case for this study.

The problem at hand in this dissertation is to understand *how* people use communication to recreate networks after a disaster. Thus, a primary methodology of in-depth interviews was employed in order to understand how post-disaster networking was accomplished. According to Miles and Huberman (1994), “Words, especially organized into incidents or stories, have concrete, vivid, meaningful flavor that often proves far more convincing to a reader” (p. 1). In doing so, human activity becomes a text from which one can derive meaning, and possibly, a sense of order about a given phenomenon (Miles & Huberman, 1994). Thus, I use the participant’s words as a basis for determining how organizational networks are formed post-disaster.

Creswell (1998) identifies five traditions of qualitative inquiry: biographical life history, phenomenology, ethnography, grounded theory study, and case study. These traditions vary in focus, and range from providing an in-depth look at an individual or case, to providing an interpretation of the experiences of a phenomenon or cultural group. The focus then drives the method and scope of data collection and analysis. These methodologies include interviews, ethnographies, observations, and analysis of documents, archival records, and physical artifacts (Creswell, 1998). Of interest to this study are the grounded theory and case study approaches. A grounded theory approach aims to provide an “abstract analytical schema of a phenomenon, that relates to a particular situation.” (Creswell, 1998, p. 56). This is accomplished by collecting data, usually first-hand accounts of the phenomenon, and then coding these data into categories that create a story. This story provides the basis for the propositions of the emergent

theory. This theory is then placed within the “social, historical, and economic” conditions by which the phenomenon is influenced. Grounded theory generally uses interviews as the primary form of data; interviews are collected until the researcher feels subsequent interviews will provide no additional insight into the problem (Creswell, 1998). As the ultimate goal of this dissertation is to extend the use of social networking theory to introduce the idea of networking in a transitional space, grounded theory and its accompanying methodologies are an appropriate tradition of inquiry. However, this dissertation accomplishes this goal by using a specific case: businesses and organizations affected by Hurricane Katrina. Thus, the study setting is bound by time and place, as in a case study. The context in which the study is set plays a large role in understanding the phenomenon being studied. Such data collection is also reminiscent of the case study approach. Ultimately, however, the focus remains on abstractions made about post-disaster transitional networking as opposed to post-Katrina New Orleans.

While qualitative inquiry can take on many forms, there are certain aspects that these forms have in common. As previously mentioned, qualitative research is often conducted in a field setting in which the researcher has contact with people who have experienced or live with the phenomenon under study. This is done in order to obtain a “holistic” or systemic approach that studies the “logic...arrangement...[and] rules” of the phenomenon (Miles & Huberman, 1994, p. 6). Research analysis is based on words, which are organized in a way that “permits the researcher to contrast, compare, analyze, and bestow patterns upon them” (Miles & Huberman, p. 7). Based on the patterns and themes derived through this analysis, an attempt is made to understand the thought processes and actions taken regarding the phenomenon under study (Miles & Huberman,

1994). Because the participants assign meaning and the researcher is the primary “measurement device” in the study, there are many possible interpretations of qualitative data (Miles & Huberman, 1994, p. 7). However, it is the job of the researcher to derive theoretically sound and consistent conclusions from these data.

In order to aid in the process of deriving sound and consistent conclusions from the data, a second methodological approach was introduced to the study. There are generally three reasons to use qualitative and quantitative data in tandem: “(a) to enable confirmation or corroboration of each other...(b) to elaborate or develop analysis...(c) to initiate new lines of thinking through attention to surprises or paradoxes” (Miles & Huberman, 1994, p. 41). Indeed, triangulation of methods was used for these reasons in this study. Using the qualitative data to derive a quantitative survey instrument allowed for corroboration of important themes and the development of analysis through direct inquiry. Thus, the words of those who experienced the phenomenon were used to develop the very instrument that brought more focus and specificity to the study. It is hopeful that such triangulation allowed for a more detailed analysis without compromising understanding the first-hand experiences shared by participants.

Data

Qualitative data allows one to “preserve chronological flow, see precisely which events led to which consequences, and derive fruitful explanations” (Miles & Huberman, 1994, p.1). For this study, data were chosen in order to create a picture of what happened during a specific timeframe: the transitional space that occurred post-Katrina. Emphasis was placed on finding out what decisions and actions led to specific consequences,

particularly looking at how networking choices and opportunities helped organizational decision makers transition back to operation in New Orleans for businesses.

Due to the scope of questions asked in this study, a triangulation of methods was necessary to fully provide answers. The primary method of data collection included in-depth interviews using the key informant technique. Such a technique emphasizes using informants who meet the following criteria: possess a role in the community that exposes them to the information sought after by the researcher, knowledge of such information, a willingness to share this knowledge with the interviewer as completely as possible, the ability to communicate this knowledge in terms that the interviewer can interpret and understand, and impartiality (Tremblay, 1957). For the purposes of learning about the networks of individual businesses during and after Hurricane Katrina, business owners or key decision-makers within businesses fulfilled the above criteria. Further, as they themselves are members of both the individual organizations and the post-disaster business community, they were in a position to provide access to other key informants. Thus a snowball sampling technique, a sampling process that “identifies cases of interest from people who know people who know what cases are information rich” provided the most advantageous way to sample informants (Miles & Huberman, 1994, p. 28).

Interviews began in December 2005 and concluded in May 2007. During that time, a total of 90 interviews with 64 organizational leaders were conducted. Fifty-seven are used in this study. They ranged from 12-105 minutes and were conducted both in person and over the telephone. The interviews were in-depth and semi-structured in format; participants were asked to describe their business prior to Katrina, key alliances that were developed, and resources that were crucial to their return. Participants included

business owners and key-decision makers from a variety of industries found in New Orleans: restaurants and bars, art galleries, media outlets, non-profit agencies, bed-and-breakfast inns, cultural venues, banks, professional firms (e.g., law, accounting, consulting, insurance firms) and retail establishments. Although the sampling technique did not aim to get a random sample of businesses in the New Orleans area, the resulting sample does represent the spectrum of business and industry found in New Orleans per the city's web site, www.neworleans.com. The resulting interviews offered a narrative beginning prior to Katrina, continuing through their period of displacement and detailing their return to business.

Just as qualitative data allow for the derivation of “fruitful explanations,” quantitative data is based on an idea of positivism that allows phenomena to “be reduced to empirical indicators which represent the truth” (Sale, Lohfield, & Brazil, 2008, p. 365). Thus, a twenty-item survey instrument was developed and administered as a follow-up to participants. While the interview data provided the basis for exploring many of the propositions and research questions, the survey data primarily provided a quantitative basis upon which to derive social networks of participants. Additionally, as the survey questions were developed based on the theoretical concepts outlined in the propositions and research questions, the resulting data were useful for bringing a focus and specificity to the data that complemented the depth of the interviews.

To develop the survey, key themes were developed into closed-ended questions based on the procedures outlined by Sudman and Bradburn (1982). Such procedures included the wording of questions in a way that would be non-threatening and easily understood by participants. Additionally, questions were ordered in a way that first

oriented subjects to the topic in order to aid recall, and then became progressively more detail-oriented. Specifically, the survey began with orienting questions about the timing and extent of evacuation from New Orleans, and progressed into explicit inquiries about ICT use, pre- and post-Katrina professional partners, and reasons for choosing these partners. See Appendix A for the complete survey instrument.

Once the survey was developed, it was formatted online using SurveySelect software. In order to ensure that the survey was both understandable and accessible, it went through several rounds of pilot testing, during which questions were added and dropped, wording was changed, and formatting was adjusted. Pilot testing was conducted with a sample that included an expert on ICT use, a network-analysis expert, and a small number of professionals that demonstrated some overlap with the type of professionals who participated in the study. At the conclusion of pilot testing, the survey was deployed to interview participants via e-mail. Participants were first sent an e-mail reminding them of their participation in the project and informing them that a follow-up survey was being conducted. This e-mail also stated that they would receive a second e-mail containing a link to the online survey in the next business day and asked them to consider participating. Within 24 hours, they were sent the second e-mail with a link to the survey. One week later, a follow-up email of the same format was sent to those contacts who had not yet filled out the survey. Using a combination of pre-survey contact and follow-up has been shown to increase response rates in paper and pencil surveys and was adapted as a way to improve response rates for this survey (Sills & Song, 2002).

Of the original 64 organizations interviewed, 50 could still be reached using the available contact information. Of these fifty, six were not able to participate because the

informants left their respective organization or the organization had gone out of business. Of the remaining forty-four contacts, twenty-three filled out the survey. This represents a 52% response rate, which is generally considered to be extremely high. The survey questions were used to measure ICT use before, during, and after evacuation; network membership based on organizational type before, during, one-year after and three and a half years after evacuation; reasons for communicating with organizational types during evacuation; perceptions of communication opportunities during evacuation; and perceptions of the effects of Hurricane Katrina on short- and long-term business operation. Following the section on the use of qualitative analysis techniques, these variables along with the concepts measured using qualitative techniques are operationalized.

Data Analysis

Analyses for the interview data utilized Strauss' and Corbin's (1998) method of asking questions and making comparisons. All cases were first reviewed for overall themes, and then coded for more specific themes using separate steps of open, axial, and selective coding. Open coding is the initial step in the process of coding, or identifying concepts and their properties and dimensions (Strauss & Corbin, 1998). Properties are the "characteristics of a category, the delineation of which defines and gives it meaning" and dimensions are "the range along which general properties of a category vary" (Strauss & Corbin, 1998, p. 101). During open coding, concepts are named, broken down into parts, and then compared. This allows for classification of concepts in a way that is meaningful to the inquiry being conducted. Essentially, the goal of this step of the process is to "uncover, name and develop concepts" by "open(ing) up the text and expos(ing) the

thoughts, ideas, and meanings contained therein” (Strauss & Corbin, 1998, p. 102). To accomplish this, all materials were read with a special attention paid to the meanings associated with words and phrases. For example, many interviewees talked about “early preparation.” During open coding, not only was this identified as a relevant category, but I had to decide what “early preparation” meant to each person who mentioned it, and then how that extrapolated to a more general definition of “early preparation.” To some it meant simply backing up data before leaving New Orleans for the evacuation, for others it meant having a full-scale emergency plan. Thus, “early preparation” came to mean any type of fore planning that helped minimize disruption caused by physical displacement. After defining this code, I was then able to apply it across texts whenever this idea arose.

The next step in the analytical process is axial coding. The purpose of this step is to begin the process of “reassembling data that were fractured during open coding”, essentially creating part of the larger picture about the phenomenon under study (Strauss & Corbin, 1998, p. 124). During axial coding, the properties identified during open coding are further defined according to the conditions, actions/interactions, and consequences associated with the overall topic being studied (Strauss & Corbin, 1998). Based on this analysis, statements can be made relating subcategories to larger categories, as well as how larger categories can relate to each other. Doing so answers questions of who, when, where, why, how, and with what consequences (Strauss & Corbin, 1998). This allows for the relating of structure and processes, which in turn relates the circumstances and context of what is being studied to the actions and interactions taken by the people, organizations, and communities operating within this structure (Strauss &

Corbin, 1998). The result is a paradigm, which includes context, actions, interactions, and consequences associated with the phenomenon being studied. (Strauss & Corbin, 1998).

“Early preparation” was a code derived during the open coding process.

Conditions that lead to early preparation are previous experience with hurricane evacuation, the mandatory evacuation announced prior to Katrina. However, sometimes intervening conditions existed, such as not believing that the Hurricane would be as severe as predicted, thus leading the business owner not to take as many precautions as were actually necessary. Actions and interactions associated with early preparation included backing up data, setting up a communication plan, taking home files, or nothing. Consequences ranged from relative ease in business operations during evacuation to the inability to conduct business for a prolonged period of time following the hurricane. Once the dimensions of “early preparation” were identified, it was possible to compare it with other categories, such as “early communication” in order to see along what dimensions and conditions they intersected. Such a comparison allows for a relating of categories on a more macro-level, which, in turn, lays the groundwork for explanatory scheme driving the theoretical conclusions made from the data.

Selective coding is the process of “integrating and refining” the categories developed during the first two steps of coding. At this point in the coding process, themes have been identified, defined, and related to each other along several dimensions and properties. Selective coding requires making generalizations about the existence of and relationship between categories. From these generalizations, a storyline is written and conditional propositions are made (Creswell, 1994). The storyline and generalizations are centered around a central, or core, category. This category summarizes the main points of

the research in a few words (Strauss & Corbin, 1998). The core category has analytic power, in that it “pull(s) the other categories together to form an explanatory whole” (Strauss & Corbin, 1998, p. 146). Refining the storyline is a continuous process that begins with the identification of the core concept and does not end until the completion of the project. Both the core concept and the storyline must be checked for logic and internal consistency. This is done by stepping back from the data and making sure that all of the properties identified in earlier stages of coding are logically accounted for in the storyline and by making sure relationships are built using participant meanings rather than researcher meanings (Strauss & Corbin, 1998). Additionally, outliers and variation must be accounted for and explained in the overall theory (Strauss & Corbin, 1998).

Finally, coding for process includes looking at how action/interaction is related to the structure in which the phenomenon is situated. Rather than focusing on properties and dimensions, this step in the coding process examines how action/interaction changes or remains the same depending on structural conditions (Strauss & Corbin, 1998). Shifts in context lead to changes in action/interaction, which in turn brings about changes in context, which then frames the next sequence of action/interaction (Strauss & Corbin, 1998). However, this is not always a linear process. Change and action /interaction can occur in stages/phases, or in sequences/shifts (Strauss & Corbin, 1998). Some questions that should be asked during coding for process include “What is going on here? What problems, issues, happenings are being handled through action/interaction, and what form does it take? What conditions combine to create the context in which the action/interaction is located? Why is action/interaction staying the same...changing?” (Strauss & Corbin, 1998). The answers to these questions provide an account of the

connection between process and structure, allowing for the explanation of the evolution of action/interactions it relates to the subject being studied.

Asking questions and making comparisons provide the basis for all steps of the coding process. This process, known as constant comparison, increases the internal and external validity of the findings (Boeije, 2002). This is because it forces researchers to examine basic assumptions, biases, and perspectives; as well as to take a closer look at the evolving theory (Strauss & Corbin, 1998, p. 85). Additionally, it helps researchers to uncover meanings, properties, and dimensions that are embedded in the text (Strauss & Corbin, 1998). Finally, constant comparison prevents the researcher from focusing too much on a single case, therefore enabling the move from detail to abstraction, thus allowing for easier linking of categories (Strauss & Corbin, 1998, p. 85). Comparison can take place on a variety of levels: within the same text, between texts within the same “group,” among texts of different groups, in pairs (Boeije, 2002). Essentially, comparison lays the foundation for analysis, rather than description, of the phenomenon being studied.

This constant comparative technique was applied to interviews to inductively create a coding scheme for multiple coders to apply. Once the coding scheme was developed, it was applied to all of the interviews in AtlasTi, a data analysis program that allows for review of data in a variety of ways, including as whole documents, chunks, by code, or by quotation. Being able to view the data in such a way allows not only for comparison of themes, but also for the building of hierarchical networks and quantitative comparison of codes. Dissection of documents in these ways was used to compare how codes were used within and among documents, including by quantity, association with

other codes, and similarity and differences among stories. See Table 2 for the full coding scheme.

Operationalizations of the concepts used in each proposition and research question were developed based upon the coding scheme and the online survey. The coding scheme enabled exploration of the propositions and research questions by using AtlasTi to recall the parts of the interviews that related to each code. The survey data were analyzed using the UCINET program, which allows for the visualization and manipulation of networks data. A breakdown of how the concepts were operationalized follows.

Transitional Space. Proposition 1 explored the parameters of transitional space. Themes that helped to define these parameters were derived using question 10 on the survey instrument and the codes functioned at a distance, prior to returning, have not connected to old contact, difficulty contacting, latent, nonreciprocal, local, city, state, and federal.

Network Development. P2 through P5 explored themes of network development and focused on issues of resource dependency, proximity, trust, and preparedness. These issues were explored using a combination of survey and interview data. Ego network information was obtained from questions 15-18 on the survey instrument, which asked about the extent to which focal parties communicated with specified others for the purposes of gaining resources, providing resources, proximity, trust based on prior interaction, trust based on reputation and working for the collective good (see Appendix A, questions 15-18). Affiliation networks were created in UCINET by first creating 2 mode ($n \times m$) matrices based on respondents' interaction with named others. Named

others included business partners, organizational affiliations and memberships, as well as individuals known professionally and/or personally. A total of 23 categories of alters were used to represent these named others. The resulting $n \times m$ matrices were then transformed into 1 mode ($m \times m$) matrices that allowed for the visualization of the extent to which these alters were similar in terms of their mention by the respondents. The resulting affiliation networks represented complete networks in that all members were connected. To highlight the most important organizations in each network, the threshold was raised to show connections between organizational types that were named most frequently. These procedures allowed for the visualization of communication networks based on issues previously identified as a basis for network development, as well as the isolation of organizational types that played central roles in transitional networks.

Themes of resource dependency were derived from the interview data by coding for the need for or access to resources, including emotional support, information, instrumental resources, and need. Examples of the meanings associated with each code can be found in Table 2. These codes were then combined to create a supercode “Resources.” The quotations associated with each of these codes were isolated using the code manager output tool, which also pulled up other codes associated with each of the resource codes. Associations between contact type and resource were then studied to determine the type of relationships that resource dependency engendered. Similarly, the codes early preparation, no preparation, recovery plan, initial re-networking, and evacuation tales were queried and compared in terms of focal organizations, as well as how they related to network development patterns. Interview data were used to

supplement, explain, and expand on the network visualizations derived from the survey data.

Network Structure. RQ 1, RQ2, and P6, which involved issues of network structure, were explored using the data derived from survey questions 10-14 (See Appendix A). These questions asked participants about types of businesses and organizations that were part of their professional business communication before Hurricane Katrina, during evacuation, for the year following Hurricane Katrina, and at the present time. Like the procedure described above for *network development*, the list of business and organization types was derived from those types of “other” mentioned most frequently during the qualitative interviews. These answers were inputted to UCINET to form a 2-mode ($n \times m$) matrix, which was then transformed into a 1-mode ($m \times m$) matrix, which calculated the most frequently cited alters among the ego networks. This allowed for a network visualization of those businesses and organizations in New Orleans that were most commonly cited by participants as being part of their networking activities. Put another way, a connection in the alter network indicates the extent to which nodes were named by various participants. A more central location of an alter in this network indicates the extent to which that node was consistently named across numerous interviews. A more peripheral location in the network indicates that a given node was less popularly named by participants as relevant to their networking activities. The *alter networks* were assessed to show a general map of interorganizational networks in New Orleans.³

As with P1-P5, interview data was used to provide a greater level of detail to the survey findings. The interview data set was queried for codes “new/disaster,” “new/non-

disaster,” “peripheral pre-disaster,” “link,” “pre-disaster link,” “same type,” “link-release,” and “different type.” See Table 2 for the coding scheme in its entirety. The results were then reviewed for information about the structural diversity of communication networks before Katrina, during evacuation, and after returning to New Orleans.

Communication. RQ3 was explored using a combination of survey and interview data. Survey questions seven through nine asked about ICT use before Katrina, during evacuation, and after returning to New Orleans (See Appendix A).

In AtlasTi, all mentions of ICT use were coded separately to reflect the type of ICT being used. (for example, ICT_cell phone, ICT_Internet). A query was run to determine the prevalence of use for each type of ICT. A supercode of “ICT use” was then created in order to search for general ICT use among participants. Quotations associated with ICT use were then culled to determine if ICT use was overall deemed useful or not useful, as well as to determine the variety of functions that ICT use filled.

Overall, combining qualitative and quantitative methods allowed for a thorough examination of post-disaster communication in a transitional space. While some researchers feel that qualitative and quantitative methods represent two inherently different paradigms (Sale, Lohfeld, & Brazil, 2008), others see quantitative and qualitative methods as two ends of a spectrum between which many useful research designs can evolve (Kratwohl, 1998). This study took the latter perspective, beginning with a qualitative approach that included semi-structured in-depth interviews in which business leaders and organizational decision makers shared their post-Katrina experiences. The interview data represented an inductive approach to describing the

situation with the words of the people who experienced it. Themes from these interviews were then used to create a survey instrument, which provided structure to the data through a numerically based description of the phenomena uncovered in the interviews. Thus, themes and relationships that were uncovered in the interviews were then verified through close-ended questions that allowed for quantification of ideas and the derivation of network diagrams. In turn, the themes and relationships described in the interviews were used to provide depth and explanatory power to the survey results. Taken together, results from the two methods were used to supplement, explain, and structure overall findings.

CHAPTER 7

Results

Results are based on survey and interview data in which organizational and business leaders (e.g., “CEO” “president” “owner”) reported on their communication experiences while evacuated from New Orleans following Hurricane Katrina. The official time of evacuation began on Sunday, August 28 and ended on Monday, September 19, although the threat of Hurricane Rita on Tuesday September 20 caused Mayor Ray Nagin to encourage residents to again evacuate. Respondents reported being evacuated anywhere from one week to nine months, with a mode of 7 weeks and standard deviation of 7.94 weeks. This indicates that the evacuation experience varied widely. Some respondents were able to obtain day passes or use subversive tactics to enter the city to check on homes and businesses several times during official evacuation, but remained evacuated from full-time occupancy of their business until a later date. Others remained evacuated from their homes and places of business for the duration of the mandatory evacuation. Regardless of evacuation length, data revealed emergent themes that were used to characterize network building in a transitional space.

Overall, data revealed transitional networking to be a largely cooperative process based on shared need. To the extent that it was possible, organizations relied primarily on members of their pre-crisis networks, although these relationships were often utilized in new ways. The structure of transitional networks tended to mirror a core group of pre-crisis networks and consisted of largely homophilous contacts. However, networks were expanded to include new network members, such as relief agencies and non-profit organizations. These new partnerships remained part of networks through the next year,

and in some cases, three years later. Cooperation and coordination were relevant to rebuilding, and continued after evacuation and into rebuilding efforts once parties returned from evacuation. ICT use played a large and varied role in the overall process of communicating in a transitional space.

Network Development

P1: Crisis creates an altered communication context.

Data showed that no networks remained unchanged following the network disruption; all respondents reported some changes in network communication caused by the devastation and evacuation following Hurricane Katrina. Interview data reveal two dominant themes that marked the overall timeframe following Hurricane Katrina: a macro-level context that negatively affected attempts to rebuild networks, and an interrupted communication infrastructure in which normal means of communication was impossible. This evidence supports the idea of a post-crisis transitional space in which business communication must shift to accommodate the changes therein.

Communication Infrastructure. The time period following Hurricane Katrina was marked by both physical dislocation and limitations to the availability of certain communication technology. This resulted in a communication infrastructure that was missing both normal partners and normal means of communication. The physical dislocation and general disorder led to a shuffling of communication partners: 68% of survey respondents reported that evacuation limited their choice of work-related communication partners, while 32% said that evacuation expanded their choice of network partners. This created an altered communication infrastructure in which normally prevalent means of business communication such as face-to-face

communication, telephone, and e-mail, were temporarily unavailable. Thus, business communication was anything but normal.

A total of 95% of survey respondents reported using face-to-face communication for business purposes prior to Hurricane Katrina. This dropped to 24% during evacuation. Thus, in order to communicate, businesses had to rely increasingly on ICTs such as telephones, cell phones, e-mail, and the Internet. However, the technological infrastructure for many of these ICTs was not always fully functioning immediately following the storm. For example, this nonprofit talked about the challenge of mobile phone use in the New Orleans area: “[communication] was a real challenge. We used cell phones, which were basically ineffective initially ...” Another business owner reported the same problem: “ But like cell phones, they didn’t work for a while, and so you’d end up having to get another cell phone with a different area code because the 504 area code just didn’t work.” The leader of this community entertainment center summed up the overall situation:

That’s the big lesson that everybody has learned here is that when you have a catastrophic event like that, it all goes down. It all goes down in a heartbeat. The only people who have any communication are the National Guard with a radio. Other than that, there’s nobody to talk to. There’s nobody to communicate with, so that was a big problem.

While the technological infrastructure was down and people were dislocated, they primarily sought out help from friends or family outside of New Orleans. They were able to communicate with these people via mobile phone, because mobile phones worked with phone numbers outside of the 504 area code. Therefore, they typically evacuated to the home of a friend or family member, and tried to reestablish contact with others from there. During this time, communication with members of business networks was scarce and

sporadic. This further contributed to the idea of a dysfunctional communication infrastructure in that technology *and* people were unavailable.

Although even ICT use was spotty at first, it became the primary means of communicating in this altered infrastructure. While ICT use is a trend explored more fully in research question 3, it is relevant to note here that many of the ways that ICT use was incorporated into business communications during evacuation represented a departure from “normal” business usage. Statistics relevant to shifting ICT use during evacuation are reported in the results for research question 3. What is relevant about ICT use and communication infrastructure to this proposition is that the initial unavailability of contacts via usual means of contact was prevalent in the post-crisis timeframe marked by evacuation. This unavailability required a shift in the usual methods of business communication.

Macro-Level Issues. A common theme was the need to restore New Orleans to working order before organizational-level working order could be fully established. Many interviewees; particularly those in the public service sectors such as food, hospitality, and the arts; cited the need for a return of utilities and schools in order support residents, a return of residents to support an employee base, and simultaneously, the need for a return of businesses to support the return of residents. It was a cyclical relationship of needs that made it difficult for anyone to return. Thus, respondents identified basic infrastructure needs, including electricity, garbage collection, water, telecommunication capability, and police security. The organizations that could supply these resources were often cited as difficult to contact or missing altogether from post-

disaster networks. The limitations posed by these missing members led, in many cases, to a longer disruption of business or a longer evacuation time.

For example, this electronics dealer could not receive customer payments due to the lack of reliable mail delivery:

Payments for...we had no mail delivery in New Orleans. We forwarded to

Houston, the forwarding system within the US Post Office sucks. I'm still getting checks dated in October. So how in the hell can I run a business?

Likewise, unopened schools caused many residents to remain evacuated until the end of a semester, or even school year, as was the case for the founder of this civic organization:

"But we were all still evacuated, and our kids were, you know, they had told us to put our kids in school, and get apartments or homes or whatever, because we didn't know when we were coming back. So we all had to finish out the semester."

Situations like the one described by this civic organization illustrate the problem created for the macro-structure by missing civic and city-level ties. Businesses could not return without basic services like school, mail, and garbage collection. Schools, the postal service and garbage collection, however, could not run without residents to staff the jobs. The following quote from an accountant contextualizes this problem in terms of missing medical workers:

But what's interesting, and I'm wondering what people are saying, is we have doctors leaving constantly – constantly – because they're not making any money here. There's not money pouring into the hospitals. FEMA is not helping. They're seeing most of the patients are these immigrant workers, who get hurt on the job. They have no Medicare, Medicaid, nothing. So these hospitals are losing millions of dollars daily. I don't know if it's daily, but lots and lots of money, and there's no relief, and there's no money coming in. So doctors are walking out of the city, because they can make more money other places. So when you encourage all these people to come back, reestablish their communities, do you bring back the people? Or do you bring back, you know, what comes first – the chicken or the

egg? And I don't know if these businesses are going to survive if you don't bring back the people, but you're not going to bring back the people if you don't have the schools and the doctors. So it's, I mean we really need somebody who knows how to make everything happen at the same time.

Likewise, this non-profit organization likened the reduced population to lost businesses.

What were the statistics that the? 18,000 businesses. Yeah. In the Orleans Parish they say were destroyed, disrupted, 250,000 jobs. 525 of Orleans Parish businesses have not been able to reopen since Katrina. You know, Orleans Parish population is down 60%. So, people believe 60% of these businesses will be permanently lost.

Retailers and other customer service industries found it especially difficult to survive without a more rapid return of the business population, as they rely on local individuals and businesses to support them.

...if business doesn't return, then there's no long-term survivability. I'm not sure what's going to happen with the city or what's going to happen to people individually. You have to believe that in time it will come back. The problem is how long? And I do believe in time it will return, but how long?

These quotes underscore that the lack of essential ties created a macro-structure that could not support the return of pre-disaster working order.

Overall, data show that the time following a disaster is marked by a negatively altered macro-structure that affects opportunities for communication in post-crisis networks. In addition to this macro-structure, the normal communication infrastructure is disrupted. The communication infrastructure can be considered dysfunctional in that "normal" means of communication are unavailable due to either technical or social reasons. As these themes create the context in which the communication theory of transitional space exists, they reemerge in the exploration of other propositions and research questions.

P2: Network Development Aims at Securing Resources

P2 posits that network development in a post-crisis transitional space will be aimed towards securing access to resources needed to overcome obstacles created by the crisis. Coding results yielded 1,352 unique mentions of resources across 57 interviews. Among interviews, the minimum number of times resources were mentioned in an interview was five and the maximum was 51. Thus, resources were mentioned a mean of 23.89 times across interviews, with a standard deviation of 10.376. To accommodate for the fact that frequency of mention could be affected by interview length, the frequency of times resources were mentioned within interviews in relation to number of total coded segments was calculated. The average percentage of mentions of resources within interviews was 61.88% of all coded segments, with a standard deviation of 19.45%. Although this variation existed, all interviews contained some mention of communicating to share resources. Qualitative analysis of the quotations associated with these codes show that respondents turned to specific others for help in securing resources to support reentry into New Orleans. Looking to these codes also provides insight into whether or not these ties, once activated, were helpful or not. Network visualization (see Figure 1 and Figure 2) based on survey results reveal the most important organizational types in post-disaster networks in terms of access to resources. Overall, data support P2 and provide insight into what types of network partners were most helpful.

Figure 1, Diagram A, depicts the affiliation network for organizational types based on access to resources, and is referred to as the *resource in* network. In other words, this figure shows the frequency with which organizational types were named by participants as a source for receiving resources “into” the organization during evacuation. The fact that there are no isolates in this network simply indicates that all organizational

types were named at least once as partners for the purposes of exchanging resources. Although it is not entirely surprising that all organizational types listed on the survey instrument are included in this network, since they were derived from coded interviews, visualization of other networks (i.e. trust and collective action affiliations networks) that did not reflect inclusion of all organizational types. Therefore, the existence of a “resource in” affiliations network that reflects one or more ties among all partners indicates that resource exchange was a salient reason for post-disaster networking.

Data also revealed network communication during evacuation in terms of ties activated because egos reported providing accesses to others, or a “resource out” network. Figure 2, Diagram A, depicts the affiliation network of organizational types based on ego reporting that their organization provided resources. As would be expected, FEMA and the SBA were isolates, as they were federal agencies designated specifically to provide aid to organizations following Hurricane Katrina. However, all others were connected at least minimally, further supporting the idea that resource dependency was a salient reason for networking post-disaster.

Figure 1, Diagram B, is a visualization of the “resource in” affiliations network, after raising the threshold to show only connections among the most frequently named organizational types. Focusing on these connections provides a truer picture of the most integral organizational types in terms of providing resources. Calculating the centrality for the altered affiliations network reveals that the three most central organizational types in the “resource in” network were (in order of highest centrality) FEMA, individual(s), and the vendors. Node size was adjusted to reflect centrality. Centrality values for organizational types can be found in Table 3. Performing the same operations on the

“resource out” affiliations network revealed that the three most central organizational types to whom egos reported providing resources were clients, individuals, and community associations. Examination of both affiliations network reveals that resource sharing was a salient reason for communicating in terms of receiving and giving resources.

While the visualization of these resource dependency networks shows the creation/activation of linkages in order to exchange resources, it does not capture what types of resources were sought, and whether or not these ties actually resulted in exchange of the desired resources. Coding of interview data for resources by type generated three distinct types of resource exchange: instrumental, informational, and emotional. Need for and exchange of instrumental, or tangible, resources such as money or supplies, was the most commonly cited type of resource exchange. Instrumental resources were coded 788 times across all 57 interviews. Information based resources were coded for 457 times, and emotional support was coded for 107 times. This trend is reflected in the centrality measurements of the resource networks. For example, FEMA, one of the most central organizations in the “resource in” network, is an organizational type whose mission was to coordinate post-disaster relief efforts.

FEMA is a government agency that is part of the Department of Homeland Security. Its mission is to “reduce the loss of life and property” in the event of a disaster (retrieved from: <http://www.fema.gov/about/index.shtm>). They fulfill their mission by providing financial support or other direct assistance to individuals, families, and businesses affected by disasters. Thus, FEMA’s centrality in the network makes sense in terms of the resources most often sought by organizations post-disaster. However, it does

not reveal whether or not they actually provided these resources. For example, an AtlasTI query of FEMA in the interview corpus reveals that while many organizations contacted FEMA for help, the actual utility of FEMA as a network contact was questionable.

Experiences represented a broad spectrum, with many characterizing the interaction as a largely bureaucratic endeavor that resulted in minimal payoff. A local arts establishment summed up this frustration, highlighting the amount of paperwork and redundancy involved in applying for financial aid:

You know, I hate to be another one of these people, but FEMA is not so helpful, and I think it's just because it's such a huge job. But there are a lot of hoops [in the] organization ... that we're having to jump through. To submit a huge FEMA application, and basically the exact same huge SBA application, knowing that the whole point is that we want to get rejected for the...It's like this is ridiculous.

A local retail establishment expanded on the same theme, citing the unresponsiveness of FEMA:

I do have a lot of bitterness towards FEMA, towards the; I'm a Republican, I voted for Bush twice, it's a disaster. I can't wait till they're gone. It's changed by whole political outlook... We couldn't get any information about going, we tried to go to FEMA, call FEMA, go to City, we tried to go to places and call but couldn't get anything.

Despite these frustrations, some characterized their experiences with FEMA positively, citing that they were able to get at least some financial help in restoring their businesses, as in the following quote from a Family Entertainment Center:

We actually had a really good experience with FEMA. I think that they were very responsive and very professional, ultimately gave us a teeny tiny bit of money, and I'm so glad we didn't have to depend on them. But I think our experience with FEMA was positive. They were helpful. They were conscientious. They tracked us down.

Ultimately, however, FEMA seemed to serve a bridge role for struggling organizational members and their businesses: they provided some tangible resources, but not in a timely

or sufficiently thorough manner to fully restore businesses. Even when characterized as very helpful, FEMA was never cited as instrumental in bringing businesses back to working order. The following quote from another New Orleans based family entertainment center characterized this sentiment:

Oh, yeah. Yeah, we started in November of '05. We did not get; I mean I think we got our first check, our first check from FEMA at all, for any amount of money, in March of '06. So September, October, November, December, January, February, March, almost 7 months after the event before we got any money. And up until July of '06, which is almost a year, we had received a total of \$250,000. This park sustained \$43 million in damage.

One dining establishment summed up the “resource in” network in the following statement: “The National Guard was wonderful, and the FEMA money was helpful, but really it was individuals.”

Individuals provided the only overlap between these two types of resource dependency-based networks. A query of the broadly applied code “individual” coupled with “personal level” and “collective level” in AtlasTI revealed variation in the role individuals played. Personal level ties generally referred to friends or family members who provided living and working space during evacuation, family and friends who pitched in to help run a business, and former colleagues and acquaintances that provided one-time access to services or information.

You know, we lived with my in-laws in Tibido, but then briefly I lived at my mother's house in Lafayette and worked at my brother's house, because he had a wireless Internet connection at his house. So he said, look, go ahead and use my house as an office.

This sentiment was echoed by the owner of an entertainment establishment:

That had to be done, and primarily there was a couple of employees that were present that helped me and family. A lot of my family is in business here with me, and specifically it was my son, my son-in-law and my nephew that initially were

called upon. And then from there, it was friends that we could get in touch with and get in contact with...

Finally, this small business owner relied on family for financial help to keep the business afloat:

I guess in many ways we were fortunate in that we've had some savings to fall back on and we've had some family that was willing to help us when we really needed financial help and all that sort of thing.

Collective level individuals were individuals who were directly involved with the focal organization in some way rather than directly helping the interviewee personally. These types of individuals most often included one-time donors or recipients of aid from the focal organization. Consider the following non-profit organization that was created by New Orleans entrepreneurs to help other fledgling businesses:

At the time they were talking about all this federal help. So all we needed to do was to bridge that, the triage where from September, October and November, maybe into December, why don't we basically triage these people and we're going to give them money just to open back up. If I can get you to pay your rent or to buy a piece of equipment just to get back in the game, you'll have, the Calvary will come with resources. So we raised about \$350,000 in pure private dollars. You know, there's no one other than us calling this one up... and these [donors] were individuals and foundations and just people who saw the need of helping.

Just as organizations provided aid to individuals, they were also the recipients of such individual-level aid, as was the case of this family recreation center:

There were a lot of individuals who came to the assistance while we were closed, who came and volunteered. It may have been a class, it may have been a family, it may have been a husband and wife team. There were a lot of people who came for a small period of time and did something that was very helpful.

Thus, resource dependency was a salient reason for activating organizational ties. This was found to be true across organizational types, and represented an overall trend in post-

disaster organizing. While certain types of ties were more frequently activated for access to resources, these organizations were not always the most helpful. Individuals, often family members or other personal contacts, were often the most helpful in providing emergency resources to businesses and organizations.

P3: Goal attainment, interdependency, and swift trust

Proposition 3 stated: A need for goal attainment will create an interdependency among members of transitional networks that allows for quick trust among formerly unconnected parties. Data support this proposition in a limited way, showing that formerly unconnected parties engaged in large-scale or high-stakes projects that usually require a high level of trust. However, this type of “swift trust” was not the only kind of trust evident in transitional networks. Results also showed a tendency to trust network partners based on reputation, and to rely on former partners. Additionally, non-profit organizations emerged as central to affiliations networks, for both prior interaction and trust based on reputation. Table 4 shows centrality scores for members of affiliations network based on trust. Figure 3, Diagram A, shows the affiliations network for partners that egos trusted based on prior interaction. Figure 3, Diagram B, shows the affiliations network for partners that egos trusted based on reputation.

Evidence of swift trust; or trust based on high interdependence, a finite task, and a sense of shared risk; was shown in the collaboration of several post-disaster partnerships. An example of this trust and cooperation is evident in the relationship between a local school board, a national political action group, and students nationwide, who worked together to raise awareness and money for a local school:

We had the rally. And the students, they had about a thousand students in here from all over the country. Common Ground [a national political action group] was

getting students. Every other week there were students coming in there. I don't know where they housed those kids, but they had them housed. Some across the river, some uptown there in the Tremont area. They were housed.

Sometimes, trust from prior interaction initiated the tie activation, but led to a much larger endeavor with formerly unconnected parties, as was the case for this performing arts organization:

And all sorts of things came out of the woodwork through that. Randy Newman was a pro bono guest artist. Isaac Perlman played. He was there anyway the previous night conducting the New York Phil, so he played a portion of a violin concerto pro bono. Beverly Sills hosted. One of the ... on the female vocalists who performed that night - oh, shoot. Maybe it'll come to me. I don't have any of my stuff here...They sold out Avery Fisher Hall, including 100 seats at \$500 apiece. They also raised donations when they were selling tickets. They also gave us 100% of the gate, plus all of the donations, plus it was live broadcast by two consortia. WNYC, which is an NPR station did a live production, and that was the feed that came down to New Orleans. And then NPR, through WFNP I believe it is, did a nationwide broadcast to 27 major markets. So there were two productions going on simultaneously, and on both of those feeds there were - either you could make donations to.... [us] at the New York Phil's website or you can call this toll free number, which happened to be fed to Chicago, where Hewitt & Associates volunteered to take all the calls. During the concert, between the website and the live call in, [we] raised \$49,000. The other donations and the gate produced \$300,000. We made \$350,000 that night, again with very little out of pocket cost.

However, much of the trust evidenced in the data was driven, to some extent, by organization type. Affiliations networks based on trust show that non-profit organizations and foundations were central to trust networks, regardless of prior interaction. When contacts activated because of trust based on prior interaction were dropped out of the network, non-profit organizations remained the most central type of organization but foundations and many other types of organizations became less important. For example, the previously mentioned academic institution collaborated with three other non-profit organizations, and received funding from two more. In another example, two competing

radio stations worked together at the behest of an international non-profit agency with a branch local to New Orleans.

I don't think anyone has given a proper recognition for - like it or not, the 2 large networks of radio stations are called Entercom which had 10 or 12, and Clear Channel 10 or 12. And Entercom, its studio was destroyed, but its antenna stayed up. And Clear Channel had a studio that wasn't, but its channel was destroyed. So there's a friend that was on our Board, who's no longer here, proactively met and established that these two would have; they called it, I forget the title, something United, and they were all 26 stations were broadcasting the same show and you could call in. I think that saved people's lives, because people didn't know what was happening, and the government so poorly, both local, state and federal, poorly dealt with this. I think that saved a significant amount of panic.

Another respondent, also a nonprofit organization, cited the United Way as a helpful collaborator:

But one of the things that was really good was that United Way nationally was able to serve as sort of like a clearinghouse for information about us, and so it would come up to United Way, and then they would share with, they would kind of contact other folks.

In turn, this non-profit reported developing trust with other contacts while working on community projects:

Nonprofit Knowledge Works is another group that, like the administrative services organization, but we all came together to create this infrastructure and to trust, and the collaborative kind of owns it, so there's no one agency that owns it. The collaborative has oversight, and each entity has its function to make it all work together. Previous to that, we all did all the functions and there was some competition, if you will, for some of the funding among the four of us who are collaborating now. A lot of that has gone away, so that's another new thing, kind of working together in an effort to develop resources and also to provide some oversight over the service delivery aspect. So those things have worked well, I think.

Data show post-disaster trust to take a combination of forms, including swift trust, reputational trust, and trust based on prior interaction. Non-profit organizations emerged as the most trusted organizational type in post-disaster networks.

P4: Post-Crisis Networks and Public Goods

P4 states that network development in a post-crisis transitional space will include some partnerships that benefit the overall good rather than simply the good of the focal organization. The findings for P4 are closely related to those of P3, in that the large-scale projects fostered by swift trust were often examples of working together for the good of the community. Also, mirroring P3, was the fact that non-profits were the most central organizational type in this network. See Table 5 for degree centrality calculations for all organizational types in this network. For example, this nonprofit organization teamed up with many other types of partners to help local farmers:

What we did was when we found 3 or 4 of our vendors who were okay - well, they'd been through hell, but they were okay - and they wanted to do something. They were so frustrated, as we all were, that you couldn't do something. They wanted to be useful. So we deputized 4 - 3 vendors and 1 volunteer, a consumer - and said, "We'll pay you," I think it was \$1,200 a month, for just a couple of months, to go find everyone else - the vendors we were worried about, fishermen who lived right in the area where the storm came through. It was to go find them and survey them, interview them to find out what's your status on this, this and this? Have you received this kind of help? Have you received that kind of help? What are your needs? And we were able to use that, and synthesized it to find out what was needed, when we communicated with organizations like Farm Aid or Oxfam or state agencies as to what kind of needs were out there. So we deputized, with the trust we'd been able to build with the vendors. They then went out to the other markets, and visit farmers and attend other conferences to figure out how to navigate through all this confusing bureaucracy of emergency assistance.

Additionally, this non-profit organization provided space to other cultural establishments who were still evacuated from their places of business.

They [business] are going to reopen in January, but they need things like office space. Well, so does the [culture establishment], because they're in a building that got totally flooded. Their building's not reopened, so they need a place to work. So we go, "Well, okay, we've got places to work, because we've got offices for 25 and there are only six of us, so why don't you guys come over here?" So there's a lot of that going on. There's a lot of, "Well, I've got a little bit of this, and I've got a little bit of this," you know.

However, collective action was not limited to non-profits. Some examples of working together for rebuilding came from business owners who were able to obtain passes to come back to town on a limited basis, or who were back personally but still evacuated from their physical space. Consider a mobile phone retailer, who joined a task force with other businesses on a time and labor-intensive project:

After the hurricane, I worked with GE for three months on part of the task force that was contracted to restore pumping to New Orleans, so the water board. And so I was engaged in that. We were closed here because the building was damaged.

Cooperation also took place on a community level. This local restaurant owner described working with the few other people who were back in the neighborhood before evacuation was lifted:

A lot of people in the neighborhood were working on their houses, who would come in like we did, and we just had our doors open. We had a generator running. We had some ice that we'd bring in every day and ice down some cold drinks, and people would come by, we'd just give it to them... We'd clean, we'd empty out boxes, we'd throw away old stuff, and bring in some ice, and we'd offer ice to neighbors. We had a big dumpster that we offered the neighbors to put a lot of their trash in.

Some organizations, in particular, were willing to work with anyone and everyone in order to facilitate collective action. One organization that stood out is a New Orleans faith-based organization. When asked on the survey with what types of partners they engaged during evacuation, they indicated working with every type of partner except FEMA, SBA, and vendors (and this is likely because they do not have a need for vendors in their business network). Data from their interview revealed that they were able to coordinate several endeavors with the intent of helping others in the community, including hiring professional search and rescue teams, assembling search and rescue

teams consisting of individuals they could reach via e-mail, and coordinating informational and instrumental resources through their web site.

We basically set up a site that had two sides to it - for evacuees and for people that want to help. We had thousands of offers from people who wanted to take in a family, communities that wanted to adopt a family, where can we send this. And then on other side, you had the people that needed help and they were able to contact us that way. And the only thing that we really; we just kept updating people in that sense. The thing that we updated on a daily basis was the search and rescue. We actually had two teams in New Orleans that were extremely successful in finding people that were stranded. And using our national network, we were able to get names and addresses of people that were stuck behind.

Cooperation for the greater good was evidenced by several organizations. Non-profit agencies were often involved. When cooperation took place between two or more organizations whose mission did not include helping others, at least one of the involved parties was usually in a more secure place. Data show an increase in such collaborative efforts once organizations returned from evacuation.

P5: Post-Crisis Ad Hoc and Formal Ordering

P5 states that: network development in a post-crisis transitional space will contain elements of ad hoc and formal ordering. Data support this proposition, revealing that while post-disaster network development can be dichotomized in terms of those organizations that had a recovery plan and those who did not, all examples exhibited some degree of formal and impromptu organizing. In cases where there was no formal recovery plan in place, much of the organizing was done by individuals on the fly. Later such activities were subsumed as part of the organization's recovery plans. Organizing that was guided by a formal plan generally followed a pre-designated communication plan, but often required some degree of improvisation.

The first type of network development was reflected by organizations that had no formal recovery plan, and reached out to other network members on the fly. This type of network development usually revolved around the activity of reaching out to other individuals or organizations. Such efforts were characterized by quotes such as this one from an attorney, who said: “We were in a friend’s office who does similar work to what we do, and we just sat down with our personal computers and sent emails to everyone we had an email address for.” This sentiment was echoed throughout several interviews, as in this interview with a religious organization:

My wife, for some reason - I’m not sure what made her do it, but thank God she did - grabbed a printout of our, of like several hundred names and email addresses from our community, because the computers, obviously they were not here. I mean they were here and we weren’t, and there was no remote access or anything like that for weeks. So we were able to, as soon as we got to a place that had an office with computers, we immediately began emailing. So that was our best way of maintaining contact.

The networking activities of this religious organization quickly took on a more formal type or ordering, as they began to reach out to national organizational affiliates to raise funds and organize search and rescue teams. What started out as an impromptu mass e-mail became an official organizational endeavor within 36 hours: “We launched a fund within about 36 hours, and our national affiliates all over the country were helping us with generating money, and we were able to distribute hundreds of thousands of dollars in those first few months.”

Other businesses and organizations exhibited a more formal networking pattern. Organizations that had a disaster plan in place were able to resume operations during the evacuation with little or no disruption to normal activity. While some recovery work was done “on the fly,” they essentially had strong, centralized plans before Katrina even

touched ground. These organizations followed a means-end sequence of organizing, where domains and tasks initiated the organizing sequence. For example, this financial institution had a plan in place, which resulted in formal organizing immediately following evacuation:

We have clients in Texas, Louisiana, Mississippi, Alabama and Florida right around the perimeter of the coast. So we are in hurricane central. So we had a good plan. We have been through many hurricanes, and we have what we call our formal business unit contingency plan. BUCP. And everybody, every department in the bank has one. And we drill...we're aware that New Orleans is a low-lying area, so we had a backup plan to have an alternate operation center in a combination of Houston and Chicago. So we knew that. And whenever we see a hurricane in the Gulf that has some probability within that cone of striking here, we put our business unit contingency plan into effect and we move key activities to Houston and Chicago, and we switch.

However, even this financial institution was unprepared for some of the challenges presented by the disaster, causing them to negotiate some of the details on the fly.

So, post-Katrina was very different than other hurricane disasters. Stepping back from that though, almost every year we will put in place our business unit contingency plan and switch our operations to Houston or Chicago. It's routine. I mean we knew what to do when a storm is out in the Gulf and it has a reasonable probability, given that cone of hitting here, we're off to Houston. So, I mean this was not the first time. We do that routinely. We know where to go. We know Everybody who is over there has a desk with a picture of their pet on it. They have a place to go. I think the thing that, if I can mention some notes, I think the challenges that we encountered with Katrina that were different than other hurricanes fall into a couple of key categories. One was communications. The communication system, cell phones, were just overwhelmed. That had never happened before. We had to deal with the communications issues on the fly.

Still others, like this retail establishment, had bare bones recovery plans in place, and were stymied by unexpected aspects of the disaster:

But we had, some of the things we have done is like we had a, we all scattered to the winds and we contacted, the first week we got as many people as we could get in touch with. We have our own AS400 so we hosted our own website, but our server was down. We had an emergency phone line for employees, an emergency hotline. But it was based locally and all the phones were wiped out. So now we have a 1-800 emergency hotline and these little cards for people to carry with

them at all times because we evacuate sometimes two or three times a year. So now we have a backup website now a little distance so we can get in touch with each other. Well one big thing was like a week after the storm 42 of us got together for lunch. I called a luncheon in Lafayette and said, everybody that can get here, get here and bring your spouse and your significant other, whoever, people. And now I hear people thought they were coming to be laid off. That's when we stood up and announced how you get your benefits and we're going to pay people all the way through and we're going to open Baton Rouge.

Additionally, data revealed two organizations that started as individuals working together in response to the challenges posed by Hurricane Katrina, and later became organizations. For example, this non-profit organization was started by one individual who saw a need for citizens to work together to recuperate New Orleans:

I emailed everybody in my email address book... I had friends out of state, but most of my email address book was to my friends that were local. Now, of course, at the time when I emailed, we were all over the map because we were evacuated... And asked that they email to everyone in their address book. And so I got a lot of responses from people that I didn't know who they were and wanted to join in. But we were all still evacuated... we didn't know when we were coming back.

As the scope of the project got larger, this non-profit engaged in mass outreach by using mass media resources to recruit more volunteers: "And so then it just sort of spread like that. I went on the radio one day, WWL, which was everybody's lifeline, and then ultimately went on the news, and then just started getting national news coverage, the CBS Early Show, and FOX news..."

The mass outreach was so effective that individuals and companies from outside of New Orleans began to contact her, asking if they could help. By the time she formalized the effort as a non-profit 501-C3 corporation, the founder had a core group of "board members" who worked with a series of individual and organizations who would donate time or money on a one-time basis. This is perhaps the most extreme example of ad hoc organizing evolving into an organized task structure.

Network Structure

RQ1: Structural diversity

RQ1 asks about the structural diversity of post-disaster transitional networks. Examination of the “evacuation” affiliations network shows that the three most central types of organizational ties were: individuals, businesses of the same type, and clients. Figure 4 shows the evacuation affiliations network when the threshold is raised to highlight the most important network members. Such findings support the idea that transitional networks were largely homophilous, in that they consisted of those who were similar or with whom long-time relationships had already been established. Interview data and ego network visualization show that organizations expanded their networks during evacuation to include relationships with aid organizations or other types of donors. These relationships were generally forged specifically to accommodate immediate needs, and did not exhibit the potential to be long-term contacts.

Finding a place to establish business while evacuated and reconnecting with existing business contacts were consistently named as the top priorities by respondents. Thus, most initial networking included activating ties with family/friends of organizational members and clients/members of the focal organizations. While friends/family members may have been new to organizational networks, they were already members of organizational leaders’ kin networks. There was already a history of interaction and trust. Thus, contacting friends and family members for a place to stay and set up business was a common theme in the data, as reported by this communication consultant:

So he’s [a former colleague] trying to reach me to say, hey man, look, what can I do to help you....And so finally though I reached out to him and let him know

where I was. He's like, where are you? By that point in time I'm at my sister-in-law's house and there's 18 people living in her house now. So we're telling him what's going on. He says, look I want to have all of you over for dinner, everybody, bring everybody you want, bring them all, and they gave us a car to use while we were in Houston. I mean, furniture, anything you need. It's like, whatever you need, you've got it. So one of the things I relied on was I had a number of former Enron employees all just reach out and say, hey, whatever you need, you just call me. You need money, call me. You need a car, here's my Mercedes. You need this, you've got it. And so I had a number of folks that just wrapped their arms around me.

In another example, the director of this nature institute called upon a trusted friend to supply him with the resources necessary to get back to business:

I said... I need an office first to work out of. He said, well you've got it. I said, I need a house to live in. He said, you got it. And I need school for my kids. He said, you got it. I said, I probably won't be able to talk to you for I don't know when. He said, don't worry about it, it's done. So 9, 10 days later I showed up in Baton Rouge, he had an office, he bought a house, and the I guess ... the right school. And I think that's what it takes. It's friendship and it's people believe in us. And whatever you ask of them, they do. And that's it.

When this business owner could not locate her employees, she used her family to fill in the gaps at her shop:

I'm calling the whole list and not one person, either the phones don't work or whatever. I mean I could not find one person. I said(?) I don't know what I'm going to do. So on the car ride back from Arkansas I had to decide what I was going to do, because I told my family, look, I'm sorry, but you're all going to have to come work for me. You're going to come help me for a little while. And so that's what happened.

Reconnecting with clients was also a top priority in post-disaster networking. For example, this non-profit organization reached out to clients simultaneously with trying to find staff: "Once we were able to get our managers together, we met in Baton Rouge, outside of New Orleans, and then we went about the project of attempting to locate both staff and clients through personal contacts, networking and whatever."

This financial institution also made reconnecting with clients a top priority:

Customers left home in many cases with nothing. So we had to get them, quickly, cards, checks. So much of the activity was just simple, but it was just time pressure to get people to either wire money in, to get them cards or a checkbook so they had a payment mechanism. So that, in the first month that's what it was all about, just getting people what they needed to do transactions.

This media outlet president reflected a common theme in reaching out to clients, in that it was based on a need to reestablish business relationships, but was also based on a desire to help clients whenever possible:

Then we had to account for all of our customers, our clients. First thing we had to do was assure them that we are down. We're not going to be charging you, your commercials. We want you to know where we are as a business. You've been doing business with us for a long time, but we want to know how you are. So we instructed all of our sales people, and our team, to get in contact with all of our customers and say two things. The first job was to find out how they were personally. We're not here to sell you anything. We just want to know how you are. Everyone at that time wanted to share their story. Our task was not to share ours with them, but to get them to tell us what happened.

Just as the line between traditional kin networks and business networks blurred as personal contacts provided work resources, clients began to fill the role of friend. For example, this retailer reported turning to customers for information: "But when we talked to our customers and friends who had contacts, they would get information, they could give.... information of what was going on."

Another example of clients filling the role of friend was evidenced by this attorney:

And then another good connection was one of our clients, was in River Ridge, Harahan not far from here, but it got up and running sooner than New Orleans and sooner than this building. So, my client told me that he'd be happy to let us use some space there.

Businesses of the same type also figured prominently in evacuation affiliation network.

Businesses of the same type often included national or international businesses that were part of the same professional ilk as the focal organization. These organizations were incorporated into networks for two primary reasons: a feeling of professional kinship, and

because they had needed resources at hand. For example, a shipping/delivery business was able to shift its operations to a nearby, but unaffected, shipping/delivery business in order to continue the flow of work:

Well, he had everything that we needed in his office. So we spent the night at his house and then the next day operated out of his office. And within an hour the world knew that [our business] was operating...

Likewise, this museum reported a relationship with another, non-local museum for facility use in case of emergency:

We had a reciprocal agreement with them. So we had prepared ahead of time for just such an instance, hoping never to have to use it, but we did. So we were glad to have that. And we also have offsite storage and backup storage of all of our computer systems, our microfilm. We have photographic storage offsite that are just duplicates for retrieval in case anything were to happen.

To the extent that it was applicable, similar businesses also included umbrella organizations and contacts made through those organizations, as was the case for this non-profit organization:

They called the National Council and offered us an office in Dallas fully furnished. Other people, at that time, at that time of the year, there's a little money left over from the grant year before that. I never knew that, because we never got it, but I found out...And people that get this little extra. Any money that they have left over that they give to organizations were offering all of their money to us. It was nice. It makes me cry.

Networks exhibited some characteristics of an open network in that they often expanded to include interactions with relief agencies and government agencies. While these were not always useful or reciprocal, almost all organizations cited seeking aid from such agencies. Additionally, networks began to take on a more open structure when a personal or other trusted contact tied the organization to a new contact that possessed a needed

resource. For example, this business consultant was given office space by his spouse's employer:

[Wife's employer] gave me an office, computer, fax, telephone line, voicemail and an assistant for free...My wife was working for them. They knew I needed to get my office up and running... They had offices to boot. They had computers, anything I wanted. It's like, "[self reference] okay, here's the supply room." I had this from the senior executive, "Anything you want, you take." I mean the assistant came in - I kid you not - she set up my desk. I had pens, stapler, scissors, everything.

An additional structural feature of post-crisis transitional networks that seems unique to this type of network is the presence of "random" ties, or one-time link/release relationships in which the focal organization was the recipient of aid by a previously unknown third-party. Individual and corporate philanthropy was at an all-time high following Katrina, leading to some beneficial partnerships. For example, a photographer reported receiving a small grant: "I got \$4,500 from a photography organization in the Midwest. That was great... Someone had read about them and said, "...you need to contact them." I was like their worst case scenario and they came through."

These examples reflect the most common type of post-disaster networks. There were, however, examples of very diverse and open networks. Such businesses often reported reaching out to everyone in their address books, and then asking those people to reach out to others. These organizations still displayed the core of homophilous contacts described above, but also included a wide range of other partnerships. Diverse networks are discussed further in the results of P6.

P6: Impact of Pre-Crisis Diversity on Post-Crisis Transitional Networks

P6 asks about the diversity of post-disaster networks in relation to the diversity of pre-disaster networks. Data show that to the extent possible, transitional networks consist

largely of pre-crisis contacts. Therefore, the more diverse the organization's normal network, the more diverse is the organization's transitional network. However, in transitional networks, certain types of alters tend to drop out, leaving transitional networks sparser than pre-disaster networks. Examination of ego networks using both survey and interview data support this finding, but also show evidence of organizations that retained their pre-network diversity. The organizations that had diverse membership both before Katrina and during evacuation were organizational types (associations, non-profit organizations, and a religious organization) that generally coordinate outreach and resource sharing as a function of their organizational mission. Thus, overall quantity and diversity of contacts during evacuation was much more limited than prior to the Hurricane.

Figure 4 shows the affiliations networks for respondents prior to the Hurricane and during evacuation. Visualization of these networks shows that, when the threshold is raised to seven, there are 11 organizational types named, including: businesses of the same type, individuals, clients, professional associations, attorneys, foundations, communication associations, vendors, and academic institutions. However, at the same threshold for evacuation networks, only three alters are named: businesses of the same type, individuals, and clients. Lowering the threshold by one degree brings FEMA, non-profits organizations, and the federal government into the evacuation network.

Of the twenty-one ego networks visualized both prior to evacuation and during evacuation, five had diverse network membership prior to Katrina and retained these diverse contacts during evacuation. Nine ego networks showed diverse pre-Katrina membership that was reduced during evacuation, six had small and homophilous

networks prior to and following Katrina. The remaining organization had diverse membership before and after Katrina, but the actual organizational types represented were different at each point in time.

Figures 5 and 6 show two different sets of ego networks both before and during evacuation. Figure 5 represents an organization whose pre-Katrina diversity did not carry over to its evacuation network. The pre-disaster ego network of this professional organization (engineering firm) reflects a diversity of partnerships, including *individuals*, *vendors*, *foundations*, their *insurance company*, *professional associations*, *clients*, and other *businesses*. However, the evacuation network for the same business shows only four types of partnerships, including *individuals*, *businesses* of the same type, *clients*, and *foundations*. Essentially, the network was reduced to the core group of homophilous contacts that were most central in the evacuation affiliations network. Figure 6, however, is an example of a non-profit organization with a diverse pre-Katrina network that retained its diversity during evacuation. Members at both time points included a diverse array of business partners. Although some partners dropped out and others joined during evacuation, the overall diversity of the network remained high. A review of the transcripts of the interviews for these organizations revealed that both were successful during and following evacuation. However, while the professional business went about reorganizing and conducting business, the non-profit organization actively engaged with many community partners in order to help facilitate its return in general.

RQ3: Sustainability of Membership

RQ2 asks about the sustainability of membership in transitional networks.

Affiliation networks were visualized for four distinct points in time: prior to evacuation,

during evacuation, in the year following evacuation, and three and a half years following evacuation. Examining these networks together shows that overall number of network ties increased during evacuation and remained level for the year following evacuation. Three and a half years later, the total number of ties in the network was still higher than prior to the disaster. Setting the threshold to seven to illustrate the most frequently named alter types shows a decrease of prominent alter types between the time prior to the disaster and the evacuation. However, in the year following evacuation and three years following evacuation, the number of organizational types that remained in the network were higher than the pre-disaster numbers. These newly important alters reflect organizational types that were likely to provide help in disaster recovery. Centrality for these networks (Table 6) show that clients and individuals remain the most central at all points in time, while other alter types such as professional organizations, businesses of the same type, and vendors increase or decrease in centrality depending on the timing proximate to the disaster. Table 6 reports degree centrality for all affiliations networks at all four points in time.

Figure 7 represents the affiliation networks for all four points in time when the degree threshold is set at 1, representing the number of times an organizational type is named by an ego. Node sizes are weighted to show the centrality reported in Table 6. Figure 8 represents the same networks when the threshold is set at seven. Figure 8 illustrates that while networks at all points in time included a wide variety of partners, those partners who were most important shifted depending on timing proximate to the disaster. Visualization of the affiliation network prior to the disaster shows a group of nine out of twenty possible organizational types who figure prominently in the network.

By increasing the threshold to focus only on the most prominent organizational types, three organizational types emerge as most critical during evacuation. The number goes up to twelve out of twenty organizational types in the year following evacuation, and remains at twelve. Thus, business networks showed a higher level of interconnectedness in the years after they returned from evacuation.

Examination of the types of organizations that figured most prominently in business networks at all four points in time shows that clients and individuals are consistently the most important, and most central, network members. With one exception, organizational types that were most prominent in pre-disaster networks were also prominent in networks the year after return and three years post-disaster. However, networks in the year after evacuation included four additional types of partners, including FEMA, insurance companies, the federal government, and non-profit organizations. Prominent members in networks three years after the disaster were the same as those in the year following evacuation, except that FEMA dropped out, and businesses of a different type became more important.

Communication and ICT Use

RQ4: ICT Use and Transitional Networks

RQ4 asks, how do organizations use ICTs to build and maintain transitional networks? Data show that almost all means of business communication were disrupted by Hurricane Katrina, forcing respondents to shift their communication strategies in order to conduct business and initiate/maintain contact while evacuated. Utilization of a wide variety of ICTs yielded high adaptability, which enabled respondents to communicate in post-disaster networks. ICT use can be coordinated into three primary communication

activities: to make initial contact, coordinate network membership, and to conduct work-related activities. Respondents reported a heavier reliance on ICTs to maintain transitional networks than in a normal space, as well as a shift in the way that ICTs were utilized. Many times ICTs had to be used creatively and in combination with other ICTs in order to overcome the communication barriers caused by the network disruption. Some of these changes in communication reverted back to prior communication patterns after evacuation, while others were adopted into regular business communication patterns. Table 7 shows the variation in manner of communication before, during, and following evacuation.

Making Initial Contact. The network disruption caused by Hurricane Katrina made making initial contact difficult. Some business owners reported having employees and other locally based contacts move as far away as the “four corners of the country” (Communication Consultant). Respondents frequently reported that they did not expect to be gone for more than three days. Thus, they did not bring much of their work and other contact information with them. Once they realized they were going to be gone for longer, many tried to reach out and reassemble organizational networks. However, accomplishing this ranged from frustrating to near-impossible. The director of a recreation center captured the total disruption in communication capabilities caused by Hurricane Katrina:

But the lack of communication, that was really, really hard. You’re functioning in a modern world, but you can’t talk to anybody. You can’t communicate. You can’t let anybody know how you’re doing. That was really, really hard. That’s the big lesson that everybody has learned here is that when you have a catastrophic event like that, it all goes down. It all goes down in a heartbeat. The only people who have any communication are the National Guard with a radio. Other than that, there’s nobody to talk to. There’s nobody to communicate with, so that was a big problem... There were no phones. There was no anything. In fact, for - I don’t

know - maybe 3 weeks, the only way that we could contact our own employees was through text messaging off of a phone. So it took me weeks to even contact people, even know where they were.

This total disruption led to drastic shifts in communication patterns among organizational networks. Prior to evacuation, 95% of respondents reported using face-to-face communication as part of their regular business communication. This dropped to 24% during evacuation. Similarly, 95% of respondents reported using a landline phone as part of their regular business communication prior to evacuation, and this also dropped to 5% during evacuation. As organizational members and external constituents were forced to relocate during evacuation, face-to-face communication was not an option for many people. Additionally, since nobody was at their place of business, and because the storm had knocked out landline phone lines, landline business numbers were useless. Even companies that had planned ahead by setting up a toll free number for information purposes were stymied by the lack of communication capabilities, as reported by this retailer: “We had an emergency phone line for employees, an emergency hotline. But it was based locally and all the phones were wiped out.”

Initially following the Hurricane, mobile phones were also generally ineffective for talk. This retailer reported that while mobile phones were his only way of communicating, it was a frustrating and ineffective process: “It was primarily cell phones...It wasn’t working fine, but you were able to contact people.” As a result, making initial contact often involved figuring out how to adapt ICT use to the crisis. Some businesses worked around this by securing alternate means of mobile communication, as was the case with this financial institution:

So one of the things we did early on, once we saw the magnitude and woke up, the magnitude of the problem, and woke up in Houston, is we went out and

bought Houston area code, 713 area code, cell phones. I don't know the exact number, but hundreds of them.

This retailer also had to secure mobile phone lines outside of the affected area code:

And then a lot of our people that scattered went to Destine, or North Louisiana or Texas. So they started getting phones in Dallas, a new cellphone in Dallas or a cellphone in Baton Rouge with a 318 number. So we had a lifeline.

One adaptive solution that respondents used to overcome the difficulties of making initial contact was text messaging. Prior to Hurricane Katrina, no respondents reported using text messaging as part of their regular business communication. During evacuation, 38% (n=10) reported use of text messaging as an alternative to or in addition to talking via mobile phone. This service professional reported acquiring text messaging as a new skill in order to communicate:

They were just finding out by mistake. I mean, I don't use text messaging, so all of a sudden I'm getting weird beeps on my phone and it's like, what is this. It is working. And so then we finally started getting text messages and when we realized that, we started text messaging everybody that we knew and telling them to call our landline in Alabama so that we could just hook up again.

This non-profit agency also reported a new reliance on text messaging:

The thing that was working was the text messages. They worked throughout and we were able to use some of those. The challenge there was that a lot of people were not familiar with using text messages to communicate, so we just had a capacity issue there.

Additionally, this retailer reported a reliance on text messaging to stay in touch. "... text messaging worked. Cell phones didn't. You couldn't talk to anybody, but you could text message."

Mobile phone use for both talking and texting was somewhat limited in that knowing personal mobile phone numbers of professional contacts was necessary in order

to make contact. Consequently, e-mail and internet also emerged as alternative means for post-disaster network communication. Initially, internet access was also interrupted by the effects of the Hurricane. While people who were evacuated could generally send and receive e-mail, locally hosted websites went down. Once those websites were back up and running, they became an important way for businesses to reach out to both internal and external networks. For example, this retailer used her site to let people know she was still in business, as well as to get in touch with people for whom she could not reach otherwise:

In the early days, when it first happened, my internet website went down. Now the fellow who was handling it, he got me a temporary site, and on the temporary site it said [the business' name] would never die. Contact [owner's name] at [business' name.com,] Well I mean that helped a lot, because when people were trying to get in touch with me, they were able to reach me that way.

Additionally, using mass e-mail was a way that people cast a wide net to get in touch with as many people as possible. For this non-profit executive, mass outreach on the part of her husband resulted in connections for her, as well:

That was kind of how the networking started with me. And then I guess [my husband] e-mailed everybody his address book... And a lot of my friends and some of the prime members and people in the organization would get his address book. So then I started getting e-mails from them, because I didn't have people's cell phones.

Coordinating Communication. ICTs were also used to coordinate communication. They provided a way for people to “check in” and find out what was going on. This was primarily done through organizational websites. Although the websites were not new to the business, they were utilized in this new way following the network disruption. For example, this family entertainment center used their website in this way:

We had a website, of course. We always had a website. And then we made changes to the website from where we were in Dallas, where I was in Dallas, and

there were a couple of us that were in Dallas and scattered, so we made changes there to keep it updated, because we thought, well, maybe our employees will try to contact us through the website, they'll try to find us through the website. So we were always pretty up to date on that website.

This recreation center used their website not only to coordinate contact on the part of the organization, but also to allow individuals to communicate with each other:

Well, of course, the website and the chat room was open. Some portion of the chat room was open to anyone, and we had lots of people that did contact, that went onto the site that were familiar with us, that wanted to find out if we were okay, or they could do anything for us or whatever. But then we had other sections that were just for the employees, where the employees could go in to get information and we could get information from them.

Blogs were also used to allow people to share information and stay in touch, as was the case with the blog set up by a local school, as reported by this communication consultant:

“Like for example, my children’s school started a blog, and that helped tremendously because then we knew what was going to happen.”

Sometimes, websites were used in combination with other ICTs:

There was sort of an informal staff phone tree, I think. There are a couple of emails that went out. Actually, we did have a blog on our website ... briefly that we took down after it was really needed. But then constituent-wise, I mean having the website up is pretty much the major way we’re communicating... (Cultural arts center)

Conducting Business. Once initial contact was made, many organizations and businesses were able to work while evacuated. Again, a variety of ICTs provided the communication capabilities necessary to become operational. For example, this retailer used mobile phones to maintain the contacts needed to hasten his reopening:

So many people like complained and complained about the cellphones....I was on the phone around the clock till one or two o’clock because we had 100 or 200 employees, we had suppliers, we had people calling tracking us down, can we help. Like....family and so it was round the clock and my cellphone worked most of the time and people were saying Cingular was bad and Nextel was bad, and everything, but I’m thinking, well, you know, they’ve got their own business

phone, they've got power down and you know, and I don't know if you know this, they didn't charge anybody for months.

This cultural center used the phone to coordinate meetings and maintain a sense of normalcy while away:

But we normally have Wednesday morning meets here, and so I asked people to consider Wednesday morning as our meeting time and to email each other reports on what they'd been doing, because they were getting paid, to share what path they were working on and what they'd been doing, any updates they had personally. And there were a few times when we had a conference call, where people called in and we just all heard each other's voices and we talked together, and that was really helpful.

This attorney used the internet to replace her locally-based vendors in order to conduct business while evacuated:

Considering that you can get just about anything on the Internet, I've already replaced some things via the Internet from places that I had no idea would have supplied that sort of thing. So it works, it's just that it takes longer to get here. I mean, I ordered a notary stamp three weeks ago and I'm not going to be getting it for another three weeks probably.

This business consultant was able to coordinate work to the extent that his organization was awarded a grant while they were still evacuated:

I: And did you actually write that proposal while you were in Houston?

R: I wrote it while I was in Houston, [colleague A] was in Atlanta, [colleague B] was in Atlanta, [colleague C] was in Baton Rouge, so we wrote it. All the Internet back and forth.

I: Track changes.

R: That's exactly right. And that's how we did it. And then we, this was in October, and then we were awarded it at the end of October.

Using ICTs to conduct business only worked for businesses that were able to work remotely. Other businesses could not rely on ICTs to the extent that other types of businesses did, except for reaching out and letting others know that they were okay and planning on coming back for business. For example, this retailer was only able to use e-mail in a limited capacity, as most of his crucial contacts did not have e-mail:

No, no. I would say, I'd say 60% of them do not have internet, because being a store you've got seamstresses and stuff like that. They don't have a computer or have internet. Those are the ones we were having trouble with.

Transitioning to the Future. Organizations recognized both the limitations and potential of ICT use for coordination purposes following the disaster, and often reported making provisions to their disaster plans so that they could use ICTs to their fullest potential in case of future disasters. This non-profit organization outlined such contingencies:

We've learned many things and have added to our disaster preparedness plan as a result of this storm. We've made plans for having an 800 number for people to get in contact with the, for leaving messages and leaving plans, to tell people where they are. We have now also, because prior to the storm, our contact information included people's cell phone numbers, but after the storm a New Orleans cell phone didn't work because the towers were down. So it was cell phones were not as helpful as we thought they would be, so we have learned that we have to; we asked our entire staff to get us a first and second contact of where they would go, should we have to evacuate again, so that we would be able to contact them at those places. We've learned that we need a GPS mobile telephone, so that we can use that, no matter where we are. We learned that all of our department heads have to have laptops and zip drives to take and portable servers, so that we can have access to our business from anywhere.

Overall, ICTs allowed for greater flexibility and adaptability following network disruption. Organizational decision makers and business owners reported an increased reliance on ICTs during evacuation. This reliance was manifested in three primary communication activities: making initial contact, coordinating network membership, and conducting work-related activities. The utility of ICTs during this time of crisis led to the incorporation of ICTs in future communication plans.

CHAPTER 8

Discussion

This dissertation develops a communication theory of transitional space. The purpose of developing this theory is to advance understanding the role of communication in rebuilding social structure following a crisis. Understanding how people use communication to build networks following a crisis can have applied implications for issues as dire as individual and organizational survival. Theoretically, such an understanding can further communication and social network theories of organizational crisis, temporary alliance building, ICT use, and the lifecycle of networks. While crises have been studied in terms of social ordering (Kreps, 1984, Topper & Carley, 1999), and communication (Dutton & Nainoa, 2003, Katz & Rice, 2002), a communication theory of transitional networks combines these perspectives to provide yet another layer of understanding to the study of post-disaster recovery.

Business owners and other key organizational decision makers participated in semi-structured in-depth interviews in which they were asked questions about their experiences following Hurricane Katrina. These interviews were coded using the constant comparative technique and studied in terms of emergent themes. These themes were then used to develop a survey instrument that asked specific questions about their business communication partners and means of communicating during evacuation, as well as their perceptions of their progress since returning. Propositions and research questions were explored using the coding that resulted from the constant comparative process and the development of social networks using the interview data in conjunction with social network analysis tool, UCINET. In this chapter, this dissertation's findings are discussed

in terms of existing network and communication research, with attention paid to how findings expand upon these bodies of work.

Given the findings, a communication theory of transitional space is advanced and supported by the results from this study. The theory posits that disaster is followed by a time of transitional space in which organizations are neither where they were nor where they need to be. The timeframe immediately following the disaster is an “emergency space.” Structurally, this space is marked by an unreliable communication infrastructure and an altered macro-level context in which vital partnerships and resources are missing. While network structures in this space vary by organization, a reduced core of homophilous members marks “emergency” transitional networks. Communication in this space is marked by adaptability and is primarily aimed at reconnecting with previous network partners and sharing resources to overcome the affected macro-structure. *Adaptable* communication includes finding alternative means of enacting communication, as well as using existing communication relationships in a new or different way.

Results point to a second phase of the transitional space that can be termed a “recovery space.” Although the recovery space was not explored as part of this study, it is a time when organizations have overcome many of the obstacles presented by the disaster, but still have networks that contain temporary partnerships made during the “emergency” phase. Networks exhibit a larger core of relationships that resembles pre-disaster networks, coupled with additional contacts that provided emergency relief.

Examining transitional space on both the ego and aggregate level shows that despite individual variance in organizational recovery experiences, the overall recovery experience of a given population can be represented in terms of a communication theory

of transitional space. Subsequent sections in this discussion delve into the theoretical concepts of transitional space and support their inclusion in the theory with evidence of individual and aggregate recovery efforts.

Post-Crisis Macro-Structure

Findings from P1 indicate that the period following a crisis is marked by an altered macro-structure that causes disruption in normal communication patterns. All participants reported some degree of network disruption following the disaster. This disruption was contextualized in a macro-structure including missing contacts, unavailable resources, and a dysfunctional communication infrastructure. Essentially, this was a time during which “normal” business communication patterns had to be adapted to accommodate the limitations and opportunities created by the disaster.

For the purposes of this dissertation, the mandatory evacuation following Hurricane Katrina was studied as the transitional space. The immediate crisis of the hurricane had passed, but with few exceptions, New Orleans business owners and organizational leaders were separated from their physical place of business and unable to locate many members of their business networks. Over the course of the next week to nine months, organizational communication was not “business as usual.” Even when business communication took place, it was not under normal conditions. People reported working from relatives’ houses, with “dogs barking in the background” or in the office space of former competitors.

Organizational decision makers reported a dysfunctional communication infrastructure during this timeframe. Immediately following the Hurricane, face-to-face communication was impossible with all but a few, select contacts. Additionally, the

utility of ICTs as a means of communication was compromised by technical difficulties. As such, organizational leaders had to adapt their use of technology. Table 7 illustrates the extent to which means of communication were altered, including an increased reliance on text messaging and other forms of electronic communication. This shift in communication was in direct response to the limitations posed by the network disruption.

Network disruption was complicated by the existence of a macro-structure unable to support the full return of organizations and businesses due to missing links in the community infrastructure. These missing links included schools, mail service, and garbage collection. These services could not resume until employees came back to fill the jobs, but employees could not come back without basic services to support their return. Likewise, businesses and other organizations could not return without facilities and employees, but employees could not return until schools opened and mail service began. Thus, even as individual businesses were ready to resume a sense of normal operation, they were inhibited by the unavailability of others. Thus, reentry into New Orleans was difficult until a critical mass of organizations was able to return. This prolonged the transitional space, keeping the City and its businesses outside the realm of normal operation.

Thus, the time following an acute crisis is a time in which the macro-structure for a given population is negatively affected to the extent that it precludes normal business operation. Characteristics of the negatively affected macro-structure include a dysfunctional communication infrastructure, missing network partners, and unavailable public and private resources. This finding builds on previous research (Kreps, 1984; Runyan, 2006; Topper & Carley, 1999,) that points to a negatively altered environment

following a crisis or disaster. As one of the basic premises of social network theory is that there is a reciprocal relationship between micro-level communication and macro-structure, defining such a macro-structure not only lays the groundwork for the idea of a post-crisis transitional space, but also draws the connection between this space and special conditions for post-crisis communication. The interdependency between this context and the communication therein is unpacked in the following sections.

Network Development

Establishing the premise that post-disaster communication takes place under exceptional circumstances points to the need to understand *what* drives formation of the resulting communication relationships and *how* they are formed. Therefore, propositions two through four explored issues of resource exchange, trust, and public collaboration as conditions for network development in a transitional space. P5 looked at how these or other conditions were enacted in order to form a network of relationships. *Taken together, findings from these propositions demonstrate that post-disaster network development was not a linear process.* Despite the existence of some emergency plans, organizational decision makers reported engaging simultaneously in various efforts to build post-disaster networks. For example, one respondent reported simultaneously reaching out to home offices or other members of sanctioned organizational bureaucracy while at the same time taking the initiative to e-mail all external constituents for whom he had an address. Resource exchange served as the overall catalyst for network development; whether it was to gain money, shelter, information, or emotional support, all organizational leaders and business owners who participated in this project reported engaging in communication directed towards sharing resources.

Trust was a largely unarticulated, but present, factor in resource exchange. When asked directly about whom they networked with based on trust, business leaders most-often cited non-profit organizations. Non-profit organizations were also the most central alter type in the collective action affiliations network. However, the emergence of similar and familiar others as most central in the evacuation affiliations network belied the fact that people showed a preference for networking with others based on prior trust. Therefore, while trust with familiar others was evident anecdotally and in the selection of post-disaster partners, egos most often recalled trusting non-profit organizations. Collective action exhibits many of the same characteristics that Myerson et al. (1995) posit for the development of swift trust, including interdependence, a shared goal, and a finite timeframe. Thus, the high centrality of non-profits in both trust and collective action networks suggests that organizations that engaged in collective action also developed trust with partners in this action. Because of the nature of collective action, this trust reflects qualities of swift trust. Additionally, this suggests that organizations whose mission it is to act for the public good rather than profit, and that fulfill that mission in their actions, are both trusted and desirable partners following a disaster.

Resource Exchange

Resource exchange emerged as a salient reason for post-disaster communication. All interview and survey respondents mentioned communicating with others in order to receive or give resources. These resources fell into three categories: instrumental resources, informational resources, and emotional resources. Instrumental resources, such as money, office space, and other tangible resources, were the most frequently named type of resources. Three types of resources were cited as most important immediately

following the hurricane: shelter, accurate information, and money. In fact, shelter during the evacuation was an immediate concern for everyone interviewed. While obtaining shelter is an individual-level need, it served as a first step towards rebuilding business. Once participants secured shelter, they often used that shelter as a “home base” from which they also began to reassemble their businesses. Due to the disrupted macro-structure, there was also a high level of uncertainty. Combined with physical dislocation that often made “checking things out” difficult or impossible, this uncertainty made accurate information another sought after resource. Finally, due to the widespread devastation, money was a third type of resource frequently mentioned in interviews.

The centrality values of integral members of the resource affiliations networks reflect the desirability of these resources. Network visualization showed that relief organizations, vendors, clients, and individuals were the organizational types most commonly cited as exchange partners. Interview data showed that of these network partners, individuals and clients were actually the most helpful. Individuals were generally either personal contacts such as family members or friends, or one-time donors or recipients of aid. While one-time donors or aid recipients reflect new and sometimes different alters; family, friends, and clients were all members of pre-disaster networks. Family and friends were cited as providing access to all of the aforementioned resources for both personal and business purposes. Indeed, as was the case with shelter, personal and business purposes began to blur in post-disaster networks. Just as family members provided shelter, Internet connection, and even became employees; clients also provided business space and supplies to participants. Such reliance on similar and known others is a theme that emerged repeatedly throughout the data. In terms of resources, they were

able to provide quick and free access to the most desired types of support. Overall, this reflects not only a tendency to rely on trusted others, but also the need for business leaders to address both personal and business needs simultaneously in following a crisis.

While individuals and clients were the most helpful types of partners, FEMA was the most central partner in the resource in affiliations network. However, many businesses reported not receiving the help that they needed through their connection with FEMA. Whether this is a function of the organization itself, or the fact that similar and familiar others actually provide better access to resources, is unclear. FEMA was widely criticized in the news in the months following Hurricane Katrina. Additionally, there may be some confusion over its mission, as it is an agency that is designed to provide immediate disaster relief. Perhaps utilizing it for business rather than personal purposes was outside of FEMA's primary mission. Regardless of why FEMA was ultimately deemed "not useful" for business purposes, what is notable is that the organization that the most business owners reported reaching out to for help was not, in fact, the most helpful. This example highlights the distinction between interaction and communication. Traditional network studies would have noted the *interaction* with FEMA, and derived its importance in the overall network based on the patterns of interaction. However, looking at the reported *communication experiences* with FEMA provides a different, and fuller, picture. Thus, looking at interaction patterns alone is not enough to tell who is the most important network member or who filled the most crucial role. Rather, looking at the nature and outcomes of the communication relationships is necessary to fully understand network development.

Trust

Literature suggests two different types of trust that is relevant in post-disaster transitional networks. Literature on post-disaster network development suggests that trust based on close-knit, homophilous relationships is preferred because it is easily developed and facilitates fast action. Conversely, literature on temporary networks posits swift trust, or trust among formerly unconnected partners based on cooperation, shared interdependence and shared risk. When asked directly about with which partners they communicated based on trusted driven by prior interaction or reputation, organizational leaders most often cited non-profit organizations. However, affiliations networks based on either type of trust were sparse (Figure 8, Diagram A and Diagram B). This could mean that respondents did not consciously cite trust as an important reason for post-disaster network development or that they only trusted a few types of alters.

Although not the most central in the trust affiliations networks, trust based on previous interaction was evident in business leaders' preference for communicating with previous network members and similar others. Both interview and survey data show a heavy reliance on personal contacts to facilitate business networks. This was evident with small business owners and professionals who worked independently, such as the attorney who first worked out of the home of relatives, and later out of the offices of other attorneys. However, this reliance on personal contacts for business purposes was not limited to independent practitioners. For example, a heavy reliance on personal contacts was also evidenced by a leader in the shipping industry who used personal contacts to coordinate emergency action immediately following the Hurricane and a performing arts organization that cited the importance of personal contacts for recovery. Although the word "trust" was not articulated in any of these examples, the trust between the business

leaders and their contacts is evident in the context of the stories. This indicates that when business owners are faced with an emergency, they rely on people whom they feel that they can trust the most, regardless of whether or not this person is usually part of the business network, and regardless of the type and size of affected business.

Non-profit organizations emerged as the most central organizational type in affiliations networks for trust based on reputation *and* prior interaction, as well as the affiliations network for collective action (see Table 4 and Table 5). The high degree centrality of non-profit organizations in trust networks shows that in an emergency, business leaders recognize trust based organizational mission or reputation as a reason for choosing communication partners. This is similar to the tendency of organizations to turn to FEMA for access to resources, since FEMA's organizational mission is to provide relief to individuals, businesses, and infrastructure following disaster. However, unlike FEMA, which was an organization with high degree centrality to resource networks but frequently deemed not helpful, non-profit organizations were both central to trust networks and ultimately trustworthy. Indeed, interview data support the utility of non-profits in terms of organizational rebuilding following Katrina, showing their ability to provide resources and coordinate contact among formerly disconnected parties. Essentially, by acting in accordance with their mission, nonprofits emerged as both trusted and useful network members.

Collective Action

The prevailing macro-structural conditions of the transitional space made working alone a nearly impossible task. While these conditions restricted the efforts of some to the extent that individuals had to focus on their own recovery before they could help others,

there was much evidence of parties working in tandem on both a small and large scale. Small-scale cooperation included sharing resource with neighbors, while large-scale examples of collective action included coordinated rescue efforts. While they did exist, examples of large-scale efforts were somewhat limited in the timeframe immediately following the disaster, as almost all participants were physically dislocated and without sufficient resources of their own or means of communication. However, moving out in time from the actual Hurricane yielded more examples of people working together to help others and repair the negative, citywide conditions to facilitate return.

If cooperation in tumultuous situations can be seen as an antecedent to trust, then a discussion of collective action in a crisis situation is an extension of a discussion about trust in the same situation. Myerson et al. (1995) defined swift trust as “a unique form of collective perception and relating that is capable of managing issues of vulnerability, uncertainty, risk, and expectations” (p. 167). This type of trust is formed specifically to complete a finite and shared task. This type of relationship was most often present when organizations worked together for overall community rebuilding efforts, rather than individual recovery efforts. Examples of collective action evidenced in the interview data reflect this notion of trust. Thus, collective action in a crisis situation can be understood both in terms of cooperation to benefit the greater good and the development of an accompanying “crisis oriented” form of trust.

Finally, the emergence of non-profit organizations as central in both trust and public collaboration networks suggests that organizations also engaged in swift trust. That is, the organizational type most often cited as trusted is also the organizational type most named as most central to public collaboration efforts. However, even when

engaging in collective action, organizations often cited working with non-profit organizations to accomplish the task at hand. This indicates that when focusing on their own recovery, organizations often relied on trust developed through previous interaction and organizational type, and that swift trust and trust based on organizational type were a sufficient basis for developing relationships aimed at community rebuilding.

Social Ordering

While the recovery efforts of organizations following Hurricane Katrina can be loosely dichotomized in terms of those who had a formal recovery plan and those who did not have a formal recovery plan, *all* businesses participated in both formal and impromptu recovery efforts. Those organizations with formal recovery plans were often able to reorganize soon after evacuation, but were also stymied by the missing communication links and dysfunctional communication infrastructure described in P1. For example, one financial institution had a comprehensive recovery plan in place that included pre-established office space for evacuation and the pre-planned use of conference calls to coordinate business communication among evacuated parties. Organizational members evacuated and reported to work according to these plans. However, despite this level of preparedness, the organization was caught of guard by the extent of disruption and had to implement *ad hoc* planning including workarounds using mobile phones and other communication technology. Alternately, there are two examples of 501-C non-profit organizations born out of the *ad hoc* efforts of individuals or business owners coming together following Katrina. Thus, social ordering in a transitional space can be viewed as taking place on a continuum with formal ordering on one end and impromptu organizing on the other. Where an organization's recovery efforts falls on this

continuum is affected by the degree to which it is prepared for disaster. However, even the extreme ends of the continuum are not absolute; the most extreme example of formal ordering involves elements of impromptu ordering and vice versa.

While organizations can fall along a continuum in terms of the *level* of formal or impromptu action evident in post-disaster ordering, the actual recovery was neither linear nor absolute. Post-disaster social organization does not proceed from point A to B to C. It is a process that can start centralized and then decentralize as time progresses, or start as people throw out feelers and then start to organize more formally based on the feedback they get. Or, recovery can be a combination of *ad hoc* and formal communication at the exact same time. Structurally, a combination of the limitations and opportunities presented by macro-level conditions, and organizational preparedness drives the organization of recovery.

This supports Kreps and Bosworth's (1994) notion that collective behavior and formal organizing are "two ends of the same coin" (p. 26). They posited that relationship networks could emerge as either means-end (formal to informal ordering) or ends-mean (informal to formal) organizing efforts. Evidence of both types of ordering was evident following Katrina. Further, organizations employed formal and informal organizing simultaneously to overcome obstacles and enhance access to resources. This supports the work of Topper and Carley (1999), who studied three models of network emergence following a disaster, and found that actual recovery efforts did not fully fit any of the models. However, particular aspects of each model were evident in recovery efforts. Based on these results, they concluded "chance...task...and formal position...all enter into determining the structure of the network organizations that emerge and the links

between them” (Topper & Carley, 1999, p. 92). This highlights the importance of flexibility following a disaster. While organizations with disaster plans exhibited more of a means-end type of ordering than organizations with no pre-existing plan, even those organizations had to communicate *ad hoc* as opportunities or problems arose. Ultimately, there is no “one-size” recipe for post-disaster network development, and remaining open and flexible to changes and partnerships encompasses the best approach to post-disaster organizing.

Previous research (Goodman & Goodman, 1976, Weick, 1990) casts the emergence of temporary networks as a goal-driven endeavor in which diversely skilled members come together to work with a high level of interdependence towards the completion of a finite task. They are either brought together by a third party “coordinator” or emerge organically as network partners seek each other out and are part of the temporary network while at the same time part of their traditional networks (Myerson et al., 1995). Findings from this study indicate that the development of post-disaster networks is not as straightforward as previous research indicates. Rather than exhibiting clear membership boundaries, goals, and timeframe, the development of transitional networks is inextricably intertwined with the limitations and opportunities posed by the context in which they are formed. Network formation *is* goal driven, as people work towards the goal of reestablishing working order for their businesses. This overall goal subsumes smaller goals of gaining access to resources and reconnecting with previous partners. To do this, organizational leaders turn primarily to others whom they trust based on prior interaction and reputation. Thus, transitional networks are not networks to which people belong in addition to their traditional networks; rather,

transitional networks represent a blending of traditional and emergency contacts. There is variation in how this is accomplished, as neither the enactment formal plans nor informal organizing completely represent the development of transitional networks. This variation is driven, to a large extent, by the macro-structural conditions that demarcate the time period as a transitional space. While there was a standard timeframe of disruption caused by the Hurricane, each organization experienced a different level of individual disruption. Thus, transitional networks evolve in tandem with the conditions in which they operate. *This relationship suggests that while network development is a finite task in that a transitional space is one in which people cannot permanently operate, there is no pre-established end time in which the networks will disband.*

Structural Mechanisms

Visualizing post-disaster ego and affiliations networks allowed for the examination of network membership in terms of structural diversity, and the implications that such membership held for the flow of information or other resources in post-disaster networks. Additionally, affiliations networks were examined at four points in time in relation to the disaster, affording a long-term view of how network structure is affected by disaster. Overall, post-disaster networks reflected a core group of homophilous contacts regardless of how diverse an ego-network was prior to disaster, which then expanded to encompass relief organizations and then to resemble pre-disaster networks as time progressed.

Homophily and Diversity

RQ1 and P6 looked at whether post-disaster networks were primarily open or closed in terms of structure and whether the diversity of pre-disaster networks affected

membership in post-disaster networks. Data showed variation in the extent to which networks were open or closed, but overall evidenced a preference for closed, homophilous networks in the timeframe immediately following the disaster. The most central members in post-disaster affiliations networks were individuals, businesses of the same type, and clients; indicating a strong tendency to turn to similar others and those who were already members of pre-disaster networks. Individuals often represented family members or friends who were utilized to benefit business recovery, and clients were often afforded the same trust as friends. Thus, in their affinity for homophilous others, post-disaster organizational networks mirrored kin networks. Business leaders utilized homophilous others to obtain access to tangible and intangible resources as well as emotional support. Additionally, most egos revealed the inclusion of at least one relief agency or non-profit organization to their networks, again highlighting the importance of such organizations in post-disaster recovery efforts.

P6 stated that the diversity of post-crisis transitional networks would be affected by the diversity of pre-disaster networks. This was true to the extent that most post-disaster networks were made up primarily of pre-disaster contacts. However, in the timeframe immediately following the disaster, many kinds of alters were either unavailable or not contacted, thus making post-disaster networks sparser than pre-disaster networks, regardless of pre-disaster diversity. Organizations that had diverse pre-disaster networks had the potential for more diverse post-disaster networks, and therefore contained some diverse links, but overall diversity in all post-disaster networks was relatively low as *membership* in post-disaster networks was relatively low (See Figure 8, Diagram B).

Data showed that post-disaster networks did sometimes expand to include three types of new members: non-profits, relief agencies, and one-time donors. However, none of these organizational types, including donors, were functions of pre-disaster network diversity. These types of organizations were often formally designated to provide help in the case of emergency, and thus were equally available to all organizations. When unknown individuals contacted organizations to make a one-time donation, it was not because of prior interaction, but rather based on the extent to which the donor was engaged in a similar business or was simply an act of charity. Thus, inclusion of these organizations was not determined by the diversity of pre-disaster networks.

These findings are similar to those found by Hulbert et al. (2000) who found that homophilous relationships are both preferred and beneficial in times of structural turbulence. The easy exchange and high levels of trust and cooperation among familiar others was more beneficial following Hurricane Katrina than turning to new or dissimilar others for help. This suggests that in times of crisis, human tendency is to “close ranks” and turn to trusted others. This human impulse, in turn, affects the structural diversity of business networks.

Data also showed evidence of organizations that exhibited high levels of diversity both before and after Hurricane Katrina. This was reflected in approximately 25% of the ego networks visualized (five out of 21). Of these organizations, two were non-profits, one was a professional association, one was a religious organization, and one was an attorney. Each of these organizational types coordinated communication and resources by nature of their profession. Additionally, four out of the five shared the mission of outreach as part of their organization. It is possible that their high level of diverse

communication both before and after the disaster reflects the fulfillment of their organizational mission. That is, they established contact for the purpose of providing resources and coordinating communication among others. Examination of the interview data supports this idea, showing that the organizations with diverse networks did step in to share resources during evacuation. However, not all non-profits and associations were able to retain their diverse membership following Katrina. That is, while all diverse evacuation ego networks belonged to organizations that coordinate communication and resource exchange, all organizations that had this mission did not have diverse post-disaster networks.

In 75% of the ego networks visualized, diverse pre-Katrina networks did not lead to diverse evacuation networks. An interesting exception is that the organizations who had diverse networks both before and immediately following Katrina were organizations whose mission or function included coordination of communication, and in four out of five cases, some sort of outreach. While post-disaster networks did show some diversity with the inclusion of non-profits, relief agencies, and one-time donors, none of these organizational types were functions of pre-disaster network diversity. These findings suggest that overall, having a diverse pre-disaster network does not lead to having a diverse post-disaster network, and that post-disaster network diversity may be impacted by organizational mission or the ability, knowledge, or desire of the organization's leader to reach out to others.

Sustainability of Membership

Affiliations networks were visualized at four distinct points in time relative to the disaster: prior to Hurricane Katrina, during evacuation, one year later, and three and a

half years after the hurricane. Affiliations networks during evacuation were sparser, reflecting a decrease in the number of ties and lower overall centrality scores (Table 6). The decrease in the number of organizations with high degree centrality reflects the tendency of organizations to interact with a few, select alters during this timeframe. This can be explained in terms of two different factors: the preference of people to interact with similar and familiar others in a time of crisis, and the availability of contact information of these familiar others. While open networks can provide access to a wider variety of resources, closed networks can facilitate quick access to commonly used resources. That is, because closed networks are composed of similar others with whom members have frequent contact, they are likely to utilize, and therefore provide access to, similar types of resources. Because of the unpredictable and unstable time following the hurricane, it makes sense that business leaders would primarily turn to others from whom they felt relatively certain that they could receive quick and reliable access to needed resources. Additionally, as most people left New Orleans with little preparation, including files and contact information, there is a higher likelihood that they knew how to get in touch with family, friends, and clients using mobile phones or e-mail.

Moving out in time from the disaster to one-year later shows an increase in the number of organizational types that remain in the network at a raised threshold. This shows that as organizations moved past the most immediate and disorganized time of crisis, most of them were able to sustain network relationships with greater numbers of contacts. Interestingly, it is at this point in time, rather than immediately following disaster that relief agencies such as FEMA and insurance companies begin to show up as prominent network members. Three and a half years later, the relief agencies are no

longer central to networks, and organizational types frequently named in pre-disaster networks regain prominence. Additionally, “businesses of a different type” emerge as prominent alters in this timeframe.

Such an evolution supports the idea of a two-phase transitional space. The first phase is an “emergency” stage in which contact is primarily limited to contacts that can provide immediate necessities. These contacts are often similar others who were members of previously existing networks. The second phase can be considered the “recovery” phase. This phase happens once business have returned to a sense of normalcy, but networks still include recovery contacts and other contacts made as a result of the crisis. Over time, even these contacts drop out as organizations move fully into business as usual. While these normal networks may now include members that were not part of the pre-disaster network, they are now part of normal communication, as opposed to recovery communication.

Communication and ICT Use

Research Question 3 explored issues of ICT use to build and maintain transitional networks. The keyword in terms of ICT use following Hurricane Katrina was *adaptability*. Organizational leaders used ICTs to adapt to the interruption of regular communication following the disaster. Three dominant themes emerged regarding adaptability: using ICTs to make *initial contact*, using ICTs to *coordinate communication*, and using ICTs to *conduct work* related activity. This reliance on ICTs during evacuation not only reflected an increase in ICT use over times of “normal” communication, but also reflected a shift in the way that they were utilized. Finally, based on their experiences

with ICTs following the hurricane, business leaders reported that they would incorporate the new uses for ICTs into future business recovery plans.

Results support previous research that demonstrated the utility of ICTs for coordinating communication following a disaster (Katz & Rice, 2002, Dutton & Nainoa, 2003). That is, data from this study support the idea that ICTs are useful for coordinating communication activity and creating a social presence separate from physical or temporal boundaries. Additionally, data showed the utility of ICTs for coordinating communication activity and creating a social presence separate from business and personal boundaries. To this end, post-disaster ICT use also exhibited an overlap in the use of personal ICTs (texting and talking on mobile phones) for business purposes. Just as personal contacts spilled over into professional networks, personal ICTs were used to facilitate business communication. This blurring was also evident in the tendency for ICT use to facilitate both individual and mass communication efforts. Organizations used their official websites not only to communicate about the status of the organization, but also included blogs in order to reestablish contact with employees and other organizational contacts, and to create a forum for sharing personal status. Thus, ICT use was an extension of the post-disaster tendency to blur the line between business and personal domains.

P1 established that one of the characteristics of transitional space is a dysfunctional communication infrastructure. ICT use enabled organizational leaders to overcome this and create their own communication infrastructure. If we consider network partnerships to be the structural embodiment of communication, ICTs were the support beams of the structure. The utilization of ICTs enabled the communication choices

demonstrated throughout this dissertation. One can speculate that without ICTs, business leaders would have been forced to communicate only with alters who were proximate. However, ICTs allowed business leaders to coordinate contact with desired partners and those who could provide access to the resources that they most needed. Further, considering ICT use in terms to the emergent categories highlights what the top priorities were in terms of communication in a transitional space: using ICTs to make initial contact, using ICTs to coordinate communication, and using ICTs to conduct work related activity. Whether it was using text messaging to make initial contact following the storm or adding a blog to the organization's web site to coordinate communication, the flexibility of ICTs enabled the creation and evolution of transitional networks.

Implications

The findings of this dissertation have implications for both theoretical development and disaster recovery efforts. Theoretically, it establishes a model of transitional space, or a time following disruption in which communication is affected on a technical and a social level. This model emphasizes the interplay between communication and social structure, and posits what types of organizations will play the most important role in such a structure. This study shows that when too many people are removed from a macro-level structure, it collapses. Once this happens, individual communication relationships must be repaired before the macro-structure can be repaired. This is accomplished through the creation of a transitional network, or a network that consists of particular organizational types that commonly emerge from post-disaster communication.

Further, by establishing the transitional space as having two-phases and then visualizing the communication relationships in each phase, this dissertation shows *how*

business leaders use communication and *with whom* in order to repair disrupted networks. Finally, the last phase of network visualization shows that individuals had reincorporated all organizational types that were in their networks before the disaster, and dropped the extra organizational types (FEMA, SBA) who were added as a result of the disaster. Such a finding again supports the idea that individuals had to repair to individual communication networks in order to facilitate the return of the macro-structure. While the theory of transitional space is not exact, it establishes parameters and context for conceptualizing and further exploring interorganizational communication following a disaster.

Visualizing networks in a transitional space emphasizes the importance of homophilous contacts following a crisis, supporting previous research in this area (Hulbert et al., 2000). Additionally, the importance of individuals and clients in the network visualization, supplemented by the themes in the interviews, shows that the lines between personal and business contacts overlap in times of a crisis. Visualization also revealed that non-profit organizations and relief organizations (in this case, FEMA) are central to post-disaster networks. This implies that in addition to communicating with trusted and known others, individuals will choose communication partners based on organizational type or mission.

While network visualizations were derived based on reported interaction between parties, this dissertation draws a distinction between interaction and communication, bringing a more robust focus to network studies. Rather than focusing only on the fact that a link exists, or even the nature of the link, this dissertation looks at individual and group level communication. Doing so highlights the important fact that sometimes the

most central network members are not the most liked, useful, or powerful; which calls into question the idea of examining issues such as power and influence only in terms of network position. Future research should further explore this relationship.

Findings from this study also have theoretical implications for studying communication in terms of technical change, specifically in expanding the dialogue on ICT use following a disaster. Most important is the fact that ICTs were used to overcome the limitations of the transitional space. Previous research emphasizes the fact that ICTs are being increasingly used in disaster situations, especially to reestablish contact and offer social support. This dissertation furthers this research by showing that people used ICTs for this purpose, but also to conduct work and coordinate business communication on a large-scale. Thus, the findings take the examination of post-disaster ICT use out of the individual realm and into the realm of organizational communication. Additionally, findings highlight that even when the technical infrastructure was not working, people still found ways to use ICTs to adapt communication, including using mobile phone texting.

This dissertation has applied implications for disaster management and policy on both an organizational and a citywide level. One of the hallmarks of transitional space, a dysfunctional communication infrastructure, is something that can be mitigated with proper planning. The creation of a disaster preparedness plan that incorporates contingency uses for ICTs can go a long way in reducing the impact of disaster on business communication. The shift in use of different ICTs before, during, and after evacuation can be interpreted in terms of utility in a disaster preparedness plan. Such a

plan should include contingencies for technical failure, as well as incorporate ICTs in a way that overcomes the social disruption in communication.

The importance of non-profit organizations and FEMA in transitional networks shows that in times of turbulence, people will turn to other organizations whose mission it is to provide aid. However, when these organizations do not fulfill their missions, it can have a negative effect on recovery efforts. Understanding the role these organizational types play in terms of trust, resource exchange, and communication can help both organizations and policy makers to effectively incorporate these organizations into recovery plans.

Less notable, but still relevant, is the fact that this study emphasizes the importance of both resource exchange and collective action as catalysts for network communication following a disaster. While this is perhaps an obvious conclusion, it adds to the robust body of knowledge about the importance of access to resources in terms of network development. Such knowledge could inform the decisions of policy makers and disaster recovery teams following future disasters in terms of organizing community members to effectively work together in order to facilitate a return to normalcy.

CHAPTER 9

Final Remarks

This dissertation developed a communication theory of transitional space, and in doing so, contributes to the fields of social network theory and communication studies. Like all research, this study has limitations of both scope and methodology. This section considers those limitations, and offers conclusions and directions for future research based on study findings.

Limitations and Direction for Future Study

This study has limitations of both scope and methodology. In carving out the idea of transitional networks as networks that organizations use in order to regain a sense of normalcy, this study is based on the assumption that organizations will *want* to regain a sense of working order. However, it is possible that organizations will choose not to reopen or may reopen but not return to the region to conduct business. If either of these scenarios are the case, network choices will be vastly different. Second, this dissertation only looks at interorganizational relationships. Intra-organizational networks, such as those forged by employees, certainly play a large role in organizational recovery from any disaster. These relationships were ignored to create a focus solely on interorganizational network building; therefore, some aspects of transitional networking have been dropped out of this examination. Research could also develop a communication theory of transitional space in an intra-organizational or individual context, looking at how employees or neighborhoods use communication to rebuild following disaster. While the exclusion of intra-organizational networks can be viewed as a limitation for this study, they are also a salient direction for future research.

Additionally, while this study proposes an examination of transitional space after crisis, all studies of such a concept do not need to include devastation. Future research should investigate alternative contexts for a transitional space such as relocation, a shift in organizational focus or mission, or acquisition and merger.

As the goal of this study was to establish the idea of a transitional space, it did not explore what types of network relationships and communication led to successful recovery. Therefore, future research should explore this issue and establish guidelines for successful recovery. Additionally, transitional networks should be studied in terms of traditional network issues such as power, influence, and innovation. Results from such studies could further insight into disaster recovery efforts.

This study used both in-depth interviews and an online survey in order to draw conclusions about post-disaster communication and network building. A combination of snowball and convenience sampling were used to recruit participants in the study; therefore, results may not completely reflect the experiences of the New Orleans businesses community. While a search of the city's web site www.neworleans.com reveals that the spectrum of business in the study sample does represent the spectrum of business and industry found in New Orleans, because random sampling techniques were not used, estimates of the findings' representativeness are impossible to make. Additionally, organizations that were available and willing to participate in this study represent those organizations that were experiencing varying levels of success in returning to New Orleans early. Thus, the sample might also be biased towards exceptionally driven leaders and/or successful businesses. Further, the fact that participants are leaders or owners of these businesses may further bias their perception of

successful return. All of these issues compromise the validity and generalizability of the study results.

Despite these limitations, every effort was made to collect detailed and accurate data. The level of detail provided in the interviews allowed for an in-depth look at the experiences of organizational leaders following Hurricane Katrina. The interviews were coded by multiple coders and tested for inter-coder reliability. Thus, the coding scheme that emerged from the interview data was considered by all of the coders to be both reliable and valid. Further, questions for the survey instrument were derived specifically from the theoretically grounded propositions and research questions of this study. This allowed for direct inquiry specifically about these items. The resulting data set included interview data that exhibited both depth and breadth in terms of information about the post-disaster experience and survey data that directly and concisely explored specific areas of the post-disaster experience. The triangulation of methods provides an effective blueprint for future studies of transitional networks. Using the survey with a random sample of New Orleans business could provide further insight into this subject.

Finally, as with any study, this dissertation prioritizes the author's point of view by nature of the literature reviewed and questions asked. Though this was not done purposefully, the very inclusion of certain literature at the exclusion of other literature advances a particular agenda. Social network theory and communication theory are diverse fields that include a wide variety of viewpoints and theories. For example, by exploring issues of resource exchange but not exploring issues of proximity, this dissertation may overlook relevant aspects of post-disaster organization. Likewise, one paradigm cannot fully capture all of the nuances of a phenomenon or experience. By

focusing on social network theory and communication, personality and other individual-level influences on post-disaster recovery remain unexplored. However, every effort was made to choose avenues of inquiry based on personal experience and knowledge of extant literature. The resulting study, while potentially highlighting some issues at the expense of others, is a focused and thorough examination of key principles combining two areas of theoretical study.

Conclusion

This dissertation outlines the context, conditions, and means of rebuilding interorganizational communication networks following a large-scale crisis. Key findings include the existence of a two-stage transitional space following a crisis and the preference of homophilous recovery networks. These networks were built using a combination of *ad hoc* and formal communication. Communication usually focused on sharing resources, both for the benefit of the individual organization and, when possible, for the greater good. Additionally, findings build on previous research about ICT use in crisis times, highlighting the adaptability of both individual use of ICTs and the adaptability of the actual communication technology.

Taken together, these findings develop a communication theory of transitional space. This theory shows that the time following a disaster is one of an interrupted macro-structure and dysfunctional communication infrastructure. In this space, organizations direct communication efforts towards reconnecting with existing network partners in order to secure the resources necessary for return to normal working conditions. Initially, this post-disaster communication is often limited to a few trusted, similar types of communication partners. As organizations begin to regain footing,

contact with communication partners expands to draw in more diverse types of contacts, eventually resulting in a return to pre-disaster communication networks. When new organizational types are drawn into the networks, they are usually those types of organizations that have a designated mission to help others, including non-profit organizations and relief organizations. Communication in these networks is enacted through a combination of formal and informal organizing, and with a heavy reliance on ICTs for the purposes of making contact and coordinating communication. This reliance on ICTs and the flexibility provided by the technology resulted in an increased reliance on ICT use for both the present and plans for the future. A communication theory of transitional space posits that there is a time between disaster and recovery in which organizations must use extraordinary communication to overcome extraordinary circumstances.

Endnotes

¹ The word “organization” is used throughout this dissertation to encompass the different types of structures in which people work. These structures include non-profit organizations, for-profit businesses, associations, foundations, establishments, and agencies.

² A false catalyst represents a catalyst other than the naturally occurring needs of network members. Examples can include crisis, as discussed in this dissertation, or something more benign, such as a shift in an organizational product line, which would potentially require an organization to cut ties with old suppliers and engage with new ones.

³ It should be noted that this affiliations matrix mimics the seminal network work by Davis, Gardner, and Gardner (1941), in which networks were developed based on women’s affiliation with various social events. Davis et al.’s “southern women data” proved to be a robust resource, as it has been reanalyzed by network scholars for advancing our understanding of social structures, class, and race relations (c.f. Freeman, 2003). Like the Davis et al. work, this alter network is derived from the extent to which participants named the same types of organizations (alters) as providing useful information, interaction, and resources in support of the participants’ abilities to rebuild.

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Table 1

Characteristics of Traditional, Temporary, and Transitional Networks

	Development	Trust	Membership	Temporality	Context
Traditional	Gradual development based on an evolution of needs and relationships	Gradual development based on repeated interaction	Varies based on a number of factors, including network type (friendship, information, etc.)	An ongoing and gradual evolution coexistent with the evolution of an organization or individual	Long-term engagement of actors based on repeated interaction
Temporary	Swift development based on completion of a specific task or goal	Swift development based on shared interaction and vulnerability	Typically includes diverse membership based on specialty in relation to task; however, can also be homophilous	Finite interaction, with a definite beginning and end point based on the task at hand	Finite engagement of actors based on task completion; often exists within traditional network structure
Transitional	Swift development based on the satisfaction of acute needs	Swift development based on shared interaction and vulnerability	Diverse or homophilous, depending on situation, availability, or preference	An accelerated evolution based on the rapidly changing needs of members and the task at hand	Rapid engagement of actors following a network disruption; exists outside of traditional network structure, although it may retain relationships from that structure

Table 2

Atlas.Ti Codes Developed From Constant Comparative Method

Code	Brief Description
2.0 Timing Of Return.....	Timing of return for individual (e.g., CEO being interviewed) and for the business or organization, itself
2.1 Individual.....	Timing of the interviewee's return as opposed to the organization's return, though both could happen simultaneously.
2.1.1 Early.....	Returned to the city prior to December 2005
2.1.2 Delayed.....	Returned to the city between January 2006-May 2006
2.1.3 Late.....	Returned to the city after June 1, 2006
2.2 Business.....	Timing of the organization's return as opposed to the individual's return, though both could happen simultaneously.
2.2.1 Before.....	Reopened prior to December 2005
2.2.2 Simultaneous.....	Reopened between January 2006-May 2006
2.2.3 After.....	Reopened after June 1, 2006
2.2.4 Not Back	
2.3 Functional Capacity ...	Can the organization function remotely (i.e., did not have to be in New Orleans in order to conduct business)
2.3.1 Functioned At A Distance.....	Functioned remotely
2.3.2 Functioned Only Locally.....	Can only function in New Orleans
3.0 Embeddedness.....	Nature of ego's general network configuration
3.2.1 individual level.....	the connection is on the individual level
3.2.1.1 Personal tie.....	Ego discusses as a personal tie
3.2.1.2 Educational tie....	Ego discusses own networks in educational circles
3.2.1.3 Political tie.....	Ego discusses own networks in the political arena
3.2.1.4 Board tie.....	Ego discusses own networks composed of directors of boards
3.2.2 Collective level....	The connection is professional/ on the organizational level
4.0 Alters.....	Type of entity of alters discussed by ego. Use the most descriptive option. E.g., they might refer to a business but is also a supplier, so use SUPPLIER (4.3) rather than the more generic BUSINESS (4.11).
4.1 Government Agency	
4.1.1 FEMA	
4.1.2 SBA.....	Small Business Administration
4.1.3 City Government	
4.1.4 State Government	

- 4.1.5 Federal Government
- 4.10 Foundation
- 4.11 Business
- 4.12 Medical..... Doctor's office, hospital, outpatient facility
- 4.13 Insurance Business/homeowners insurance companies
- 4.14 Nonprofit (501-C3)
- 4.15 Umbrella org..... Alter is the larger entity of which ego is a part (e.g., ego is the N.O. location of their global corporation- a McDonald's restaurant might talk about McDonald's headquarters. Headquarters is an umbrella org)
- 4.19 Bring Back New Orleans Commission
- 4.2 Client
- 4.3 Supplier..... Alter is a vendor or supplier of tangible goods or services of ego
- 4.4 Academic
- 4.5 Individual..... A person mentioned who was not viewed as an agent of some other organization. E.g., personal friend, acquaintance. A contact can be coded for both individual and collective levels (codes 5.8, 5.9) when the friend also acts as a professional contact
- 4.6 Media..... Television, radio, newspaper, web based outlet
- 4.7 Association..... Professional association. E.g., American Music Association
- 4.8 Faith-Based..... Religious communities such as churches, temples, faith-oriented clubs/meeting groups
- 49.0 Group alters.....** General descriptor of groups to which alter is connected
- 49.1 Donation/Volunteer Relationship
- 49.2 Stakeholders..... Ego discusses alters that reflect general groups that have a stake in ego's business
- 49.3 Employees..... Use this for when ego talks about connecting with specific employees or employees and his/her relationships with them in general. DO NOT use it when ego simply says "I have 7 employees". Only use it if ego then proceeds to discuss his/her interactions with them.
- 41.0 Alters operational level...** NOTE: this is about alter's level of operations; not whether alter is located in N.O. (location is captured under code #16, *physical proximity*)
- 41.5 Local Level Entity..... Operates only in the N.O. area (e.g., 1-location restaurant)
- 41.6 State Level Entity..... Operates around the state (e.g., agencies that represent state laws)
- 41.7 National Entity..... Operates around the country (e.g., chain business like Office Depot)

41.8 International Level Entity.. Operates globally (e.g., multinational organization like Greenpeace)

42.0 Alters business type compared to ego

42.0 Same Type

42.1 Different Type

- 5.0 Tie Type**..... Describes the nature of the tie with alter
- 5.2 New/Disaster..... Ego and alter link after Katrina and as a direct result of the disaster
- 5.3 New/Non-Disaster..... Ego and alter link after Katrina but the link is not a direct result of the disaster
- 5.4 Peripheral, Pre-Disaster... Ego and alter knew each other prior to disaster but were not part of each other's key contacts
- 5.5 Idealized..... Ego discusses a potential alter. Ego sees a contact with the potential alter as one that would be important and useful, but has not been realized due to lack of interest on the part of alter
- 5.6 Link (unclear timing)..... Ego and alter are clearly linked but there is not enough information in the interview to establish more details of the link
- 5.7 Pre-Disaster Link..... Ego and alter were clearly linked prior to Katrina but there is not enough detail to establish whether alter is part of ego's core or periphery
- 5. Tie level** level of connection (tie is seen as a personal asset and/or an organizational level asset)
- 5.8 Individual level..... Ego and alter link on the individual/personal level
- 5.9 Collective level..... Ego and alter link on the organizational/professional level
- 6. Tie Activation**..... Timing of when the connection was made to gain support from alters and whether the tie was to an old or a new contact relative to the hurricane.
- 6.1 Prior To Returning..... Made prior to individual returning to New Orleans
- 6.2 Immediately Upon Return... Made when ego returned
- 6.3 After Settled In..... Time lapsed before ego reconnected to alter
- 6.4 Have Not Connected to Old Contact
- 6.7 Difficulty Contacting..... Contact attempted, but not made
- 6.8 Latent..... Dormant / undeveloped contact
- 6.9 Link/Release..... Contact initially made but dissipated shortly thereafter
- 6.10 Nonreciprocal..... One-way contact that ego initiates but alter does not return
- 6. Tie activation level**..... Level of activation (in a personal domain versus on behalf of the collective)

- 6.11 Individual level..... Connection made on the individual level
- 6.12 Collective level..... Connection made on the organizational level
- 7. Nature Of Tie.....** A general description of ego and alter's relationship (not about where the relationship might be going, but what it has been and what it is now)
- 7.1 Social..... Contact primarily from social interactions
- 7.2 Professional..... Contact primarily from business interactions
- 7.1 Strength of Tie.....** How often ego and alter have contact or interact.
- 7.13 Weak..... Cursory levels of interaction (know, but don't often interact- follow the Granovetter rule: 1-2 times/year or a very infrequent interaction yet they do, indeed know each other)
- 7.14 Moderate..... Limited levels of interaction (know and interact with some frequency, often a uniplex relation, e.g., engage only in work related interactions)
- 7.15 Strong..... Frequent, significant levels of interaction (know extremely well, interact often such that this is probably a vital relation for ego). This is a multiplex relation, involves a strong personal connection as well as professional interactions.
- 7.6 Strength Unknown..... Unclear nature of ego and alter relationship or how often they interact
- 7.7 Indirect Link..... Connect to some alter through someone else
- 7.8 Linking pin..... Ego acts as a liaison between two unconnected alters
- 79. Communication flow....** Specifies the direction or flow of communication between ego and alter. Also shows that either ego or alter clearly has an advantage (tangible or intangible) in the relationship.
- 79.1 Outward flow..... communication flows from ego to alter
- 79.2 Inward flow..... communication flows from alter to ego
- 79.3 Bidirectional..... communication flows between ego and alter reciprocally and/or directionality is not clear so we must simply assume that communication could flow in either direction
- 8. Type of Support/Resource..** Types of support or resource alter provided ego or ego provided alter
- 8.1 Instrumental..... Tangible benefits provided
- 8.2 Emotional..... Emotional assistance provided
- 8.3 Informational..... Informational resources provided
- 9.1 Usefulness Of Tie.....** Identifies the usefulness of alter to ego's or ego to alter's individual and business recovery. Ego does not need to explicate but the tie's usefulness (or not) should be unambiguous. Otherwise, don't use the code.

- 9.11 Useful..... Tie provided support that was helpful to business recovery
- 9.12 Not Useful..... Tie was not helpful to business recovery

9.2 Level of usefulness.....

- 9.21 Individual level..... Tie was most useful to the individual
- 9.22 Collective level..... Tie was most useful to the organization/business

10. Perceptions Of Return

- 10.1 Generally Negative Ego regrets returning to the region; sees little hope for the region
- 10.2 Generally Positive Ego was pleased to have returned to the region; sees hope for area
- 10.3 Unsure About Success
- 10.4 Confident About Success

16. Proximity To Alter

- 16.1 Physically Proximate... Alter is physically nearby. In the greater New Orleans region, including the following: Jefferson Parish, Kenner, Metairie, West Bank communities (Terrytown, Harvey, Westwego, Algiers, Gretna), Algiers Point, and the N.O. districts including CBD (Central Business District), Bywater, Carrollton, French Quarter, and the Garden District).
- 16.2 Physically Distant..... Alter is physically distant (located outside of the greater New Orleans region)

- 19. Nature of outcome.....** Short, moderate, v. long term implications of the support
- 19.1 Short term..... a quick fix, like making use of some media to communicate information or to repair a roof; secure a small loan
- 19.2 Moderate..... the outcome was not everlasting but involved a significant chunk of time (e.g., loaning office space)
- 19.3 Long term..... The support resulted in some fundamental change in ego's business or communication practices

21. Boundary spanning...

- 21.1 external organizational... ego discusses general interaction and networking outside the organization leading to greater quantity of ties
- 21.2 referrals... ego discusses an increase in number of external organizational ties through referrals (e.g., friends of friends; by word of mouth)

- 23. ICT/Media rich link.....** Specific to ICT use only (not including TV, radio).
What is the nature of the link in terms of media used for interaction:

- 23.1 face-to-face;

- 23.2 landline phone;
- 23.3 mobile phone texting;
- 23.4 mobile phone talking;
- 23.5 email;
- 23.6 blog/website (e.g., used a website to 'check in' with others);
- 23.7 phone (but unclear if it is mobile or landline);
- 23.8 one-way (e.g., bulletin or ad or some mass communication announcement that wouldn't enable 2 way communication through the same medium)

25. Characteristics of support/resources.... Type of support ego received

- 25.1 Public resources... Publicly available tangible (e.g., physical labor that improves an area; general handouts for which applications are not needed) and intangible (e.g., information or other avenues of access like (a) information announced on CNN regarding the progress of the mandatory evacuation or information about a FEMA application or NOLA news or a government funded grant—since the government must make such resources publicly available, even though ego might have to apply for the resource, it's still learned about through public communication)
- 25.2 Private resources.... Information obtained only because of contacts (e.g., personal or foundation donations made to ego)

- 26. Preparedness.....** Assesses the extent to which ego had a plan for managing crisis/disaster events
 - 26.1 Early preparation..... Organization had a formal plan for disaster preparedness prior to Katrina.
 - 26.2 No preparation..... This organization had no disaster plan or their experiences were not at all consistent with their expectations
 - 26.3 Recovery plan..... Organization created disaster preparedness plan as a result of Katrina
-

Table 3
Degree Centralities of Resource Affiliations Networks (Figures 1 and 2)

Organization Type	Degree Centrality	
	Resource In	Resource Out
Client	30.000	41.000
Vendor	52.000	28.000
Umbrella Org.	36.000	20.000
Individual	61.000	32.000
Foundation	43.000	25.000
Non-Profit	40.000	29.000
Community Assoc.	40.000	32.000
Professional Assoc.	19.000	19.000
Faith Based	37.000	20.000
Business – Same	46.000	21.000
Business – Different	40.000	17.000
Medical	40.000	17.000
Insurance	27.000	27.000
Academic	32.000	23.000
Attorney	31.000	20.000
FEMA	59.000	0.000
SBA	33.000	0.000
City	40.000	25.000
State	35.000	25.000
Federal	44.000	21.000

Table 4
Degree Centralities of Trust Affiliations Networks (Figure 4)

Organization Type	Degree Centrality	
	Trust Based on Prior Interaction	Trust Based on Reputation
Client	15.000	11.000
Vendor	17.000	4.000
Umbrella Org.	4.000	0
Individual	24.000	10.000
Foundation	15.000	7.000
Non-Profit	26.000	21.000
Community Assoc.	13.000	15.000
Professional Assoc.	15.000	14.000
Faith Based	9.000	10.000
Business – Same	9.000	7.000
Business – Different	0	0
Medical	0	7.000
Insurance	0	0
Academic	12.000	10.000
Attorney	3.000	0
FEMA	3.000	4.000
SBA	0.000	0
City	0.000	0
State	0.000	0
Federal	5.000	0

Table 5
Degree Centralities of Collective Action Affiliations Networks

Organization Type	Degree Centrality
Client	48.000
Vendor	8.000
Umbrella Org.	11.000
Individual	46.000
Foundation	34.000
Non-Profit	50.000
Community Assoc.	45.000
Professional Assoc.	35.000
Faith Based	22.000
Business – Same	34.000
Business – Different	27.000
Medical	19.000
Insurance	8.000
Academic	21.000
Attorney	14.000
FEMA	8.000
SBA	0
City	30.000
State	30.000
Federal	24.000

Table 6

Degree Centralities of Affiliation Networks at Four Points in Time (Figure 8)

Organization Type	Degree Centrality			
	Prior	Evacuation	One Year	Three Years
Client	136.000	83.000	158.000	153.000
Vendor	104.000	46.000	139.000	133.000
Umbrella Org.	69.000	37.000	76.000	65.000
Individual	130.000	83.000	140.000	143.000
Foundation	82.000	52.000	85.000	92.000
Non-Profit	93.000	54.000	105.00	97.000
Community Assoc.	92.000	36.000	113.000	102.000
Professional Assoc.	107.000	36.000	99.000	107.000
Faith Based	67.000	37.000	98.000	76.000
Business – Same	106.000	64.000	131.000	129.000
Business – Different	80.000	39.000	82.000	100.000
Medical	81.000	23.000	67.000	89.000
Insurance	84.000	46.000	102.000	86.000
Academic	83.000	42.000	75.000	88.000
Attorney	110.000	51.000	119.000	112.000
FEMA	0	66.000	100.000	42.000
SBA	0	39.000	62.000	35.000
City	69.000	30.000	95.000	89.000
State	69.000	30.000	99.000	94.000
Federal	82.000	58.000	123.000	106.000

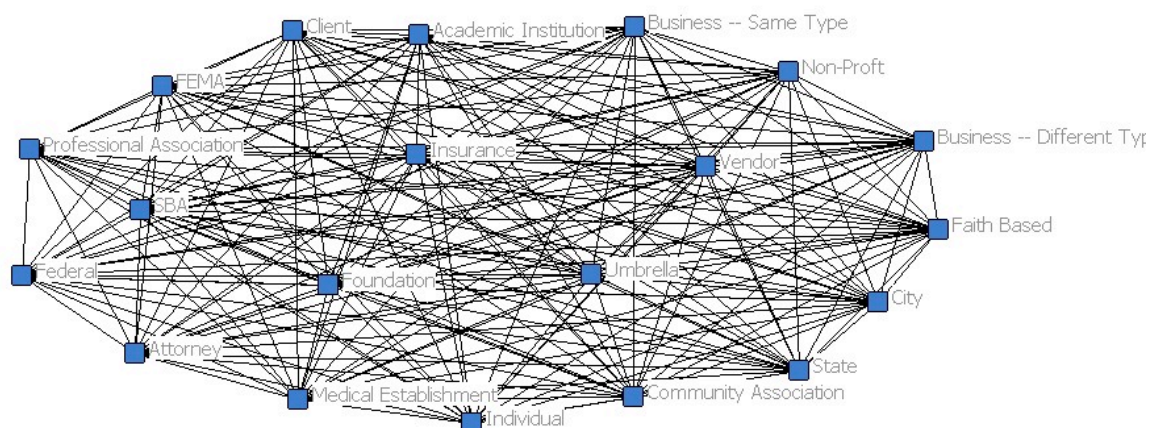
Table 7

Respondent Manner of Business Communication (Percent That Utilized Each Category)

Manner of Communication	% Before Evacuation	% During Evacuation	% After Evacuation
Face-to-Face Meetings	95	24	91
Landline Phone	95	24	95
Mobile Phone (Talking)	77	95	18
Mobile Phone (Texting)	5	58	32
Blog	5	16	10
Internet	81	65	77
E-mail	100	90	100

Figure 1. “Resource In” affiliations network.

Complete Network.



Network with threshold raised to 4.

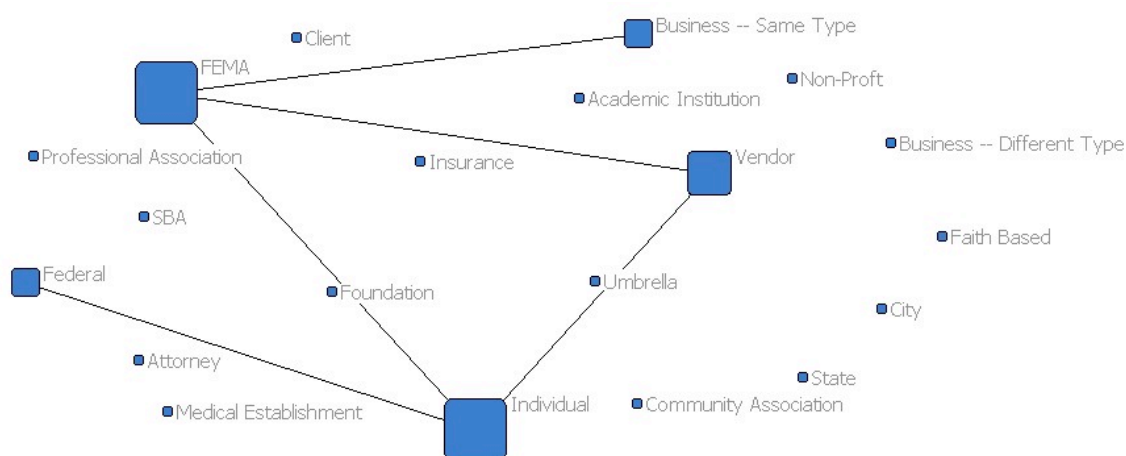
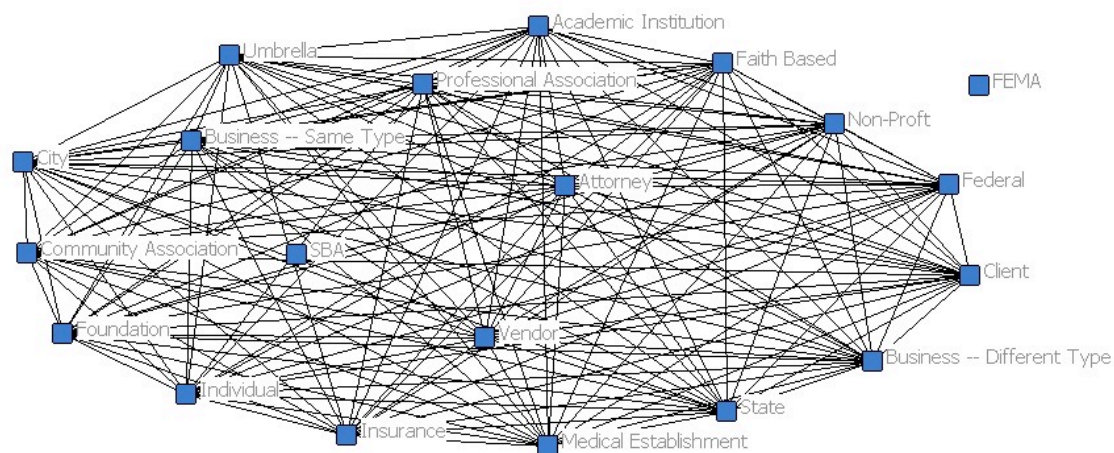


Figure 2. “Resource Out” affiliations network.

Complete network.



Network with threshold raised to 3.

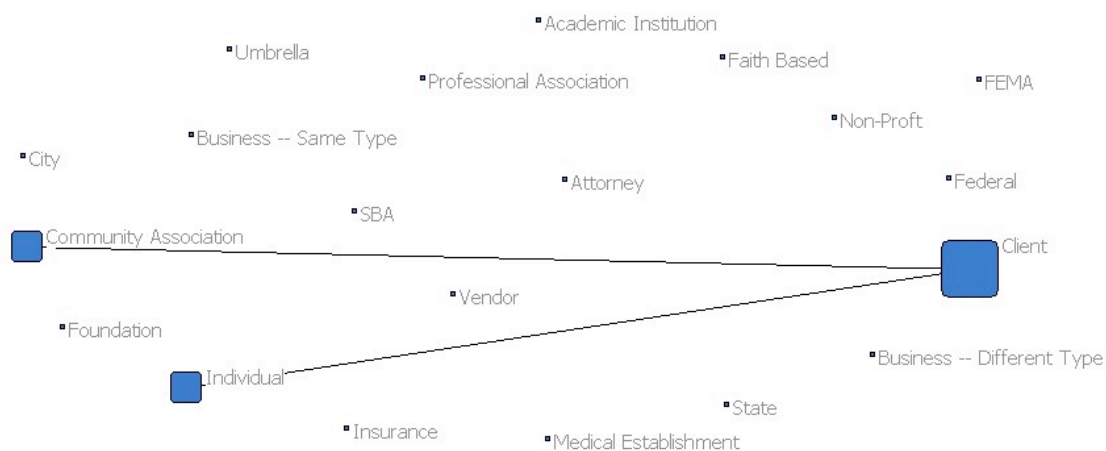
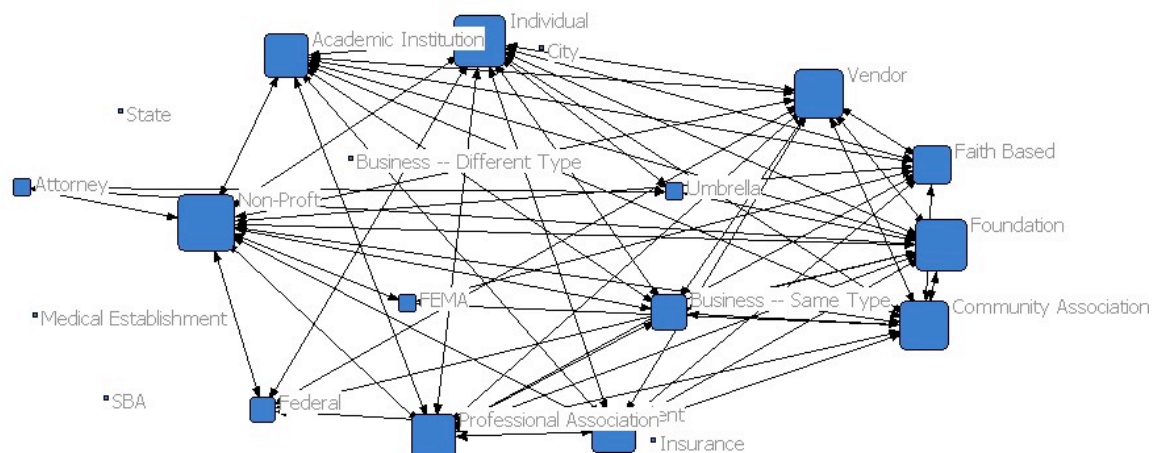


Figure 3. Affiliations networks for trust.

Trust based on prior interaction, node size reflects centrality.



Trust based on interaction, node size reflects centrality.

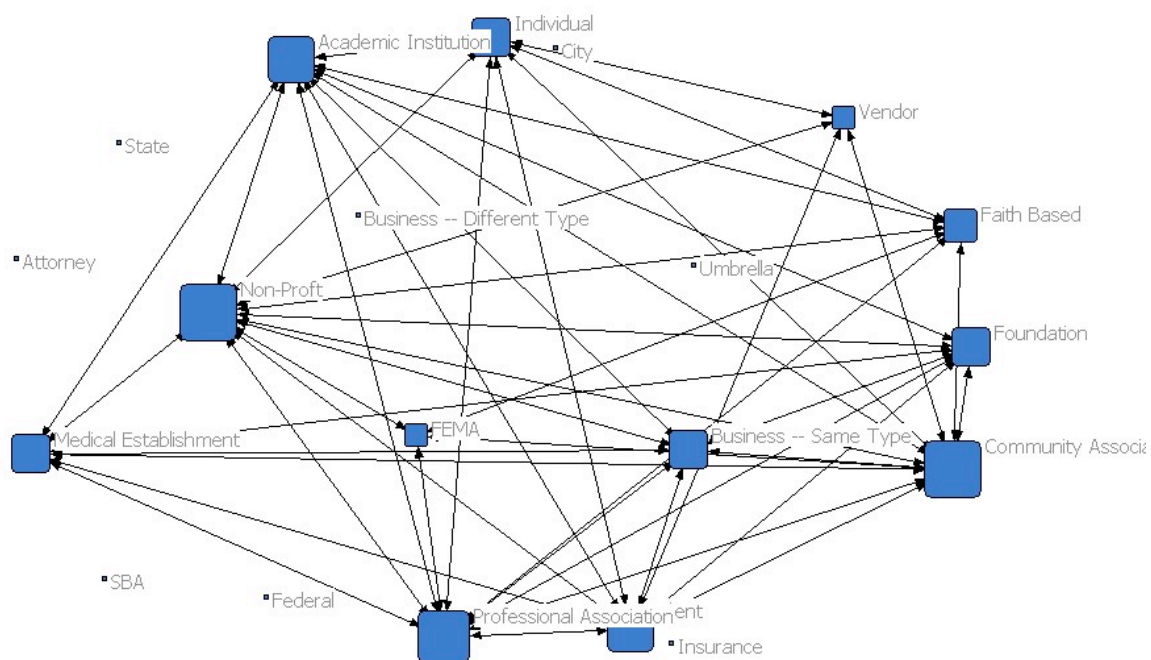


Figure 4. Affiliations network during evacuation, threshold raised to 7.

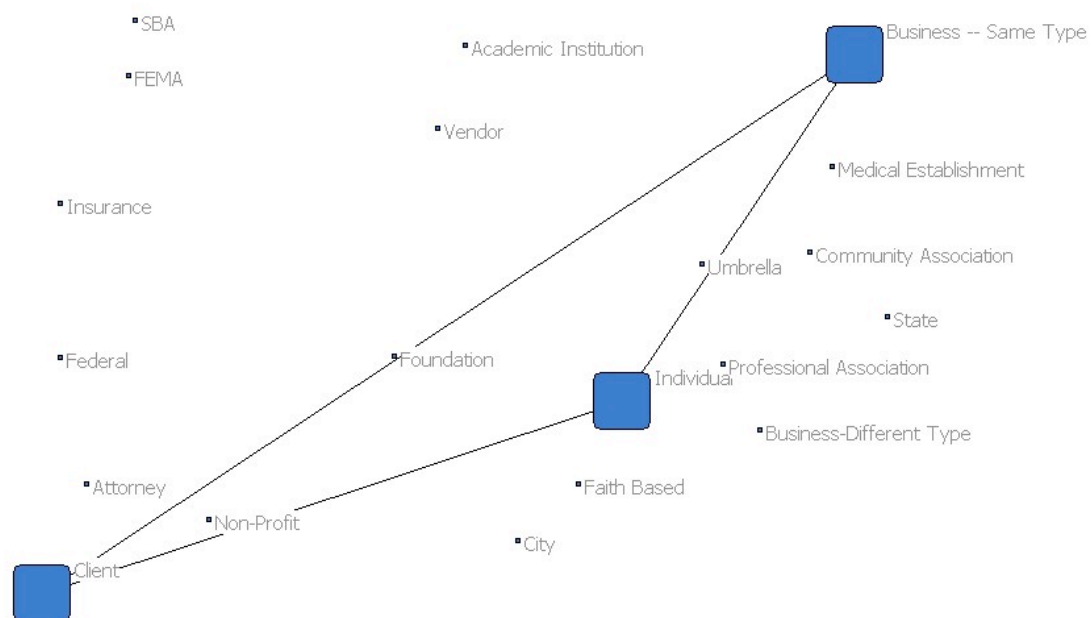
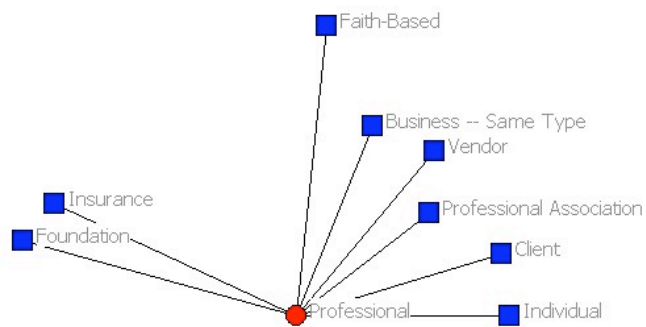


Figure 5. Professional ego network.

Prior to evacuation.



During evacuation.

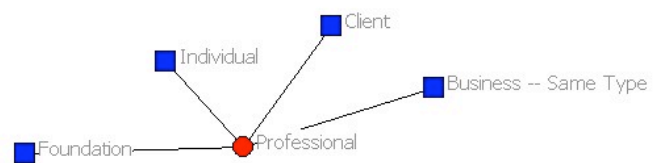
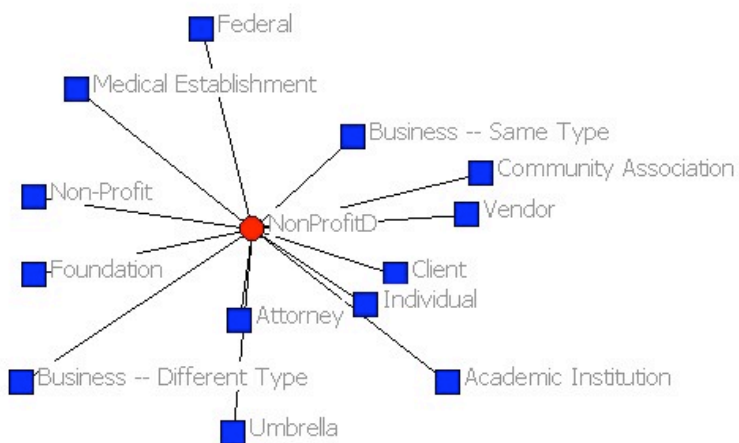


Figure 6. Non-Profit D ego network.

Prior to evacuation.



During Evacuation.

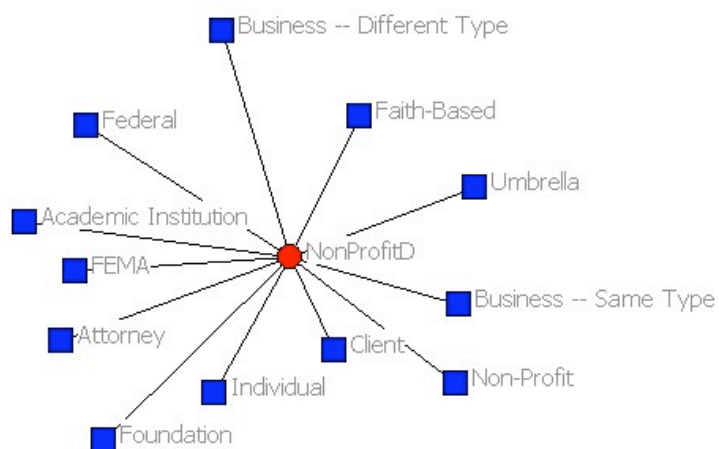
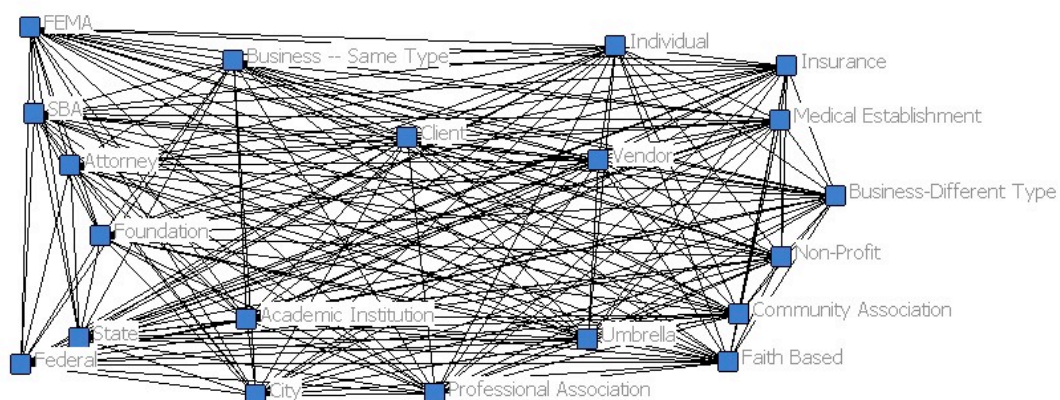


Figure 7. Combined affiliations network before evacuation, during evacuation, one year after Hurricane Katrina, and three and a half years after Hurricane Katrina.

Complete Network, threshold set at 0.



Network with threshold raised to 7.

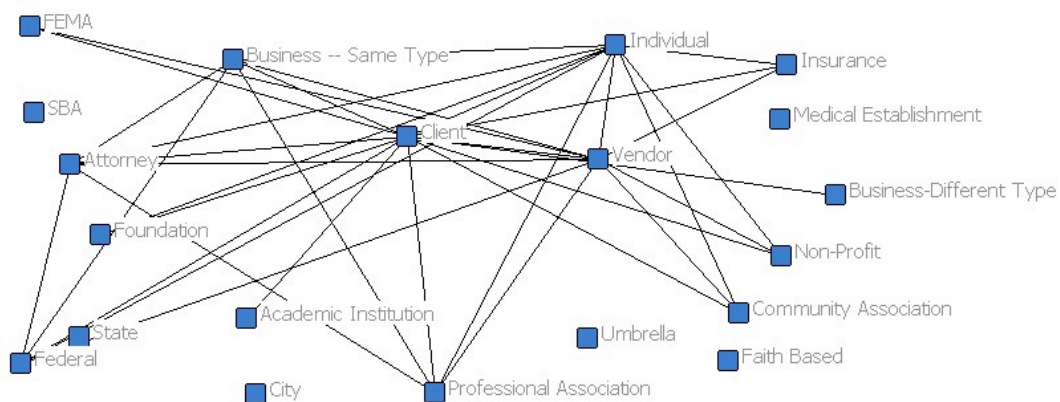
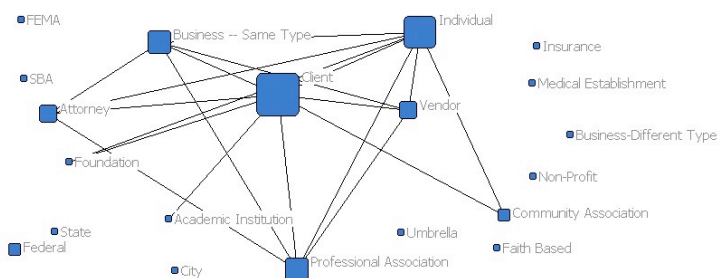


Figure 8. Affiliations networks for all four timeframes, threshold raised to 7.

Network prior to evacuation.



Network during evacuation.

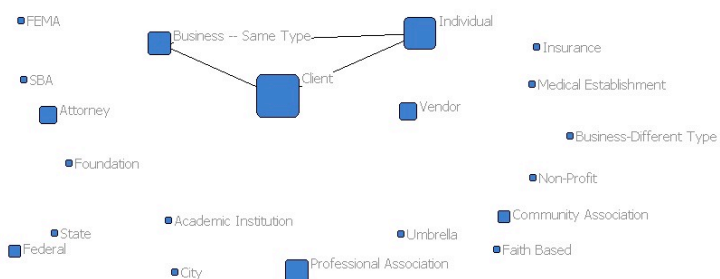


Diagram C: Network One Year Later.

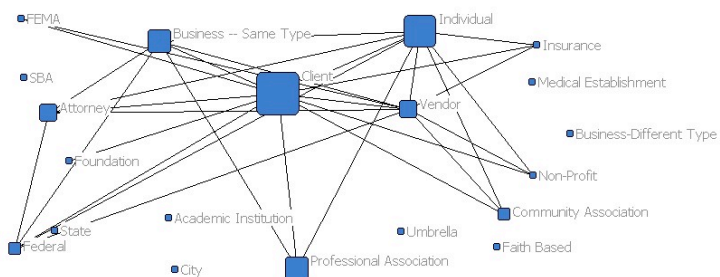
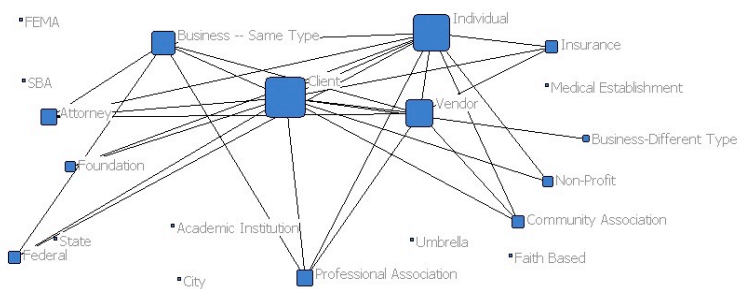


Diagram D: Network Three Years Later.



Appendix A: Hurricane Katrina Communication Experiences Survey

Informed Consent and Introduction

Title of Study: Dynamic use of social network and leadership theories in disaster recovery

Principal Investigator: Marya Doerfel, Rutgers University

Sponsor of Study: National Science Foundation

You are invited to participate in a research study. Before you agree to participate in this study, you should know enough about it to make an informed decision. If you have any questions, you can contact me at any time. You should be satisfied with the answers before you agree to be in the study. The study is to find out how various organizations (such as churches, small businesses, larger corporations, community groups) have used communication to recover during and since the mandatory Hurricane Katrina evacuation from New Orleans. I am interested in learning what sorts of information resources you have used to figure out how to get your organization back on its feet, communication practices that have helped or hindered your return, and successes or struggles your organization is experiencing now.

Participation includes filling out a brief survey using the link below. As a participant, you are able to withdraw at any time simply by discontinuing the survey.

Participation in this survey does not pose any foreseeable risks for you. Participation in this study may not benefit you directly. However, the knowledge that we obtain from your participation, and the participation of other volunteers, may help us to better understand recovery efforts following natural disasters.

For more information about your rights as a research participant, you may contact the Sponsored Programs Administrator at:

Rutgers University Institutional Review Board for the Protection of Human Rights

Office of Research and Sponsored Programs

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To continue with the survey, please click on the NEXT button below.

Directions

This survey is about how Hurricane Katrina affected communication in your professional relationships.

Questions asking about the time that you were evacuated from your place of business refer to the time between when you left New Orleans (either as part of the mandatory evacuation prior to Hurricane Katrina or at a different date) and when you returned to the area full time.

Please answer from the point of view of your business or organization

This survey is best viewed in Internet Explorer or Safari web browsers.

This survey should take approximately 15 minutes to complete. You can discontinue by clicking on the Cancel button at any time

Thank you!

Survey Questions

First, please answer some questions about how long you were evacuated from the region. Your best guess will do.

1. Following Hurricane Katrina, approximately how long were you evacuated from your place of business?

Did not leave.

Left for approximately this many weeks:

2. Approximately how long were you evacuated from your home?

Did not leave.

Left for approximately this many weeks:

3. Were you able to conduct business while you were evacuated?

Yes

No

Next, think about how you connected with professional contacts while you were evacuated.

Please type the number in the box below the question. Your best guess will do.

4. During the time that you were evacuated what is the total number of professional colleagues/ business associates (not including employees) with whom you had contact?

5. Of these people, how many contacted you?

6. Of these people, how many did you contact?

Now please think about how you have stayed in touch with professional colleagues/ business associates (other businesses, organizations, clients, and stakeholders). For each row, please check the button that best describes how often you communicated in that way.

7. How often did you communicate in the following ways before Hurricane Katrina.

	Never	Rarely	Sometimes	Often	Daily or almost daily
Face-to-Face Meetings					
Mobile Phone (talking)					
Mobile Phone (texting)					
Blog					
Internet					
E-mail					

8. How often did you communicate in the following ways during evacuation?

	Never	Rarely	Sometimes	Often	Daily or almost daily
Face-to-Face Meetings					
Mobile Phone (talking)					
Mobile Phone (texting)					

Blog					
Internet					
E-mail					

9. How often do you communicate in the following ways now?

	Never	Rarely	Sometimes	Often	Daily or almost daily
Face-to-Face Meetings					
Mobile Phone (talking)					
Mobile Phone (texting)					
Blog					
Internet					
E-mail					

10. Thinking about communicating with others while you were evacuated, please indicate how much you agree/disagree with the following statements.

Click the button of the option that best reflects your attitude, ranging from strongly agree to strongly disagree.

	Strongly	Agree	Neutral	Disagree	Strongly
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	Agree				Disagree
Evacuation required me to communicate with new businesses/organizations.					
Evacuation limited my choice of work-related communication partners.					
Evacuation expanded my choice of work-related communication partners.					

Think about the professional contacts you communicate with on a regular basis.

Please answer each of the questions along the top row by checking professional contacts that apply. Skip any contacts that do not apply to that statement.

11. Was a professional partner of this type part of your regular business communication...

	A. ... prior to Hurricane Katrina?	B. ... while you were evacuated?	C. ... during the first year following Katrina?	D. ... now?
Client/customer of your business/organization				
Vendor that provides supplies to your business/organization				
Umbrella Organization (e.g., Parent company, Company Headquarters)				
Individual (personal contact who directly helped your business/organization)				

12. Was a community partner of this type part of your regular business communication...

	A. ... prior to Hurricane Katrina?	B. ... while you were evacuated?	C. ... during the first year following Katrina?	D. ... now?
Foundation (an institution financed by a donation or legacy to aid research, education, or the arts)				

Nonprofit Organization (e.g., 501-C3)				
Community Association (e.g. Neighborhood Association, PTA)				
Professional Association (e.g., Merchants Association, Home Builders' Association)				
Faith Based Establishment (e.g., church, synagogue, or other religious organization)				

13. Was an establishment of this type part of your regular business communication...

	A. ... prior to Hurricane Katrina?	B. ... while you were evacuated?	C. ... during the first year following Katrina?	D. ... now?
Business/organization in the same professional sector as yours				
Business/organization in a different professional sector than yours				
Medical Establishment (e.g., hospital, clinic)				
Insurance Company				
Academic Institution (e.g., community school, university)				
Attorney/Law firm				

14. Was a government agency of this type part of your regular business communication...

	A. ... prior to Hurricane Katrina?	B. ... while you were evacuated?	C. ... during the first year following Katrina?	D. ... now?
FEMA				

SBA (Small Business Administration)				
City Government or affiliated agency				
State Government or affiliated agency				
Federal Government or affiliated agency				

Next think about why you interacted with these business/organizational types during evacuation.

Please confirm the statements across the top row by checking all of the professional contacts that apply. Do not check any contacts that do not apply to that statement.

15. I interacted with these professional partners during evacuation because...

	... they could provide access to resources for my organization.	... my business/organization provided them with resources.	... we were physically close to each other.	... I trusted them based on prior interaction	...I trusted them based on reputation.	... I wanted to promote overall community rebuilding efforts.
Client/customer of your business/organization						
Vendor that provides supplies to your business/Organization						
Umbrella Organization (e.g., Parent						

company, Company Head- quarters)						
Individual (personal contact who directly helped your business/ Organi- zation)						

16. I interacted with these community partners during evacuation because...

	... they could provide access to resources for my organi- zation.	... my business/ organi- zation provided them with resources.	... we were physically close to each other.	... I trusted them based on prior interaction	...I trusted them based on reputation.	... I wanted to promote overall com- munity rebuilding efforts.
Community Association (e.g. Neighborho od Association, PTA)						
Profes- sional Association (e.g., Merchants Association, Home Builders' Association)						
Faith Based Institution (e.g., church, synagogue, or other						

religious organization)						
Academic Institution (e.g., community school, university)						

17. I interacted with these establishments during evacuation because...

	... they could provide access to resources for my organization	... my business/organization provided them with resources	... we were physically close to each other.	... I trusted them based on prior interaction	...I trusted them based on reputation.	... I wanted to promote overall comm.-unity rebuilding efforts.
Business/organization in the same professional sector as yours						
Business/organization in a different professional sector than yours						
Medical Establishment (e.g., hospital, clinic)						
Insurance Company						

Foundation (an institution financed by a donation or legacy to aid research, education, or the arts)						
Nonprofit Organization (e.g., 501-C3)						
Attorney/Law firm						

18. I interacted with these government agencies during evacuation because...

	... they could provide access to resources for my organization.	... my business/organization provided them with resources	... we were physically close to each other.	... I trusted them based on prior interaction	...I trusted them based on reputation.	... I wanted to promote overall community rebuilding efforts.
FEMA business/organization						
SBA (Small Business Administration)						
City Government or affiliated agency						
State Government or affiliated agency						
Federal Government or affiliated agency						

19. What were the three businesses/organizations most important to your ability to work during evacuation?

A.

B.

C.

20. You have reached the last set of questions. These questions ask about the current state of your business/organization.

Click the button of the option that best reflects your attitude, ranging from strongly agree to strongly disagree.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Hurricane Katrina led to a complete restructuring of my business/organization.					
My business/organization works with a completely different set of partners than before Hurricane Katrina.					
My business/organization continues to have unique problems that it did not have prior to Hurricane Katrina.					
My business/organization enjoys a better position in the New Orleans business community than it did prior to Hurricane Katrina.					
My company is in a worse position in the New Orleans business community than it was prior to Hurricane Katrina.					
My company is a totally different company today than it was prior to Hurricane Katrina.					
My company is pretty much the same as it was prior to Hurricane Katrina.					

Appendix B: Development and Dissemination of the Hurricane Katrina Communication Experiences Online Survey

The Hurricane Katrina Communication Experiences survey was developed based on key themes derived from the in-depth semi-structured interviews conducted between December 2005 and May 2007, as well as themes guided by a review of social network literature, literature on ICT use following a disaster, and disaster literature. The survey was designed to supplement the interview data and provide specificity and focus to the rich detail provided by the interviews. Additionally, because it was disseminated a year and a half after the last set of interviews, the survey was a way to obtain follow up information and create a longitudinal view of recovery efforts. Because of the nature of the survey questions (social network questions) and nature of the subject and participants (emotionally involved disaster survivors), the survey faced unique challenges in terms of development, dissemination, and response. This section will provide more insight into survey instrument, particularly in the context of these challenges.

Development of the survey took approximately three months, and dissemination and response gathering took an additional three months. Because the focus was on honing themes uncovered in interviews and obtaining follow-up information, the decision was made to limit the sample to interview participants. Once this decision was made, the decision to use an online survey platform was made primarily for ease of dissemination. That is, because many members of the sample had been through evacuation and relocation over the last few years, the most dependable contact information for participants was their e-mail address. Although some research shows that online surveys do not yet get a high enough response rate to properly generalize results (Sills & Song,

2002), the accessibility of e-mail over other forms of communication seemed outweigh the potential drawbacks given population being surveyed.

Creating and refining the questions for the survey followed the techniques outlined by Sudman and Bradburn (1982) and included several rounds of pilot testing. The process was rigorous, but straightforward. Choosing and adapting to an online survey platform was a more difficult process. Many of the survey questions asked about network membership based on various criteria. These questions are best represented in a grid format that allows participants to check multiple boxes for each question. Ideally, subsequent questions should only contain the network members chosen in the original questions. It quickly became apparent that most traditional online survey platforms are not equipped to handle this type of question format. The resulting survey required a lot of scrolling, which resulted in the inability for participants to see column headers while choosing network members. Additionally, there was no way to effectively screen out potential network members not chosen in a previous question, an obstacle that made subsequent question choices potentially redundant.

To alleviate this obstacle, I sought help from an online listserv for social network scholars. I received and explored one strong lead, even going so far as to create the survey on an online survey platform designed specifically for social network studies. Ultimately, however, this platform was not fully developed and had more restrictions than traditional platforms, causing me to abandon this avenue. When it was clear that a survey on this platform would be less intuitive and less user-friendly, I returned to the original SurveySelect platform. Once committed to this platform, I had to modify the social network questions by truncating grids so that participants would not have to scroll.

It is possible that this could have affected the validity of some of the network questions, as asking them outside of the traditional grid format may have distorted the meaning. However, I made every attempt to compensate for this with clear and consistent wording of the questions. While this format represented a compromise rather than the optimal format, the overall consensus of the pilot testing was positive.

Dissemination of the survey was potentially complicated by three factors: the length of time between the last communication with participants and the survey, the uncertain nature of the professional futures of participants, and the evacuation of New Orleans residents directly before dissemination of the survey. Because of the length of time between the last round of interviews and the surveys, it was unclear whether or not there would still be interest in participating, as well as whether or not I would still be able to contact participants. Indeed, of the original 64 participants, only 40 could be reached through existing contact information. When it became evident that the contact information on file was not working, I conducted Internet searches to obtain new information. In the end, I was able to obtain contact information for 50 participants. Of those 50, six were no longer at their place of employment or had gone out of business altogether. Thus, dissemination was complicated by the length of time between periods of data collection and the fact that many people who participated in the interviews were no longer part of the organizations that they had represented immediately following the Hurricane.

Further complicating dissemination was the fact that immediately before I was ready to send out the surveys, New Orleans residents were once again evacuated because of a Hurricane. While this Hurricane and evacuation did not have nearly the affect of

Hurricane Katrina, it did cause business leaders to leave their places of business for a short amount of time. This delayed survey dissemination, and potentially affected responses in that (a) the evacuation likely brought up memories and emotions from Hurricane Katrina, and (b) it likely made business leaders busier and less likely to have time to fill out a survey. While the first effect could have provided bias in that people would blend the perception of their recent evacuation experience with their Hurricane Katrina evacuation experience, it is more likely that it served as a sort of “primer” and actually strengthened their memories of Hurricane Katrina. However, because this is such an emotional and personal topic, it is impossible to say how it affected each individual. While it may have ultimately increased willingness to participate and strengthened recollection, it is just as likely the evacuation dredged up negative feelings, and made some people unwilling to relive their Katrina experiences for the purposes of a survey. Additionally, regardless of emotional affect, it is likely that the evacuation left some business owners and leaders too busy to participate in the survey. One participant went so far as to send a response to my request for participation saying: “I will keep this in the line-up of things I need to get done. But in all honesty, I don't think I will be able to get to it for quite a while.” Despite his interest, he ultimately did not fill out the survey.

In order to reorient participants to the study and increase response rate, I sent out a pre-survey e-mail describing the project, the purpose of the survey, and letting them know that they would be receiving a link to the survey via e-mail the next day. The participant was then sent the link to the survey the next day in an e-mail that again reminded them of their previous participation and explaining the purpose of the survey. While feedback to the survey was somewhat limited, I did receive six responses to the

pre-survey e-mails from participants who expressed that they would be happy to participate. These responses were usually one or two lines and included sentiments like: “Great hearing from you and of course I will be pleased to participate.” Two participants followed up after taking the survey to say that they wanted to add a little bit of information to their survey answers because they did not feel that they were able to fully portray their situation solely in terms of survey responses. These e-mails were one and two paragraphs, respectively, and elaborated on answers survey questions. I even conducted one survey completely by phone, as this participant did not have an e-mail address. While it was difficult to confine her responses to the questions, as she wanted to tell her own story, she was clearly willing to participate.

Although early responders clearly had a high interest level in participation, I did have to follow up with a “reminder e-mail” for several participants. When that did not work, I called unresponsive participants. Of those to whom I reached out via phone, none declined participation, although a few never did fill out the survey. When I had to leave a message, rather than reaching someone in person, I often did not receive a call back. Thus, although the survey was a welcome chance to participate for some, it was either not a priority, or not a welcome topic, for others. Because the only way people declined to participate was through non-response, it is impossible to say why they did not participate.

Overall, despite the unavailability of some previous participants and nonresponse of others, the survey was able to garner detailed and direct responses from one-third of the original sample. Some research indicates that a pre-survey or follow up letter through the mail, even for an online survey, can increase response rates (Sills & Song, 2002). However, because of the aforementioned unavailability of mailing addresses for

participants, I did not use this method of communication. While I could have e-mailed or phoned participants and requested their mailing addresses, that would have added another layer of communication and seemed redundant, as the people who were likely to respond to that e-mail were also those most likely to respond to the survey. While nonresponse makes it impossible to say why people did not participate, the few personal responses that I got indicate that participants were overall interested and happy to participate. The non-responses or lack of availability of the original sample is troubling; nonresponse error is mitigated, to some extent, by the original participation of the entire sample. While this study does not have the benefit of their participation in the survey, it does represent their observations from the interviews.

As the obstacles to creation and dissemination of the survey were largely out of my control, I cannot say what I would have done differently. Online survey dissemination, despite the technical drawbacks, represented the easiest and most efficient way to reach members of this sample. However, if I were to send out this survey to other samples, I would continue to investigate online platforms looking for a better fit between social network survey questions and online survey platforms. As all choices in research methodology have some drawbacks, I feel that the survey data complemented the interviews in terms of both reliability and validity, providing another layer to the same stories.

V I T A

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Education

2009 Rutgers University, Ph.D., Communication
 2002 Rutgers University, M.A., Communication
 1997 Rutgers University, B.A., English

Employment Positions

2008-present, Instructor, Penn State Abington
 2004-2007, Adjunct Faculty Member, Rutgers University, Department of
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 2005-2008, Research Assistant, New Jersey Workplace Partnership for Life. Office of
 Research and Sponsored Programs, Rutgers University, New Brunswick, NJ.
 2004-2005, Project Manager, New Jersey Workplace Partnership for Life Grant Project.
 Department of Communication, Rutgers University, New Brunswick, NJ.
 2003-2004, Research Assistant, University Worksite Organ Donation Campaign.
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 2001-2003, Graduate Fellow, Corporate Communications, Johnson & Johnson, New
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 1997-2001, Production Manager, *New Jersey Jewish News*, Whippany, NJ

Published Work

- Harrison, T.R., Morgan, S.E., Chewning, L.V. (2008). The challenges of social marketing of organ donation: News and entertainment coverage of donation and transplantation. *Health Marketing Quarterly*, 23(1/2), 33-65.
- Morgan, S.E., Harrison, T.R., **Chewning, L.V.**, Davis, L., & DiCorcia, M. (2006). Entertainment (mis)education: The framing of organ donation in entertainment television. *Health Communication*, 22(2), 143-151.
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