THE EFFICACY OF INCIDENT MANAGEMENT TEAMS AND EMERGENT MULTI-ORGANIZATIONAL NETWORKS IN THE IMPLEMENTATION OF THE INCIDENT COMMAND SYSTEM

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Abstract: The Incident Command System (ICS) exists as the nationwide standard for on-site incident management, as called for under the National Incident Management System (NIMS). However, the effectiveness of ICS is debated, both for its systemic efficacy as a response model and for its inconsistent application. Since the development of ICS, individual responders have trained to work together as Incident Management Teams (IMTs). Even though little research exists on IMTs, their use has increased widely since the release of the NIMS. The alternative to IMTs is implementing ICS through a collection of individuals in an ad hoc manner, often referred to as an Emergent Multi-Organizational Network (EMON). This study strives to determine the impact of IMTs versus EMONs on the effectiveness of emergency and disaster response. It is hypothesized that the use of IMTs will increase the perceived effectiveness of a response, specifically in the application of the Incident Command System. The population for this study is emergency and disaster responders at large, regardless of disciplinary or jurisdictional demographics. The sample population is individual responders comprising both members and non-members of Incident Management Teams. The responders were from across the four state area of FEMA Region VII (Iowa, Kansas, Missouri and Nebraska). Non-IMT responders serve as a control group of EMONs to determine whether IMT membership has any effect on response. This study is limited in that it is not based on specific responses. Instead, respondents provide feedback to a survey based on what their normal actions were for their last biggest response.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

In February 1997, an out of work janitor contacted the Tulsa Police Department dispatch in order to turn in a hazardous material that he had stolen from his former employer. When an officer arrived, the subject told him that he had 300 ccs of potassium cyanide which was becoming unstable and starting to sweat. An after action report would later indicate a release of the material would have been enough to have injured people in a three block radius. The material was in a metal container in the floorboard of his car. The subject's location was in the middle of downtown, across the street from the federal building. With the memory of the 1995 Murray bombing still fresh, local police and fire set up a perimeter and treated the situation as a potential intentional incident. When I arrived on the scene, the police command post was located at one end of the block, with the fire command post at the other end of the block. The only communication between the two agencies was either on the radio through their respective dispatchers, or for a responder to walk around the perimeter to the other command post. While the incident was resolved with no injury, the inefficiency of the agencies lack of coordination became the impetus of my search for effective emergency response.

The debate over the most conducive structure and environment for responding to disasters has existed since the beginning of formal research into the field of emergency management. Research has shown that there is often great variance between response plans and the final look and feel of a response (Quarantelli, 1988; Schneider, 1992). This variance in response frameworks stems from several characteristics. Some characteristics, such as inter-agency role conflict and lack of understanding of response structure, exist pre-disaster or are accentuated during a disaster. Others, such as inter-agency coordination and communication, trust, or improvisation and flexibility, are non-existent or diminish during a disaster. All of these characteristics have an impact on the effectiveness of a multi-agency response. While much research has been done on the presence or absence of these characteristics in an overall response, no research has looked at the respective characteristics during a disaster response coordinated by an Incident Management Team (IMT). The purpose of this study is to determine whether previously identified characteristics, such as interorganizational trust, collaboration, communication, role clarity and others exist within IMTs to a higher degree that in an ad hoc group of emergency responders. And if they do exist, what is the impact to the overall response operation, especially in relation to implementing the ICS?

STATEMENT OF THE PROBLEM

Some researchers question the effectiveness of the Incident Command System (ICS) for coordinating a response (Neal and Webb, 2006, Jensen, 2008, Jensen, 2011). Others see its utility, but in particular settings or by specific disciplines (Buck, Trainor, & Aguirre, 2006; M. K. Lindell, Perry, & Prater, 2005). ICS has garnered widespread acceptance and usage by practitioners (Buck et al., 2006). While most practitioners prefer the command and control model (Seigel, 1985), many researchers criticize it as too rigid for fast moving, chaotic incidents (Drabek, 1983; Dynes, 1983; Kreps, 1983; Neal & Phillips, 1995; Quarantelli, 2008). Others classify the ICS structure as high-reliable organizations (Bigley & Roberts, 2001) or governance networks of partner organizations (Moynihan, 2009) that add benefit to the overall response. Another view classifies ICS as a hybrid, allowing for the bureaucratic rigidity in some circumstances, while affording increased improvisation in others (Schneider, 1992). Still other research indicates that many response organizations merely give lip service to a specific structure during a response (Wenger, Quarantelli, & Dynes, 1989).

Apart from the on-going debate of the ICS, the fact remains that it is the current national standard for emergency response across the United States (Hannestad, 2005). Post-9/11, the federal government created a nationwide system for emergency response with the issuance of Homeland Security Presidential Directive #8 (U. S. Dept. of Homeland Security, 2006). Implementing several recommendations from the 9/11 Commission Report to establish a “Unity of Effort” among federal agencies (National Commission on Terrorist Attacks Upon the United States, 2004) the National Incident Management System (NIMS) was created (U. S. Dept. of Homeland Security, 2004a). The NIMS serves as an overarching attempt to coordinate the sharing of resources across agencies and jurisdictions for emergency response. Resources run the gamut to include personnel, supplies, information, funding and authority. The NIMS is intended to span the four phases of emergency; preparedness, response, recovery and mitigation (FEMA, 1996). Based on collaboration across the levels of government (Lester, 2007), the NIMS demonstrates an understanding that disaster response requires a mix of public, private and non-profit organizations (Rikoski, 2008).

The NIMS mandates the use of ICS as the model for structuring the incident response. It applies to all Federal agencies and any state, local, or tribal agencies receiving federal grants related to Homeland Security (U. S. Dept. of Homeland Security, 2004a, 2008b). Since its inception, the development of Incident Management Teams has occurred at all levels of government with the intent of more efficiently implementing the ICS. From this premise, this study seeks to determine whether the use of IMTs actually increase the efficiency and effectiveness of a response using the ICS. To better understand the use of IMTs, I first expand on the history of ICS and why it was adopted as the current national model for incident response.

ICS HISTORY

Prior to the 1970s, there was no recommended model for how emergency response agencies structured their response. The decision was left to the local government agencies, particularly fire and police, to determine how best to oversee their respective personnel during emergency operations. Even within a single jurisdiction, this led to tremendous divergence in how a response was coordinated. As agencies sought to maintain operational and organizational continuity, they often remained within their respective organizational chains of command. This resulted in disjointed responses, as each agency attempted to serve its own directive with little understanding or support of the needs of other agencies. Operating in this manner led to numerous breakdowns in communications and resource management. It also resulted in an inefficient response plagued by response gaps, missed opportunities and duplication of efforts. Differing terminology across disciplines and jurisdictional boundaries caused misunderstanding and was detrimental to the overall response. The greater the number of individual agencies involved in a single incident, the more those issues manifested themselves.

In the early 1970s, fire agencies in California experienced a series of large wildland fires. The frustration of lack of coordination led to the creation of the Firefighting Resources of Southern California Organized for Potential Emergencies (FIRESCOPE) (Chase & Pacific Southwest, 1980; Emergency Management Institute, 1987; Harrald, 1990; National Wildfire Coordination Group, 1994a). In an attempt to identify common response obstacles and a possible structure of processes to overcome these obstacles, FIRESCOPE was developed. This group was comprised of representatives of seven local, state and federal response agencies working with consultants from the Rand Corporations and NASA (Cole, 2000, 2001; Nichols, 2005). The group was tasked with developing a common organizational structure that all agencies would operate within when assigned to a common response. The structure that they developed was called the Incident Command System (ICS), and was initially intended for use by fire departments in battling wildland fires.

Originally developed as a closed system (Walker, Harrald, Ducey, & Lacey, 1994), ICS has evolved in several ways. In 1982, the U.S. Forestry Service adopted FIRESCOPE's ICS, renaming it the National Interagency Incident Management System (NIIMS) (Buck et al., 2006; Harrald, 2006;

National Incident Management System Integration Center, 2004) used by the U. S. Forestry Service. The U. S. Coast Guard subsequently adopted NIIMS as their response system (Harrald, 2006; Hawley, 2005). NIIMS later resumed being called the ICS. In 1986, the passage of the Superfund Amendment and Reauthorization Act (SARA) led to OSHA requiring "a site specific Incident Command System" to be used for a hazardous materials incident (OSHA, 1986). In 1989, the ICS merged with Fireground Command (IFSTA, 2007), an urban firefighting organizational structure developed by the Phoenix Fire Department (Nichols, 2005). Finally, under the command and management component, NIMS established the ICS as the recommended on-scene management system (U. S. Dept. of Homeland Security, 2004a, 2008b).

Agencies at various levels of government accepted the ICS, which has further morphed from use for wildland fires and hazardous materials to being considered an all-hazards model for incident response (Anderson, Compton, & Mason, 2004). It has even been adopted as an accreditation standard for hospitals to use during emergencies (Stanley, 2003). Widely accepted by practitioners, it receives mixed reviews from academics. Research debates whether ICS is a hierarchical bureaucratic structure (Neal & Phillips, 1995) or a network (Moynihan, 2009). Some see its benefit, but with limitations, for certain types of responses or disciplines (Buck et al., 2006; Simpson & Hancock, 2009; Soliman, 2005) or for specific components of a response (Lutz & Lindell, 2008). Others debate its effectiveness dependent on the size or complexity of an incident (Howitt & Leonard, 2005), or only as useful in later stages of a response (Renaud, 2012). Still, others define ICS as creating a high reliability organization (Bigley & Roberts, 2001), as a best practice for emergency response (Crichton, Lauche, & Flin, 2005; Moynihan, 2009), or as a true all-hazard model (Hawkins & McClees, 1988). Many researchers agree that implementation issues surround the use of ICS (Neal and Webb, 2006, Jensen, 2010, Jensen, 2008, Buck et al., 2006). Factors, such as training and experience levels of the ICS, are also considered (Buck et al., 2006). With these considerations and others, Stanley (2003, p. 16) states, "…ICS is neither a perfected science nor an art."

The ICS is simply a means of identifying functional areas of a response (U. S. Dept. of Homeland Security, 2008a). These functions are delegated only when issues arise during a response and are arranged in a pre-designated organizational structure. The overall structure serves as a template for which functions can be assigned (Figure 1), but the system is not intended to be an exact structure simply overlaid on every incident response. The final structure for each response can vary from other responses, as the system is intended to meet specific needs as they arise within a particular incident. The structure can even change from one operational period to the next on a single response.

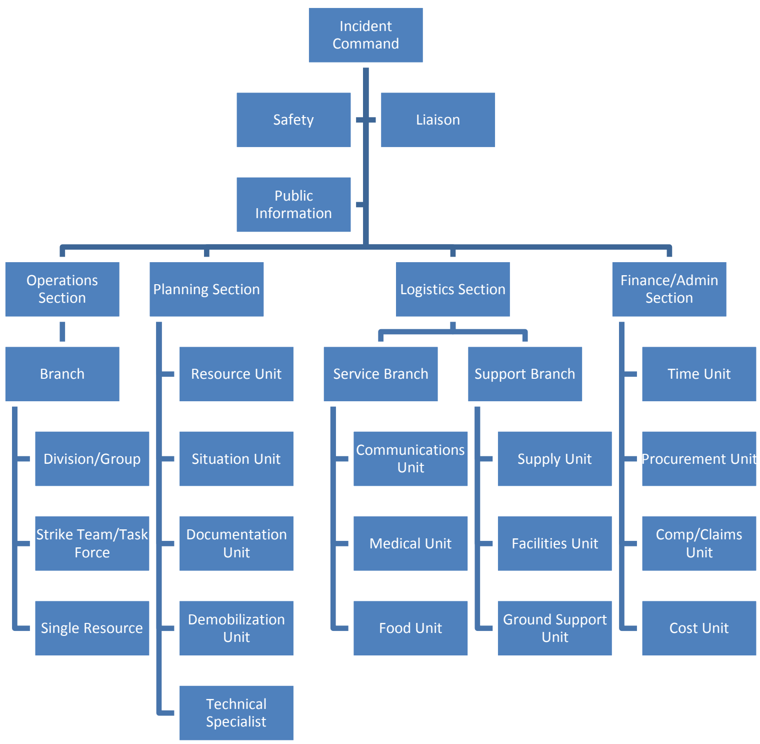

FIGURE 1: ICS Organization Template (FEMA, 2010b)

As the on-site management system under the NIMS, the ICS has been written into various state, regional and local regulations (Villa, 2013). However, its implementation does not carry the force of law (Banks, 2011). And though the debate continues about the true nature of ICS and its efficacy for organizing a response, it is undisputed that the ICS remains as the coordination system prescribed by the NIMS (Hannestad, 2005, Stanley, 2003). As such, the current project takes the stance that ICS is the leading organizational structure to be used by emergency responders nationwide. Thus, it is the intent to examine the use of Incident Management Teams as an alternative to maximize the implementation of ICS for responses.

OVERVIEW OF IMT CONCEPT

Throughout 1999 amidst the hype of the impending Y2K, the mayor of Tulsa directed all emergency response agencies to become ICS compliant by the eve of the year 2000. As an ICS instructor, I was directed to write the ICS into the policies of the Tulsa Police Department. During this process, I developed a plan of creating a contingent of officers that specialized in emergency and disaster response, the same as SWAT teams specialize in hostage situations or Bomb Squads responding to explosive devices. This was a new concept for law enforcement and for municipalities as a whole. In essence, the Department created an Incident Management Team several years before the ICS became mandated under NIMS and IMTs became more common at all levels of response. Developing and running this team over the years I have constantly evaluated their internal interaction, as well as relations with other response agencies and individuals. In comparison, I have observed emergent responses where all the agencies coming together had to build the structure from scratch. These contrasting experiences drive my desire to better understand the attributes that exist within and throughout the organization of a response.

Because it is not the disaster itself, but the response that is the source of many problems (Dynes, 1976), this project seeks to examine a current trend of disaster response - the use of Incident Management Teams (IMTs). The core of this research examines the differences between responses using ICS by ad hoc (or emergent) groups of responders (T. R. Forrest, 1972; Neal & Phillips, 1988; Quarantelli, 1966; Quarantelli & Dynes, 1970) as opposed to IMTs. These ad hoc groups are referred to as emergent multi-organizational networks (EMONs) (Drabek, 1983). It is widely accepted that disasters present circumstances that are beyond the capability of a single agency to address (Harrald, 2006; Lucie, 2013; Perry, 2003a; Quarantelli, 1966; Quarantelli, 1982, 1988). It is quite common for agencies to become overwhelmed, as organizations often misjudge their capacity to meet the needs of disasters (S. D. Smith, 2004). This situation creates a dependence on other individuals, agencies and levels of government to mount an effective response. This reliance on others occurs in a chaotic environment where quick decisions based on limited information must be made to save lives and preserve property. However, simply adding in more resources does not ensure a successful response (O'Brien, 2010). As incidents increase in size and complexity, so does the need for some type of organization for the response (Flin, 1996).

Decisions made in the initial stages often set the tone of later decisions (Renaud, 2012). They can make the difference between the success or failure of the response (Waugh, 1994). As a response progresses, decisions made in one phase can affect actions taken in later phases (Neal, 1997). It is because of this non-linear interplay of actions and decisions during a response that interorganizational communication and coordination becomes so important. This interaction can occur spontaneously, as in the case of ad hoc work teams, or can be intentional, as in the case of IMTs. Some researchers view this interaction of players as a basic feature of emergency management (Schaafstal, Johnston, & Oser, 2001). Some disasters result in disruptions so immense or widespread that effective response is barely attainable (Neal, 1997; Pawlowski, 2012).

The use of work teams spans several disciplines (Drnevich, Ramanujam, Mehta, & Chaturvedi, 2009; Stacy & Stamieszkin, 1996) as a management tool to address emergent issues (Kauffman, 1993; Templeton, 2005). Standards other than the NIMS recognize the benefit of developing teams to administrate an effective response (Houston, 2006; National Fire Protection Association, 2013a, 2014; U. S. Dept. of Homeland Security, 2005).

Shortly following the creation of the ICS, IMTs began developing. With the release of the NIMS, IMTs are presented as a means of more effectively coordinating a disaster response. ICS training at multiple levels stress the use of IMTs (FEMA, 2008a). The National Fire Academy (NFA) encourages local fire officials to develop IMTs during their Executive Fire Officer training (Metro Chiefs, 2004). In 2008, a national conference was held in DeKalb, Illinois to discuss the priorities of IMT development (Donahue, Harker, Graves, & Wilford, 2009). This conference became an annual event and led to the creation of the All Hazards Incident Management Team Association (AHIMTA) (AHIMTA, 2011). This professional organization works to continue efforts to standardize training and certification for IMTs and their individual members.

IMTs are making their way into other professions and standards as well. The National Fire Protection Association (NFPA) has recognized IMTs and set guidelines for their use in the fire service (National Fire Protection Association, 2013b), emergency medical (National Fire Protection Association, 2014) and for emergency management and business continuity planning (National Fire Protection Association, 2013a). The petroleum industry has also adopted their use, specifically for incidents occurring on oil rigs (Crichton et al., 2005).

In essence, AHIMT training seeks to establish a level of expertise in the individual responders in the respective functions of the ICS. Prior to becoming IMT members, individuals must complete all levels of ICS training; ICS100 (Introduction to the Incident Command System) through ICS400 (Advanced Incident Command System) (FEMA, 2008a). In addition, they must complete a course on IMT membership and then receive training on their specific functional assignment. There are currently courses available for 16 ICS functions (Emergency Management Institute, 2012) (see Table 1) with more being developed. Course completion is only

COURSE TITLE	COURSE LENGTH
Incident Commander	5 days
Public Information Officer	5 days
Liaison Officer	2 days
Safety Officer	4 days
Operations Section Chief	4 days
Division/Group Supervisor	3 days
Task Force/Strike Team Unit Leader	3 days
Planning Section Chief	4 days
Situation Unit Leader	5 days
Resource Unit Leader	4 days
Logistics Section Chief	5 days
Communications Unit Leader	3 days
Supply Unit Leader	4 days
Facilities Unit Leader	5 days
Finance/Administration Section Chief	3 days
Finance/Administration Unit Leader	3 days

TABLE 1 – Position Specific Training (Emergency Management Institute, 2012)

part of the process of certification. Once they receive the training, responders must demonstrate competence in performing the tasks learned by completing Position Task Books (PTBs) (U. S. Dept. of Homeland Security, 2011a). In order to complete a PTB, the responder performs functional tasks while being rated by an evaluator certified in the position. The intent behind the overall process is the development of functional experts who have not only demonstrated training and experience in the ICS, but also in being a team member. Once all the requisite training is completed, along with a completed PTB, the responder is then credentialed for that function.

Various types of teams exist at various levels of government or by different names; Incident Support Teams (IST), Emergency Response Teams (ERT), and Incident Management Assistance Teams (IMAT) to name a few (FEMA, 2010a). Some of these teams are used in advisory capacities from one level of government to another. The focus of this research will remain on teams intended for use for on-scene incident response. Following the incident typing schedule developed for the NIMS (U. S. Dept. of Homeland Security, 2004a, 2008b), IMTs are rated by their capabilities. These IMTs are classified by the incident complexity type and member training levels the IMT is capable of addressing. The complexity typing is tied to the incident typing as described in the NIMS (U. S. Dept. of Homeland Security, 2004a, 2008b).

IMTs are classified as Type 1 – 5 with Type 5 being the lowest in capability. The Pennsylvania Emergency Management website lists the typing as follows (Commonwealth of Pennsylvania, 2014):

“Local and Regional Incident Management Team (Type 4 and 5) - A Local or Regional IMT (Type 4 or 5) is a single and/or multi-agency team for expanded incidents typically formed and managed at the city or county level or by a pre-determined regional entity. It is a designated team of 7-10 trained personnel that responds to incidents that are typically contained within one operational period or usually within a few hours after resources initially arrive on scene. The Local IMT may be dispatched to manage or help manage incidents requiring a significant number of local and mutual aid resources. Incidents that a Local IMT may be utilized at include major structure fires, multi-vehicle crashes with multiple patients, armed robbery operations, or a hazmat spill. The Local IMT may also be used at public events. Local IMTs may initially manage larger, more complex incidents prior to arrival of an All-Hazard IMT or a Type 1 or 2 IMT.

All-Hazard Incident Management Team (Type 3) - An All-Hazard (Type 3) IMT is a multi-agency/multi-jurisdiction team for extended incidents formed and managed at the State, regional or metropolitan level. It is a designated team of trained personnel from different departments, organizations, agencies, and jurisdictions within a state or DHS Urban Area Security Initiative (UASI) region, activated to support incident management at incidents that extend beyond one operational period. All-Hazard IMTs are deployed as a team of 10-35 trained personnel to manage major and/or complex incidents requiring a significant number of local, regional, and state resources. They also manage incidents that extend into multiple operational periods and require written Incident Action Plans (IAP). An All-Hazard (Type 3) IMT may be utilized at incidents such as a tornado touchdown, earthquake, flood, or multi-day hostage/standoff situation. They are also utilized at planned mass-gathering type of events such as festivals, political rallies, state and national summits and conferences. An All-Hazard IMT may initially manage larger, more complex incidents that are later transitioned to a Type 2 or Type 1 IMT.

Type 2 Incident Management Team - A Type 2 IMT is a self-contained, all-hazard or wildland team recognized at the National and State level. They are coordinated through the State, the Geographic Area Coordination Center (GACC), or the National Interagency Fire Center (NIFC). All personnel meet the NWCG training regimen at the Type 2 level for their specific position. A Type 2 IMT is deployed as a team of 20-35 to manage incidents of regional significance and other incidents requiring a large number of local, regional, state, and national resources. This includes incidents where Operations Section personnel approach 200 per operational period and total incident personnel approach 500. Several dozen Type 2 IMTs are currently in existence, and operate through the U.S. Forest Service.

Type 1 Incident Management Team - A Type 1 IMT is a self-contained, all-hazard team recognized at the National and State level, coordinated through the State, GACC, or NIFC. All personnel meet the NWCG training regimen at the Type 1 level for their specific position. A Type 1 IMT is deployed as a team of 35-50 to manage incidents of national significance and other incidents requiring a large number of local, regional, state, national, and Federal resources over multiple operational periods. This includes incidents where Operations Section personnel may exceed 500 per operational period and total incident personnel may exceed 1000. Eighteen Type 1 IMTs are now in existence, and operate through the U.S. Forest Service."

A tiered system is intended to match capabilities with incident complexity. This helps to minimize a situation where responders are put into situations for which they are unprepared. The main limitation is the availability of the corresponding type of team when larger and more complex incidents occur. Availability issues, however, are beyond the scope of this present study. The focus will be on contrasting pre-existing teams to emergent teams. The pre-existing teams have pre-designated functional experts, who are working toward or have already attained certification in a position. The emergent teams are those that do not have pre-designated assignments, with the respective functions staffed by individuals with varying levels of ICS or disaster response experience.

OVERVIEW OF EMERGENT MULTI-ORGANIZATIONAL NETWORKS

Following Hurricane Katrina, the State of Oklahoma sought to open a mass evacuation shelter. The shelter was established at a National Guard training facility in a rural setting. Staffing for the shelter came from numerous agencies across the entire state, but mainly from smaller jurisdictions near the facility. I became the Planning Section Chief for the first operational period as the evacuees arrived on 52 buses. Based on the issues identified during the evacuee's arrival, we needed administrative help in processing and tracking the evacuees. We also faced issues with inventorying all of the supplies and donations that were quickly arriving at the facility. One of my duties was to develop a staffing plan for the second operational period with no foreknowledge of the capabilities of the responders and volunteers arriving at the facility. As they arrived, the responders were brought into the check-in building to await assignment. After a briefing on the overall operations of the facility by the Incident Commander, I began making assignments. In order to address the stated issues, I began asking for anyone with experience in logistics or inventory. I assigned those who raised their hand to work in the warehouse. I assigned those with experience in administrative or secretarial work to planning, and so on to cover the needs of the response. Not having a pre-scripted staffing plan necessitated an ad hoc assembly of personnel.

Within emergency management, not all issues that arise during an incident are considered in the preplanning (Rodríguez, Trainor, & Quarantelli, 2006; Uhr, Johansson, & Fredholm, 2008). Most of the plans and policies that do exist are used as reference rather than for strict adherence (Wallace & Balogh, 1985). Responders are quite practiced at the tactics and networks they use on a regular basis. However, as the incident grows in magnitude or complexity, they find the need for a different set of tactics or relationships (Petrescu-Prahova & Butts, 2008). Agencies have a difficult time seeing their own shortcomings (S. D. Smith, 2004). Responders have a tendency to get sucked into a response and become overwhelmed. They are forced to take on new roles, develop new relationships, or learn new tactics (Rikoski, 2008). As the response structure of professional traditional responders develops, outside individuals or groups (Rodríguez et al., 2006) may perceive gaps in the response that the "professionals" fail to detect or respond to (Stallings & Quarantelli, 1985). Some of these individuals or groups have no prior "disaster" experience (Donahue & O'Keefe, 2007). Often, groups with divergent backgrounds, philosophies and intentions operate within the same incident having little connection between the groups. This makes it difficult to identify all of the various groups or bring them together for a cohesive, concerted effort (Stallings & Quarantelli, 1985). This develops a response based on a mixture of old tasks, tactics, and relationships intermingled with the new tasks, tactics and relationships (Dynes, 1970; Quarantelli, 1966; Rodríguez et al., 2006). With no categorization of good or bad, these new aspects are considered “emergent” (Rodríguez et al., 2006).

This interaction of old and new creates the demand for an ad hoc or emergent organization simply because this unique mix has never existed before (Rikoski, 2008). The wide variety of stakeholders could extend to public, private, military, paramilitary, and non-profit groups or individuals. They could also represent a different level of perspective and range, from the neighborhood level to an international or global interest. Given this range, there is no centralized office or individual that has authority over them all (Uhr, 2009). This creates an atmosphere for an amorphous structure for the response. The membership of the network ebbs and flows depending on the focus and resources of the individual stakeholders. The success or failure is also highly dependent on the respective leader’s personalities. Leadership develops around an individual’s personality traits rather than predesignated authority. Managing across organizational boundaries for a network of people and groups varies considerably from managing within a single entity (Milward & Provan, 2003). Effective management of such a response rests upon instilling a common set of objectives as the basis for creating teamwork (Paton & Flin, 1999). These issues must be considered in the development of an EMON, along with the issues of the incident itself.

THEORECTICAL PERSPECTIVE

Instead of focusing on entire teams, this is a study of the microtheory (Babbie, 2004) of individual interactions within an IMT to measure the effectiveness of the team. Of particular interest are the capabilities in implementing the ICS as well as team effectiveness. I attempt to measure this through the perceptions of the respective team members, be they pre-designated or emergent.

In order to conduct this research, I must conceptualize the following:

- Effectiveness – as the dependent variable
- IMT – as the independent variable
- EMON – as a control variable
- Intervening variables - trust, coordination, role clarity, improvisation, leadership, etc.

The review in Chapter 2 examines the current literature of each of these concepts. Once these concepts have been expanded, their inclusion in this study will be detailed.

PURPOSE OF THE STUDY

Since almost the beginning of disaster research, researchers have debated on command and control models versus emergent systems. Perhaps the most descriptive criticism of a hierarchical model comes from Quarantelli (2008, pg 896), when he states "Formal, highly hierarchical, structured and bureaucratic organizations, whether pre-impact planned or post-impact imposed, are both the source and locus of most problems in community crises." Despite this continued debate, response organizations from all disciplines continue to offer hours of instruction, spend limited budgets, and implement ICS systems to varying degrees during incidents of all sizes.

The purpose of this study is to address deficiencies in current literature. First, this study will not directly address the ICS and how it should be classified. Instead, the study focuses on the attributes that operate within IMTs and emergent groups as they work to apply the ICS. This examination is intended to help better classify the ICS, be it a bureaucratic model or network governance model. While using a hierarchical structure, the ICS's reliance on collaboration and information sharing separates it from the more traditionally considered command and control model (FEMA, 2008a; Irwin, 1989). The fact remains that as an incident increases in size and complexity so does the need for some type of structure for organization (Flin, 1996).

The second deficiency addressed is the inconsistency of applying the ICS across jurisdictional and disciplinary boundaries. As previously noted, research indicates that ICS is unevenly applied within and across jurisdictions (Buck et al., 2006; Jensen, 2008, 2009, 2010; Jensen & Yoon, 2011; Neal & Webb, 2006). However, Jensen (2008) noted that IMT involvement improved the coordination of the response and increased the use of NIMS and ICS. She recommended expanded research on the use of IMTs. However, this type of research is still limited.

In addition to addressing whether IMTs decrease ICS variances, this study seeks to add to the limited body of knowledge on IMTs. Despite the amount of training offered for IMTs members, very little research exists on what attributes, if any, exist within the IMT structure. This study examines the presence or absence of these attributes, to determine why they may or may not be effective. This study seeks to provide an understanding of "what makes an IMT tick" so practitioners can determine for themselves whether they are effective.

RESEARCH QUESTION

The main issue being examined deals directly with whether IMTs make a response more effective, specifically by increasing the consistency of ICS implementation.

Hypothesis #1 - Directional: IMTs increase the perceived effectiveness of implementing the ICS.

Null Hypothesis: Use of IMTs during the response has no effect on implementing the ICS.

Subordinate to this hypothesis lies development of an understanding of what attributes may or may not be at work within IMTs. As such, I addressed several intervening variables, as follows (in no order of priority):

1. Adaptation
2. Delegation

3. Interorganizational Communication
4. Interorganizational Coordination
5. Leadership
6. Prior Experience
7. Role Clarity
8. Situational Awareness
9. Support
10. Team Cohesion
11. Training Levels
12. Trust

Each of these twelve variables has independent research that corroborates having a positive relationship on the effectiveness of responder interactions. However, none have been specifically researched in relation to IMTs, or even the ICS. This project seeks to determine which of these variables exist within IMT operations. Of the variables present, I seek which ones play a bigger role in the perceived effectiveness of IMTs.

Thus, each variable has its own hypothesis pertaining to its existence within IMTs or EMONs. The exact methodology for measuring each of these variables is explained in Chapter 3. First, I examined the current literature of each variable, conceptualizing how each comes into play in relation to Incident Management Teams.

CHAPTER II

LITERATURE REVIEW

The literature review for this project relies initially on the identification of primary sources using the databases within Proquest, EBSCO and Google Scholar. For variables that were independently identifiable, such as Incident Management Team or IMT and Emergent Multi-Organizational Network or EMON, no other keywords were included for the search. However, for other variables, specifically "effectiveness" and each of the intervening variables, other keywords were included. In order to narrow the search, the keywords "disaster," "emergency" or "emergency management" were added.

Once the primary sources were located and information was gleaned from them, I identified secondary sources from the reference lists and reviewed them. Some of them are cited throughout this manuscript as clarifiers to better understand a specific topic or variable.

In addition to the search for empirical references, many governmental documents were reviewed. These include planning documents, training manuals and/or reference guides. In order to locate many of these, I searched the FEMA.gov website as well as the databases listed above. Again, these references provided much background on the topics of the NIMS, the ICS and IMTs as a whole.

Much of the search was conducted prior to the actual conduct of the data collection. However, in order to ensure full understanding, I conducted review up to the final writing of this project. As extensive a search as was conducted, the process was by no means exhaustive.

EFFECTIVENESS CONCEPTUALIZATION

Any research project that seeks to measure group effectiveness faces obstacles from the outset in that no general definition for the term "effectiveness" exists (Price, 1972). As such, there are differing theories regarding how to research it (Cameron, 1986). Given that emergency response lies in the public realm, I took a different approach to measure effectiveness than if dealing with private organizations (Wamsley & Zald, 1973). Within emergency management, performance varies greatly depending on compositional dimensions as well as social dimensions (Crichton et al., 2005). Compositional dimensions deal with the overall structure of the response and how well respective individuals understand the structure. These dimensions pertain more with the mechanical aspects of an organization. The social dimensions deal with interactions between various components of the response, be that between organizational units or individuals. It also encompasses personal capabilities, which are the more organic aspects of a response. Various mechanical and organic aspects have been used in measuring organizational effectiveness (Mahoney & Weitzel, 1969).

There are two major approaches for measuring effectiveness – the goals (Etzioni, 1964; Ghorpade, 1970; R. H. Hall & Clark, 1980; Price, 1972; Yuchtman & Seashore, 1967) and the systems approach (David G. Bowers, 1968; D. G. Bowers & Seashore, 1966; Katz & Kahn, 1966; Seashore & Yuchtman, 1967; Yuchtman & Seashore, 1967). Each of the two approaches has advantages and disadvantages that make it more appropriate in differing situations. I examined the major arguments for and against both in order to determine the most appropriate approach for this research.

The goals approach is the more traditional of the two methods (Price, 1968). Simply stated, the goals approach focuses on the organization's ability to attain its overarching objectives (Ghorpade, 1970; Molnar & Rogers, 1976; Price, 1968). Determining an organization's goals is accomplished by either polling the organizational leaders as to their goals, or by monitoring the activities of organizational members for their outcomes (Perrow, 1961; Weiss, 1972). While this might appear fairly straightforward, it is more complicated in its application. Organizational leaders may differ in their perceptions of the overall goal of an organization. Some may overlay their personal goals upon the organization, confusing the measurement of effectiveness. The monitoring of activities also may not be as easy as it sounds. This method is based on the assumption that activities are successfully completed. It must also be realized that similar activities may result in different outcomes. One of the limitations of the goals approach is the lack of general measures that are applicable across organizational types (Molnar and Rogers, 1976). Also, given that the approach looks almost solely to the end product of an organization, it fails to encompass the interactive and multi-faceted nature of an organization (Ghorpade, 1970).

According to Molnar and Rogers (1976), the systems approach is more suitable for public agencies. Because there is not always a direct link between system input and organizational output, a disconnect exists in program measurement (Downs, 1967). This becomes abundantly evident in the disaster realm, when the basic measure of success of a response is the public's perception of how well it ended and how quickly the community returns to normal (Bevc, Barlau, & Passanante, 2009; R. A. Boin & Van Duin, 1995; Renaud, 2012; Schneider, 1992). Truly measuring response effectiveness is complicated by the dynamic nature of the organizational environment, the imbalance of resources and results, and the complexity of multiple players (Sahin, 2009). Researchers must consider the interaction of participants, the structure of the organization, and the outputs of the organization (Hackman, 1987). Working within the fluid environment of a disaster takes a network of individuals that must rely on one another (Kapucu, 2005). It is this entire network that must be addressed and managed (Drabek, 1983). Instead of falsely measuring success as the end of chaos (Renaud, 2012), I will look to the process of resource manipulation as my basis. From this perspective, resources are defined as information, time, personnel, structures and supplies.

For these reasons, the systems approach is the more appropriate method for this research study. In short, this approach views effectiveness as an organization's capacity to acquire limited resources (Bowers and Seashore, 1966, Bowers, 1968, Katz and Kahn, 1966, Seashore and Yuchtman, 1967, Yuchtman, 1966, Yuchtman and Seashore, 1967), even in a dynamic environment. As Price (1972) concludes, effectiveness increases as capacity of the organization increases. It is this interaction of internal and external factors to the organization (Gladstein, 1984; Sundstrom, DeMeuse, & Futrell, 1990) that becomes the greatest drawback to this method of measuring effectiveness. It is often difficult to draw direct linkages between these factors and the outcomes. A multitude of activities conducted by an organization means that there must be multiple dimensions to measure effectiveness (Cameron, 1986). It is understood that some of these dimensions, while contemporaneous, may even be contradictory (Cameron, 1986). As a result, it is also nearly impossible to establish complete conceptualization of an organization (Cameron, 1986).

Following Ghorpade (1970), the focus of any research should take precedence in determining which of the approaches to take. Given the multiple dimensions of concern in this project, there must be multiple criteria for measuring effectiveness. As stated above, I gave consideration to the compositional and social dimensions of IMTs. In doing so, I looked not simply to IMT members' individual and collective performance, but also to their interaction and attitudes of the IMT membership (S. G. Cohen & Bailey, 1997). I sought to measure the IMT's sense of adaptability and sense of identity (Bennis, 1966). The organization's adaptability is its capacity to react to the evolution of the environment in which it exists. In this case, it is the flexibility of the IMT in the midst of a disaster. An organization's sense of identity allows it to understand where it exists in an overall environment and what defines its function. This ties back to Drabek's (1983) position that organizational leaders often misinterpret their position within an overarching compilation of responders during a disaster.

For this present study, I followed Sahin's (2009) advice to apply a multi-variable test to measure effectiveness. Since success of a response lies in the varied acts and decisions throughout the response (McBride, 2013), I sought to measure several of these individual actions and decisions. My greatest task lay in determining the proper tasks to serve as indicators (Cameron, 1986). Thus, to conceptualize the effectiveness of implementing ICS, I used indicators (Babbie, 2004), such as completion of ICS forms, preparation of the IAP, and holding the meetings and briefings as outlined in various ICS training programs. Other indicators were the twelve dimensions identified as intervening variables. Research exists for each of these attributes indicating that independently they impact the effectiveness of either teams or the disaster response as a whole. I sought to determine their existence within IMTs. In addition to these various indicators, I measured the overall perception of individual responders (IMT members and non-IMT responders) of the effectiveness of a response.

IMT REVIEW

Just as organizations of all types have seen the increased use of teams (Zaccaro, Rittman, & Marks, 2001), it is not surprising to see this in the emergency management realm as well. Some researchers have discussed this evolution in capabilities (Dercole, 2006; Quarantelli, 2001). Some of these teams arise ad hoc in the midst of a response as a matter of emergence (Dynes & Quarantelli, 1968, 1976), developing into emergent multi-organizational networks (EMONs) (Drabek, 1983), which will be discussed in more detail below. Others develop as the intentional compilation of responders for the specific goal of meeting the needs of all-hazards responses before a disaster occurs. Some see this as the currently preferred method of preparation (Templeton, 2005). These pre-designated teams are called IMTs and are staffed by supposed operational experts to provide on-scene management of a response (Crichton et al., 2005).

Research on the effectiveness of IMTs is extremely limited. The single largest repository of IMT literature is at the FEMA National Fire Academy in Emmitsburg, Maryland. Part of the Executive Fire Officer (EFO) program includes studies of IMTs, and as a result several papers have been released. Some of this research seeks to expand on the overall IMT concept (Dosmann, 2013; Douglas & Short, 2008; J. J. Smith, 2009). Most of these papers address the establishment of IMTs for various jurisdictions (Asche, 2003; Bertram, 2005; Brautaset, 2004; Cardwell, 2005; Doherty, 2012; Gates, 2002; Hawley, 2005; Hunt, 2013; Merryfield, 2008; Nied, 2009; Oates, 2006; Sacra, 2005; Thomas IV, 2008; Wilkie, 2008) or regions (Hoppe, 2007; Lusk, 2006; West, 2006). Other EFO papers examine IMTs in relation to specific disciplines, such as fire versus EMS (Locke, 2006; Sturgeon, 2008; P. C. Webb, 2009). Still others look to overlay the IMT concept for specific incident types, like terrorism (Beyer, 2003). Some of the research examines the use of IMTs within various types of jurisdiction, be they volunteer organizations (Deckers, 2006; Nichols, 2005) rural (Cleck, 2010; Litton, 2003; Sohyda, 2006) or large metropolitan areas (Davis, 2005; Leidig, 2010; Marsar, 2009). IMTs are also being researched for use in other countries, like Australia (Keen, 2010). One of the more unique EFO papers proposed components for sustaining an IMT and member selection (Parker, 2009).

As a whole, these EFO papers are supportive of the IMT concept. However, they also lack rigorous empirical data given that their respective literature reviews are fairly limited to citing other EFO works. None were found to have been published in peer review journals. Other works commonly cited within the EFO papers include the various governmental documents regarding IMTs, such as the NIMS documents (U. S. Dept. of Homeland Security, 2004a, 2008b) and various ICS and IMT training modules (FEMA, 2009; National Incident Management System

Consortium, 2007a, 2007b; National Incident Management System Integration Center, 2004). As a result, this study refrains from relying on these references other than to note their existence.

Empirically, there exist only a handful of studies on IMTs. One of the first studies of IMTs is the Space Shuttle Challenger recovery operation (Donahue, 2003). This case study details the use of twenty-one IMTs over the course of more than four months to coordinate the search of almost 68,000 acres. This research results in a list of ten "findings" that address training and certification, funding, mobilization and coordination issues. These issues are considered in this present study when addressing the intervening variables of delegation, interorganizational coordination, support and training levels. Donahue's (2003) findings also deal with the interaction among respective team members as well as with responders from other entities. I address these factors in the variables of leadership, team cohesion and trust. Donahue's (2003) discussion of turf wars experienced and use of expertise within and without the IMT align with my variables of interorganizational communication and coordination, as well as trust.

The use of IMTs has also become a fairly common practice on rig emergencies in the oil industry (Crichton et al., 2005). This research details the use of technical expertise by various personnel in incidents within a confined environment and limited access to resources and personnel. This research demonstrates that the concept of IMTs is not strictly limited to the emergency management arena. This case study focuses more on the individual attributes and capabilities of IMT members. Crichton et al's (2005) attributes align with my variables of improvisation, leadership, prior experience, role clarity, situational awareness, training levels, and again, trust.

Another IMT study addresses the decision making capacity within IMTs in wildland firefighting (McLennann, Holgate, Omodei, & Wearing, 2006). This study reveals what the researchers dubbed "important determinants of IMT effectiveness", namely "information management and cognitive overload, matching components of function goals to overall goals and team metacognition to detect and counter task-disruptive developments" (McLennann et al., 2006, pg 27). These determinants correspond with my identified variables of interorganizational communication and coordination, role clarity, situational awareness, team cohesion and trust.

Factors of decision making are the basis of another project involving wildland fires (Canton-Thompson et al., 2008). The researchers interviewed 48 IMT members, mostly Incident Commanders (ICs), to understand the issues that weighed heaviest for decision makers in developing operational and tactical plans. The largest external factors identified pertain to administrative policies, risk management and the politics of a response. I address these issues in the identified variables of interorganizational coordination, prior experience, support and trust.

One more piece of research contrasts the practice of industrial work teams with IMTs in emergency management (Templeton, 2005). This research emphasizes team effectiveness and managing conflict, and identifies several barriers to the success of IMTs (Templeton, 2005, pg 4):

"1. Situational urgency & complexity

2. Cultural clashes between agencies

3. Unclear domain/role activities

4. Lack of clear communication agreement

5. Lack of team "esprit de corps"

6. Crippling stress levels

7. Historical issues between responder agencies."

These barriers cover almost the entire gamut of the twelve intervening variables of this present study (discussed below).

The final piece of empirical literature on IMTs outlines the creation of the IMT professional organization; the All Hazards Incident Management Team Association (AHIMTA) (Donahue et al., 2009). As discussed in Chapter 1, the organization began with a conference of IMT members in 2008 to discuss the growing pains of individual IMTs, as well as their collective issues. The report outlines the top concerns of conference attendees in legitimizing IMTs as a viable and accepted resource for emergency response. Donahue et al (2009) identifies these concerns as being legislative, training, funding or coordination issues. As such, I align these issues mostly with interorganizational coordination, support, and training level variables.

The remaining literature on IMTs is limited to government documents, training modules and fact sheets. Collectively, these do not lend themselves to solid empirical amplification. They do, however, allow us to operationalize the term "IMT" for this study. As already discussed in Chapter 1, IMTs are categorized by Type - Type 1 to Type 5 - with Type 1 being the highest capacity team in terms of members and capability (Emergency Management Institute, 2012; U. S. Dept. of Homeland Security, 2011a). In order to be considered an IMT, the team must have pre-designated personnel for the various ICS positions. I use the Resource Typing Guide criteria for IMTs as determined by FEMA (U. S. Dept of Homeland Security & FEMA, 2005). These guidelines are listed in the Table 2 below. Thus, for this study, references to IMT types will follow this matrix.

Throughout the IMT literature, there are repeated references to a number of attributes of individuals within the team, or for the team, as a whole. These attributes are discussed by the respective researchers as having an impact on the operation of the team. While the list from any single reference is not comprehensive, there are no two lists that are identical. Aggregate to them, however, are several attributes that are repeated. I have adopted these attributes as the intervening variables for this study and discuss them individually below.

Minimum Capabilities		Type I	Type II	Type III	Type IV	Other
Component	Metric					
Personnel	Incident Commander	Yes	Yes	Yes	Yes	
Personnel	Operations Section Chief	Yes	Yes	Yes	Yes	
Personnel	Planning Section Chief	Yes	Yes			
Personnel	Logistics Section Chief	Yes	Yes	Yes		
Personnel	Finance/Admin Section Chief	Yes	Yes	Yes	Yes	
Personnel	Specialized Functions (i.e. HazMat, Insurance, etc)	Yes	Optional	Optional	Optional	

Table 2: Incident Management Team Typing Guide (U. S. Dept of Homeland Security and FEMA, 2005)

EMON REVIEW

Much research exists on emergent multi-organizational networks (EMONs) to the positive and negative. Most of the negative revolves around a false assumption of emergence being counterproductive (Dynes, 1994; Neal & Phillips, 1995). Uhr (2009) believes that these feelings about emergence stem from the negativity associated with the concept that these actions are ad hoc, or not part of pre-plans. Most of the positive conclusions revolve around the ineffectiveness of command and control (C2) models for disaster (Britton, 1989). What is agreed is that the stresses of differing disasters create differing response patterns (Comfort, Ko, & Zagorecki, 2004). Addressing these stresses calls for capabilities or authority beyond that of any single individual (Uhr, 2009), but requiring the collective ability of a group of responders (D. Smith, 2000) or emergent actors (Weick, 1987). EMONs are the result of group emergence (T. R. Forrest, 1972; Quarantelli, 1995), in which a collective of responders develops to address the needs of a response where no set collective existed before the disaster. Various actors may have interacted to some degree on prior projects, while others never have. It is only when the specific needs of a specific disaster align that these specific group of actors converge. Whether viewed positively or negatively, the truth remains that emergence always occurs (Uhr, 2009).

There are no guidelines for membership, structure or longevity for the structure within an EMON. Comprised of “bystanders” and “survivors”, EMONs develop in the very early stages of an emergency response, prior to the arrival of traditional “professional” responders (Quarantelli, 1988). They exist from the perception of a need, generally from a need that goes unmet by other parts of a response (Stallings & Quarantelli, 1985). Membership ebbs and flows based on the independent perceptions of individuals throughout the network (Tierney & Trainor, 2004). Members enter and exit the network based on their personal perspectives and not on an overarching goal set by mutually designated leadership. In fact, there may be no leadership within the grouping at all, indicating limited coordination among the participants. Members throughout the network often have little awareness of the roles played or tasks performed by other members (Tierney & Trainor, 2004). Membership is most often a matter of personal passion or expertise on a specific response. This fluctuation of membership causes issues in accountability and adds to the burdens of leadership in coordinating the efforts of the network (Milward & Provan, 2003).

Rikoski (2008) describes EMONs as unstable. Others see their fluidity as creating resilience. They are able to morph and change to meet the dynamic needs of larger incidents (Tierney & Trainor, 2004). Their lack of formality in structure and leadership make them more adaptable. They are able to operate without the limitations or constraints of pre-incident plans or structured templates. Milward and Provan (2003) however advise, "Our tentative recommendation for managing networks effectively is that they need time to develop and if you must change them, do so incrementally" (p 10).

Milward and Provan (2003) admit that emergent networks show some advantage over preplanned templates. Agreeing with Uhr (2009), I use the concept of emergence as being defined as unplanned. Thus, for this study, I focus on the ad hoc characteristic when referring to an emergent multi-organization network.

With this understanding of IMTs and EMONS, the main hypothesis for this study thus becomes:

Hypothesis #1 – Directional: IMTs will increase the perceived effectiveness of implementing the ICS.

Null Hypothesis – There will be no difference in the perceived effectiveness of implementing the ICS for IMTs over EMONs.

INTERVENING VARIABLES

Given that there is no direct measurement of effectiveness for IMTs, this study includes several intervening variables. Uhr (2009) points out that one of the best ways to study multi-actor interactions is by using indicators. In this study, the indicators serve as an array of variables. Each of these variables carries its own set of research pertaining to the specific attribute and its impact on the effectiveness of a response. This study seeks to determine the presence or absence of each of these attributes within the context of the independent variable - being an IMT member or not.

I derived much of these variables from organizational theory and systems theory. In order to understand each of the intervening variables, I consider the chaotic environment in which they exist in the world of emergency management. Disasters are rife with management problems, such as communication and information disruptions, over-extended or collapsing chains of command, conflicting lines of authority, and imbalanced levels of coordination and cooperation (Fritz & Williams, 1957; Quarantelli, 1988). The chaotic nature of a disaster disperses operations across the affected area, while the need increases for coordinating decision making (Kapucu, 2006). This increases the need of teamwork (Crichton et al., 2005) in all aspects, be it from an EMON or an IMT. Whatever the structure, the goal is to create a balance between needed coordination and a coordinated response (Moynihan, 2009).

At the conclusion of the review of each of the respective intervening variables, I present a hypothesis for that variable in relation to IMTs effectiveness.

Adaptation (Improvisation and Emergence)

When Minneapolis Deputy Police Chief Rob Allen arrived at the I35 bridge collapse on Aug, 1, 2007, he observed a stack of police gun belts lying on the ground next to collapse. Five officers had arrived on scene, made assessments of what actions to take, and rid themselves of their normal set of tools - gun, radio, flashlight and handcuffs. These tools were nothing more than a snag when crawling through the snarled collapse area searching for victims or extra weight as the officers dove into the river. They knew that this incident required a different response from what they were accustomed (R. Allen, 2007).

By their very nature, disasters create chaos. Researchers are well aware of the disruption that they cause to an area as well as to the response system (Dynes & Quarantelli, 1973a; D. Mendonca & Wallace, 2004; Quarantelli & Dynes, 1977; Weick, 1993). This fact is the basis for much of the emergency management planning (Drabek, 1983; Harrald, 1990; U. S. Dept. of Homeland Security, 2004b). Dynamic and rapidly changing issues mean that there are no pat answers during disaster response. Responses and response structures must be flexible to meet these ever changing challenges (Turner, 1994). Several researchers posit that adaptability is the most important characteristic for effective emergency management (Comfort, 1990; Harrald, 2006; Kartez & Lindell, 1990; Quarantelli, 1995; Sahin, 2009). Others state that adaptation adversely impacts a system's effectiveness (Miles & Snow, 1992). Sometimes these adaptations are short lived, reverting back to the status quo once the chaos subsides (Neal and Phillips, 1995). Organizations cannot simply depend on routine structures to get through dynamic and complex responses (O'Brien, 2010).

Conflict exists throughout the research, as the terms improvisation and emergence are often used interchangeably. Many researchers categorize improvisation as adaptation at the individual level (Findley, 2013; Franco, 2009; Kendra & Wachtendorf, 2003; Moorman & Miner, 1998; G. R. Webb, 2004). One of the pivotal studies of individual adaptation dealt with the Beverly Hills Supper Club Fire where employees altered their normal roles to attempt to save lives (Johnston &

Johnson, 1989). Johnston and Johnson (1989) termed this behavior "role extension." Improvisation is equally researched as existing as a group, or organizational, phenomena (D. Mendonca, 2001; D. Mendonca & Wallace, 2004; S. Mendonca, Cunha, Kaivo-oja, & Ruff, 2004; Weick, 1998). Other researchers use the term "emergence" for adaptation occurring at the organizational level (Drabek, 1985; Dynes & Quarantelli, 1973b; T. R. Forrest, 1972).

What is demonstrated is the need to examine adaptation at both the individual and group levels. Individuals must have the capacity to adapt their decisions and actions to meet the needs of a specific incident. This may occur in the individual tasks they perform or in applying various resources differently. These adaptations may occur at the organizational level as well, as groups may alter their interactions by changing the operating structure to more closely align with the needs of the response. The group may also alter resources to better meet the challenges faced. For the purposes of this study, I use the term "improvisation" for individual adaptation and the term "emergence" for group adaptation.

In relation to response systems, hierarchical structures are deemed to be too rigid to be effective (Britton, 1989; Brouillette & Quarantelli, 1971; Drabek & McEntire, 2003; Kapucu, 2006; Morrissey & Gillespie, 1975; Neal & Phillips, 1995; Starkey, 1992; G. R. Webb, 2004). Schneider's (1992) study of bureaucratic norms deal with the gap between how a response is intended (planned) and how it actually occurs (response). Quarantelli (1977) tells us that pre-disaster behavior is the strongest indicator of post-disaster behavior. While the plan may be along a specific structure, the response must become an open system to develop an atmosphere conducive to improvisation (Dynes, 1994; D. Mendonca & Wallace, 2004; Walker et al., 1994). These concerns carry over to the ICS, since it is based on a hierarchical structure (Cohn, Wallace, & Harrald, 1991). Acknowledging the rigidity of ICS, others recognize that the system also allows for adaptation as incidents grow or evolve (Carwile, 2005; M. K. Lindell et al., 2005; Stanovich, 2006). The ICS was sufficiently adaptable for the Pentagon site on Sept. 11, 2001 in what is labeled a successful response (Harrald, 2006). Uhr (2009) challenges the concept of a command and control (C2) structure as being purely rigid, which he identifies as the traditional view. He then defines a contemporary view as well, “Finally, the most important characteristic of this approach is that this view does not regard the commander as being above the system, exerting command and control from outside, the commander does not act as a chess player moving the chess pieces as he wishes, but as an integral part of a complex web of reciprocal influences” (Uhr, 2009, p 59-60). Other researchers also see a blur in defining C2 system as a hierarchy or network (Donahue & Tuohy, 2006; Kettl, 2006; Rikoski, 2008).

One argument over the inflexibility of a response derives from team members and not from the structure itself (Mendonca et al., 2004). This stems from an unfamiliarity of the actual incident, the available options and the potential outcomes of those options (Quarantelli, 1988a, Renaud, 2012). When this occurs, there is a tendency for responders to revert back to familiar structure and policies (Donahue & Tuohy, 2006; Uhr, 2009). Individuals only begin to adapt when they have faced enough obstacles or pressures, made enough errors, or exhausted their options (Flin, 1996; Moorman & Miner, 1998; Quarantelli, 2008; G. R. Webb, 2004). For this reason researchers state that IMT members should be specifically trained to develop flexibility (Crichton et al., 2005; Flin, 1996).

Much research demonstrates the value of improvisation on numerous incidents (Kendra & Wachtendorf, 2003; D. Mendonca, 2005; D. Mendonca & Wallace, 2004; Miller, 2001). Despite allowing the response system to be more responsive to the needs of the situation, not all adaptation is positive. Adaptation, either individually or organizationally generated, changes a response structure to some degree (Bevc et al., 2009). These changes, however limited they may be, have the potential to negatively impact the response. As such, improvisation should be aligned with the overarching objectives of the response (Bigley & Roberts, 2001; McLoughlin, 1985). Otherwise, it is considered freelancing (S. Mendonca et al., 2004), which increases the likelihood for harm to responders and the public (Bigley and Roberts, 2001).

This now frames the definition of adaptation used in this study. In truly emergent responses, most all actions taken may be considered adaptation. With this study focusing on IMTs that rely on the establishment of a set of incident objectives, adaptations are the adaptive actions which align with those objectives. These adaptations present themselves in several emergent behaviors as new tasks, new applications of resources or new applications of procedures (Quarantelli, 1995).

The struggle within a multi-organizational response occurs where the adaptation is taking place. Uhr (2009) talks about local adaption; flexibility at the tactical level. Some researchers deem this flexibility as the most effective (M. D. Cohen, March, & Olsen, 1972; Comfort, 1985). There is, however, a great potential for tactical level adaptation to conflict with the goals set at the higher strategic level. There must be harmonization of goals between all levels (Uhr, 2009) for the response to truly be effective. Adaptation has to be implemented at the appropriate times and location within the response.

During September 2012, I worked the wildfires burning through Creek County, Oklahoma. The Incident Commander determined that there was no way to put out the main fires as we headed into nighttime operations. He set the priority to attempt to simply contain the fires by consolidating the firefighting resources, setting an east and west boundary to keep it from spreading. The determination was made to evacuate the area, knowing that we could not save everyone's property. Individual fire companies from different jurisdictions however attempted to fight fires wherever they saw a structure burning. As a result of a lack of understanding the overall goal by the respective responders, the fires got out of the established boundaries and burned even more properties. It raged for several more days, consuming almost 59,000 acres and destroying over 370 structures.

Another negative aspect of adaptation is the fact that system deviation must be communicated quickly to be successful (Findley, 2013). This may be difficult in a rapidly changing environment with limited communication capabilities and create an atmosphere where situational awareness is lost (W. Smith & Dowell, 2000). Adaptation may also require the use of limited resources that may be dedicated elsewhere. Too much adaptation is difficult for a system already under pressure and can further complicate a situation (Bigley and Roberts, 2001). While not adapting is detrimental to an organization (Starbuck, 1983), too much flexibility or too rapid of adaptations can create a structure that is unstable as well (Bigley & Roberts, 2001; Cameron, 1986).

Dynes (1994, pg 153) states, “Preparedness means to organize a response prior to an event and improvising means organizing a response during an event.” Even with this defined, neither he nor others see preparedness and improvisation as being mutually exclusive (Kendra & Wachtendorf, 2003; Kreps, 1991). In fact, the two complement each other. Through appropriate planning and training, organizations and individuals increase their improvisation capabilities. As this quality becomes more acute, organizations can become proactive in their adaptive handling of incidents (Weick, 1998; Weick & Sutcliffe, 2008).

Effective adaptation is actually the result of expanded training and understanding (Findley, 2013; D. Mendonca & Wallace, 2007). Responders should develop a culture of hazard intrusiveness (Michael K. Lindell & Prater, 2000), in which they talk frequently about various potentialities in response as well as possible improvisations to address them. Doing so helps to hone their awareness of identifying novel situations and provides them with options (Alberts & Hayes, 2007). Only by knowing an array of potential resources, structures and procedures can a responder truly create viable alternate solutions to new situations (Kreps & Bosworth, 1993).

Sometimes it is the person who poses a viable option to a unique situation that takes the lead in a response (Aguirre, 2005). Preparation should not be sacrificed for improvisation, nor vice versa. Plans that are too detailed discourage improvisation (Altay & Green, 2006; G. R. Webb, 2004) as does too much focus on existing plans or structures (Harrald, 2006).

Adaptation does not occur automatically. Responders must be committed to the goals of the response to be willing to put forth the extra effort required (Burke et al., 2006). Adaptation also requires some social capital between the involved individuals or organizations. Improvisation occurs more readily in an environment of low interorganizational conflict (A. Boin & t Hart, 2003) and mutual acceptance of proposed changes (Loasby, 1994). This environment more commonly exists in groups with ongoing relationships (Wise, 2006). Other research indicates that a cohesive team environment fosters improvisation by individuals of the group (Magni, Proserpio, Hoegl, & Provera, 2009).

While adaptation is generally acknowledged as a positive characteristic within a disaster, it is not always accepted or acceptable. Appropriate adaptation efforts occur in an environment ripe for these alterations, where multiple stakeholders must be willing to receive them. It is the culture of the organization that then drives the possibility for improvisation. Thus, I anticipate that improvisation will not be any more prevalent in IMTs than in EMONs. Organizationally, one of the benefits touted for IMTs is the system's flexibility in the final structure meeting the needs of the incident (Cole, 2000; National Incident Management System Consortium, 2007a; National Incident Management System Integration Center, 2004; U. S. Dept. of Homeland Security, 2008a). On the other hand, EMONS are by their very nature adaptive organizations. They develop, almost from scratch, around the specific needs that arise in the response.

Hypothesis #2 (Improvisation) – Nondirectional: There will be differing levels of improvisation in IMTs than EMONs.

Null Hypothesis: There will be no difference in the level of improvisation in IMTs over EMONs.

Hypothesis #3 (Emergence) – Nondirectional: There will be differing levels of emergence in IMTs than EMONS.

Null Hypothesis: There will be no difference in the level of emergence in IMTs over EMONS.

Delegation (Empowerment)

Traditionally, there is a trend for organizations to discourage deviation from the norm (Starbuck, 1983). This is particularly true in the chaotic environment of a disaster response. However, researchers and practitioners also understand that emergency response leaders cannot address all of the issues single-handedly (Thomas, Abrigo, & Cieslak, 2004). While spontaneous action is often viewed as disruptive to a response (Dynes, 1994), autonomous decision making by experienced subordinates increases effectiveness (Price, 1968).

Early in a response, personnel tend to operate within a narrow band of actions defined by agency or discipline-specific affiliations instead of incident needs (Drnevich et al., 2009). An atmosphere of strict conformation to standard operating procedures (SOPs) and agency structures leads to a feeling of disconnect (Aiken and Hage, 1966). This continues until personnel develop a sense of identity to the emergent structure within the response. Much of the dynamics that allow for this change are addressed in other variables listed below, such as interorganizational coordination, leadership, support and trust. However, this evolution must occur for responders to become "part of the response" so to speak. Without this alignment, they remain alienated, which inhibits the organization from accomplishing what is needed (Morrissey and Gillespie, 1975).

As members settle into their roles and trust increases, managerial control shifts to leadership, instruction shifts to encouragement, and direction to delegation (Walton, 1985). This empowerment of members increases the quality of decision making (Cotton et al., 1988, Yuki, 2008). The more a leader knows the respective team member's capabilities, the more responsibilities they may be given, with less build-up to each increase (Klein et al., 2006).

The result of this delegation and empowerment among the response structure is a form of distributed leadership, which allows the team to better react to arising issues (Friedrich et al., 2009). This is a cornerstone of the ICS, in which leaders at all levels of the structure are empowered to make decisions on issues within their purview (Stanley, 2003). Having the ability to be proactive can create an organization that is considered to be "self-synchronized" (Duggan, 2011), where members automatically organize and coordinate their actions with limited direction.

Delegation to a trusted team also helps abate the stress level for the team leader (Paton & Flin, 1999). Integrating the expertise and diversity of the team's membership leads to better decisions (De Dreu et al., 2008, Hinsz et al., 1997, van Knippenberg et al., 2004). In addition, higher levels of empowerment within an organization can lead to increased flexibility for the response (Salas and Cannon-Bowers, 1993). The overall benefit of delegation is its quality as a motivator. Taken as a whole, team members become part of the response, having a sense of ownership and commitment to what is being accomplished.

Given that IMTs are ongoing teams, team leaders have the opportunity to know the capabilities of their membership from the onset of a response. This built-in team trust will potentially allow an IMT to reduce the learning curve to be able to make decisions and take action. This level of delegation may not exist for EMONs, which will experience the "getting to know" one another phases.

Hypothesis #4 - Directional: IMTs will have a higher degree of delegation than EMONs.

Null Hypothesis: There is no difference in the degree of delegation between IMTs and EMONs.

Interorganizational Communication

A common joke among responders is that it is not a matter of when communications will fail during an incident, but to what degree. Among researchers, communications is deemed the weakest link during disasters (Auf Der Heide, 1989, Haddow and Bullock, 2003, Nigg, 1999, Pattison, 2005, Dercole, 2006). It is even identified as the determining factor between success and failure of a response (Agranoff and McGuire, 1998). Communication failures, however, are commonly misinterpreted as coordination failures (Drabek, 1985). It is common that communication and coordination are discussed jointly. However, for this study, the two are addressed separately.

Jensen (2010) notes that physical communications system failures lead to management and coordination issues. Communications failures were shown to have led to the deaths of multiple responders during the World Trade Center response (Renaud, 2012). Much government funding has gone into the development of interoperability of communication (U. S. Dept. of Homeland Security, 2005, U. S. Dept. of Homeland Security, 2007). Training guidelines stress the need for common communications (IFSTA, 2007), while properly managing the information flow impacts overall emergency management (Kim, Sharman, Rao, & Upadhyaya, 2007).

While much attention has been paid to the tangible aspect of response communications, the larger obstacle exists in the non-tangible aspect. As Quarantelli (1988) identifies, communication failures have more to do with unbalanced information flow. Kapucu (2006, pg 215) cites the following causes for this unbalance; "lack of prior communication (49%), lack of common priorities (13%), lack of trust (13%), lack of flexibility (11%), lack of technical structure (9%) and lack of leadership (6%)." The focus of this study is on this aspect of communication, as they are the ones that tend to cause problems with decision making and management (Drabek, 1985, Sahin, 2009). As McBride (2013, pg 9) states in his evaluation of the Tuscaloosa tornado, "When an organization's crisis communications efforts are ineffective, their crisis management efforts become ineffective as well." There are internal (within a single agency) and external (across organizational boundaries) aspects of information flow (Coombs, 2010). My purpose is to determine how well IMTs gather and share information, both internally and externally among the multiple organizations and/or disciplines involved in a response.

Kapucu (2006) notes that effective communication includes gathering, assimilating, vetting and distributing information to the appropriate personnel. "Information sharing is at the core of all coordination and cooperation during any kind of group activity" (Kim et al., 2007) (p. 240). While each step in the information flow is important, the assimilating and vetting process takes raw information and turns it into useful intelligence (Stanovich, 2006). Information for information sake is not appropriate in a disaster situation. Not all information is of equal value, nor should it be shared equally with all involved entities (Stanovich, 2006).

The structure of a response has a tremendous impact on the organization's ability to properly communicate across agency boundaries. Price (1968) found that formal communication systems prove more effective than informal ones. Other researchers caution against too much structure, as a hierarchy can hinder information flow, especially in a disaster situation (Britton, 1989; Brown & Miller, 2000; Comfort, 1985). Whatever the structure, the system must be open enough to include traditional and non-tradition organizations that could be beneficial during a response (Harrald, 2006; Petrescu-Prahova & Butts, 2008).

The communication structure during a disaster is almost always different that the non-emergency structure (Kapucu, 2006). Non-emergency structures may actually be the source of communication issues (Rice, 1990). Comfort's (2002) examination of the 9/11 response reveals that lead officials mostly used pre-existing information networks, limiting access to newcomers to the response. While informal lines of communication develop organically, information management should be as intentional as possible. Historically, emergency planning efforts typically are limited in focus to the downward flow of information (Dynes, 1994). Effective response, however, requires ongoing, two-way communication which often results in establishing positive connections between involved organizations (McBride, 2013). These communication networks often continue after the response (Doerfel, Lai, & Chewning, 2010). An incompatible structure can be detrimental to the organization's interaction (Houghton et al., 2006), during and after a disaster.

Another consideration in developing a communication structure is creating the shortest possible path between respective personnel. The length of communication pathways determines their strength and impacts the value placed on information flows. Longer pathways are typically weak and result in slow response, while short paths typically receive more attention and direct action by the participants (Kapucu, 2005).

Interorganizational communication is included as a variable for this study because failures are so common and their impact is so dramatic. On the other hand, when handled appropriately, it has a positive effect and can reduce interpersonal conflict with the organization (Moye & Langfred, 2004). With IMTs being established entities, I expect they will have established systems for internal communication. They may be lacking in their external mechanisms, especially if they move into a different jurisdiction with unfamiliar responders. If, however, they have experience in addressing interpersonal conflict as described above, I anticipate that they develop information sharing protocols fairly quickly.

Hypothesis #5 – Directional: IMTs will have more interorganizational communications than EMONs.

Null Hypothesis: There is no difference in interorganizational communications for IMTs or EMONs.

Interorganizational Coordination

Very few organizations or even jurisdictions can single-handedly address all issues as an incident grows in magnitude (Quarantelli, 1966, Quarantelli and Dynes, 1977, Harrald, 2006, Donahue and Tuohy, 2006, Moynihan, 2009, Lucie, 2013, Templeton, 2005). This disruption of normalcy necessitates that organizations develop relationships with other organizations, often brand new ones (Carr, 1932; Kreps, 1984; Runyan, 2006). The trick then becomes how to structure these relationships, as the culture of interaction defines the system (Comfort et al., 2004). The coordination between agencies, or lack thereof, is one of the most cited issues impacting the success of a response (Alter & Hage, 1993; Auf Der Heide, 1989; R. Chen & Sharman, 2005; Comfort et al., 2004; FEMA, 2008b; Gillespie, 1991; McBride, 2013; Quarantelli, 1988; Schaafstal et al., 2001; D. Smith, 2000; U. S. Dept. of Homeland Security, 2008c).

It is almost without question that the success of a response rests on the fact that there is cooperation and collaboration across agency boundaries. Reviews of several large scale responses indicate the limited level of coordination between agencies negatively impacted the overall response (Donahue and Tuohy, 2006, Renaud, 2012). Emergency management by its very nature demands a high degree of interorganizational interaction (Drabek, 1985; Gillespie & Banerjee, 1993). It is for this reason that disaster research and governmental policies agree on the mandate of establishing interorganizational collaboration (Drabek, 1985; Harrald, 2006; U. S. Dept. of Homeland Security, 2004b). Collaboration begins as the various agencies develop shared understanding across jurisdictional or agency boundaries (Templeton, 2005). Sahin (2009) demonstrates that the system's perceived effectiveness increases as efforts to coordinate increase. Uhr (2009) sees coordination as the melding of emergent and planned activities. Others see coordination as a fully emergent quality within a response (Faraj & Yan, 2006). There is a lack of consensus, however, on the structure that best fosters coordination during a crisis (Rikoski, 2008).

The benefits of collaboration are numerous, with no negative effects identified in available research. Individual responders and agencies often lack the needed depth of resources, experience, and understanding to properly address the needs of larger incidents. Success of a response rests not on simply having an appropriate amount of resources, but on the proper coordination of those resources (O'Brien, 2010). McBride (2013) sees interagency coordination acts as a force multiplier. It allows for a sharing of resources across agency boundaries (Comfort et al., 2004, Doerfel et al., 2010). On the flip side, with multiple agencies responding and each dedicating resources, coordination allows for a conservation of resources, with limiting duplication of efforts (Lucie, 2013). At times, there are goals that are only accomplished through the inter-related accomplishment of individual tasks (Ma, 2012).

Coordination involves the synchronization of efforts and tasks (Chen et al., 2007). Plans are built using the most appropriate resources and tactics, playing off the strengths and capabilities of the respective agencies. There is also the collation of work flows, communication streams or reporting structures (Alberts & Nissen, 2009). This is most easily achieved by assigning work along functional lines (Chen et al., 2007). The highest level of coordination is the coming together of overlapping or often conflicting priorities and goals among the various agencies (Duggan, 2011). Hancock (2009) warns that the lack of a familiar structure increases the gap in coordination between stakeholders in the response.

It is advisable for responders from differing agencies to be aware of each other's response model (Flin, 1996). The synchronizing of all of these parts is accomplished through a determination towards unity of effort toward a common outcome (Lucie, 2013). Uhr (2009, p. 96) tells us that "coordination has to do with harmonizing activities, or harnessing complexity, to achieve an overall goal." This unity is derived from, fed by, and built upon a level of trust between the involved entities (Kapucu, 2006). Coordination is often tied to trust between organizations or individuals within organizations. However, I treat these two qualities as separate variables and examine trust later in this review. Collaboration is the unifying factor which brings the independent groups together during a disaster (Richey, 2009). Weick (1987, p. 124) describes the process in the following way, "Before you can decentralize, you first have to centralize so that people are socialized to use similar decision premises and assumptions so that when they operate their own units, those decentralized operations are equivalent and coordinated. This is precisely what culture does. It creates a homogeneous set of assumptions and decision premises which, when they are invoked on a local and decentralized basis, preserve coordination and centralization."

While it is easy to see the needs and benefits for interorganizational coordination, there exist multiple barriers to its establishment. Some seem insurmountable at times while others are really nothing more than what Dercole (2006) calls "turf wars." Sometimes coordination fails to take root because of organizational stagnation (Nystrom, Hedberg, & Starbuck, 1976; Starbuck, Greve, & Hedberg, 1978). This occurs when an organization fails to grasp the threats presented by the incident along with failing to move beyond perceived constraints that inhibit needed action.

Physical separation of involved stakeholders also limits coordination (Crichton, Flin, & Rattray, 2000). When an incident spans multiple jurisdictions, agencies may strive to serve their respective jurisdictions rather than coordinating the wider response (Comfort et al., 2004). More organically, failure to collaborate stems from the fact that individual organizations serve different purposes (Templeton, 2005). They have differing priorities and processes (Templeton, 2005, Duggan, 2011), serve different groups (Provan & Milward, 2001), and involve differing skills and players (Bevc et al., 2009). These divergent needs, goals and structures create a fragmented system of response (Drabek, 1985) where there exists dissensus in how to coordinate (Stallings, 1973).

Failure to coordinate may be inadvertent, where involved agencies simply focus on their own internal needs more than the overarching needs of the incident as a whole (Dercole, 2006). They may simply focus their efforts on the more immediate needs occurring instead of developing the "big picture." This can easily occur if the structure has not developed or shared a common operating picture (W. Smith & Dowell, 2000). Coordination can occur, but only on a limited basis. Kapucu (2005) show that grouping occurs during disaster response. Grouping occurs as organizations coordinate with organizations of similar characteristics, structures or goals, but fail to interact extensively outside of these parameters. When there is no system-wide interaction, there is no system-wide coordination (Comfort, 1999).

Lack of coordination may occur in a more intentional and direct manner. Research shows that interagency conflict has a definite impact on the failure to collaborate (Dercole, 2006, Neal and Webb, 2006, Jensen, 2009). Some agencies may also fear becoming too closely aligned, or embedded (Granovetter, 1985) with other response agencies or the incident as a whole. This comes from the fact that failures within parts of the system can domino throughout the overall structure (Comfort, 2002). Agencies may also have limited access to a structure because of exclusion by boundary personnel (Quarantelli and Dynes, 1977). Donahue and Tuohy (2006) exhibits that sometimes a commitment to coordinate never develops because of lack of trust or understanding of one another.

The organizational structure of IMTs is built around the concept of coordination, both internal and external to the team. As IMTs type move from Type V to Type I, there is a greater emphasis on developing diversity of disciplines (Templeton, 2005). These members then have an understanding of the divergent needs, pressures and possibilities that exist between agencies. In fact, within an IMT, the overarching task of the IC is to develop coordination among participating groups (Renaud, 2012). How this is carried out is heavily debated among researchers. Many feel the ICS structure is too dependent on command and control, which fails in its capacity to coordinate (Drabek, 1986; Quarantelli, 1996b), urging direction more than coordination (Dynes, 1994). It is viewed as a closed system, making it too difficult for incoming entities to penetrate (Dynes, 1994, 2000). The adherence to a hierarchical structure also inhibits the flexibility needed for interorganizational coordination (Kapucu, 2006). The overarching structure may develop too many layers of government oversight that prove too cumbersome to establish true collaboration (Comfort, 2005).

On the other hand, other researchers have seen this structure develop coordination across agencies (Buck et al., 2006, Duggan, 2011). The formality of structure does not eliminate developing collaboration (Wise, 2006). Cole (2001) points out that ICS is intended as a system to manage toward results, not to dictate actions. Mendonca (2005) views an IC as a centrally located coordinator that facilitates decision making. IMT training stresses the need for interorganizational coordination, even to the point of subjugating individual goals for the overall goals of the response (Templeton, 2005).

Before an incident ever occurs, it is advantageous to develop relationships between agencies to allow them time to work out the finer details (McBride, 2013). However, this is not always possible. There will always be instances where new players enter the game. As such, any response structure must develop a system for identifying and including emerging resources. This inclusion is the most effective way of maximizing their benefit (Sahin, 2009). EMONs develop organically as a result of consensus needs within a response (Quarantelli and Dynes, 1970). In the chaos of responses, it is easier for coordination to occur within familiar networks of established relationships (Doerfel et al., 2010). Because of their singular focus and familiarity, EMONs may operate better as efforts are focused on function through coordination as opposed to structure (Simpson & Hancock, 2009). Informal structures based on coordination have been shown to operate better in times of chaos than formal structures (Krackhardt & Stern, 1988). This dilution of structure is critically viewed by some researchers. Templeton (2005) deems EMONs as less efficient in more complex responses.   Hannestad (2005) equates this dilution with management by committee, which is ineffective.

Interorganizational coordination is a key ingredient for whatever system is used in disaster response. Conceptually, I view coordination as the development and implementation of common attributes throughout the response; common lines of communication, common priorities and common goals. "Coordination reasonably has to have a purpose and this purpose can be to achieve some overall goal or decompositions thereof" (Uhr, 2009)(p 66). These are accomplished through the sharing of resources, be they tangible or intangible. There exist arguments for both IMTs and EMONs in their capacity to instill and foster an atmosphere of coordination. However, I estimate there to be differing levels between the two.

Hypothesis #6 – Nondirectional: There will be differing levels of interagency coordination between IMTs and EMONS.

Null Hypothesis: There will be no difference in the level of interorganizational coordination between IMTs or EMONs.

Leadership

All organizations are built around a structure of leadership, whether vested in a single individual or a system of distributed leadership. However, leadership in times of disaster differs from leadership in routine, daily operations. During disasters, a distributed leadership model is more likely to develop (Friedrich, Vessey, Schuelke, Ruark, & Mumford, 2009). Leadership in times of crisis requires what Weick (1993) calls sensemaking, which sorts through possible solutions to complex issues in times of rapidly evolving uncertainty. During routine operations, there is time to gather resources (personnel, supplies and information), weigh the pros and cons of various options and then make a decision. During disasters, time is a commodity that may be in short supply for decision making. Research tells us that most organizational leaders fail to prepare for their roles during disasters (Boin and t Hart, 2003). This lack of preparation and experience makes leading the response even more challenging (O'Brien, 2010). The capacity for leading a complex response has a foundation in an organization's plans and structures (Meyers, 2014).

Leadership during times of crisis requires implementing a different skillset than is practiced in routine operations. Leading during times of chaos means a leader must move a team from being reactive to being proactive (Flin, 1996). We know that during times of crisis people tend to revert back to their regular behavior (Quarantelli, 1988). Known as role carryover (T. Forrest, 1973), pre-disaster organizational leaders often assume leadership roles during a disaster. For first response agencies, this typically follows a leadership structure with strict chain of command that follows orders (Boin and t Hart, 2003). This type of structure implies the implementation of a set hierarchy with established decision making protocols (Pigeau & McCann, 2001). Drabek (1986) tells us that command and control is not the most proper structure during emergency response. Under these circumstances of balancing out short and long-term decisions, leadership requires more negotiation than directing skills (Mitchell, 2006). "Operational handling of the physical incident itself is not the only yardstick of effective leadership" (Devitt & Borodzicz, 2008)(p. 209). A crisis leader is judged by interpersonal skills, which impacts the work group (Balkundi & Kilduff, 2005). These skills include how well they manage the interaction among the responders they oversee (Day, Gronn, & Salas, 2004; Dercole, 2006; Goleman, 2004; Zaccaro et al., 2001). Leaders must exhibit transformational characteristics that inspire personnel to go the extra mile to meet the needs of the response (Harrington, 2011).

In addition to the interpersonal skills, a crisis leader must possess a high degree of strategic and tactical ability (Flin, 1996). This expertise comes into play in their decision making of specific goals and tactics to apply. The chaos of the situation may require the leader to alter the approach in handling specific issues (Quarantelli, 1988). A good leader must identify when it is appropriate to improvise and when it is not (Crichton et al., 2005). In the midst of this chaos, a leader must demonstrate confidence, providing stability for the group (Flin, 1996). Renaud (2012) contends that being a strong leader is not attainable by everyone, even within the first responder community. In times of chaos where the timely coordination of multiple actions is tested, good leadership works to meld individual tasks into a collective team operation (Burke et al., 2006). The reality is that disaster management is both a challenge and responsibility of leadership (Boin and t Hart, 2003).

Effective leadership begins with the structure developed to oversee the application of tasks and resources as it impacts the organization's performance (Friedrich et al., 2009). Some research indicates that proper leadership impacts the overall team in how well they perform individual tasks (Durham, Knight, & Locke, 1997). Others say that the leader's actions may merely influence the perception of the team's effectiveness rather than influencing actual team performance (Burke et al., 2006). This may be because leaders provide guidance to team members in what is expected and acceptable as being a member of the team (Salas & Cannon-Bowers, 1993), developing the team culture (Pidgeon, Turner, Toft, & Blockley, 1992). They help to establish the team norms, by helping members of the team to understand their individual role, within the confines of the overall team function (van Ginkel & van Knippenberg, 2012).

Leadership impacts performance as well. One of the skills required by leaders is quality decision making (Fallesen, 2000). When competent leaders develop sound strategies for response, teams seek to deliver better tactics to meet these goals (Durham et al., 1997). Competent leaders not only exhibit confidence, they also instill confidence in others through good communication as well as negating conflict among team members (Flin, 1996). Harrington (2001, p. 39) tell us "The cornerstone of any effective crisis management program is the ability of individuals in positions of management to assume roles of leadership to plan and communicate risks to the constituents in advance."

Not every attempt at leadership is a success. The multiple pressures of a fast moving incident make decision making extremely difficult (Boin and t Hart, 2003). Options tend to be limited and shortcuts taken in the heat of the situation to make the best short-term decision as opposed to filling the long-term need (Mitchell, 2006). Some leaders, however, may not be up to the task. As Quarantelli (1988, p 379) states, "If the exercise of authority is weak during non-stressful periods, it will prove even weaker when disasters strikes." Leaders may bypass accepted decision making procedures to make quick decisions (Boin and t Hart, 2003). There is also the risk of the group relying too heavily on the leader (Conger & Kanungo, 1998). Some leaders may not hold up to the pressures of the response, reverting to a more transactional leadership style of using rewards and punishment rather than support and guidance (Burke et al., 2006).

Leadership in crisis may even fall to individuals that do not hold official leadership roles. Given the uncertainty of disaster, some leaders emerge as a result of specifics of the incident. While the cliché may be that leaders are simply those that are in the right place at the right time, this may not be true. At times, leaders are those that have access to the needed resources at the time (Drabek, 1983). Resources cover the gamut from technology, equipment and supplies, to personnel, information and structures. Leaders may be the gatekeepers with access to these resources, commonly referred to as boundary spanners (Kapucu, 2006; Kroeger, 2012; Williams, 2002). Leaders may come from outside the affected community as a result of locals being overwhelmed by the magnitude of the response (Quarantelli, 2006).

Much research exists on emergent leadership (Bennis, 1959; Friedrich et al., 2009; Mehra, Smith, Dixon, & Robertson, 2006; Pescosolido, 2002), however much of it is limited to non-emergency environments. The focus of this study is on contrasting IMTs and EMONs for ICS implementation. Using these parameters, an emergent leader would be one that would be working within emergency management structures. However, it is quite conceivable that Mehra's et al (2006) observation of conflict between a formal and an emergent leader would apply.

Without acceptance of one another, the team can fail. There also remains the possibility that no true leadership will emerge in a given situation. In researching repeat obstacles encountered during numerous large-scale incidents, Donahue and Tuohy (2006) found that some responses are slow to develop as no individual or agency steps forward to take the lead. This can have a dramatic effect on not just the response partners, but on the community at large.

Thus, I identified the concept of leadership for this study as the ability to develop structure and create a sense of teamwork. The leader should possess a level of competency, while being self-confident. Using these guidelines, IMTs have the advantage in that they have existing structures with pre-designated leaders. The IMT member selection process ensures that these leaders have demonstrated skill competency (Emergency Management Institute, 2012; National Fire Protection Association, 2014; U. S. Dept. of Homeland Security, 2011c). While IMT leaders may possess technical competency, they may, however, lack team building experience (Crichton et al., 2005, Donahue and Tuohy, 2006). There are no established expectations for leadership for EMONs. As such, I proposed that IMTs will have a higher level of leadership than EMONs.

Hypothesis #7 – Directional: There will be a higher level of established leadership in IMTs over EMONs.

Null Hypothesis: There will be no difference in the level of established leadership between IMTs and EMONs.

Prior Experience

On the morning of May 26, 2002, the Robert Love tugboat was moving several barges north on the Kerr McLellan Navigation Channel outside Weber Falls, OK. As it was passing the I40 Bridge, one of the barges struck a pier at the water level, causing the bridge to collapse. Ten vehicles vaulted into the waters, killing 14 people. Oklahoma Highway Patrol Captain John Harris became the Incident Commander for the recovery efforts. During the response, Capt.

Harris received a call from the official that had been the Incident Commander at the Padre Island, TX bridge collapse in September, 2001. As the Texas official shared various issues that arose during his response, Capt. Harris took several notes. Over the next few days, Capt. Harris was able to use this information for decision making of similar issues that arose at the I40 collapse (Harris, 2002).

Having experienced and confident leaders is particularly vital during complex incidents (Dawes, Cresswell, & Cahan, 2004). The development of competent leaders is greatly dependent on prior experience. A greater depth of experience gives leaders a wider menu of options from which to choose under the constraints of a disaster response (Flin, 1996). Research on prior disaster experience covers a wide span of issues. Some address the impact on the individual; either emotionally, in relation to future stress coping or in terms of future preparedness. While research tells us that experience seems to impact organizational effectiveness for future events (Carley, 1991; Quarantelli, 1996a; Sahin, 2009), I am focusing on the impact to the individual. Skills develop at the individual level (Seamster & Kaempf, 2001), but the practice of these individual skills is enacted within a team (Salas et al., 2001). It is this interplay of individual skill sets that becomes important for IMTs and EMONs. Success stems in part from the organization's maximization of individual behavior during disasters (Pearson. C. M. & Clair, 1998).

Effective leadership starts with having a strong foundation of the basics of response (Meyers, 2014). Uhr (2009) tells us that this basic knowledge and experience influences a leader's actions and decisions. Their understanding of the organizational culture then influences their actions (Meyers, 2014). Quarantelli and Dynes (1977) propose the principle of continuity, telling us that disaster behavior strongly replicates pre-disaster behavior. This holds true for commonly occurring issues that arise regardless of disaster type or size (Quarantelli, 1982), such as convergence, communications failures and resource management. As responders address new issues successfully, they are able to add these experiences to their skills for the future. It is the collection of this knowledge and experiences that lends itself to Naturalistic Decision Making (NDM) (Cannon-Bowers & Bell, 1997; C. Klein, 1997; Schaafstal et al., 2001). NDM flows from personal experiences of the individual to allow them to quickly react to changing circumstances. Another closely tied concept is that of Recognition Prime Decision Making (RPDM) (G. A. Klein, 1993). RPDM occurs with experienced personnel that have developed a deep sense of awareness of their surroundings (situationally and organizationally) and the circumstances they commonly operate within. This intimate understanding allows them to quickly detect changes within their environment that demand alterations to be made. Their experience also allows them to have a repertoire of potential changes to evaluate and determine the most appropriate action for the given situation. It may only be those responders with prior experience that realize the need for such changes (Boin and t Hart, 2003). This may be the basis for research indicating that responders with disaster experience adapt more easily to changing situations than responders without prior experience (Carley & Harrald, 1997; Paton & Jackson, 2002). This individual adaptation can then transition to increase a team or organization's adaptation capability (Carley, 1990; Lin & Carley, 1992).

However, a caveat to the impact of past experience exists. There is a tendency to take the lessons learned in smaller events and apply them inappropriately to incidents of all types and sizes (Carley and Harrald, 1997). As Drabek (1983, p 279) states "few responders at the local level especially seemed to grasp the complexity of the response system which emerged quite rapidly." And the saying, "a little knowledge is a dangerous thing", can easily be applied to disasters. Quarantelli (1987) tells us that experiencing a single disaster is experiencing a single disaster. Responders may not learn anything or may learn the wrong things. Even for a multi-agency response within a single disaster, each organization can come away with different lessons learned (Carley and Harrald, 1997). Carley and Harrald (1997) state that disaster experience may occur within a single response, but more likely is a process evolving over the course of several responses. High levels of capability normally result from repeated exercise of skills over time (Ericsson, 1996). There is even the possibility for individuals and organizations to come away from disasters seeing their situation as unique from all others, leading to divergence in how they plan, organize and respond (Jensen, 2010).

Aside from the technical lessons learned from prior experience, research also looks at the psychological impact. It has been shown that the stress experienced may be of benefit against the detrimental impacts of future stress (Eysenck, 1983). This concept is also researched in relation to disaster related stressors (Norris & Murrell, 1988). It is further demonstrated that prior experience for responders increases their resilience to dealing with future stresses (Ersland, Weisaeth, & Sund, 1989; McCarroll, Fullerton, Ursano, & Hermsen, 1996). Flin (1996), however, warns against the psychological impact of a bad experience, in terms of increased stress and decreased confidence.

Thus experience impacts the capability and stress reactions of individual responders. However, I also consider the impact of prior experience upon team dynamics. Friedrich et al (2009) states that a wide array of experience within a team is critical to its overall performance. Because of the multitude of issues that arise within a disaster, no single responder can possess all of the requisite knowledge and skills to meet every need. The needed knowledge is a culmination of combined understanding of response plans, SOPS, tactics, resource and responder capabilities (Chen et al., 2007). This combination of knowledge and skills as applied to disaster differs from the combination required for daily operations. Too often however, organizations tend to assign groups accustomed to daily operations to disaster situations (Smith, 2000). As already discussed, this group most likely will not possess the specialized capabilities that are unique to disasters. Crichton et al (2005) asserts that the successful handling of complex incidents requires high skill levels, specifically in ICS skills. Failures of implementing ICS have been tied to a lack of overall understanding of ICS (Hancock, 2009; Jensen, 2008; Neal & Webb, 2006; Rudman, 2003). Most of those studies have been ad hoc teams, which have proven ineffective from a lack of adequate individual experience (Carley, 1992). Without a base of knowledge for how the team works together (Comfort, 1999), they may not be as successful. Prior experience can help to increase their levels of coordination (Comfort, 2002). Additionally, while EMONs may have individuals with prior experience, there is no mechanism to ensure that all team members have any degree of prior experience.

One of the proposed strengths of ICS is the standardization of the system, in terms of structure and communication flow. When responders are unfamiliar with a system that is built on the fly or is foreign to them, they will revert back to familiar responses (Dynes, 1994, Comfort, 2002, Donahue and Tuohy, 2006). McLennann et al (2006) asserts that all IMTs need to have a strong depth of ICS experience. Responders that use the system on a regular basis for incidents of all size will more likely use the system out of habit (Donahue and Tuohy, 2006). Part of the certification process of IMT members (FEMA, 2011, Emergency Management Institute, 2012) requires that IMT members have demonstrated specific capabilities during actual or simulated responses. This helps to ensure that they not only have experience in the stress and chaos of a disaster, but also in the application of ICS during a response. For this study, the operational definition for prior experience covers disaster experience as well as ICS experience. As such, I anticipate that IMT members, as a whole, will have more prior disaster experience than EMON members.

Hypothesis #8 – Directional: IMT members will have higher levels of prior disaster response experience than EMON members.

Null Hypothesis – There will be no difference in the level of prior disaster response experience between IMT and EMON members.

Role Clarity

The disruptive nature of disasters places organizations under stresses that cause them to morph and evolve (Quarantelli, 1966). Because any organization can only operate effectively within given limits (Miles and Snow, 1992), changes can take on both positive and negative aspects. Much is dependent on the learning capability of the organization and the individuals involved (Carley and Harrald, 1997, Miner et al., 2001, Shrivastava, 1988, Weathers, 2000). Some research tells us that organizations perform better the more the structure resembles the group's normal structure (Altay and Green, 2006). Other research indicates that disaster response structures cannot be overly rigid (Neal and Phillips, 1995). The fact remains that organizational structures aid in determining the weight given to the decisions made at differing levels (Cohen et al., 1972). This is the basis for having identifiable roles throughout whatever structure develops. It is only fair that individual members of a group understand the various positions (roles) that exist. An unfamiliarity of roles leads to missed opportunities for decision making and action, and a breakdown in information flow (Salas and Cannon-Bowers, 1997). Diversity of incident roles creates an atmosphere for improvisation (Gillespie, 1991). There is also a direct correlation between clarity and group performance (Mott, 1972).

As Dynes (1994) observes, responses rarely suffer from the lack of willing participants, but from identified roles from which they operate. Within a disaster environment, these roles often exist across the boundaries of agency, jurisdiction, authority, function or capability. Coordination and management of these combined roles are what makes a response effective (Crichton et al., 2000). The mutual understanding and acceptance of one another's roles (McBride, 2013) helps to distinguish a team from merely a group of responders responding to the same incident (Hackman, 2002). Role clarity defines the common purpose of those involved by formulating an inclusive approach (Katzenbach and Smith, 1999). Relationships to one another are redefined with each new addition to the response, making coordination that much more difficult (Comfort et al., 2004). In Duggan's (2001) examination of the New York Fire Department's Urban Search and

Rescue team, he finds that role clarity is one of the most critical requirements for interagency effectiveness. Role clarity is the basis for formal structures like the ICS (Arbuthnot, 2002). "ICS is often misunderstood to be rigid and even dictatorial. It serves instead to clarify roles and responsibilities in ways that promote collaborative problem solving and minimize the duplicative and conflicting efforts that so often undermine effective response on large disasters " (Donahue & O'Keefe, 2007)(p 80).

Outlining specific roles and limits of authority should occur well before an incident develops (Sahin, 2009). Also important in disaster situations is an understood division of labor, to reduce duplication of effort (Soliman, 2005). Not having these roles, divisions and limits properly defined can negatively impact response (Waugh, 1994, Patton, 2007, McEntire and Dawson, 2007). Having these issues pre-designated allows for a quicker response (Carley and Harrald, 1997). Such criteria are included in several Federal guidelines for the development of response plans at all levels of government (U. S. Government Accounting Office, 1993, National Incident Management System Consortium, 2007a, National Incident Management System Consortium, 2007b). Within the designated lines of authority are prohibitions where response agencies cannot supersede one another's authority (Jensen, 2009). As more agencies join in, it creates a situation where responders potentially work at cross-purposes while fulfilling the expectations of their respective agencies (Molnar and Rogers, 1976). As new roles are identified, they may be at odds with existing roles and processes, adding more stress to the group (Schneider, 1992).

While most responders are altruistic in their intentions, there also exists the potential for social shirking (Sagan, 2004). All responders know that there are fun things to do on a response and other tasks that are not as pleasant. Social shirking is the tendency to leave those less exciting tasks undone, assuming that others will handle them. Leaving tasks undone creates gaps in a response. Role clarity provides a consistency of expectations of who is responsible for which tasks. Having these expectations in mind, teams are better able to set goals of performance (Durham et al., 1997).

This is where IMTs are intended to be of benefit. Operating within the ICS structure, IMTs are designed around functions, not specific responders, as they are needed within a response (Bigley and Roberts, 2001). Being functionally structured makes the system more flexible (Perry, 2003). An EMON lacks the opportunity to pre-establish these roles (Templeton, 2005). IMTs have defined roles and guidelines for the delegation of these roles when required (Crichton et al., 2005). In his evaluation of wildland fire IMTs, McLennann et al (2006) recognizes the members develop what he terms “team metacognition.” This is an awareness of the team’s abilities in relation to the team’s goals and their attainment of those goals. This dovetails Friedrick et al (2009), who supports the need for team members to be aware of the status of various members’ tasks in relation to their own. So, true role clarity aids in developing a situational awareness of team operations.

The structure of IMTs defines roles and the relationships between these roles. This is one of the biggest advantages of an IMT (National Wildfire Coordination Group, 2005). EMONs have no such advantage and must create structure on the fly. As such, I anticipate that IMTs will have a much higher degree of role clarity than EMONs.

Hypothesis #9 – Directional: IMTs will have a greater level of role clarity than EMONs.

Null hypothesis: There will be no difference in defined role clarity for IMTs or EMONs.

Situational Awareness

Federal disaster guidelines recognize that developing a comprehensive overview of a disaster takes time, depending on the magnitude of the incident (U. S. Dept. of Homeland Security, 2004b). The process of developing a common operating picture is based on the response system's ability to attain situational awareness (SA). SA is a process of information exchange (Carroll and Burton, 2000) whereas participants know the status of what is currently happening and where the response is going (Endsley and Garland, 2000). The degree of SA existing within the response organization affects the decisions made by responders (Cannon-Bowers and Bell, 1997, McCann and Pigeau, 2000, Annelli, 2006). Researchers regard good SA as key to better decision making (Endsley, 1990; Meyers, 2014). It allows them to make projections and set goals for progress (Rouse et al., 1992, Crichton et al., 2005). Flin (1996) cites the lack of complete and accurate information flow as a key issue for leader's failure to develop good SA.

There are several factors that enable the process of attaining and maintaining SA on a disaster scene. The greater experience level of a responder enables them to more quickly get a sense of the situation as they can recognize patterns of action and behavior (Stokes et al., 1997). Responders must have an awareness of a variety of resources; their intended use, capabilities, and status, and be able to get a clear picture of the current and future status of the response (Zhang and Dilts, 2005). Organizational leaders must be able to piece together all of the moving parts from various sources to understand how they work together to develop an overall SA. If information is lacking, leaders are left to make decisions in a vacuum (Smith and Dowell, 2000). This is why Renaud (2012) recommends that leaders periodically stop and obtain a clear understanding of the situation before taking further action.

It is not only the individual responders that need SA, but this mental picture must be communicated and understood throughout the response organization. History provides several examples of incidents where SA was missing across the response networks. Duggan (2011) cites this as one of the major obstacles facing responders at the WTC site early in the 9/11 attacks. Likewise, the inadequate information flow during Katrina crippled response leaders from having a clear understanding of the magnitude of the incident (U. S House Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina, 2006). On lesser widespread disasters, a review of NIOSH reports on firefighter deaths reveals that loss of up-to-date SA often results in tactical issues (Cardwell, 2005).

Failure to obtain or maintain SA stems from several issues, with the first being the incident itself. For incidents that are uncommon in nature, intensity or magnitude, responders may have no frame of reference on which to develop SA (Basher, 2008). This drawback ties to the experience level of responders, particularly those in leadership positions. Other impediments to group SA arise from the structure of the response. Consideration must be given to the design of the information flow. Inconsistencies in information type and interruptions in information flow can stall the development of good SA (Gouin and Gauvin, 2003). Information, regardless of its accuracy, from emerging or unofficial sources may be de-valued or dismissed entirely (Britton, 1989). Development of a common SA is unlikely without communicating information throughout the entire response organization (Rui Chen, Sharman, Rao, & Upadhyaya, 2007). Because of differing perspectives, leadership personnel may interpret information different than line personnel (Starbuck, 1983) leading to differing SA between the two levels. Differing backgrounds, demographics and even response disciplines affect individual interpretations of the same information leading to diverse SA (Bigley and Roberts, 2001). Organizational leaders that fail to establish a system wide SA have difficulty obtaining buy-in to their efforts of coordination (Wise, 2006). It is this coordination that is important for this study. My focus is on the development of organization-wide SA, as individual SA is lacking in its impact on coordinating a multi-agency response.

The pre-existing structure of an IMT gives its members an advantage in understanding one another's roles, decision making and actions. This shared understanding helps to anticipate future actions and needs (Salas and Cannon-Bowers, 1993). It is still a huge obstacle for IMTs to develop good system wide SA (McLennann et al., 2006). They may develop SA internal to the team in relation to each other, but still struggle with developing an overarching SA to the response. This is especially true for teams that respond to new jurisdictions, as they are unfamiliar with local information. They are unfamiliar with local geography, responder and resource networks, and local politics. This is where EMONS of local responders have the advantage in having an understanding of the lay of the land, literally and figuratively (Choi & Brower, 2006; Gillespie & Murty, 1994). Because of this home field advantage, I propose that EMONs will be able to develop and maintain SA better than IMTs.

Hypothesis #10 – Directional: EMONs will develop a higher degree of situational awareness than IMTs during a response.

Null hypothesis: There will no difference in the level of situation awareness between EMONs and IMTs.

Support

During the early hours of the September 2012 Creek County wildfires, I responded to the area with my IMT, which is composed of a group of law enforcement officers. After the team arrived, they began gathering information from various personnel on the ground to gain SA of the operation. As they were walking around taking notes from their conversations, I was pulled to the side by one of the local Sheriff Department commanders. He proceeded to tell me that this was "his back yard" and that we had no jurisdiction there. He demanded that I provide him with "all the notes" that my personnel were taking. I informed him that we were not there for law enforcement purposes, but for assistance in command post operations. I also told him that the notes we were taking were to provide documentation for his jurisdiction, in order to better help them make decisions and recover costs for the response. The notes were being taken specifically to give to his jurisdiction's emergency manager.

Part of this responder's skepticism in having the IMT there came from his feeling that we were subverting his authority. Another part stemmed from his lack of understanding the role of an

IMT. These two feelings are quite common in a responder's level of support given to an IMT. The authoritative and moral support given to any component of a response impacts the overall response (Uhr, 2009). It provides legitimacy to the organization, without which individual or collective efforts may prove ineffective. Ultimately, only those entities deemed as legitimate will continue operations (M. W. Allen & Caillouet, 1994). Thus, it is imperative for response structures to receive the legal, administrative and logistical support of incident stakeholders. As one of the least researched of the intervening variables for this study, support is no less important.

Dynes (1994) shows that pre-incident authority carries over into a disaster, providing the initial level of legitimacy. First response agencies (police, fire, or emergency medical) typically carry the authority needed to make decisions and take actions. In the initial stages of a response, these agencies are so focused on addressing the tactical issues (McBride, 2013) that they may fail to develop much of a structured response (Donahue and Tuohy, 2006). As was discussed in the section for coordination, what is often seen is a structure built on the interests of the individual agencies comprising the response (Templeton, 2005). This reinforces Drabek's (1983) contention that overarching response networks are seldom managed appropriately. As the response gains headway, it tends to gain more support and agency specific boundaries diminish. As this occurs, individual participants begin to support more of the overall goals of the response than their own.

As the structure develops further, on-lookers (other response agencies, elected officials, and other stakeholders) are watching the process. The more the structure aligns with their expectations, the more it is perceived as legitimate (Bedeain, 1989). Legitimacy increases the stability of a response network (Milward & Provan, 2003). The more legitimate the structure, the greater the support. This becomes important because to be successful, the response team must be trusted (Dercole, 2006). Managerial support increases a team's cohesiveness (Wendt, Euwema, & van Emmerik, 2009), to be discussed more below. Legitimacy also breeds accountability where the stakeholders expect results. A system that is deemed legitimate will draw more support from these stakeholders in the form of resources. Astute response leaders understand the need for support from agency and political heads (Flin, 1996; Harrington, 2011). Research shows that providing dedicated resources for a system improves the implementation of that system (Edwards, 1980; Keiser & Meier, 1996). As the legitimacy of the system grows, the organization may also be afforded more autonomy. This autonomy can improve how quickly the structure is able to respond to the changes of the operation (McBride, 2013). Flin (1996) posits that teams must be provided the leeway to take whatever actions they need to fully address specific issues in the midst of a chaotic response.

Hancock's (2009) study of the ICS implementation in Alberta, Canada indicates management support for ICS users. Most other researchers disagree, indicating that ICS support is limited (Jensen, 2008, 2009, 2010, 2011; Jensen & Yoon, 2011; Neal & Webb, 2006). Either way, IMTs are becoming more prevalent in the emergency management realm, albeit still with limited exposure. They do not exist in many jurisdictions so teams may respond to outside jurisdictions. Being outsiders, they often face resistance to accept them (Donahue and Tuohy, 2006). Within communities that have IMTs, many response agencies are still unfamiliar with them. Even though IMTs are more function-based than discipline specific (Perry, 2003b), many jurisdictions are unfamiliar with what they are or what they are intended to do. This lack of familiarity can greatly limit the overall effectiveness of the team (Kartez & Kelley, 1988; Nickerson, Brock, & Reeves, 2006). Being unfamiliar with the teams or the processes, local elected officials may also not support the IMT (Howitt & Leonard, 2005). Some local responders are averse to use resources from others jurisdictions as it is perceived as abdicating their authority. NIMS components, however, are not intended to usurp local authority (U. S. Dept. of Homeland Security, 2008d). Ad hoc teams, on the other hand, are typically comprised of local responders that are familiar to the stakeholders. For this reason, I expect EMONs to automatically bring a higher level of legitimacy than IMTs.

Hypothesis #11 – Directional: EMONs will have a higher level of support than will IMTs.

Null hypothesis: There will be no difference in the level of support between EMONs and IMTs.

Team Cohesion

It almost goes without saying the increased group cohesion increases team effectiveness (McKenna, 1994), just as a lack thereof decreases it (Smith, 2000). That is why Wendt et al (2009) tell us “An important correlate of effective teamwork is cohesiveness of the group.” (p. 358). But for this study, I focus on the grouping of individual members as opposed to the collective as a whole (Friedrich et al., 2009). I am more interested in what factors exist that allows individual responders to group together to overcome the obstacles in a disaster.

It is not in the nature of members of host agencies to easily set aside their loyalties and invest in a newer or temporary structure (Moynihan, 2009). They must work out the conflict of serving the short term needs of the new structure over the long-term needs of their host agency (Drnevich et al., 2009). Their tendency is to work within proven interpersonal relationships (Lambright, Mischen, & Laramee, 2010). The characteristics of these relationships determine the success or failure of a group (Barsade, 2002; De Dreu & Weingart, 2003). The level of trust that exists between the respective team members really determines these dynamics. This is why trust is another, but separate, variable for this study. In this variable, I am looking for the degree of “teamness,” also called collective efficacy, a group develops (Salas and Cannon-Bowers, 1993). It is this quality that creates the atmosphere for teamwork. It is also the quality that helps to determine the difficulty level at which the group will set their objectives (Durham et al., 1997). As individual members identify more with the group, they begin to align their individual goals with those of the group (Bushe & Coetzer, 2007). That is why Crichton et al (2005) proposes that IMT members possess an aptitude for teamwork. Templeton (2005) considers the inability of EMONs to develop teamwork prior to a crisis as their biggest disadvantage. However, Bushe and

Coetzer (2007) propose that individuals can effectively bypass the need to feel a part of a group if the grouping process focuses around specific tasks.

Teamwork is not something that can be forced, nor simply assumed. It must be experienced to be achieved. It occurs as individuals work together in a give and take environment toward a common objective (Salas and Cannon-Bowers, 1997). Team members get to experience the aptitudes, capabilities and attitudes of one another (Stanley, 2003). Individual team members must possess a competency in order to be considered part of the team (Salas and Cannon-Bowers, 1993). Repeated interactions and interpersonal awareness will increase trust to the point of anticipating the needs of other team members (Andrew & Carr, 2013). Cohesive teams can progress to the point where they play off one another's strengths, increasing effectiveness (Grosse, 2007). Once attained, team cohesion reduces interpersonal conflicts (Friedrich et al., 2009). Cohesiveness is the result of the trust developed among the individuals across the network (O'Brien, 2010). With an eye toward supportive relationships, cohesive teams seek to work together (Mahoney & Weitzel, 1969).

While it is typically thought that teams get better the longer they are together (Austin, 2000), this is not always the case. All teams experience a degree of fluid participation (Cohen et al., 1972) in which member's devotion and commitment ebb and flow. It is also possible for team members to interpret decisions and actions by group leaders as preferential to other members. Even though a group might be quite familiar with one another, if the team is not cohesive, these perceived inequalities will prove detrimental (Friedrich et al., 2009). If inequalities are perceived and interactions of group members continue, there is the potential for retaliation between members (Lambright et al., 2010).

Another obstacle can be the development of groupthink, when a team becomes so close to the point of excluding deviation (Eaton, 2001). Weick (1987) warns against the group becoming so homogeneous that there is no diversity in their collective experiences and expectations of the response. There is also the danger of team members being too closely identified as a group. The sub-par performance of one member could reflect on the performance of the whole team, hindering the development of an adequate response (Flin, 1996; Lagadec, 1993). One other obstacle of cohesion is the formation of cliques within the overall team (Pittinsky & Simon, 2007). If these in-groups develop, they may begin to serve their own purposes as opposed to the goals of the group.

Efforts to stem off some of these obstacles to cohesion must occur for groups to continue to exist. Team building exercises can keep individuals focused on the group. Research demonstrates that a mix of informal socializing within the group along with external individuals can positively affect group effectiveness (Oh, Chung, & Labianca, 2004). Sahin (2009) shows an increase of group effectiveness of almost 40% for efforts to increase interpersonal relationships within groups.

The interaction of individuals then becomes the definition of team cohesion sought in this study. With IMTs being an on-going concern, there is more opportunity for individual team members to become more familiar and comfortable with one another as opposed to the temporary nature of EMONs. For this reason, I expect that IMTs will exhibit a higher degree of team cohesion that EMONs.

Hypothesis #12 – Directional: IMTs members will experience higher levels of team cohesion that EMONs.

Null hypothesis: There will be no difference in the levels of team cohesion between IMTs and EMONs.

Training Levels

Training is included as a variable because almost every empirical study on NIMS, ICS or IMT cites training as a factor, either positively or negatively, to the success of implementing NIMS or ICS (Annelli, 2006; Autrey & Moss, 2006; Bauer, 2009; Buchman III, 2005; Can, 2006; Carwile, 2005; Crichton et al., 2005; Donahue et al., 2009; Jensen & Yoon, 2011; M. K. Lindell et al., 2005; Lutz & Lindell, 2008; Mason, 2006; McLennann et al., 2006; Neal & Webb, 2006; Norton, 2007; Templeton, 2005). In more practical terms, the New York Fire Department's assessment of internal changes post-9/11 cites the need for continuous training (McKinsey & Company, 2002). Hancock (2009) discusses the impact on responders of limited ICS training opportunities. With this much weight given to the topic, I would be remiss not to include it. Beginning from the premise of the importance of training to implement the ICS, I will examine other dimensions of training.

Quarantelli (1988) notes that the management of an emergency requires implementing the most appropriate tactics for a given situation. Responders need a wide range of knowledge of various tactics which begins with training and is enhanced through exercising these skills regularly. Just as with varying experience levels, limited training inhibits a responder's awareness of potential options for a response (Harrington, 2011). Practicing the application of skills, especially within a team format, determines what McBride (2013) terms the fitness of team members within the overall system. It allows them to apply their various skills and expertise to differing situations to ensure that they work together. While training is more of an individual benefit, exercising skills tests the overall organization by checking the coordination of an individual's respective skills. This becomes important because of the unique nature of different teams of responders (Dercole, 2006). Testing their unique mix of skills and aptitudes against various scenarios determines the width and breadth of team capability. Technical proficiency in one arena does not always transition over to another. As discussed under team cohesion, testing under differing stressors increases their coordination skills.

Numerous standards exist regarding the training of individual responders for ICS and as a group for IMTs (Emergency Management Institute, 2012; Metro Chiefs, 2004; National Fire Protection Association, 2014; National Wildfire Coordination Group, 1994b, 2012; U. S. Dept. of Homeland Security, 2008b). Beginning with the Presidential Directive requiring the establishment of NIMS (Bush, 2003), the aim has been to standardize responses into one system. The ICS training guidelines are based on the assumption that anyone trained in ICS will be able to operate within the system at any time and place. The results of Hancock's (2009) study contradict this assumption. Some researchers focus on the stumbling blocks to achieving standardization (Neal and Webb, 2006, Jensen, 2008), while others focus on the advantages of attaining it (Buck et al., 2006, Donahue and O'Keefe, 2007, Crichton et al., 2005). Ultimately, the individual agencies use whatever expertise they possess to move from reactive to proactive response (Deal, de Betterncourt, Huyck, Merrick, & Mills, 2006).

This is done either through the development of an ad hoc EMON or the mobilization of an IMT. The upward scaling of an incident increases the likelihood that response leaders are faced with unique situations for which they may be unaccustomed (Simpson and Hancock, 2009). The natural tendency is to assign responders based on rank and assignment, rather than individual ability (Smith, 2000). This is one of the main benefits of an IMT over an EMON. McLennan et al (2006) notes that starting the response with a core of trained IMT members as opposed to a "scratch team" helps to jump start the response. The preferred mode of deployment for IMTs is to plug into the local ICS structure, providing support to local ICs, as long as they have an appropriate level of training and understanding of ICS (National Incident Management System Consortium, 2007b). However, disparate training levels between responders across the response can become an obstacle (Templeton, 2005, Dercole, 2006). There is also a need for cross training of various functions, which adds to a team's understanding of anticipating one another's needs (Schaafstal et al., 2001).

Harrington's (2011) findings indicate that training improves a responder's ability to detect potentialities during an incident. By receiving training on a wide array of situations, responders increase their decision making capabilities (Crichton et al., 2005). Realistic training scenarios decrease the stress levels of responders (Auf Der Heide, 1989; Paton & Flin, 1999). Thus, the operational definition cannot simply focus on the level of ICS training, but must include the wider spectrum of an all-hazards response.

With this study focusing on the implementation of ICS, I will examine the varied training between IMTs and EMONs. The intent of the IMT training process is the tiered training, culminating in the certification of a responder in a specific function of ICS. Templeton (2005) explains the need for continued training beyond a mere ICS proficiency into various aspects of team dynamics. There is almost no doubt that IMTs will possess higher levels of training in all things ICS, as well as disasters as a whole, when compared to EMONs. In addition to this initial training, on-going teams also have the opportunity to practice their skills through regular group exercises. Emergence, on the other hand, is not dependent on an individual's level of training (Petrescu-Prahova & Butts, 2008). The biggest obstacle is that there is no exact method to measure a competency in emergence.

Hypothesis #13 – Directional: IMTs will have higher levels of training to aid in the implementation of ICS than will EMONs.

Null hypothesis: There will be no difference in the training levels for IMTs and EMONs.

Trust

It is without question that trust is a key element in the effectiveness of any collective endeavor (Costa, 2003; Oh et al., 2004; Rousseau, Sitkin, Burt, & Camerer, 1998; Schobel, 2009). While held in high regard for its benefits, there is no single definition for trust (Kramer, 1999; Rousseau et al., 1998). Trust exists in many dimensions within a multitude of interpersonal and interorganizational relationships. In the broadest sense, trust involves one entity making itself vulnerable to another (Mayer, Davis, & Schoorman, 1995; Schobel, 2009). How much one party chooses to be vulnerable is based on how much they believe the other party to be capable, open and reliable (Mishra, 1996). Therefore, trust is a conscious effort based on perceived qualities of another party.

Given the agreement of the impact of trust among and between stakeholders, it is easy to see its applicability to the disaster realm. Trust is the basis for relationships throughout the NIMS requirements (Jensen, 2010). It serves as the pathway by which individual parts of a system work out solutions (Bachmann, 2001) and can impact the entire response system (Uhr, 2009). Rousseau et al (1998) tells us that trust simultaneously covers the gamut of actions, interactions, and the structures of which organizations are a part. As such, trust is the basis for interagency coordination (Moynihan, 2009) where the actions of one entity (individually or organizationally) are interdependent with another (Jagd, 2010). This makes it very welcome in the disaster realm (Dynes, 2002, 2005; Koh & Kadigan, 2007). Within disaster environments, trust comes into play because individual participants must work together with or without clear direction and protocols (Axelrod & Cohen, 1999). As chaos increases, this is particularly applicable as attempts to control become less effective and trust becomes more important (Jagd, 2010). The simple existence of trust within a network does not automatically focus efforts on a common objective (Bennis, 1959). But Uhr (2009) reminds us that it does create an atmosphere where the stakeholders are more open to novel approaches to crises.

Understanding the need for trust, I determined several of its benefits. At the basic level, trust serves to bring a group together as a team, allowing participants to share resources (Esser, 2008). In the building of a team, the individuals are more willing to work together and share information with one another (Aghabakhshi & Gregor, 2007; Beaudoin, 2007; Kramer, 1999). The sharing of resources allows for a quicker response to needs as they arise (Oh et al., 2004). As this trust intensifies, individuals move to a level of interdependence in which tasks cannot be performed without relying on others (Rousseau et al., 1998).

This working environment is built upon the concept of social capital (Coleman, 1988) as the basis for interactions. Social capital is the currency upon which social interactions occur. Individuals and organizations extend "credit" to another on the belief that they will receive something back, or at least will not be taken advantage of. Thus, trust is building on the likelihood of future interactions between the two parties (Lambright et al., 2010). The system becomes cyclical as one trusts another and it is reciprocated, the two parties build stronger relationships, which builds more trust for future interactions (McGuire, 2006; Vangen & Huxham, 2003). As these relationships grow stronger, individual job satisfaction increases (Costa, 2003, Dercole, 2006). As this social capital increases, the better one party can understand and project likely actions of the other (Bachmann, 2001). And as more parties become involved in this social network, the more capabilities that may be made available for each participant involved (Kapucu, 2005).

Not all groups are allowed the luxury of moving through all of the team building phases discussed in the literature. Bushe and Coetzer (2007) recognize that some groups work together simply to accomplish a definite goal, never developing a real interpersonal relationship. Their research indicates that these groups will perform with less effectiveness. The early interactions of a group greatly impact all ensuing interactions of the individuals (Vlaar, Van den Bosch, & Volberda, 2007). Trust develops an environment conducive to cooperation and performance (Dirks & Ferrin, 2001). Dawes et al (2004) shows that trust built over time creates a more stable working relationship.

In this present study of effective response for IMTs and EMONs, I consider many dimensions of trust. First, there is trust placed in an organization itself, also called institutional trust (Luhmann, 1979). This deals more with the processes at work than the actual organization. Zaheer et al

(1998) points out that inter-organizational trust simply allows groups to work together toward a common goal, without a true environment of mutual trust. On the other hand, interpersonal or relational trust exists at the individual level (McKnight, Cummings, & Chervany, 1998; Rousseau et al., 1998; Zaheer, McEvily, & Perrone, 1998). These two types of trust become important in the disaster realm. For IMTs and EMONS, there are many situations where individuals across boundaries are familiar with one another. This can create a response where relational trust exists while institutional trust is developing (Kroeger, 2012). There may also be times when the players are unfamiliar with one another, but individuals are familiar with other organizations merely by reputation. Research shows that institutional trust can stand in the gap in the absence of, or during the development of interpersonal trust (Shapiro, 1987). Where this occurs, organizational members are vested with a level of trust simply by virtue of their association with that entity (Kroeger, 2012). This identification-based trust (Lewicki & Bunker, 1996) is one of the most fragile in working relationships as it has no basis of trust in specific qualities of an individual. In this environment participants exhibit cordial behavior to one another but no real trust exists (Solomon & Flores, 2001). Relational trust builds over time and increases with interaction with the other person. It is also the most resilient type of trust, able to withstand letdowns and obstacles to the relationship (Rousseau et al., 1998).

Another type of trust that becomes important to this study is an understanding of initial (McKnight et al., 1998) or swift trust (Drnevich et al., 2009). In the context of disasters, responders are often thrown into an environment where they must work with numerous others. Some may have interacted previously on many levels, while for others, this will be the first interaction. This initial trust is similar to the identification-based trust in that the trust extended is based more on situational traits than individual ones. Some possible traits that build trust are agency, responder discipline, demeanor, and even the way someone looks. Working within an organization setting, institutional trust usually dominates relational trust as the group works within the organizational structure (Zaheer et al., 1998). Working the other direction, from personal to organizational trust, an individual must be vested with appropriate qualities (Nooteboom, 2006). These qualities include their status and position with the organization.

McKnight et al (1998, p 473) states “Arguably, the most critical time frame for organizational participants to develop trust is at the beginning of their relationship.” Dirks and Ferrin (2001) caution that the toughest time to develop trust is in the midst of an organizational crisis. As such, it is important to understand what enhances and what detracts from trust. Within the response structure, whether developed on the fly or preplanned, subordinates must feel they are trusted by those above them (Blau, 1964). Subordinates who experience a supervisor’s commitment to an ongoing relationship more easily develop trust (Goffman, 1953). This environment of trust decreases the need for using power and control to achieve results (Bradach & Eccles, 1989; Dekker, 2004). And as the relationship continues with more interaction between the parties, trust becomes easier (Lambright et al., 2010).

Even though these positives exist, trusting relationships are difficult to maintain (Burt, 1997; Granovetter, 1973). Within an organizational setting, groupings where interpersonal trust overshadows institutional trust may exist. When this occurs, cliques occur where certain individuals insulate themselves from the overall group structure (Lambright et al., 2010). Particularly in the disaster realm, many responders come together for a large response and never work together again (Bigley and Roberts, 2001). It is also quite common to have various entities play different roles within a response, where one agency is more invested in the response than another or has a larger role (Donahue and Tuohy, 2006). In this atmosphere, individuals may feel no need to develop an ongoing relationship and never develop high levels of trust. Missed opportunities for coordination and collaboration result from these low levels of trust (Holsapple & Sasidharan, 2005; Wells & Kipnis, 2001). Weick (1987) discusses that the tendency to develop trust diminishes as the diversity of a team increases. This could be a bigger potential issue for an EMON than an established IMT.

Even more detrimental than situations where trust fails to develop are situations where it is built and then breached. Trusting relationships are always subject to interpersonal and organizational politics (Mizrachi, Dori, & Anspach, 2007). Some entities simply prove themselves to be untrustworthy (Provan and Milward, 2001), either through lack of commitment, by being unreliable, or by over-extending their trust. This creates a situation where the risks involved far outweigh the perceived benefits from an interaction (Schobel, 2009), a typical case of "asking too much" of others. Kroeger (2012) tells us that, if large enough, a single breach of trust is all that is needed to destroy a trusting relationship. Once lost, it is harder to re-establish than it was to develop in the first place.

For trust as it relates to IMTs, Buck et al (2006) notes that there needs to be a degree of institutional trust by responders applying ICS along with relational trust in working with other responders. McLennan et al (2006) adds that trust aids in the decision making process for IMT members. The teamwork aspect of response is gained from their common learning, goals and experiences which tie them together (Buck et al., 2006). The caveat within ICS is a tendency to revert to a reliance on control, especially across jurisdictional and agency boundaries. This reliance on authority falls short without having a base of trust among a core group of responders within the response (Moynihan, 2009). Also, trust in the IMT can be dependent on who is the point of contact for the team with other agencies (Kroeger, 2012). If this person fails to establish a level of relational trust, their attributes may be projected as existing in all team members, and the team as a whole is not trusted.

In studying the Alabama tornadoes, McBride (2013) shows that responders tend to rely on informal networks more than formal. This was earlier observed in the WTC attack where local responders operated more within their pre-existing relationships (Voorhees, 2008). Several other researchers have also noted the benefits of both formal and informal relationships that exist before a crisis occurs (Kapucu, 2006; Renaud, 2012; Soliman, 2005; Wachtendorf, 2001). Relationships can be bolstered by casual, non-intentional, even social interactions among the individuals (Krackhardt and Stern, 1988, Zaheer et al., 1998). One reason may be that these smaller informal structures provide more support than do larger structures (Zhao & Dalen, 2006). Another benefit of these pre-existing relationships is they allow for a more rapid creation of a response (Meyerson, Weick, & Kramer, 1996). Rousseau et al (1998) notes that the ability to self-organize during times of flux exists among trusting groups. These pre-existing and on-going relationships help to bolster the argument for the effectiveness of EMONs.

In order to appropriately conceptualize trust for this study, I do not simply look at the trust of EMONs and the control of IMTs as the two opposing ends of the argument for creating a successful structure for response (Costa & Bijlsma-Frankema, 2007). There must be a balancing of the two concepts to create adequate balance during a response (Jagd, 2010). At times, lead decision makers must rely more on trust, but then must exercise control to keep a response moving forward under the ICS.

Having this understanding of trust, I anticipate that IMTs will have a greater level of institutional trust based on their experience and training. They are also likely to have high levels of trust within the team. However, the trust level for the individual members or the team as a whole will not be as high as EMONs that are established with responders local to the disaster jurisdiction. EMONS are expected to have instant trust as they arrive on the scene, which they can call upon to get the response rolling. IMTs may only experience a cordial level of trust, but then be made to earn everything from that point forward. And disaster situations are difficult environments to begin this trust building relationships. As such, I anticipate the EMONs will have higher levels of trust when first entering a response.

Hypothesis #14 – Directional: EMONS will experience greater levels of initial trust than IMTs.

Null Hypothesis: There will be no difference in the levels of initial trust between EMONs and IMTs.

LITERATURE REVIEW CONCLUSION

Given that effectiveness exists on different planes in differing fields, there is no easy method to define it. It is for this reason that this research of IMTs examines the presence of several intervening variables. Each variable has independently been shown to impact effectiveness; however, this study will determine their affect both individually and collectively. Each variable has a projected impact for IMTs to determine its significance toward effectiveness.

Hypothesis #1 - Directional: IMTs increase the perceived effectiveness of implementing ICS.

Hypothesis #2 (Improvisation) – Nondirectional: There will be differing levels of improvisation in IMTs than EMONs.

Hypothesis #3 (Emergence) – Nondirectional: There will be differing levels of emergence in IMTs than EMONs.

Hypothesis #4 - Directional: IMTs will have a higher degree of delegation than EMONS.

Hypothesis #5 – Directional: IMTs will have more interorganizational communications than EMONs.

Hypothesis #6 – Nondirectional: There will be differing levels of interorganizational coordination between IMTs and EMONs.

Hypothesis #7 – Directional: There will be a higher level of established leadership in IMTs over EMONs.

Hypothesis #8 – Directional: IMT members will have higher levels of prior disaster experience than EMON members.

Hypothesis #9 – Directional: IMTs will have a greater level of role clarity than EMONs.

Hypothesis #10 – Directional: EMONs will develop a higher degree of situational awareness than IMTs during a response.

Hypothesis #11 – Directional: EMONs will have a higher level of support than will IMTs.

Hypothesis #12 – Directional: IMTs members will experience higher levels of team cohesion that EMONs.

Hypothesis #13 – Directional: IMTs will have higher levels of training to aid in the implementation of the ICS than will EMONs.

Hypothesis #14 – Directional: EMONS will experience greater levels of initial trust than IMTs.

CHAPTER III

METHODOLOGY

LITERATURE REVIEW

The issues I address in the literature review are the driving force for this study (Drabek, 1997). As Uhr (2009) states, individual interactions better define a multi-organizational response. To understand the respondents' perception of the overall effectiveness of IMTs and EMONS for disaster response, I have to understand what characteristics exist at the individual level within these groups, and to what degree. Thus, the intervening variables (Creswell, 2009) are pivotal for this study. With each one being supported independently, I can imply the validity of each variable to this study. As well, it is not feasible to make the direct leap from IMT membership to effectiveness, without having an understanding of what may or may not make IMT's effective.

To develop a strong understanding of the variables; dependent, independent and intervening, I conduct an extensive literature review. The computer databases search engines PROQUEST and EBSCO and GOOGLE SCHOLAR were used for the literature review. Using these, I searched different variations of the dependent variable "effectiveness" – such as "effectiveness in disaster" or "effectiveness in response". These searches resulted in numerous references to develop a strong basis for the characteristics of what makes for an effective disaster response.

Next I combed for existing research on IMTs, the independent variable. This was more extensive as the literature was more limited. In addition to the above databases, I searched of the digital libraries of the U. S. Fire Academy (USFA) and Homeland Security Digital Library (HSDL).

The HSDL is the repository for research conducted at the Naval Postgraduate Center for Homeland Defense and Security. Using these resources, I searched for the following key words: “Incident Management Team(s)”, “Incident Command Team(s)”, and “Teamwork during emergency/disaster”. As individual references were obtained and reviewed, I used the reference lists for follow up resources. I used the same process and resources to search for EMONs.

Terms of several attributes or characteristics, such as “flexibility,” “trust,” “experience” and others were repeated throughout the review of the literature of effectiveness and IMTs. It became apparent that there was no direct linkage between the two without one, or multiples, of these characteristics existing as well. I pared down the list to a more manageable level of twelve characteristics. Then I reviewed the databases on each of the intervening variable terms, coupled with the terms “disaster,” “emergency,’ or “crisis”. Repeating the process described above, I followed up on applicable research from the reference lists of each source.

TYPE OF RESEARCH DESIGN

As noted in Chapter One, this research is a study of the microtheory (Babbie, 2004) of Incident Management Teams. To be able to detect effectiveness within IMTs, I could not determine the overall effectiveness of the team as a whole. I have to understand the smaller unit of the individual to begin to understand the larger unit of the whole team. Following Uhr (2009), I examine the interactions of the individuals within these teams as well as their interactions with outside agencies and agents. This understanding provides me with an understanding of the overall team.

With no existing research covering the spectrum of this study, the overall intent of this study is exploratory. The design of this research is a quantitative design using an internet survey to be able to reach a wide array of responders across several states. Internet surveys allow for a broader audience while also minimizing the cost of the project. I distributed the surveys and collected the results electronically, aiding in the timeliness of conducting the research.

This method allows me to obtain a cross-sectional design (Fitzpatrick et al., 2004, O'Sullivan et al., 2003) from a variety of responders and IMT members. The cross-sectional design provides the following benefits for this project: (O'Sullivan et al., 2003)

- Many variables
- Large group of subjects
- Geographically dispersed
- Acceptable level of reliability

The low response rate is the biggest drawback for this study (O'Sullivan et al., 2003). I will expand more on this later in the results chapter.

POPULATION, SAMPLE, AND PARTICIPANTS

Unit of Analysis

Individual members within an Incident Management Team are the unit of analysis (O'Sullivan et al., 2003) for this present study. The IMT is contrasted with the control group of responders who are part of an ad hoc response, or EMON. I surveyed these two groups in their capability and experience of implementing the ICS for disaster response.

Sampling Unit

Individual emergency responders who identify themselves either as members or non-members of an IMT also become the sampling unit (O'Sullivan et al., 2003).

Population

FEMA Region VII, which includes Kansas, Iowa, Missouri and Nebraska, is the focus of this study. Choosing an entire FEMA region allows a wide array of responders from multiple disciplines. They are not clumped so close together that they are limited to a singular experience level in ICS application, nor disasters as a whole. They have experience across a multitude of responses, as well as sizes and types of jurisdictions. I sent the survey to responders from law enforcement; local police, county sheriff, and state agencies. I also sent the survey to fire agencies and emergency medical services (EMS), whether imbedded within a fire department or as a stand-alone agency. I also presented it to emergency management agencies at the local, county and state level.

LOCATION	POPULATION	PERCENTAGE
United States	321,418,820	
Iowa	3,123,899	.97%
Kansas	2,911,641	.91%
Missouri	6,083,672	1.89%
Nebraska	1,896,190	.59%
Cumulative Percentage of U. S. Population		4.36%

TABLE 3: FEMA Reg. VII Population (U. S. Census Bureau, 2016).

The composition of FEMA Region VII gives us a fairly generic region in terms of population, number of responders and disaster history. None of the states in the Region have any of the top tier population centers as far as jurisdictions. According to the U. S. Census Bureau, the population of the four states that comprise FEMA Region VII contains 4.36% (see Table 3) of the United States (U. S. Census Bureau, 2016). Averaging out the total U. S. population would yield each of the 50 states having 2% of the total. As such, each of the four states in Region VII is below the national average, with Missouri being the closest at 1.89%.

OCCUPATION	U. S.	IOWA	KANSAS	MISSOURI	NEBRASKA	FEMA REGION VII
Emergency Management	**5,180**	**220**	**200**	**190**	**110**	**720**
Emergency Medical Technician or Paramedic	**65,470**	**2,530**	**2,600**	**5,790**	**1,120**	**12,040**
First line supervisor – firefighting	**55,570**	**460**	**1,050**	**1,420**	**360**	**3,290**
Firefighter	**281,200**	**1,850**	**3,710**	**6,850**	**1,040**	**13,450**
First line supervisor – law enforcement	**79,430**	**790**	**1,440**	**2,450**	**680**	**5,360**
Detective / investigator	**45,690**	**530**	**880**	**1,690**	**230**	**3,330**
Police patrol or sheriff deputy	**547,520**	**4,950**	**6,030**	**12,710**	**3,370**	**27,160**
COMBINED OCCUPATIONS	**1,030,047**	**11,330**	**15,910**	**31,200**	**6,910**	**65,350**
PERCENTAGE	**-**	**1.1%**	**1.5%**	**3.0%**	**.7%**	**6.3%**

TABLE 4: Responder Occupational Data for FEMA Reg. VII (Bureau of Labor Statistics, 2016).

The occupations reviewed for this study include law enforcement, fire and EMS and emergency management. Federal statistics (Bureau of Labor Statistics, 2016) for occupational data for traditional first responder disciplines is listed in Table 4. Many fire personnel are cross-trained as EMS, however, for these statistics EMS is listed as a separate category from fire. The statistics do not distinguish between those responders that may be identified as both. It is quite common for police or fire personnel to be assigned the duties of an emergency manager, especially in smaller jurisdictions. As such, it is also possible that there are duplications in the numbers for emergency management personnel with police or fire. There is no way to determine if this has occurred in the statistics reviewed. As such, each is assumed as a stand-alone occupation.

As with the population of these states, the overall national average for responders for all 50 states would be 2.0%. Thus, Iowa, Kansas and Nebraska have a below average number of responders while Missouri has a slightly higher number. Thus, the population (O'Sullivan et al., 2003) for this survey contains all responders within FEMA Region VII.

To better understand the applicability of using Region VII for this study, I also examine the disaster history for the region. According to FEMA (FEMA, 2016), there have been a total of 3,596 disaster declarations issued for the 50 states. These include emergency and disaster declarations as well as fire management assistance declarations. Again, looking at a national average of 2% per state, Region VII states are all just under by merely a few tenths of a percent (Table 5).

LOCATION	DECLARATIONS	PERCENTAGE OF TOTAL DECLARATIONS
U. S. (50 states)	3596	
Iowa	60	1.7%
Kansas	57	1.6%
Missouri	68	1.8%
Nebraska	60	1.7%
FEMA REGION VII	245	6.8%

TABLE 5: Disaster Declarations for FEMA Reg. VII (FEMA, 2016).

The typical hazards or disasters for these states are (FEMA, 2014):

- Flooding
- Tornadoes
- Severe weather
- Winter storms

Thus, in all aspects considered (overall population, responders population and disaster history), the states of Region VII are below the national averages. This factor decreases the likelihood of potential outliers in terms of bias presented by major metropolitan jurisdictions and the agencies within them. Absent the May, 2012 Joplin, Missouri tornado, there are no national level events that occurred in terms of disasters. This decreases the likelihood of a bulk of the responders having personally experienced responding to a catastrophic incident, particularly the same one. Responding to these types of events requires a higher order of response than do disasters (Pawlowski, 2012; Quarantelli, 2006; Rodríguez et al., 2006).

Sample Population

I generate the sample (target) population (O'Sullivan et al., 2003) using information from various sources. With this study focusing on IMTs within the overall responder population, I had to employ purposive sampling (Fitzpatrick et al., 2004). The first source is the membership roster of the All Hazard Incident Management Association (AHIMTA) (AHIMTA, 2015). I narrowed the list down to members that reside within the Region VII area. I also conducted a Google search for any IMTs within Region VII that have a website or are listed within the respective jurisdictions. Each of the four states have some IMT information listed on the websites on their respective webpages for the state's Emergency Management or Homeland Security agency (Iowa Homeland Security & Emergency Management, 2014; Kansas Adjutant General's Department, 2014; Missouri Office of Fire Safety, 2014; Nebraska Emergency Management Agency, 2015). This information became the start of my list for the survey. Each state throughout Region VII demonstrates an IMT presence by listing some level of IMT program or training on the webpage.

The next step was to identify responders from multiple disciplines across Region VII. I did this using the webpages of each of the Emergency Management or Homeland Security agencies within the four states. I identified some local and county agencies for the identified responder disciplines. Professional emergency management organizations throughout the states were another source for contact information. They were limited to identifying contacts for emergency management agencies.

Identification of contacts for law, fire and EMS agencies prove more challenging. With no centralized source for these respective agency types, I first had to determine the various individual jurisdictions throughout the four states. To do this, I used the website www.50states.com. I went to the four respective states and generated a list for each discipline; law (police and sheriff agencies), fire and EMS. These lists contain the individual local, county and state jurisdictions that exist for each state, but lacked specific contact information for the agencies other than phone and mailing address. From these lists, I then conducted a Google Search for each agency which then took me to the website for the specific agency. Several jurisdictions or agencies did not have independent websites. From the websites, I collected 978 email addresses for agencies across Region VII. This list then became the basis for my survey sample.

Having a population for Region VII responders of 65350, I set a confidence level (Bernard, 2000) for 90%, with a 3% margin of error. This is used given the fact that this was a purposive sample, rather than a random sample survey. This yields a sample size of 739, which provides a buffer for non-responses (Bernard, 2000; Wright, 1979). However, the non-responses proves greater than anticipated. I received a total of 203 responses to my survey, a 22% response rate. This still yields enough responses for a 90% confidence level, but adjusts my margin of error to 5.75%

Initial Contact with Potential Respondents

All contact with the potential respondents was made via email. Using the email addresses collected, I sent out "Blind Copy" emails in batches by state – Iowa, Kansas, Missouri and Nebraska. Using the blind copy feature hid the email addresses from the respective recipients in order to maintain confidentiality. The email contained information describing the project (see Attachment C). It also explained the intent for the project and encouraged the recipients to forward the email on to other responders inside and outside of their agencies. This then began a snowball sampling portion for this exploratory project (N. Cohen & Arieli, 2011; Stover-Wright, 2013).

DATA COLLECTION

The project's intent is to collect input from individual responders that have taken part in a multi-agency disaster response. In order to adequately identify these responders, I developed a purposive design targeting responders from several response disciplines. These responders were then encouraged to forward the survey email to other responders as a form of snowball referrals. The data collection for this project was done entirely using an online survey via SurveyMonkey.com.

Conducting the survey in this manner posed several obstacles. The first pertains to a purposive sampling of candidates. Cohen (2011) and Stover-Wright (2013) both demonstrate that this method is acceptable for exploratory research. Given that there is no other identified research touching on the full spectrum of this research, this project became exploratory. Once the first wave of potential respondents was reached, snowball sampling was initiated in an effort to attain a wider sample population. Snowball sampling, just like purposive sampling, does not allow for easy generalization of the survey results (N. Cohen & Arieli, 2011; Sadler, Lee, Lim, & Fullerton, 2010). It is also used less often for quantitative research (N. Cohen & Arieli, 2011) than in qualitative formats (Noy, 2008). However, it is possible to obtain valid and reliable estimates from snowball sampling (Heckathorn, 2011). Cohen (2001) goes on to tell us that representativity can be increased by adequately planning how the sample meets the target for the goals of the project. Using random sampling of all responders would not have provided such a focused group of responders that have taken part in multi-agency disaster responses. Therefore, I feel that snowball sampling is appropriate.

Sample bias is a potential for snowball sampling as well (N. Cohen & Arieli, 2011; Ritter & Sue, 2007a; Stover-Wright, 2013). The fact that this project was conducted remotely using Internet resources reinforces the possibility. First, only those agencies which had websites were in the initial wave contacted. Then, the individual responders had to have an email address to receive the survey information. This limits the number and array of respondents taking part in the survey (Thayer-Hart, Dykema, Elver, Schaeffer, & Stevenson, 2010). The likelihood of this bias was decreased by seeking input from responders across the entirety of four states (Heckathorn, 2011). The widespread availability and usage of the Internet in today's world also buffers against this limitation.

Using snowball sampling affords other benefits. Given the expanse of the project across four states, I was able to reach a wide array of responders at a minimal cost within a short period of time (N. Cohen & Arieli, 2011; Ritter & Sue, 2007a; Sadler et al., 2010). By having the first wave of responders forward the survey request to others they knew, I was able to tap into their known networks (Noy, 2008). From the results received I am able to construct a much clearer sampling frame than I could envision beforehand (Stover-Wright, 2013). With the results coming from a narrow band of responders with multi-agency disaster response experience, I am afforded a glimpse of their insight that I could not have attained in a random sample. This makes up for the loss of generalization (Stover-Wright, 2013).

The other obstacle present for this project is a response rate of 22% for the survey. This is typically considered a low response for research (Johnson & Owens, 2003; Nulty, 2008). Thayer-Hart, et al (2010) encourage a 30-40% response rate for online research. However, for numerous reasons, response rates in research have been declining for years (Carley-Baxter et al., 2009; Johnson & Owens, 2003). Response rates for online surveys also are much lower than hard copy surveys (Nulty, 2008). I employed several recommended techniques for increasing the response rate (Nulty, 2008; Ritter & Sue, 2007d). I attempted to persuade the respondents of the importance of this research and their participation as well as sending a reminder email. Instead of purely seeking a higher response rate, I focus more on the total number of responses. This ultimately affords me a total of 203 responses, which is considered suitable for a non-random sample (Ritter & Sue, 2007c).

Survey method

Using SurveyMonkey.com allowed for unlimited questions and responses. It also allowed me to export responses to Excel for data analysis. As mentioned previously, the online capability allowed me wide access to responders from four states. The survey is a mixture of factual, knowledge and attitudinal questions (O'Sullivan, Rassel, & Berner, 2003; Ritter & Sue, 2007b). I present attitudinal questions as Likert-scale items (Fitzpatrick et al., 2004). I include demographic questions regarding the individual respondent at the end of the survey (Ritter & Sue, 2007d). I attempt to keep the survey at an appropriate length to protect against poor survey design (Downes-Le Guin, Baker, Mechling, & Ruyle, 2012).   Instead of strictly limiting the number of questions in the survey, I am more concerned with the time required to complete the survey (Ritter & Sue, 2007d). The survey takes approximately 15-20 minutes to complete.

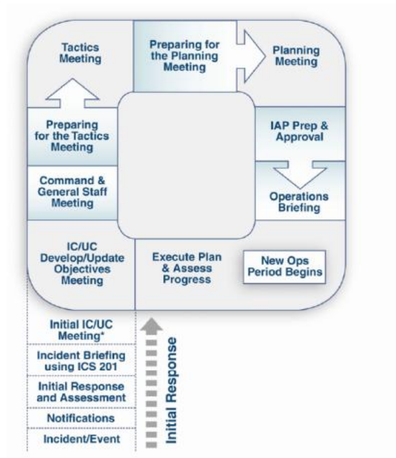

FIGURE 2 - Planning P (U. S. Dept. of Homeland Security, 2008b)

Given the stated intent of the project, I test “effectiveness” using the systems approach by asking both behavior and attitudinal questions. Behaviorally, I establish indicators to identify whether components of the ICS are actually implemented.   Drawing from ICS training modules (Emergency Management Institute, 2012; FEMA, 2007, 2008a), I include tasks and objectives that IMT members are expected to perform. Questions include tasks regarding the following:

- Completion of a variety of ICS forms
- Assignment of personnel to specific functions within the ICS structure
- Creation and use of an Incident Action Plan (IAP)
- Conduct of various briefings and meetings as outlined by the ICS Planning “P” (See Figure 2.
- Conduct of transfer or closeout of command

I ask respondents their perception on how "effective" the response was, both in terms of the overall response and in how well the ICS objectives were met. This allows me to capture a final dimension of the outcome of the response in addition to the outputs listed above.

I also gather factual information particular to any IMT that the responder may be associated with. This information includes the following:

- IMT info – existence of IMT within jurisdiction (nominal)
- Team type (ordinal)
- Size (interval)
- Disciplines involved (nominal)
- Tenure of team (interval)

In addition to the team type, I gather information specific to the individual to allow for analysis of member qualities within IMTs. This information is as follows:

- Highest ICS training level (ordinal)
- PTB completion (nominal)
- IMT membership (nominal)
- Team tenure (ratio)
- Team position (nominal)
- Number of deployments for that position (ratio)

For analysis, several of these qualities, such as discipline, training levels, etc. are converted to dummy variables (O'Sullivan et al., 2003).

Other questions include information about the independent and intervening variables. All of these variables are ordinal, except for the IV, which is nominal:

- IV – IMT membership
- IV2 – Freedom for improvisation
- IV3 – Freedom of emergence
- IV4 – Degree of delegation
- IV5 – Level of interorganizational communication
- IV6 – Level of interorganizational coordination
- IV7 – Perceived leadership of group
- IV8 – Individual's prior experience
- IV9 – Role clarity within group
- IV10 – Situational awareness of group
- IV11 – Support of group
- IV12 – Degree of team cohesion
- IV13 – Level of individual training
- IV14 – Level of initial trust with locals

The final batch of questions gathers the following demographics:

- Age (ratio)
- Race (nominal)

- Sex (nominal)
- Discipline (nominal)
- Agency type (nominal)
- Government level (nominal)
- Educational information (ordinal)
- Agency tenure (interval)

Gathering this information allows the development of a respondent profile to understand if there is any difference in the overall demographics of IMT versus non-IMT responders. While there are no specific hypotheses referencing these demographics, it provides some insight to see whether IMTs are staffed more by one discipline or another, or by more senior versus younger responders.

Once the survey was developed, the Informed Consent was drafted. The IRB approved it and the survey was then pilot tested with emergency responders within the State of Oklahoma.

PILOT TEST

Once the survey was developed, I conducted a pilot test of the survey instrument. In order to develop the same atmosphere as close to what respondents experienced, the survey was tested via SurveyMonkey.com. I distributed the introduction email to responders across the State of Oklahoma. These emails target both IMT and non-IMT members in order to gather feedback on the entire range of questions. Included in the email is a link for recipients to go to the online survey. For the test survey, there was an added section at the end for the respondent's input on the survey. I requested information regarding the length of the survey (number of questions and time to complete), as well as wording and format of the questions. Once these results were received, the survey instrument was revised based on comments received.

With Question 1 identifying those respondents with Type 3 experience, those answering “no” were forwarded to the end of the survey. Those answering “yes” then moved on to the survey. In order to clarify the perspective of the respondents in providing their answers, I added the following statement:

> “Please answer the following questions based on the last multi-agency, multi-operational period incident that you were involved in.”

The other revisions to the test address the Likert scales for each of the dependent and intervening variables. In the pilot test, the Likert scales were all a 10-point scale with only three descriptors, at the 1, 5 and 10 points. I amended them to a 5-point scale with descriptors for each point. This creates a clearer understanding of each of the specific points for the respondents to answer. Question 30 was also reworded for better clarification to read as follows:

> “Indicate the level of leadership provided in establishing a structure for the response by the Incident Commander setting overall goals of the response and creating a sense of teamwork to accomplish these goals.”

The last revision was adding “emergency management” to the list of disciplines as an option for IMT membership to Question 24. This revised survey became the instrument used for data collection.

DATA ANALYSIS

Once collected, I imported responses to the survey into an Excel spreadsheet for further import to SPSS for analysis. I then recoded the data into numeric format to allow for statistical analysis. The questions rendering a simple “Yes” or “No” response were recoded as a “1” and “0” respectively. The questions with a "Yes," "No," or "Unsure" answer were recoded as "1," "2" and "3." The attitudinal questions that were formatted on a Likert scale were recoded from "1" to "5" for the answers from least likely to most likely. The question for AGE was grouped into 7 bands for respondents to select, which was then recoded 1 to 7. Two questions (FUNCTIMES and ORGTENURE) were open questions to allow respondents to enter specific numbers, which were not recoded. The open-answer questions following the attitudinal questions were not recoded as they allowed respondents to address narrative statements of "why" they provided their answer along the Likert scale. These questions were intended to add a qualitative depth to the survey to better understand the reasoning behind their answers. This information sought to add a level of richness to the data not afforded purely by statistics.

I conducted data analysis to determine the below listed descriptive statistics. These descriptives were then used for further analysis on the relationships of the variables to determine statistical significance (O'Sullivan et al., 2003):

- Mean, median and mode – to provide measures of central tendency for the variables.
- Standard deviation – to explain the spread of the mean of the values within a given variable
- Variance – to understand the degree of distribution of the individual responses within each variable and demonstrate how far a response may be from the mean.
- Skewness – to indicate the distribution of the respondent's answers to understand if a particular question is considered internally reliable. When graphed, the skewness provides a visual representation to demonstrate if the answers are evenly distribution across the range.

Q1 served as the qualifying question of being involved in a Type 3 response. For all respondents that answered “no”, all of the subsequent questions were skipped, resulting in missing values. I compensated for these missing values (Ritter & Sue, 2007) by recoding the missing values for those respondents using pairwise deletion for the missing values (Vogt, 1999). This allowed for the model to retain the answers that were supplied while removing only the missing values.

This survey did not involve random sampling. I targeted emergency responders that had experience on Type III or greater incidents. This would allow them to have a depth of understanding needed to answer most of the questions throughout the survey. In addition, I also had to target a group of responders that were known to be IMT members and well as others that were not. From this initial wave of respondents, I then used snowball sampling to reach other responders that were a mix of IMT and EMON members. All of these potential respondents also needed a background of Type III response. The lack of random selection impacted the distribution curves and level of homogeneity throughout analysis (Chen, Qin, & Tang, 2013; Hart, 2001; Zimmerman, 1985). I implemented nonparametric analyses (Gibbons, 1985) to determine any direct or inverse relationships between the variables (O'Sullivan et al., 2003).

The first nonparametric test used was the Mann-Whitney U test (Siegel, 1956; Vermeulen, Thas, & Vansteelandt, 2015; Yue & Wang, 2002; Zimmerman, 1985). I used Mann-Whitney to test each of the DVs, demographic variables, ICS indicators and intervening variables against the IV. The Mann-Whitney U allowed me to analyze for statistically significant differences between the two categories within my IV (IMT membership versus EMON membership) for each variable.

I also had to use a nonparametric test for a correlation analysis. Kendall’s tau-b (Vogt, 1999), like Mann-Whitney, is used for non-normally distributed samples with potential skewness issues. Kendall’s tau-b compensates for these issues, allowing for a better evaluation of relationships than the Pearson’s correlation.

Conducting the above listed analyses allowed me to evaluate each of my stated Hypotheses. The results allowed me to determine which of them were supported. Following the evaluation of my Hypotheses, I conducted multivariate analysis of my IV and 2 DVs against the ICS Indicators and intervening variables. I created Models of these combinations and tested them using linear regression. This allowed me to determine the goodness of fit and develop residual plots for each of the Models, reducing the number of variables to only those that proved statistically significant. I present the results of the various tests in tabular and narrative formats throughout the remainder of this study.

POTENTIAL ETHICAL ISSUES

With this research being conducted in regards to professional standards for emergency response, I do not identify any ethical issues regarding the topic nor subjects of this study. By following IRB and Informed Consent protocols, responses are and will remain confidential. Specific answers provided do not identify any specific respondents. As an added precaution, no specific responses identified to specific location are included from any specifically identifiable respondent. This maintains the integrity of all respondents to the research.

The potential for bias on the part of the researcher is always a concern in research (Hoover & Donovan, 2004). While being an IMT member allows me entry into the world of IMTs, specifically into the AHIMTA, there is the potential for bias. In order to minimize this potentiality, I gathered the research data from a FEMA Region other than where I reside. This also limited the likelihood of personal relationships with several possible respondents (Fitzpatrick, Sanders, & Worthen, 2004). This lack of prior contact also limited known respondents from potentially swaying results based on prior knowledge of the researcher. The other potential bias on the part of the researcher stems from the fact that I have been a responder and IMT member for a number of years. I work to limit this bias through an expansive literature review and adherence to the available research. I tried to minimize sampling bias (Babbie, 2004) conducting data collection from another Region as well as doing it via an internet survey. I further minimized bias on my part as the researcher by conducting the data analysis discussed above.

SUPPORTING INSTRUMENTS

With the research data being collected in FEMA Region VII, I collected disaster and responder data for Region VII. I use U.S. Census data to determine population demographics, as well as Department of Labor data for emergency responder disciplines. I also include Presidentially Declared Disasters for the respective States.

I use other supporting instruments ICS documents published by FEMA, DHS, and NWCG. These instruments help operationally to define the components of ICS that are included in this survey (ICS forms and templates). These documents and tables are presented throughout this study.

RESEARCH ASSUMPTIONS

Several researchers have developed lists of assumptions regarding the need for ICS or coordination (Klein, 1999, Buck et al., 2006, Moynihan, 2009). Collectively, these assumptions consist of an expectation that responders possess some level of ICS knowledge, that individual responders are technically competent and that the response requires a coordinated response by multiple agencies. These same assumptions apply to this present study.

In addition, all respondents are assumed to have been honest and truthful in their responses. Their responses are limited to personal experiences and do not include what they believe the "correct" answer should be. The benefit of their experience is truly the input needed for this study to be meaningful.

CHAPTER IV

FINDINGS

This chapter provides the results of the Internet survey of emergency responders from across FEMA Region VII, which includes Iowa, Kansas, Missouri and Nebraska. With the intent to reach responders that have taken part in Type 3 responses, I targeted the survey toward senior personnel. I initially emailed the survey to the agency heads, chiefs, or directors for emergency management, EMS, fire and law enforcement agencies. In the absence of having the contact information for the lead personnel, I sent the survey to public information or training personnel. The email contains instructions for the personnel to complete the survey as well as encourages them to forward the survey to other responders that they know have been involved in Type 3 incidents. In order to capture the diversity needed for the survey, the instructions were to send the survey on to both IMT and non-IMT members.

A total of 978 emails were initially distributed. Of those, I received a response that 61 were either not available or not deliverable, leaving a total of 917 delivered emails. The survey was completed by 203 (N) respondents, yielding a 22% response rate of the delivered emails. As previously discussed, this response rate is in line with other web-based surveys.

In conducting the various analyses, EMON membership serves as the control against which to measure the impact of IMT membership. Thus, in answering the question for IMT membership, "no" responses provide the control measure. I conduct frequency and distribution analysis on the various components covered in the survey:

- Type 3 incident response experience
- Demographics – gender, age, educational level, organizational level and type, and discipline type.
- IV - IMT membership information
- DV – Success of Response and Overall Effectiveness (both are measured on the perceptions of the respondents)

Following the frequency analysis, I determine which variables to include in my analysis. I conduct correlation analyses to check the inter-relationship between the variables, to include the ICS indicators and intervening variables. I then conduct a regression analysis to determine the collinearity of the significant variables. For those determined to be too closely related, I eliminate them and run further analysis to identify the variables that have the greatest impact on the perceived effectiveness of a response.

QUALIFYING QUESTION

Q1 – "FEMA lists disaster responses in a tiered system from Type 1 to Type 5, with Type 1 being a large incident involving in excess of 500 responders per operational period lasting for multiple operational periods. A Type 3 response involves more than a single agency, and lasts more than one operational period. Have you ever been involved in a Type 3 or higher response where you were assigned to work in the Command Post?"

The first question of the survey serves as a qualifying question to determine whether the respondents fall within the desired sample population of having been involved in a Type 3 response. A total of 203 respondents (N) answered this question. Yes responses are coded as "1" and no responses are recoded as "0".

Even though the survey was initially presented to agency leads, only 61.58% of the respondents have been involved in Command Post operations for a Type 3 incident. Over a third of respondents (38.42%) have never experienced this level of response (Figure 3). This confirms previous research indicating that large-scale multi-agency command-post level operations are a rarity for responders (Dercole, 2006; Donahue & Tuohy, 2006; Lutz & Lindell, 2008; D. Mendonca, 2005).

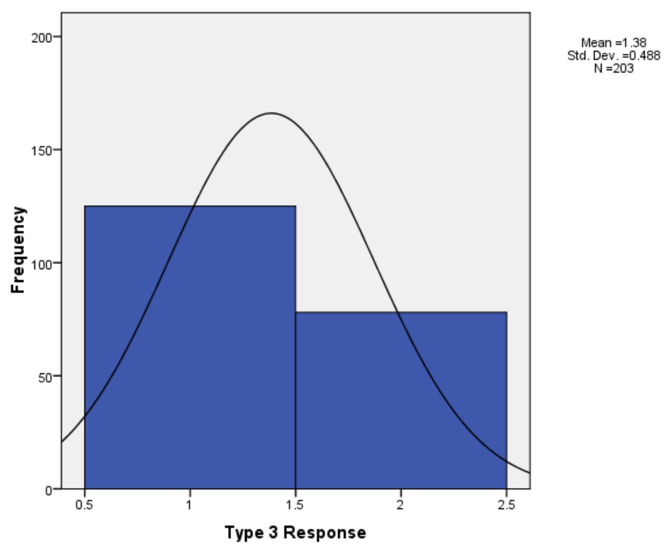

FIGURE 3 – Responders With Type 3 Experience

This survey targets individuals with Type 3 incident experience. As such, using skip logic, respondents answering "no" to this question are taken to the end of the survey and thanked for their participation. I identify this as a missed opportunity in the research. I should have allowed the respondents to complete the questions that pertained to their IMT membership, ICS training levels and demographics. This would have provided a further comparison for the responders that had been involved in Type 3 incidents.

The result of dropping respondents from answering the remainder of the survey drops the survey total to 125 respondents (N), still an adequate number of responses for analysis. The missing values were then deleted pairwise for the remaining responses. Individual responses and missing values vary for the remaining survey questions. The handling of each is addressed individually as it pertains to the respective questions, beginning with responder demographics and team information.

UNIVARIATE ANALYSIS

Independent Variable

Q19 (Independent Variable) – "Are you a member of a predesignated Incident Management Team (IMT) or Incident Support Team (IST)?"

Answers are recoded to "1" for yes and "0" for no. With 114 responses (N) and 11 missing values, the mean is .54 and variance is .250. IMT membership versus non-IMT are fairly evenly split at 54.4% IMT and 45.6% EMON (Figure 4). This indicates a normal distribution, with a skewness of -.178. Having this split allows a more balanced comparison to the other variables.

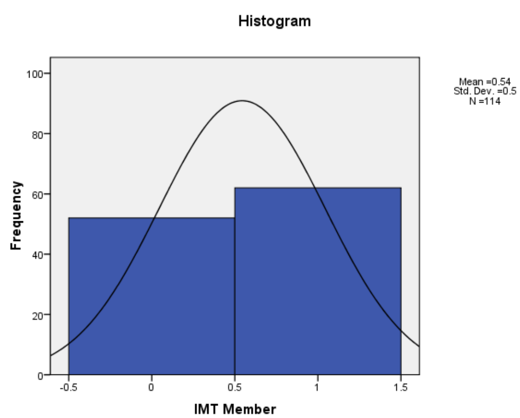

Figure 4 - IMT Membership

Incident Management Team Data

For those respondents that identify themselves as IMT members (N = 114), a series of questions is included to develop a profile of an IMT. The results of these questions are presented, but no other statistical evaluation is conducted for any of this information. This information is presented simply for a better understanding of IMT membership but is not included in any of the study's hypotheses.

Q20 – "Approximately how long have you been a member of the IMT or IST?"

Respondents that answered that they are members of an IMT are asked to provide some information regarding team membership. Only 63 (N) respondents answer this question. The first quality is their tenure on the IMT, which is open-ended for them to input an exact number. Tenure ranges from 1 year to a high of 35 years on a team, with a mean tenure of 6.63 years. The mode is 8 years and median is 7.00.

Q21 – "What is the approximate size of your team (how many team members)?"

Sixty-one (N = 61) respondents answer this question, with teams ranging in size from 5 to 93 members. The mean size of an IMT is 36.62 members, but the most commonly identified (11 respondents) team size is 30 members.

Q22 – "Indicate the type of IMT or IST that you belong."

The respondents were provided the list of teams from Type I to Type V. Of the 62 (N) respondents that provided team type, all are able to identify the respective Team Type. Two respondents identify themselves as members of a Type I, National or State recognized team. This is followed by 5 respondents (8.06%) who are part of a Type V, Local or single agency team. The next level of team identified is a Type IV, local or regionally recognized team, with 8, or 12.90%. The most commonly identified team is the Type III, State, regional or metropolitan team, with 47 (75.81%). No respondents are from a Type II team.

Q23 – "Does your team have members from multiple disciplines?"

All 62 (N) of the respondents that answered this question identify their team as being multi-disciplinary.

Q24 – "Indicate the types of disciplines that are included on your team (check all that apply)."

The disciplines identified within the IMTs are as follows:

- Education	12.90% (8)
- Emergency management	98.39% (61)
- Emergency medical services	93.55% (58)
- Dispatch / communications	72.58% (45)
- Fire	98.39% (61)
- GIS / mapping	41.94% (26)
- Law enforcement	95.16% (59)
- Military	14.52% (9)
- Public health	75.81% (47)
- Public works	56.45% (35)
- Non-governmental organization (volunteer)	54.84% (34)
- Other (please specify)	11.29% (7)

- State veterinarian - 2
- Medical examiners
- Private industry
- Mortician
- Weather service
- Industrial safety

Having multi-disciplinary teams allows for variety in the individual responders background, experience level and expertise. I conduct no further analysis as this question merely provides insight into the types of organizations involved in IMTs.

Dependent Variables

In this section, I present the analysis of the two DVs; the perceived Success of Response and the perceived Overall Effectiveness. Using the system's approach, I could not simply rely on a single measure for effectiveness. I ask two separate questions to measure the respondent's perception of the effectiveness of their respective responses. The first question addresses the successful accomplishment of the ICS component of objectives set by the Incident Commander, as perceived by the respondents. The second question addresses the perceived effectiveness of the response in a broader sense for helping the effected community.

Q5 – "How successful do you feel the response was in accomplishing the objectives set by the Incident Commander?"

There are 116 responses (N) to this question and 9 missing values. I recode the answers numerically as follows:

- Not at all successful is coded as "1"
- Not very successful is coded as "2"
- Somewhat successful is coded as "3"
- Mostly successful is coded as "4"
- Fully successful is coded as "5"

The resulting mean is 4.14, with a median of 4.00 and a mode of 4. The SD is .733 and variance is .537. This indicates that most (52.6%) respondents feel their response was mostly successful (Figure 5). For both IMT and EMON members, the largest category answered is "Mostly

Successful" with 58.1% and 47.1% respectively. Measuring the responses for IMT members reveals that 92% of members rate the response as "Mostly Successful" and "Fully Successful". Only 76.5% of EMON members rate their response across the same two categories. The distribution curve indicates a slight skew but is acceptable at -.626.

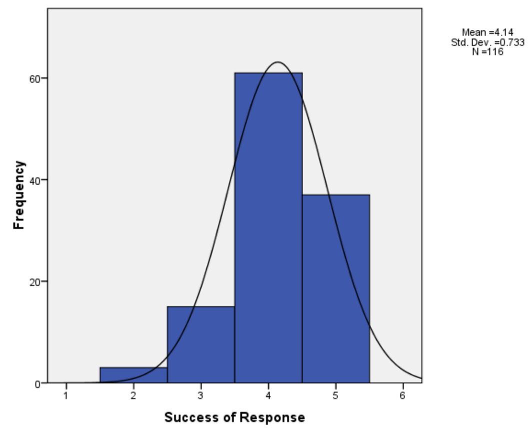

FIGURE 5 - Histogram on Perceived Success of Response

Comments by the respondents provide a richer understanding of meeting the established objectives during a multi-organizational response:

- Respondent #10 - "The incident objective in the IAP were measurable so we were able to determine if they were completed or not based upon the measures established in the objectives."
- Respondent #15 - "Goals were set and accomplished with challenges and an understanding of who was responsible."
- Respondent #34 - "Incident Command was not always concerned about all of the affected areas."
- Respondent #45 - "The objectives were met for the portion of the incident I was involved in. However, ICS was not fully implemented for the overall incident (just the Fire/EMS component). Law enforcement utilized ICS in the EOC, but not in the field. Therefore, there were some issues with coordination."

- Respondent #130 – "As some of the objectives were implied I believe not all responders understood them or the priority of them."

Q36 – "Indicate how effective you feel the overall response was in meeting the needs of the incident."

This question determines the respondent's perception of the success of the overall response, not just in relation to using the ICS. The options for answering this question are coded as follows:

- Not at all effective is coded as "1"
- Minimally effective is coded as "2"
- Somewhat effective is coded as "3"
- Significantly effective is coded as "4"
- Fully effective is coded as "5"

Respondents provide an N of 110 for this question, with 15 missing values. The mean for the question was 4.25, with a median of 4.00 and a mode of 4. The SD is .582 and variance is .338. The curve (-.094) demonstrates a reliable and symmetrical distribution (Figure 6).

The overall perception of their respective responses is fairly positive. The majority of respondents (60%) feel the response as a whole is "Significantly Effective." The results are very similar when splitting out for IMT (58.3%) and EMON (62%) members. This is followed by 32.7% of respondents rating the response as "Fully Effective", with IMT members scoring 35% and EMON members scoring 30%.

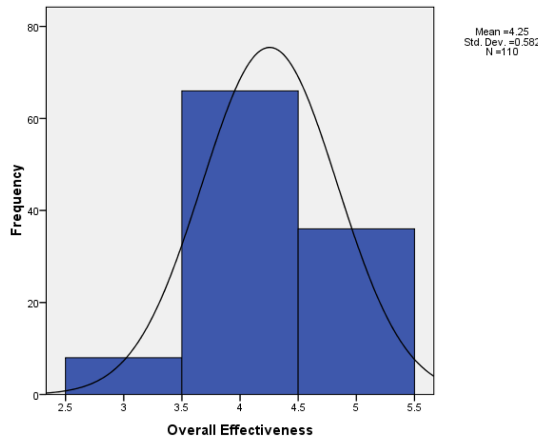

FIGURE 6 – Perception of Overall Effectiveness of the Response

Some comments of the respondents regarding their perceptions of the overall effectiveness are provided:

- Respondent #163 – "We have found going to assist other locations during an incident we have made things better to meet the needs of the incident"
- Respondent #63 – "Had great success despite our lack of fully implementing the ICS model."
- Respondent #45 – "Political interference hampered the IC and often led to responses that were ineffective. Needs of the incident were eventually met, but with a much greater degree of difficulty and likely greater damage to the community."

Respondent Demographics

The next section presents the demographic information of the respondent pool. This allows an understanding of the characteristics of the respondents as a whole, with a comparison of IMT versus non-IMT (EMON) responders. The demographic information is then used to develop a potential profile for IMT and EMON teams. I later examine these qualities in relation to the individual Hypotheses to determine if they have any impact.

Q37 – "What is your gender?"

Answers to this question are coded "1" for male and "0" for female for GENDER. With emergency responder disciplines being heavily male dominated, I expected a greater number of males than female respondents. This proves to be true, with 93.6% (103) males and 6.4% (7) females, translating to EMONs having 8% female membership while IMTs have only 5%. While the percentages between EMONs and IMTs remained fairly consistent, the overall distribution for gender was skewed at -3.625. The SD is .245 and variance is .060.

Q38 – "What is your age?"

With respect to age, I created seven age brackets spanning 18 to over 75 years of age. I recode the brackets "1" to "7" from youngest to oldest, allowing a range of 7 for AGE. No respondent identify themselves as 18-24. Of the 110 (N) respondents answering this question, half (50%) of the respondents fall within the 45-54 range, with another 30.9% in the 55-64 range. The mean age is 4.18, with a median of 4.00 and mode of 4, all of which are in the 45-54 range. The SD was .869, with a variance of .756. The age distribution was symmetrical with a skewness of .063. The age distribution of the respondents for IMT versus EMONs shows a younger trend for IMT membership than EMON membership, as follows:

- 25-34: 2% of EMON members with 5% for IMT members
- 35-44: 10% of EMON members with 15% for IMT members
- 45-54: 48% for EMON members with 51.7% for IMT members
- 55-65; 38% for EMON members with 25% for IMT members

Q39 – "What is your ethnicity? (Please select all that apply)"

The answer options for ETHNICITY are recoded as follows:

- American Indian or Alaskan Native becomes "1"
- Asian or Pacific Islander becomes "2"
- Black or African American becomes "3"

- Hispanic or Latino becomes “4”
- White / Caucasian becomes “5”
- Prefer not to answer becomes “6”
- Other (please specify) becomes “7”

With multiple options for ethnicities, respondents fall within only three categories; White / Caucasian (94.5%), Hispanic / Latino (2.8%) and Black or African American (.9%). Two other respondents chose “Prefer Not to Answer.” Some opted not to provide this information resulting in a total of 109 (N) respondents that answered this question. Only 4 respondents identified themselves other than White/Caucasian. This yields a skewness of -3.284 indicating a not normal distribution.

I then reduced the categories from seven to four, as follows:

- Black or African American becomes “1”
- Hispanic or Latino becomes “2”
- White / Caucasian becomes “3”
- Other becomes “4”

This transformation yields a normal distribution curve for the results at a skewness of -.051. The SD is .437 and variance is .191.

Q40 – “What is the highest level of school you have completed or the highest degree that you have received?”

Of the 125 (N) respondents that had Type 3 experience, 17 respondents opted not to answer this question. The answers for EDUCATION are coded from “1” for “less than high school degree” to “8” for “Doctorate degree.” The majority (94.5%) of respondents have some level of post-secondary education. Just under 40% of them have at least a Bachelor's degree. Interestingly, EMON members (64.6%) indicate higher levels of education (Bachelor and Masters Degrees) than IMT members (56.6%). The skewness of -.647 indicates a normal distribution curve. However, I then transform the categories to reduce them from 8 to 5, as follows:

- Some college becomes "1"
- Associates degree becomes "2"
- Bachelors degree becomes "3"
- Masters degree becomes "4"
- Other becomes "5"

This transformation reduces the skewness to -.096, with an SD of 1.284 and variance of 1.649.

Q41 – "What type of organization do you work for?"

This question addresses the level of government or non-government organization of the respondent, listed as ORGTYPE. The answers are recoded numerically from "1" to "8" to allow for analysis. With 110 (N) respondents, the vast majority of respondents (92.8%) work at the local and county government level. This yields an asymmetric distribution curve at 3.438. Given that the target audience for receiving the survey is local and county officials, this is expected and stands as a biases within the survey. Of note, however, is the slightly higher participation of county officials in IMTs (38%) than for EMON teams (32%). This contrasts local officials being higher for EMON teams (62%) than for IMT membership (53%).

With the high level of skew across the 8 categories, I reduce the number to 3, as follows:

- Local government becomes "1"
- County government becomes "2"
- Other becomes "3"

This transformation reduces the amount of skewness for the distribution to .621, which indicates a symmetrical distribution. The new mean is 1.68, SD is .768 and variance .590.

Q42 – "What is the discipline of the organization that you work for?"

While there are numerous options for agency discipline, the initial distribution of the survey was to law enforcement, fire, EMS and emergency management personnel. Only through the snowball process did the survey reach other disciplines. This creates a bias in developing a full understanding in what disciplines take part in an IMT versus an EMON team. There are 12 options to pick from in the survey list, but the 110 (N) respondents only identify themselves as belonging to 6. The last option is to designate a discipline not specifically listed. Five respondents identify themselves as cross-discipline personnel, as follows:

- Fire/EMS (2)
- EM – Fire – EMS
- Public safety, police & fire
- Fire EMD

The answers for ORGDISC are recoded numerically from "1" to "12" resulting in a mean of 5.22. The median is 5.00 (fire personnel) and a mode of 3 (emergency management). This wide array of categories yields a normal distribution curve at a skewness of 1.154.

Across the discipline type for IMT participation, respondents in emergency management are the most involved (42%), followed by fire personnel (33%). Within the specific disciplines, emergency management personnel are more likely to be involved in IMTs (59.5%) than working within an EMON (40.5%). The same holds true for fire personnel, with 64.5% being part of an IMT. IMT participation falls to 39.3% for law enforcement personnel. The other disciplines (military, public health and non-governmental organization) have 1 or 2 respondents so no comparison is made.

With 91.8% of respondents identified as members of only 3 disciplines, I reduced the number of categories to 4, as follows:

- Emergency management becomes “1”
- Fire becomes “2”
- Law enforcement becomes “3”
- Other becomes “4”

This updated mean is 2.27, with an SD of 1.124 and variance 1.264. The skewness is reduced to a symmetrical distribution curve of .274.

Q43 – “How many years of experience do you have in this job?”

This question is a fill in the blank answer for a specific number of years, with 109 respondents completing this question. Organizational tenure (ORGTENURE) ranges from 4 to 44 years. The mean experience level for the respondents is 23.47 years, with a median of 25.00 and mode of 22 years. Given the target audience for survey recipients, I expected the experience level would be this high. Despite the variance of 96.583 and SD of 9.828, the distribution curve is acceptable, with a skewness of -.141.

The distribution for organizational experience shows a younger trend for IMTs. IMT membership clusters at the 17-22 year range, with 25% of respondents being on an IMT and 8.2% not being a member. However, EMON membership clusters at the 24-28 year range, with 28.6% being EMON and 15% being an IMT member. IMT membership peaked at 22 years , with EMON membership peaking at 25 years.

Respondent Profile

Table 6 shows a comparison of the mean values for the demographic information developed from this survey. From this, IMT members are slightly more likely to be male than EMON personnel.

IMT members are also likely to be slightly younger, but are more likely to be of diverse ethnicity. IMT members tend to have a little lower level of education than EMON members. They are more likely to work for a county level organization, while EMON members are more likely to be local officials. IMT members have a slightly higher likelihood of being from a fire background, while ad hoc members are more diverse in their backgrounds. Lastly, IMT members have approximately two years less of experience (22.57 versus 24.58 years) within their discipline that do their EMON counterparts.

	Respondent	IMT Member	Ad Hoc Team
Gender	.94	.95	.92
Age	4.18	4.08	4.30
Ethnicity	4.97	4.95	5.00
Educational level	5.53	5.47	5.60
Organization level	2.62	2.68	2.54
Discipline	5.20	4.93	5.56
Years of experience	23.47 yrs	22.57	24.58 yrs

TABLE 6: Profile Comparison by Mean Scores

Q13 – "What ICS function were you assigned while working in the Command Post?"

This question simply allows me to determine the specific functions assigned to each of the respondents. Of particular note is the number of respondents (13.27%) who were not assigned to a specific function during their incident. For EMON members, 22% of respondents were not assigned as opposed to this occurring for IMT members (6.5%). There was no other statistical significance determined for these assignments:

- IC – 23.89% (27)
- LOFR – 4.42% (5)
- SOFR – 2.65% (3)
- PIOFR – 2.65% (3)
- OSC – 23.89 (27)

- PSC – 17.70% (20)

- LSC – 10.62 (12)

- FASC - .88% (1)

- I was not assigned to a specific ICS function – 13.27% (15)

ICS Implementation Indicators

With this survey examining the effectiveness of ICS implementation, I had to determine the level that ICS is actually used. In order to do so, I identified several indicators of ICS from various training manuals. These include making key assignments, such as designating an Incident Commander and other integral functions within the ICS. I measured other components, including the setting of objectives, taking steps to track response personnel, the use of ICS forms and the development of an Incident Action Plan (IAP). Determining the presence of these indicators for both IMT and EMONs helps to understand if ICS is actually implemented.

Q2 – "Based on your answer to Question 1 of having been involved in a Type 3 or greater response, was the Incident Command System used?"

The first of the questions serving as an indicator of implementation, there is 1 missing value, giving an N of 124. Yes answers are coded as "1" and no answers as "0" for ICSUSED. The respondents as a whole indicate that the ICS is used for a vast majority of responses (97.6%). It was determined that IMT members used ICS 98.4% of the time and EMON members 98.1% of the time. The mean is .98 and SD is .126. The question proves to be highly asymmetrical, with a skewness of -7.777, indicating a variance of just .016.

Q3 – "Was there a clear understanding of who was the lead official, often designated as the Incident Command (or Unified Command), for the response?"

One of the basic tenets of the ICS is that the first position designated when arriving at an incident is the Incident Commander (IC) (National Incident Management System Consortium, 2007a). This is the basis for asking this question of the respondents. Failure to proactively identify the IC is also a re-occurring issue for responders (Donahue & Tuohy, 2006). I recode ICDESIG answers as "1" for yes and "0" for no. There are 122 respondents (N) that answered this question. Overall, ICs are designated 94.3% of the time. IMT members indicate an IC is designated 93.5% of the time, while EMON members indicate an IC is designated 94.1% of the time. The skewness is -3.854, indicating a lack of variance (.055) and asymmetric distribution. The mean is .94 and SD is .234.

Q4 – "For this incident, did the Incident Commander present a set of objectives to accomplish for each operational period?

One of the functions of the IC is to develop a set of objectives for the response. Doing so sets a direction for the response. With 123 (N) respondents answering this question ICOBJ, 2 opted out of answering. I recode the answers with "1" and "0" respectively for yes and no, with an added "2" for unsure. 86% of respondents indicate that the objectives are set by the IC, with 7.3% indicating there are no objectives set. Within an IMT, objectives are set 91.9% of the time, with no objectives only 1.6% of the time. However, 6.5% of IMT members are unsure if they were set. For EMON members, objectives are set 80.8% of the time and not set 13.5% of the time. Those that are not sure if objectives were set are only 5.8%. The mean is .99, with an SD of .373. I calculate a variance of .139 and skewness of -.094, indicating a symmetric distribution.

Q6 – "Was there an established ICS organizational structure for the response?"

To facilitate the lines of communication and authority, the ICS seeks to develop an organizational structure. The intent is to facilitate an understanding of the roles and responsibilities of the respective responders. This also allows for greater accountability of resources.

With 117 (N) respondents answering this question, 8 opted not to answer. Yes answers are coded as “1”, no answers are coded as “0” and unsure answers are coded as “2” for ICSORG Respondents indicate that an ICS organizational structure is developed 91.5% of the time, with the structure set 90.3% of the time for IMT members and 92.3% of the time for EMON members. Again, more IMT members (8.1%) are unsure if a structure was set than non-IMT members (3.8%). The answers yield a mean of 1.03, SD of .292 and variance of .085. The distribution is symmetric at a skewness of 1.055.

Q7 – “During the incident, were various ICS forms used for documenting and tracking the response?”

The ICS has numerous forms that allow for documentation of the decisions made, actions taken and resources used during a response (FEMA, 2010c). The forms are standardized for better understanding across varying disciplines and jurisdictions.

There are 8 missing values for this equation and a total of 117 responses (N). The answers for ICSFORMS are coded “1”, “0” and “2” for yes, no or unsure. Respondents indicate that forms are used only 79.5% of the time and not used 14.5% of the time, with 6% respondents unsure if they are used. Forms are used to a greater degree by IMT members 91.9% of the time as opposed to 67.3% of the time for EMON members. The mean is .91, with an SD of .447 and variance of .200. The skewness of -.393 indicates an acceptable distribution curve.

Q8 – “Was an Incident Action Plan (IAP) prepared for each operational period?”

The ICS uses an IAP as a roadmap, so to speak, for what needs to be accomplished during a response. The IAP serves a general guide for the responders to see who is assigned to all levels of the response, along with what resources are to be provided to them. It outlines a rough structure at all levels to allow for accountability. The document is never intended to be strictly followed, allowing for responders at all levels to take independent actions as needed to meet the needs of the specific response. Built around the IC's objectives, the IAP is intended simply to provide a direction for the overall response.

The analysis of using IAPs results in a total of 116 answers (N), with 9 missing values for this indicator. The answer options to IAP are yes or no, which are recoded as "1" and "0" respectively. Overall, respondents indicate that an IAP is prepared only 78.4% of the time, 85.2% of the time for IMTs and 71.2% for EMONs. The mean is .78, with a SD of .413 and variance of .171. A skewness of -1.402 is acceptable with a slight skewing to the left.

Q9 – "If an IAP was prepared, was the ICS Planning P method used to develop it?"

A system for developing an IAP is learned in various ICS training levels (Emergency Management Institute, 2012; U. S. Dept. of Homeland Security, 2011a, 2011b). This process is known as the "Planning P" and lays out a system of meetings and briefings to share information and create a plan for handling the response. It also details who is responsible for gathering various bits of information, as well as developing the different parts of the IAP. Walking through the Planning P is the direct responsibility of members of an IMT.

Answers yes, no and unsure are recoded to "1," "0" and "2" for analysis under PLANP. For the N of 92, there are 33 missing values, a substantial percentage. This is likely due to respondents not knowing what constitutes a Planning P. Respondents indicate that the Planning P is used 72.8% of the time, with 17.4% unsure if it is used and 9.8% indicating it is not used. The percentages between IMTs and non-IMT usage vary quite a bit. IMT members use the Planning P 86.8% of the time, and do not use it 5.7%, with 7.5% unsure if it is used. For EMON members, only 54.1% use the Planning P, with 29.7% not using it and 16.2% being unsure. There is a mean of1.08, an SD of .519 and variance of .269. The skewness is .111, indicating a symmetrical distribution.

Q10 – "If an IAP was prepared, was it distributed to response personnel & briefed for each operational period?"

Once IAPs are developed, they are intended to be distributed to responders at all levels of the incident. This is to allow any responder to have readily available the information they need to carry out their assignment within the overall response. This includes information on who they reported to, what communications they are to use, where their defined area of operations lies, and how they are supported logistically. Supervisory personnel receive a briefing on the IAP prior to their actually beginning their work shift. They, in turn, brief their respective personnel.

The question (IAPBRF) allows for a yes, no or unsure response, which I recode as "1," "0" and "2". There are 89 responses to this question, with 36 respondents opting out. Overall, respondents indicate that the IAPs are distributed and briefed only 85.4% of the time, with it occurring within IMTs 88.7% of the time and 80% of the time for EMONs. Respondents indicate this does not occur 9.0% of the time; 9.4% for IMT and 8.6% for EMON. The largest difference exists for those are unsure if this occurs, with 11.4% of EMON members and only 1.9% of IMT members. IAPBRF yields a mean of .97, with an SD of .383 and variance of .147. This distribution curve was a skewness of -.3512, indicating a normal distribution.

Q11 – "Was a check-in/check-out system established to track on-scene resources?"

A system for checking individual resources in and out of an incident provides for their accountability. Having an understanding of resources that are on scene during a response provides a degree of safety for the responders. It provides the supervisors throughout the command structure an awareness of the people that are on-scene that they must keep safe. It also increases the situational awareness of resources readily available that can be used to meet the needs of the incident.

With 116 responses to this question, there are only 9 missing values. The answers are coded for CKIN as “1,” “0,” and “2” for yes, no or unsure. Check-in/out occurs only 75.9% of the time; 75.8% for IMT and 78.8 for EMON. 12.9% of IMT members indicate it does not occur, while 17.3% of EMON members indicate it does not occur. For those respondents who are unsure, 11.3% are IMT members and 3.8% for EMON members. The mean was .91, with an SD of .486 and variance of .236. The curve had a skewness of -.224, which is a normal distribution.

Q12 – “At the conclusion of your assignment at the incident, was there an official transfer to someone else replacing you in the function?”

Within the ICS, continuity is built into the system by having responders pass on relevant information as they leave the incident. This allows for responders replacing them to obtain an understanding of the actions, decisions and resources in place for the response. This is intended to increase situation awareness for the overall response.

With 116 responses and 9 missing values, I coded the yes or no responses as “1” and “0” for TRANSFER. Transfer of function occurs 78.4% of the time; 85.5% for IMTs and 71.2% for EMONs. The results were a mean of .78, an SD of .413 and variance of .171. The distribution curve is acceptable at -1.402.

Intervening Variables

In addition to the independent and dependent variables, I identified 12 characteristics during the literature review that impact disaster response. Each of these characteristics can exist for individual responders within the context of IMTs and EMONs. I identified these characteristics as intervening variables in an effort to determine their existence. For most of these characteristics, I structured the questions on a 5-point Likert scale, from low to high. The low point is where respondents feel the characteristic does not or only minimally exists, extending to where they feel it fully exists. For the other characteristics, the answers pertain to specific levels of training or experience.

Q25 – "Indicate the amount of flexibility that you were allowed in making needed decisions & using resources to meet the needs of performing your assigned function."

The literature review identifies individual flexibility, termed improvisation, as having a positive impact on disaster response. For this study, I obtain an N of 113, with 12 missing variables for FLEXIND. For the 5-point Likert scale, the mean, median and mode are very close, at 4.01, 4.00 and 4 respectively. The SD is .750 and variance is .562. The distribution curve for this variable is symmetrical at -.402, with a slight left skew. Just over half (52.2%) of the respondents feel they are afforded "Significant Flexibility", with IMT members scoring a 55.7% and EMONs scoring a 48.1%. However, EMONs score "Full Flexibility" higher than IMTs (32.7% versus 19.7%).

Note some of the respondent's comments on improvisation:

- Respondent #23 – "There were parameters established as part of the IAP in which we could make decisions, but some options were eliminated due to conditions identified in the IAP and reinforced by the IC."

- Respondent #48 – "Limited only by amount of resources available and finances available. Previous working relationship with the IC"

- Respondent #64 – "Due to additional tasking on my supervisor, a significant amount or autonomy is allowed for personnel in certain positions, based on background and/or experience."

- Respondent #88 – "Flexibility is required to make the system work"

- Respondent #142 – "I was allowed full flexibility to make decisions to perform my function, as long as I notified the IC of the situation prior to doing it."

- Respondent #191 – "Everything had to be approved by the IC."

Q26 – "Indicate the degree of flexibility of the overall structure of the organization for meeting the needs of the response."

Organizational flexibility (FLEXORG) is viewed as emergence for this study. With 111 responses (N) there are 14 respondents that opted not to answer this question. On the 5-point scale, the mean is 3.86. The median is 4.00 and mode 4. The SD = .792 and variance is .627. The numbers indicate a normal distribution at -.313, with a slight left shift. "Significantly flexible" is scored evenly across all respondents at 45.9%, even for IMT and EMONs alike. IMT members did view the organization as less flexible than EMON members. At the "Somewhat flexible" level, 34.4% of IMT members compare with 26% of EMON members. EMON member also score 26% for "Fully flexible" with IMT members dropping to 18%.

The respondents however, provided some insight into organizational flexibility:

- Respondent #177 – "Restructuring overall response is more difficult than modifying internal team procedures to overcome incident-specific challenges. If a good relationship exists between the IST and local officials, it's generally an easier task. Building those good relationships is a core component of being a successful IST, but it does take time. This makes a full restructure, especially early in an incident, challenging."

- Respondent #154 – "Budgetary constraints"
- Respondent #145 – "The knowledge and familiarity members of the Incident Command Structure had with each other established trust and cooperation among all those involved. This resulted in the significant flexibility necessary to meet the need of the response."
- Respondent #93 – "Our command structure remains flexible to adjust with the situation."
- Respondent #76 – "As previously mentioned, having individuals in positions of responsibility who are no fully versed in the roles and responsibilities can be a challenge."
- Respondent #75 – "Decision making ability was strictly defined to the scope of responsibility. Within that scope, flexibility was sanctioned, working with allocated resources."
- Respondent #43 – "The command structure was very rigid yet functional"
- Respondent #21 – "The IC still had overall control, but the local jurisdiction political force had input on what actions were not allowed to occur."

Q27 – "Indicate the degree of authority that you were given to carry out the functions of your assignment."

The amount of authority each respondent is afforded indicates the level of delegation for the assigned function. Respondents provided an N of 111, with 14 missing values for AUTH. Respondents indicate a high level of their authority, with 46.8% scoring at "Significant authority" and 37.8% at "Full authority". However, at the "Full authority" level, EMON (41.2%) members feel they have more authority than do IMT (35%) members. For the 5-point Likert scale, the mean score for authority (delegation) is 4.21, with a median of 4.00 and mode of 4. There is minimal skewness scored at -.627, providing an acceptable distribution curve. The SD of the variable is .740, with a variance of .548.

Comments from some of the respondents are included for a richer understanding of delegation:

- Respondent #43 – "Authority was given based on the needs specific to my position"
- Respondent #48 – "No delegation of authority was issued to our team, we were assigned to support and staff the ICS structure - no authority to spend money without elected official approval."
- Respondent #64 – "Though official approval is required at some point, I'm delegated fairly wide latitude in initiating actions, across agencies and/or jurisdictions, based on my assessment of the need. I am also expected to provide recommendations to superiors."
- Respondent #71 – "We were given a mission and it was up to us to find a way to accomplish the mission."
- Respondent #76 – "I have found an area of confusion for individuals who haven't received adequate training is there is confusion about the roles and responsibilities of the OSC versus the IC. What this usually means is requests and contacts come directly to the IC which should probably be run through the OSC first."
- Respondent #142 – "I was allowed to do my job without question."

Q28 – "Indicate the level of information sharing back and forth between the various agencies involved in the response."

Information sharing is the operational definition for interorganizational communication. During multi-agency responses, communication across organizational boundaries is imperative. Respondents are fairly optimistic in their perceptions of the amount of information sharing on their responses, with 88.4% rating it at the significant or full levels. However, IMT members rate information sharing higher than EMON members. For IMTs, 68.9% feel it was significant and only 4.9% rate it as limited. For EMONs, only 51% rate it as significant, but 19.6% rate it as limited. The N for this question is 112, with 13 missing values for INFOSHARE on a 5-point Likert scale. The mean, median and mode are very close, at 4.08, 4.00 and 4. The SD is .686 and variance shows .471. Measuring skewness shows a slight left shift with a value of -.615, indicating an acceptable distribution.

Comments regarding interorganizational communication provide more detail than for the other variables. The comments span from positive sharing of information to indicating barriers that existed:

- Respondent #194 – "seamless information sharing"
- Respondent #182 – "As I explained earlier, while the IMT is fully trained they are integrating with local officials who usually do not have training and do not understand why things are run during a disaster."
- Respondent #142 – "Regular briefings and communication kept the sharing of information a top priority."
- Respondent #93 – "Full sharing was attempted, but some information did not make to all the agencies in a timely fashion."
- Respondent #76 – "Any communications challenges are historically rooted in the deficiencies of the person rather than the ICS"

- Respondent #75 – "Each event, of my involvement, was law enforcement lead. Excluding coordination for potential response or support roles, there was little communication with non-law enforcement agencies."

- Respondent #62 – "Each agency was like its own island."

- Respondent #54 – "Initially, very little and with time, improved information sharing. With a shift change in command staff the whole process had to be started again. This had a significant effect on search and rescue efforts."

- Respondent #48 – "The EOC was opened, ICS implemented and the agency heads declared that those working in the EOC will follow the system or be disciplined, to include information sharing."

- Respondent #32 – "Sharing was (as it always is) limited somewhat by the different players personal willingness to share to the degree necessary"

Q29 – "Indicate the level of coordination between the various agencies involved in the response."

Coded as COORD, there are 112 respondents (N) that answered this question, with 13 opting out of answering the 5-point Likert. The mean value scores at 4.13, with a median of 4.00 and a mode of 4. The SD is .651 and variance is .423. The distribution is slightly skewed left at -.538, but is still an acceptable curve. Respondents rate the overall coordination at 61.6% for "Significant coordination" and 26.8% for "Full coordination." The split for significant coordination was 67.2% for IMTs and 54.9% for EMONs. At full coordination, IMTs rate 19.7% while EMONS jump up to 35.3%.

Several comments from respondents on their perception of coordination are included:

- Respondent #10 – “Even though the team produces a clear IAP it is not until a few days into an event that the locals catch on that getting a copy of the IAP and attending operational briefings are important to the successful completion of the objectives and activities of the incident. The further you go into an incident the more copies of the IAP have to be printed and the participation at the operational briefing grows significantly. Eventually we get as close as you can come to achieving full coordination.”

- Respondent #45 – “As with information sharing, efforts at coordination by law enforcement were minimal. There was also a separation of communications systems between functions and sometimes within a given function.”

- Respondent #113 – “Unified command was eventually established and coordination improved.”

- Respondent #145 – “The Incident Command Structure promoted coordination and cooperation among all involved.”

- Respondent #182 – “In the initial response, there were a large number of "volunteer" responses- not requested or coordinated through ICS. Numerous jurisdictions began sending resources based on their perception of need without working through the local commanders. At one point, there were two command posts operating independently of one another in the town- neither realizing the other existed.”

Q30 – “Indicate the level of leadership provided in establishing a structure for the response by the Incident Commander setting overall goals of the response & creating a sense of teamwork to accomplish these goals.”

With an N of 111 and 14 missing values on “LEADERSHIP” for the 5-point scale, the mean scores at 4.25. The median is 4.00, mode is 4, SD is .753 and variance is .568. This variable skews a little higher than the other intervening variables at -1.086, but is still an acceptable distribution. At least half of the respondents from all groups rate leadership as significant; 51.4% overall, 52.5% for IMTs and 50% for EMONs. Over a third score leadership as strong; 38.7% overall, 41% for IMTs, and 36% for EMONs. The biggest difference is for those that felt leadership was limited; 10% of EMONs compared to 1.6% for IMTs.

Some of the respondent's responses provide their view of leadership:

- Respondent #191 – "There appeared at times to be and issues with the civilian IC and the Military Post commander. visible conflict."

- Respondent #177 – "Our IST has excellent team leaders who are very good at building trust with local officials. Their job can be very political in nature, but in building trust with the proper officials they are able to clearly translate the desires of the locals into realistic goals for the team."

- Respondent #113 – "IC was not as familiar with ICS as other agency responders and looked for direction from others."

- Respondent #63 – "Very little incident leadership, our leadership came from within our department operations team."

- Respondent #45 – "ICS was used, but not very coordinated in the EOC. In the field, the IC put little emphasis on the ICS model and, for the most part, used existing command structures within each function."

Q18 – "What is the highest level of experience that you have in the ICS function that you listed above?"

Looking to the degree of prior experience, this quality is covered by two questions. The first covers the respondent's highest level of hands-on experience operating in their assigned function. The second aspect of experience level is examined in the next question regarding the number of times assigned to this function.

This variable is measured by identifying whether the respondent has ever been assigned to work this function before up to their being credentialed for the assignment, with options as follows:

- No prior experience in performing that function, coded as "1"
- Completed the above listed training only, coded as "2"
- Shadowed another person performing the function, coded as "3"
- Previously assigned to work the position, coded as "4"
- Working to complete a Position Task Book (PTB) for the function, coded as "5"
- Credentialed for the function, coded as "6"

With only 11 missing values, I obtain an N of 114 for ICSEXP. The mean for responses is 4.11, with a median of 4.00 and mode of 4. SD = 1.368 and variance is 1.872. There is a slight left skew at -.378, but still within a normal distribution curve (Figure 7). Two responders identify having never been assigned to the position previously; one being an IMT member and one not. The largest single grouping is "Previous assigned to work the position" at 37.7% of the responders. Within this category though, 53.8 EMON members compare to 35.5% of IMT members. IMT membership shows an increase at higher levels. For responders that are working on a Position Task Book, IMT members rate 35.5%, while EMONs drop to 1.9%. Then for respondents credentialed for the position, IMTs rate 21%, while EMON rate 15.4%.

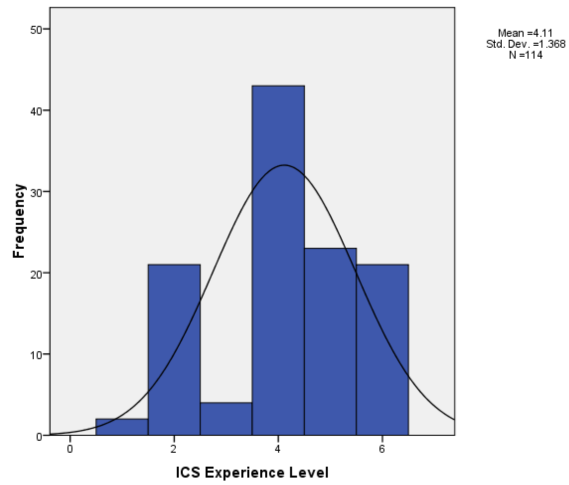

FIGURE 7 – Respondent's Experience Level for Assignment

Q16 – "What is the approximate number of times that you have been assigned to this function during a live incident or planned event?"

Given that many responders have never used ICS during an incident (Hancock, 2009), this statistic is of particular importance. With 17 respondents opting out of this question, the N was 118 for FUNCTIMES. Respondents answered this question by entering a specific number of times assigned to the function. The mean is 11.77 times assigned. The median is 5.00 and the mode is 3 times previously assigned. The SD is 20.060 and variance is 402.385. The skewness rates at 3.467, as the result of respondents stating a wide range of times assigned. Most respondents (89.8%) answered from 1to 20 times assigned. The remaining respondents indicated 25 (1.9%), 30 (.9%), 50 (3.7%), or 100 (3.7%) times. Had the number of these outliers been fewer, I would have excluded them. During a response, having a responder with vast experience is highly valued. As such, I cannot exclude them from my analysis. However, due to the highly skewed curve, the measure is unreliable. I later examine this variable using nonparametric analysis.

Q14 – "Upon arrival at the incident, did you have an understanding of what functions you would be assigned?"

Through the literature review, role clarity was shown to improve disaster response. I developed two questions to understand the quality of role clarity. This question determines whether respondents had foreknowledge of what would be expected of them during the response. This allows respondents to better prepare for their expected role. They could bring the proper equipment and supplies, addressing any logistical needs for their assigned. The following question addresses the respondent's understanding of their assigned role.

For this question FUNCINIT, there are 114 respondents (N), with 11 missing values. The mean is .87, median is 1.00 and mode is 1, with an SD of .340 and variance of .115. There is an asymmetrical distribution with a skew to the left, at -2.209. The yes or no answers are recoded to "1" and "0". Responders that knew their assignment upon arrival rate at 86.8%, with 87.1% for IMT and 86.3% for EMON members.

Q15 – "Once assigned, indicate your level of understanding of the expectations and responsibilities for how to perform your function."

FUNCUND measures the respondent's level understanding on a 5-point Likert scale. With 115 respondents (N) answering this question, 10 opted out. The mean scores at 4.20, median at 4.00 and mode at 4. The SD is .703 and variance is .495. There is a normal distribution curve with a slight left shift, at -.456. Understanding was fairly consistent across the board for all groups. For "Average understanding", 13.9% of overall respondents fall into this category, with 11.3% IMT and 17.3% EMON members. "Significant understanding" is the highest rated level for all groups: 49.6% overall, with 48.4% for IMT and 50% for EMONs. "Full understanding" is next highest, at 35.7% overall and 38.7% for IMT and 32.7% for EMON.

Respondents are asked for comments as to why they score this question as they do. These comments seek to establish an understanding for how responders feel about their level of role clarity:

- Respondent #9 – “I knew what was expected and how to achieve it.”
- Respondent #45 – “My background is law enforcement. I was performing tasks related to fire/ems. Therefore, my level of understanding was not greater than average. Fire/ems personnel were working with me on this incident. Their understanding was obviously much greater.”
- Respondent #63 – “I had basic ICS but no full position specific training at that time. I now have it.”
- Respondent #84 – “This was tornado incident and the use of an EOC/ICP had not been effectively used prior. We were somewhat prepared, but there is always room for improvement!”
- Respondent #86 – “I'm not sure that anyone fully understood the situation, let along their expectations and responsibilities, until we were well into the recovery effort.”
- Respondent #172 – “Full understanding was realized after a few days.”

Q31 – “Indicate the level of situational awareness that you had in your assignment of the overall status of the response as it evolved.”

Respondents answering this question provide an N of 110, with 15 missing values for SITAWARE. The 5-point Likert scale yields a mean of 4.16, median of 4.00 and mode of 4. The SD is .657 and variance is .432. There is a normal distribution, at -.382, with a slight left skew. The biggest category is “Significance awareness” with 57.3% of the respondents. IMTs yield 60%, while EMONs show 54%. The biggest difference occurs at “Full awareness where IMTs are 23.3% and EMONs rate at 38%.

The respondents provide the following comments regarding situational awareness:

- Respondent #43 – “Operational awareness was maintained from first arrival until the end of the incident”

- Respondent #45 – “Situational information was not shared between functions. Law enforcement kept their own units apprised, but other functions had to seek out situational information.”

- Respondent #63 – “Got most of my information from the officers and the news.”

- Respondent #71 – “We initially had a bit of a struggle realizing how big of an event we were dealing with. Once the scope of the damage was realized, then it all seemed to come together.”

- Respondent #90 – “Mandated frequent briefings and updates provided a clear understanding of progress and next steps.”

Q32 – “Indicate the level of support provided to you by the local officials to allow you to carry out the functions of your assignment.”

While 115 respondents (N) answering the question, 10 opted out of SUPPORT. This reveals a mean of 4.17, a median of 4.00 and a mode of 4 on the 5-point Likert scale. The distribution curve shifts to the left with a -.671, which is considered acceptable. The SD scores as .776 and variance is .603. IMTs consider the support at the significant level at 55%, while EMONs only rate it at 34%. EMONs have a much higher rating for full support. They rate it at 46%, with IMTs only yielding 30% at this level.

Respondents share the following thoughts concerning their experiences of support:

- Respondent #194 – “difficult when management plays a micro-management outlook”

- Respondent #177 – "Significant support is the average of our experiences. Initial support is heavily dependent on the jurisdiction you are working in. In the last incident of significant duration I responded to, initial support was minimal but transitioned to full support after our team was able to build its relationship with the locals."

- Respondent #149 – "The command staff of L/E was supportive in the EOC, but at the forward ICP's there was significant disconnect between disciplines."

- Respondent #113 – "Great support from elected officials."

- Respondent #80 – "Some local officials chose to deviate from the established incident command system in an effort to execute objectives that they established. This created some conflict and confusion and in some cases compromised support for the mission."

Q33 – "Indicate the level of cohesion (how well the group worked together) among the team that you worked with during the response."

Team cohesion is captured as COHESION with an N of 110 and 15 missing values. Ratings are fairly consistent across the board for all levels on the 5-point Likert scale. Over half of the respondents (52.7%) feel they have significant cohesion within their team. For IMTs, the level is 53.3% and 52% for EMONs. Full cohesion within the team scores at 31.8% overall, with 30% for IMTs and 34% for EMONs. This provides a mean of 4.15, with a median of 4.00 and mode of 4. The SD is .715 and variance is .511. This yields a normal distribution curve with a slight left shift at -.528.

Respondents share the following comments on team cohesion:

- Respondent #9 – "Overall was very good but there were those that sought to make problems."

- Respondent #45 – “My law enforcement background allowed me to work well with other functions since this was a law enforcement event. However, fire personnel did not get the same level of cooperation and information sharing from other functions.”

- Respondent #48 – “A few bumps in the road.. Some people were interested in micromanaging every one rather than focusing on their position. Some got upset when they were tasked with more than one position such as being the COM-T or Situation Unit in addition to being a section Chief.”

- Respondent #71 – “Everyone worked well together.”

- Respondent #76 – “Once an event progresses to the IMT/regional response level, these individuals are pretty good about checking ego's and working together.”

- Respondent #142 – “Many of us were from the same area and we had also trained and exercised together.”

- Respondent #145 – “Most team members were familiar with each other. The prior established working relationships resulted in a cooperative, cohesive working group.”

Q17 – “What is the highest level of ICS training that you have received for the assigned function that you were assigned?

Options for answering this question are as follows:

- I have had no ICS training, recoded as “1”
- ICS100 – Introduction to the ICS, recoded as “2”
- ICS200 – Basic ICS, recoded as “3”
- ICS300 – Intermediate ICS for Expanding Incidents, recoded as “4”
- ICS400 – Advanced ICS, recoded as “5”

- Position Specific Training, recoded as “6”

An N of 114 with 11 missing values is obtained for ICSTRNG. The mean of the answers is 5.42, with a median of 5.00 and mode of 6. The SD is .623 and variance is .388. The distribution curve shifts to the left at -.815, but is still considered acceptable.

Training levels vary greatly for IMTs and EMONs. With little difference at lower levels of training (ICS200 and ICS300), the difference appears ICS400 and above. EMONs overwhelming indicate ICS400 to be their highest level of training at 82.7%, with only 9.6% having the highest level of Position Specific Training. IMTs, however, indicate that 80.6% have Position Specific Training, with 16.1% having ICS400 as their top level of training.

Q34 – “Indicate the level of trust among the various individuals working within the Command Post team.”

Initial trust is identified in the literature as having an impact on disaster response. Initial trust is developed as a combination of internal trust, tested in Q34 and external trust, tested in Q35. I first test the statistics of each question to determine their independent reliability and variance. If both results stand, I then test their interaction.

For internal trust (TRUSTINTERNAL), I obtain an N of 110 with 15 missing values. The mean score is 4.35, with a median of 4.00 and mode of 4 on the 5-point Likert scale. The SD is .612, with a variance of .375. There is an acceptable left skewed distribution curve at -.606.

Mostly, respondents feel significant trust within the team, at 53.6% for respondents overall. IMTs indicate a level of 56.7% while EMONs rate it as 50%. Next, full trust is felt by all respondents at 40.9%, with 40% for IMTs and 42% for EMONs.

I present some comments from the respondents on internal trust:

- Respondent #191 – "at first it was as expected, just because you ID says you can do something doesn't always mean you can. Time was needed to establish trust."

- Respondent #149 – "The staff in the EOC and at least one of the ICPs worked well together. The agencies involved in the ICP that fell apart will still not generate an after action report or face the reality that they need further ICS training and exercises to stay informed and ready for mutual aid response."

- Respondent #142 – "I never saw a lack of trust among the team members."

- Respondent #90 – "A thorough understanding of boundaries, roles and expertise thorough past training has developed a great working relationship amongst the agencies."

- Respondent #71 – "There were only a couple of issues involving trust. Usually this was short lived once everyone got to know each other."

Q35 – "Indicate the level of trust you experienced in working with responders from other jurisdictions."

This question addresses the trust external to the team, focusing more on the trust of other agencies and responders. TRUSTEXTERNAL has 109 respondents (N) answering, and 16 missing values. This yields a mean of 4.03, with a median of 4.00 and 4. This yields as SD of .630 and variance of .397. This reveals a reliable left skewed distribution curve of -.246.

Surprisingly, respondents across the board list that they experience "Limited trust" at 15.6%, with 13.3% of IMT and 18.4% of EMON members agreeing. However, all groups feel a significant level of external trust. All respondents scored at 63.3%, with IMTs rating 65% and EMONs rating 61.2%. Full trust rates at 20.2% overall, with IMTs at 21.7% and EMONs at 18.4%.

Respondents share the following comments on the obstacles of establishing trust:

- Respondent #10 – "Trust is earned and our team has earned the trust of the local agencies we have supported during our deployments. The evidence I site for saying this is on every occasion we were told by the requesting agency they wish we could stay a little longer."
- Respondent #40 – "Several outside agencies had limited IC experience. Some PD did not like the idea they would answer to a Firefighter and vice versa."
- Respondent #43 – "We are from the outside and it took some time to gain their trust"
- Respondent #75 – "Generally speaking individuals who respond to ICS events has an understanding of the operational function and some level of training. Significant trust only comes through working side by side."
- Respondent #149 – "Within the IST, there is trust. Again, the one area ICP and the indigenous departments around it don't seem to trust the agencies command staffs."
- Respondent #196 – "Once our expertise in the area assigned and the assistance we could bring were recognized by the locals, things went smoothly. Prior to that the locals allowed us to work beside them, but not make decisions or create documents and plans."

Summary of Univariate Analysis

I begin my analysis with an over-abundance of variables. I start with a single IV, 2 DVs, 7 demographic variables, 10 ICS indicators and 12 intervening variables (examined by 16 questions0. Flexibility is examined both internal and external to the team, as is trust. ICS experience is also broken out to examine levels of hand's on usage as well as number of times assigned to a specific ICS function.

The IV and both DVs prove to have a symmetric distribution. The demographic variables, however, proved less reliable. GENDER, ETHNICITY and ORGTYPE all proved initially to be asymmetrically distributed. I reduced the number of categories for both ETHNICITY and ORGTYPE, bringing them both to a normal distribution curve. Of the ICS Indicators, the first 2 examined (ICSUSED and ICDESIG) proved to be not normally distributed. All of the other 8 were symmetrically distributed. For the Intervening Variables, all proved to be symmetrically distribution curves except for FUNCTIMES and FUNCINIT. Neither of these two were able to be reduced, however will be examined further using the Mann-Whitney U test. I move on to examine the relationships of all the remaining variables using bivariate analysis to determine their relationship with the IV and DV for this study.

BIVARIATE ANALYSIS

I use bivariate analysis to determine statistically significance differences between IMT and EMON membership, as well as statistically significant correlations between the respective variables. This analysis helps to demonstrate the relationship of each individual variable to the independent variable and the two dependent variables. I also compare the relationship between the variable groups to determine any relationships that occur. I run the matrices with both pairwise and listwise deletion of the missing variable to determine any significant changes.

Independent and Dependent Variables

First, I examine the relationship between the independent and dependent variables. I begin by examining for a statistically significant difference between IMTs and EMONs (IV) for the 2 DVs (perceived Success of Response and Overall Effectiveness). Given that I obtained the survey results through a combination of convenience and snowball sampling, I examine this using the Mann Whitney U test. I first run the test using test-by-test deletion, followed by listwise deletion, with no difference in the results. Even though all three individual variables demonstrated normal distribution, however I find no statistically significant difference for either DV. Perceived

Success is $U = 1364$, $z = -1.386$, $p = .166$, while perceived Effectiveness is $U = 1417$, $z = -.578$, $p = .565$.

I then test for the correlation between IMT membership and the two dependent variables. There is no significant correlation between IMT membership and either of the dependent variables. However, I find a strong relationship between the two dependent variables. This relationship measures a Kendall's tau-b of .394 with a p-value of .000. The two dependent variables are essentially asking the respondents in two different ways their perception of the result of the response. As such, this correlation is expected.

Demographics

Even though the demographics do not impact the stated aim of this study, I examine them to determine any statistically significant difference for IMTs versus EMONs. Using test-by-test deletion and then listwise deletion, I analyze each demographic. There are no differences in results between test-by-test and listwise, so I report all results in test-by-test. All tests are run at the 95% confidence level.

GENDER

With GENDER having an asymmetrical distribution, I run a Mann-Whitney U test to determine if gender is significantly different between IMTs and EMONs. The Mann-Whitney shows that $U = 1455$, $z = -.639$, $p = .523$, indicating no statistically significant difference. I exclude gender from further analysis.

AGE

In order to determine if there is a difference in the age distribution between IMT and EMON members, I run a Mann-Whitney U test. The test demonstrates that the distribution by age is not statistically significant at the 95% level: $U = 1282$, $z = -1.425$, $p = .154$. I exclude age from further analysis.

ETHNICITY

I transform ETHNICITY by reducing the categories from 7 to 4. Based on this, I perform a Mann-Whitney U test. The $U = 1523$, $z = -.989$, $p = .323$. This indicates no statistically significant difference between IMTs and EMONs based on ETHNICITY of the respondents. It is excluded from further analysis.

EDUCATION

EDUCATION is asymmetrically distributed until I reduce the categories from 8 to 5. This results in a symmetrical distribution curve, but I run a Mann-Whitney U test to determine if educational levels were significant different between IMTs and EMONs. The $U = 1376$, $z = -1.388$, $p = .165$. This is not statistically significant at the .05 level. I exclude EDUCATION from further analysis.

ORGANIZATION TYPE

With having transformed the categories for ORGTYPE, I reduce the options from 8 to 3. As such, I run a Mann-Whitney U test on ORGTYPE; $U = 1484.5$, $z = -.816$, $p = .414$. There is no statistically significant difference for ORGTYPE and it is excluded from further analysis.

ORGANIZATIONAL DISCIPLINE

ORGDISC is reduced from 12 to 4 categories. With this transformation, I ran a Mann-Whitney U test; $U = 1355$, $z = -1.530$, $p = .126$, indicating no statistically significant difference between IMTs and EMONs. I exclude this demographic from further statistical analysis.

ORGANIZATIONAL TENURE

Given that ORGTENURE is a scalar measurement, I run an independent-samples *t*-test. This resulted in an F of .311 and a p-value of .578. This indicates there to be no statistically significant difference in ORGTENURE between IMT and EMON members. I exclude it from further analysis.

All of the demographic variables are tested to determine any statistically significant difference between IMT and EMON membership. I also run a matrix (Appendix F) to identify any possible correlation of the hypothesized variables and the respondent demographics. None of these relationships demonstrate a statistically significant relationship to IV or either of the DVs. I conduct no further analysis of demographics.

ICS Indicators

The ICS indicators help to understand whether ICS is actually being implemented by responders as a whole. They are also tested to determine if there is any statistically significant difference in the degree to which any of them are used for IMTs versus EMONs. Mann-Whitney U testing is conducted using test-by-test and then listwise deletion, yielding no difference in results at the .05 alpha level.

Each of the ICS indicators demonstrate that the various variables are used a vast majority of the time. Between the individual variables there was variance in the usage between IMTs and EMONs, however none of these differences proved to be statistically significant. In order to better understand the impact and interaction of the indicators, I run a correlation matrix. Just as I used the Mann-Whitney U due to non-parametric distributions and ordinal variables, I must Kendall's tau-b to test for correlations. The matrix contains the IV, both DVs and all 10 ICS indicators (See Appendix F). All correlation results are presented using pairwise deletion at the 95% confidence level.

IMT membership does not demonstrate a statistically significance correlation with any of the ICS indicators. However, there are correlations between the 2 DVs, as well as between the individual DVs and a mix of the ICS indicators. The matrix reveals the following correlations:

- SUCCESS
    - ✓ OVEREFFECT Kendall = .394, p = .000
    - ✓ ICDESIG Kendall = .202, p = .023
    - ✓ IAPPREP Kendall = .278, p = .002
- OVERALLEFFECT
    - ✓ ISDESIG Kendall = .209, p = .025
- ICSUSED
    - ✓ ICSORG Kendall = -.212, p = .021 (negative correlation)
- ICDESIG
    - ✓ ICOBJ Kendall = .182, p = .042
    - ✓ PLANP Kendall = .226, p = .027
- ICSOBJ
    - ✓ ICSORG Kendall = .233, p = .010
    - ✓ ICSFORMS Kendall = .253, p = .005
    - ✓ PLANP Kendall = .348, p = .001
    - ✓ IAPBRF Kendall = .321, p = .002
- ICSORG
    - ✓ PLANP Kendall = .248, p = .014
- ICSFORMS
    - ✓ PLANP Kendall = .232, p = .022
    - ✓ IAPBRF Kendall = .330, p = .002
- IAPPREP

- ✓ TRANSFER Kendall = .336, p = .000

- PLANP
  - ✓ IAPBRF Kendall = .410, p = .000
  - ✓ CKIN Kendall = .264, p = .008
- IAPBRF
  - ✓ CKIN Kendall = .505, p = .000

The fact that IMT membership shows no correlation to any of the ICS indicators demonstrates that ICS implementation is not dependent on IMTs. The correlation of both DVs (SUCCESS and EFFECTIVENESS) with ICDESIG may indicate that the perceived success and effectiveness of a response is tied to the specific designation of a lead individual (i.e. Incident Commander). The correlations between the respective ICS indicators is expected, given their interaction when using the ICS.

Intervening Variables

Each of the intervening variables is analyzed using the Mann-Whitney U test. They are examined using both test-by-test deletion as well as listwise deletion. The results are presented for test-by-test deletion at the 95% confidence level.

The only intervening variables that demonstrate a statistically significant difference are:

- ICSTRNG $U = 489$, $z = -7.201$, $p = .000$
- ICSEXP $U = 1116.5$, $z = -2.930$, $p = .003$

These variables are closely tied to the process of becoming an IMT member. IMT candidates are required to take higher levels of training than first responders in general (FEMA, 2009). Another aspect of IMT candidacy is actually working in a specific assignment to demonstrate competency. In order to be credentialed in a functional role, the candidate must perform the responsibilities of the assignment and be evaluated on doing them properly (U. S. Dept. of Homeland Security, 2011b).

In addition to the differences between IMT and EMON members I check the correlations among the intervening variables. The Kendall's tau-b test is run using pairwise and then listwise deletion. All results are presented using pairwise at the 95% confidence level.

Correlations with the IV only demonstrate a relationship with 2 of the intervening variables. ICSTRNG (Kendall = .662, p = .000) and ICSEXP (Kendall = .250, p = .003) both demonstrate a positive relationship with IMT membership. This is expected for the same reasons as the difference demonstrated above for these variables.

Correlations with the respective DVs are more revealing. Both SUCCESS and OVERALLEFFECT are positively correlated with most of the intervening variables, with only a few exceptions. The correlations are as follows:

- SUCCESS
  - ✓ FLEXIND Kendall = .352, p = .000
  - ✓ FLEXORG Kendall = .322, p = .000
  - ✓ AUTH Kendall = .333, p = .000
  - ✓ INFOSHARE Kendall = .258, p = .003
  - ✓ COORD Kendall = .326, p = .000
  - ✓ LEADERSHIP Kendall = .480, p = .000
  - ✓ SITAWARE Kendall = .315, p = .000
  - ✓ SUPPORT Kendall = .205, p = .018
  - ✓ COHESION Kendall = .358, p = .000
  - ✓ TRUSTINT Kendall = .455, p = .000
  - ✓ TRUSTEXT Kendall = .335, p = .000

- ✓ FUNCINIT Kendall = .193, p = .032
- ✓ FUNCUND Kendall = .353, p = .000
- ✓ ICSEXP Kendall = .20, p = .000

- OVEREFFECT
  - ✓ FLEXIND Kendall = .448, p = .000
  - ✓ FLEXORG Kendall = .381, p = .000
  - ✓ AUTH Kendall = .394, p = .000
  - ✓ INFOSHARE Kendall = .396, p = .000
  - ✓ COORD Kendall = .535, p = .000
  - ✓ LEADERSHIP Kendall = .492, p = .000
  - ✓ SITAWARE Kendall = .438, p = .000
  - ✓ SUPPORT Kendall = .365, p = .000
  - ✓ COHESION Kendall = .410, p = .000
  - ✓ TRUSTINT Kendall = .450, p = .000
  - ✓ TRUSTEXT Kendall = .484, p = .000
  - ✓ FUNCUND Kendall = .333, p = .000

The respective DV's correlations with such a wide array of the intervening variables indicate that the perceived success and effectiveness of the responses is more likely due to these qualities than IMT membership. These correlations confirm the studies cited throughout the literature review of the various intervening variables. These individual qualities continue to be tied to effective emergency response.

The intervening variables show a number of positive correlations among the respective variables. In addition, a correlation matrix is run for the relationships between the ICS indicators and the intervening variables. Each of these relationships, while interesting and confirmatory of previous research, is beyond the scope of this present study. These correlations are contained in the correlation matrices in Appendix F.

Summary of Bivariate Analysis

In the bivariate analyses, I identify several important relationships, or lack thereof. I determine the lack of significant interaction between the IMT membership and either of the dependent variables. I find no statistically significant difference in IMT membership for any of the ICS indicators. Only 2 of the intervening variables (ICSTRNG and ICSEXP) demonstrate a statistically significant difference between IMTs and EMONs.

The correlations testing yield similar results for IMT membership. There is no statistically significant correlation between IMTs and either of the DVs. The two DVs are related via positive correlation. Correlations are also lacking for any of the ICS indicators with IMTs. However, there are correlations with the respective DVs. Of note is the relationship with ICDESIG and both SUCCESS and OVERALLEFFECT. SUCCESS is also positively related to IAPPREP. As would be expected, there are several correlations among the respective ICS indicators.

The most telling of all the analysis are the correlations of the 2 DVs with the various intervening variables. Each DV is positively correlated with most of the intervening variables. These results give credence to the value of these variables identified in previous research. Interactions of the IV and DVs are not impacted by any of the demographic characteristics.

HYPOTHESES EXAMINATION

Given the results from the univariate and bivariate analyses, I now examine the study's stated hypotheses. I present each hypothesis and its corresponding null hypothesis. This will provide a fuller understanding of the impact of IMT membership on implementing ICS and its effectiveness.

Hypothesis #1 – Directional: IMTs will increase the perceived effectiveness of implementing the ICS.

Null Hypothesis – There will be no difference in the perceived effectiveness of implementing the ICS for IMTs over EMONs.

This hypothesis tests the IMT membership against the two dependent variables of the respondent's perceptions; Success of Response and Overall Effectiveness. There is no statistically significant difference seen between IMTs or EMONs in regards to either of the DVs. In addition, the correlation matrix indicates that IMT membership has no significant relationship with either dependent variable. These results fail to reject the null hypothesis and Hypothesis #1 is not supported.

Hypothesis #2 (Improvisation) – Nondirectional: There will be differing levels of improvisation in IMTs than EMONs.

Null Hypothesis: There will be no difference in the level of improvisation in IMTs over EMONs.

Neither the Mann-Whitney U nor Kendall's tau-b indicate a statistically significant impact on individual flexibility between IMT and EMON members. Hypothesis #2 is not supported and the null hypothesis is not rejected. FLEXIND is seen to be positively correlated with both SUCCESS and OVERALLEFFECT.

Hypothesis #3 (Emergence) – Nondirectional: There will be differing levels of emergence in IMTs than EMONS.

Null Hypothesis: There will be no difference in the level of emergence in IMTs over EMONS.

As with individual flexibility, analyses fail to demonstrate a statistically significant difference in organizational flexibility for IMT membership. There is also no correlation seen between IMT membership and FLEXORG. These results indicate a failure to reject the null hypothesis and does not support Hypothesis #3. While the hypothesis fails, FLEXORG is positively correlated with both DVs.

Hypothesis #4 - Directional: IMTs will have a higher degree of delegation than EMONs.

Null Hypothesis: There is no difference in the degree of delegation between IMTs and EMONs.

Hypothesis #4 is not supported, with a Mann-Whitney U test p-value of .638. This indicates a failure to reject the null hypothesis of a statistically significant difference in the degree of delegation between IMTs and EMONs. There is also no correlation seen between IMTs and AUTH using the Kendall tau-b test. AUTH is positively correlated with both DVs.

Hypothesis #5 – Directional: IMTs will have more interorganizational communications than EMONs.

Null Hypothesis: There is no difference in interorganizational communications for IMTs or EMONs.

Neither the Mann-Whitney nor Kendall's tau-b supported rejecting the null hypothesis for interorganizational communication. There is no statistically significant difference seen for information sharing between IMTs and EMONs. Thus, Hypothesis #5 is not supported. While this hypothesis fails, the relationship of INFOSHARE to the DVs proves to be statistically significant.

Hypothesis #6 – Nondirectional: There will be differing levels of interagency coordination between IMTs and EMONS.

Null Hypothesis: There will be no difference in the level of interorganizational coordination between IMTs or EMONs.

Hypothesis #6 is not supported, with a Mann-Whitney U of .082 (p-value). The null hypothesis fails to be rejected, indicating there is no difference in the level of coordination between IMTs and EMONS. There also is no correlation between IMTs and COORD when using Kendall's tau-b. There is however a positive correlation with both of the DVs.

Hypothesis #7 – Directional: There will be a higher level of established leadership in IMTs over EMONs.

Null Hypothesis: There will be no difference in the level of established leadership between IMTs and EMONs.

In testing for a difference in leadership, the Mann-Whitney U scores at a .385 p-value. This fails to reject the null hypothesis and does not support Hypothesis #7. Kendall's tau-b also fails to demonstrate a statistically significant correlation between LEADERSHIP and IMTs. There is a strong correlation for LEADERSHIP with SUCCESS, as well as with OVERALLEFFECT.

Hypothesis #8 – Directional: IMT members will have higher levels of prior disaster response experience than EMON members.

Null Hypothesis – There will be no difference in the level of prior disaster response experience between IMT and EMON members.

Level of experience for respondents is tested in two ways. First, I determine the level of ICS experience for each respondent. Mann-Whitney U testing scores a p-value of .003, indicating a statistically significant difference between IMT and EMON members. Using Kendall's tau-b, I get a result of .250 and .003 p-value. This also indicates a statistically significant difference. Both tests confirm a rejection of the null hypothesis and support Hypothesis #8. The correlation analysis shows a positive correlation between ICSEXP and SUCCESS, but not for OVERALLEFFECT.

The second test for prior experience examines the number of times a respondent has been assigned to a specific function (FUNCTIMES). This distribution was skewed but nonparametric testing showed the difference between IMTs and EMONS is not statistically significant. However, the correlation analysis failed to show a statistically significant relationship between IMTs and FUNCTIMES. FUNCTIMES also did not demonstrate a correlation with either of the two DVs.

The first measure of experience (ICSEXP) deals directly with the respondent's specific prior experience with the ICS. This measure supports Hypothesis #8. The second measure (FUNCTIMES) addresses the respondent's overall experience with working in the particular functional assignment. This measure fails to support it. As such, overall the Hypothesis is not supported.

Hypothesis #9 – Directional: IMTs will have a greater level of role clarity than EMONs.

Null hypothesis: There will be no difference in defined role clarity for IMTs or EMONs.

Role clarity is examined in two questions. The first question addresses whether respondents knew what their assignment was to be upon arrival at the response (FUNCINIT). This question proves not to support the Hypothesis using the Mann-Whitney U. It also shows no statistically significant correlation to IMT membership using Kendall's tau-b. The second question addresses the respondent's level of understanding of the expectations and responsibilities of their assigned function (FUNCUND). No statistically significant difference is seen for IMTs versus EMONS nor is a correlation seen between IMTs and FUNCUND. These analyses fail to reject the null hypothesis and do not support Hypothesis #9.

FUNCINIT does show a statistically significant correlation with SUCCESS. However, it does not with OVERALLEFFECT. Both DVs demonstrate a positive relationship with FUNCUND.

Hypothesis #10 – Directional: EMONs will develop a higher degree of situational awareness than IMTs during a response.

Null hypothesis: There will no difference in the level of situation awareness between EMONs and IMTs.

The Mann-Whitney U yields a p-value of .053, which fails to reject to reject the null hypothesis at the 95% confidence level. There is also no statistically significant relationship seen between IMTs and SITAWARE. Thus, Hypothesis #10 is not supported. Both DVs show a correlation with SITAWARE.

Hypothesis #11 – Directional: EMONs will have a higher level of support than will IMTs.

Null hypothesis: There will be no difference in the level of support between EMONs and IMTs.

The difference of support for IMTs and EMONs is tested using a Mann-Whitney U test. The p-value of .337 indicates any difference measured between the groups is not statistically significant. Kendall's tau-b also fails to demonstrate a correlation between IMTs or EMONS and SUPPORT. Hypothesis #11 is not supported and the null hypothesis fails to be rejected. SUPPORT does demonstrate a statistically significant correlation with both DVs.

Hypothesis #12 – Directional: IMTs members will experience higher levels of team cohesion that EMONs.

Null hypothesis: There will be no difference in the levels of team cohesion between IMTs and EMONs.

Team cohesion is tested using a Mann-Whitney U test. The p-value of .612 indicates there to be no statistically significant difference in the level of cohesion between IMTs and EMONs. There is also no significant relationship detected in a correlation analysis. Thus, Hypothesis #12 is not supported and the null hypothesis fails to be rejected. COHESION, however, is seen to be positively related to both SUCCESS and OVERALLEFFECT.

Hypothesis #13 – Directional: IMTs will have higher levels of training to aid in the implementation of ICS than will EMONs.

Null hypothesis: There will be no difference in the training levels for IMTs and EMONs.

Training levels between IMT and EMON members is tested as statistically significant using the Mann-Whitney U p-value of .000. The difference is further examined using Kendall's tau-b tests, providing a value of .662 and p-value of .000. These results indicate a positive relationship between IMT membership and ICS training levels. The results reject the null hypothesis and support Hypothesis #13. ICSTRNG does not show to have a statistically significant correlation with either of the 2 DVs.

Hypothesis #14 – Directional: EMONS will experience greater levels of initial trust than IMTs.

Null Hypothesis: There will be no difference in the levels of initial trust between EMONs and IMTs.

Trust is broken into internal trust among team members and external trust of team members with individuals outside the team. I asked questions addressing both types of trust. However, both levels of trust prove not to be statistically significant using a Mann-Whitney U test. Internal trust measures a p-value of .924 and external trust measures a .365 p-value. Neither levels of trust demonstrate a statistically significant correlation with IMT. This fails to reject the null hypothesis and fails to support Hypothesis #14. Both levels are positively correlated with the respective DVs – SUCCESS and OVERALLEFFECT.

Summary of Hypotheses Examination

The main hypothesis addresses IMTs and their impact on the perceived success and effectiveness of implementing ICS. After analysis, it is shown that there is no correlation between IMT membership and the perceived effectiveness of a response. I then examine the intervening variables to determine the level to which each may or may not exist within an IMT versus an EMON. The only two of the intervening variables that are determined to exist at a significantly different level with an IMT than an EMON are ICSEXP and ICSTRNG. However, ICSEXP is coupled with FUNCTIMES to create Hypothesis #8. FUNCTIMES is determined not to be statistically different between IMTs and EMONs. IMT members are shown to have higher levels of experience in ICS, but not necessarily in how often they are assigned to a specific function. As such, Hypothesis #8 failed to be supported. IMT members do have higher levels of ICS training than their counterparts with an EMON. As a result, this remains as the only Hypothesis (#13) to be supported.

Intuitively, ICSTRNG and ICSEXP seem to be closely aligned. Practically though, this is not always the case. The term "paper tiger" describes a person that has an abundance of training but no real life experience. The two factors go together in the sense that one reinforces the other. Good training prepares responders for what they will experience in the field. Hands-on experience brings appropriate training to life, providing responders with options for better decision making. This study determines that both are an important factor for IMT members.

MULTIVARIATE ANALYSIS

I conduct multivariate analysis of the various components to determine which have a greater impact on the respective dependent variables; the respondent's perception of Success of Response and Overall Effectiveness. This analysis checks for multicollinearity of the variables to ensure they are not too closely related that they measure the same thing. In addition, I obtain a plot to depict the fit of the variables. Given the two dependent variables, I have to run a model for each independently. Each begins with all the ICS indicators, followed by all the intervening variables. Following an individual regression of the dependent variables, I combine the two of them to determine any impact of the perception of the combined "success and effectiveness" of a response.

Remaining Variables

Beginning with Success of Response, I regress listing the ICS Indicators, intervening variables and the independent variable. The R- square for Model I is .491, indicating that the composition of the IV and mix of variables account for 49.1% of the perceived Success of Response. IMT membership has a β of -.039 and p-value of .788. The independent variable and 13 other variables with a β below .100 are dropped. These variables include: IMT, ICSORG, IAPPREP, PLANP, IAPBRF, TRANSFER, FUNCUND, FUNCTIMES, ICSEXP, FLEXIND, INFOSHARE, LEADERSHIP, SUPPORT, COHESION and TRUSTINT. Dropping these variables is intended to improve Model II.

Model II is run using the remaining variables against SUCCESS. The regression for Model II dropped the R-square to .338, but narrowed the gap of the adjusted R (.254). There are no outliers identified in the regression model. Several of the variables β dropped significantly (ICSOBJ, ISCFORMS, CKIN, AUTH, COORD and SITAWARE). These are excluded to create Model III.

The R-square for Model III dropped to .315 but the adjusted R-square increased to .274. The p-value for ICSUSED and ICDESIG was above .05, so they were dropped to create Model IV. This leaves the following four variables: FUNCINIT (β = .247, t = 2.964, p =

.004), ICSTRNG (β = .200, *t* = 2.409, *p* = .018), FLEXORG (β = .250, *t* = 2.909, *p* = .004), and TRUSTEXT (β = .234, *t* = 2.585, *p* = .011).

Model IV (TABLE 7) provides a set of variables that each demonstrates statistical significance to the SUCCESS. The regression model (FIGURE 8) shows a goodness of fit for the relationship of the variable to SUCCESS.

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
1 (Constant)	.215	.710		.303	.763		
Function Known at Initial Arrival	.485	.183	.225	2.650	.009	.995	1.005
ICS Training Level	.241	.100	.204	2.404	.018	.991	1.009
Flexibility Organization	.248	.081	.268	3.059	.003	.933	1.072
Trust External	.308	.102	.265	3.004	.003	.923	1.084

a. Dependent Variable: Success of Response

TABLE 7 - Model IV Regression for Perceived Success of Response

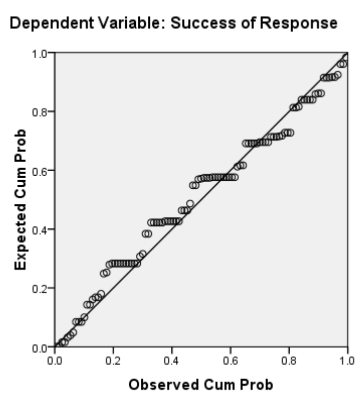

FIGURE 8 - MODEL IV Regression Plot for Perceived Success of Response

Beginning with the same set of variables in Model I above, I conduct regression analysis on the other dependent variable, Overall Effectiveness. This regression becomes Model V, with an R-square of .606 and adjusted R-square of .427. Within this model, only 8 of the variables (IMT,

ICSFORMS, FUNCTIMES, FLEXORG, AUTH, COORD, LEADERSHIP and TRUSTEXT) demonstrate at β above .10. Most of the others even show a negative β on OVERALLEFFECT. All of the variables below .10 are dropped to create Model VI with the remaining 8 variables.

The results of Model VI in an R-square of .456, with an adjusted R-square of .445. Both of the variables demonstrate to be statistically significant at the 95% level. COORD scores β = .469, t = 6.121, and p = .000. TRUSTEXT scores β = .347, t = 4.529, and p = .000 (TABLE 8). The regression plot is presented in FIGURE 9.

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
1 (Constant)	1.232	.325		3.786	.000		
Coordination	.419	.068	.469	6.121	.000	.875	1.143
Trust External	.320	.071	.347	4.529	.000	.875	1.143

a. Dependent Variable: Overall Effectiveness

TABLE 8 - MODEL VI - Perceived Overall Effectiveness

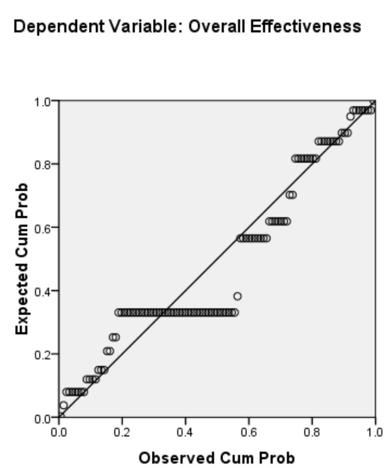

FIGURE 9 - MODEL VI - Regression Plot for Perceived Overall Effectiveness

The only variable remaining that demonstrates a statistically significant relationship with the both DVs was TRUSTEXT. In order to understand the relationship of TRUSTEXT with the combined DVs, I run a multivariate analysis combining the two. The results show a Wilks' Lambda of .676. It also yields an F of 7.415 and a p-value of .000. Thus, TRUSTEXT stands as the only variable with a statistically significant relationship with the combined SUCCESS and OVERALLEFFECT.

Summary of Multivariate Analysis

I run individual regression plots for each of the two dependent variables against the IV and all of the ICS indicators and intervening variables. Running multiple models, I continue to reduce variables that have negative or minimal impact on the dependent variables. As a result of this reduction throughout the models, I eliminate the IV, all of the ICS indicators and all but one of the intervening variables. I am left with only one remaining intervening variable; TRUSTEXT. Analysis of the individual DVs shows TRUSTEXT to be statistically significant. A multivariate analysis of the combined DV indicates that TRUSTEXT is still statistically significant.

Chapter V

CONCLUSIONS

In October 2012, Hurricane Sandy pounded the northeastern coast of the United States. Like thousands of other responders from across the nation, I responded. I was assigned to the work in the State of New York's Emergency Operations Center (EOC) in Albany. When my team arrived, we were briefed on the current status of operations. During the briefing, one the key bits of information included was "Don't use the term ICS around here, the Director hates it." Over the course of my 14-day deployment, I was reminded of this from time to time. However, the organization and operations of the EOC was structured on the ICS, using the functional names, terms and concepts of the system. The truth of the situation was that I was working within a large network with hundreds of others I had never met before and most I have not talked with since. This was a gigantic EMON, working under some semblance of the ICS (Petrescu-Prahova & Butts, 2008) while denying to do so.

With little doubt, this type of situation has played out multiple times throughout the country. Responders struggle to bring together the most appropriate mix of personnel, equipment, expertise and information (Dawes et al., 2004). They attempt to put the resources together in such a way as to save their community from further harm from whatever disaster it is currently facing. Trying to do this from scratch every time a new disaster occurs seems counter-productive. This concept is the basis for the Incident Command System, upon which IMTs are based. And this concept is the foundation for this present study.

RESEARCH SUMMARY

In 2004, the Incident Command System became the national standard for on-scene management during emergency and disaster responses (U. S. Dept. of Homeland Security, 2004a). Since that time, IMTs have been developing across the nation. Many jurisdictions have started to develop IMTs for their own, and for deployment to other jurisdictions in need. The intent of these teams is to provide "subject matter experts" to assist in the implementation of ICS (McLennann, Holgate, Omodei, & Wearing, 2006). The federal government provides funding for all things ICS: training, exercises, equipment and expertise. Budgets are spent at the local, regional, state and tribal levels as well on implementing ICS. Funding is also used for the development and maintenance of IMTs. The alternative to using a pre-designated IMT is to use an ad hoc group of responders to oversee and coordinate the response. These ad hoc groups are known as EMONs (Drabek, 1983).

However, ICS is hotly debated in its efficacy as a response system. The intent of this present study is not to address ICS directly but to examine IMTs. Incident management teams have been rarely researched. No research has sought to determine the overall effectiveness of IMTs in implementing ICS during a response. This is the main goal of the present study.

To be able to determine whether IMTs are beneficial in implementing ICS, I could not have a single benchmark from which to judge. Using the system's approach (Ghorpade, 1970; Yuchtman & Seashore, 1967), I established a perception and an output measurement to determine the effectiveness of a response. For the perception standard, respondents were asked two questions in different ways about the success or effectiveness of their response. For the output standard, respondents were asked about the level to which ICS was implemented.

In order to determine whether ICS is actually being implemented, I identified 10 indicators. The first indicator is tested by asking respondents whether ICS was actually implemented on their response. Almost 98% of all responders indicate that ICS was used for their responses. The other indicators revolve around key assignments made or tasks completed during the response. These were identified through a review of the NIMS and ICS training documents (Emergency Management Institute, 2012; FEMA, 2007, 2010; National Incident Management System Integration Center, 2004; U. S. Dept. of Homeland Security, 2004, 2008a, 2008b, 2011a). Those indicators are:

- Designation of an Incident Commander
- Incident Commander designates specific objectives to be accomplished for each operational period
- The establishment of an actual ICS organizational structure during the response
- The use of ICS forms for documenting the decisions made and actions taken during the response
- The development of an Incident Action Plan for each operational period
- The use of the Planning P for developing the Incident Action Plan
- The distribution and briefing of the Incident Action Plan at the beginning of each operational period
- The establishment of a check-in and check-out procedure for tracking of resources used in the response
- The official transfer of function at the conclusion of each respondent's work period

These indicators are considered an integral part of the ICS. They set the framework for setting a direction for the response, communicating that direction to all involved responders and establishing continuity for the response. They are intended to increase the accountability for covering all aspects of a response. For this study, respondents indicate that all of these indicators are used to a high degree. For responders in general, usage of these indicators ranges from a low of 72.8% for PLANP to a high of 97.6% for ICSUSED. Their actual application by IMTs and EMONS is discussed further below.

In addition, I seek to determine the characteristics that exist within a team structure that could help or hinder it. For this, I identified 12 intervening variables through an extensive literature review. Each of these independent intervening variables has been shown to impact disaster response. The intervening variables are:

- Improvisation – individual flexibility
- Emergence – organizational flexibility
- Delegation
- Interorganizational communication
- Interorganizational coordination
- Leadership
- Prior experience
- Role clarity, by knowing what their assignment will be from the beginning of the response as well as having a firm understanding of the expectations and responsibilities of that assignment
- Situational awareness
- Support, from local official and other response agencies
- Team cohesion
- Training level
- Trust – internal and external to the team

The methodology for this study is an on-line survey presented to emergency responders that have been part of a large- scale response involving multiple agencies over more than one operational period. Respondents are asked whether they are members of IMTs. Those that do not identify as

IMT members are defaulted to being part of an EMON. Respondents are asked to rate the level of the various characteristics in the intervening variables. They are also asked to rate the level that ICS was implemented, based on 10 identified indicators. A total of 14 hypotheses were developed for the study. The main hypothesis examines whether IMT membership increases the perceived effectiveness of the response. The remaining 13 hypotheses seek to determine the presence of the characteristics of the intervening variables.

The unit of analysis for this study is the individual responder. This allows me to examine the qualities of the intervening variables. Analysis at the individual level reveals the interactions within the teams that could not be determined at a different level of analysis.

Respondents were identified throughout FEMA Region VII for participation in the study. The region was determined to be a fair representation for emergency responders and disaster experience. Participation was targeted to higher ranking individuals from a variety of emergency response disciplines. Respondents were encouraged to forward the survey on to other responders they had worked with in the past. This allowed for an increase in participation through snowball sampling.

After the survey was closed and the data gathered, I use SPSS to conduct analysis of the data. Using various statistical analyses, I tested each of my 14 hypotheses. At the conclusion of my analysis, only one of the hypotheses is supported by the collected data. It was not my primary hypothesis but pertained to one of the intervening variables:

- *IMTs will have higher levels of training to aid in the implementation of ICS than will EMONs.*

IMT members demonstrate to have statistically significant higher levels of ICS training than did their EMON counterparts. Looking at the highest 2 levels of ICS training (ICS400 and Position Specific Training), there were vast differences. For most EMON members, ICS400 was their highest level of training (82.7%), with only 9.6% having Position Specific Training. However, IMT members topped out the highest level of training, with 80.6% having Position Specific Training. 16.1% indicated ICS400 was their highest training received. This higher level of training ostensibly provides an increased awareness of potential response issues for IMT members not present in EMON members.

Only one other variable showed a statistically significant difference for IMTs as opposed to EMONs. ICSEXP addressed the level of experience to which a responder had attained for working a specific ICS functional assignment. The question determined whether the responder had:

- Previously ever been assigned to the function
- Was working to complete a Position Task Book (PTB) toward being credentialed in the function, or
- Was already credentialed in the function

The majority of EMON members (53.8%) indicated their highest level of ICSEXP was being previously assigned to work a specific ICS function. Only 1.9% were working to complete a PTB, while another 15.4% were already credentialed in the function. These three categories total 71.1%, while the remaining 28.9% has even less previous experience. On the other hand, IMT members totaled 92% for the same 3 categories (35.5% were previously assigned, 35.5% were completing a PTB, and 21% were already credentialed in the function).

ICSEXP was coupled with another variable (FUNCTIMES) to evaluate the Hypothesis for Prior Disaster Response Experience. FUNCTIMES addressed how often a responder had been assigned to work a specific function during a live response. This question asked respondents to provide a specific number of times, which provided a mean score to 11.77 times for respondents overall. The mean for EMON members was 13.18 times, compared to 10.42 times for IMT members. As such, EMON members appeared to have higher levels for FUNCTIMES, but this difference was determined to not be statistically significant.

The prior experience Hypothesis combined the ICSEXP and FUNCTIMES variables. The two variables conflicted in which (IMT versus EMON) had greater experience. As such, Hypothesis #8 was not supported. Even though this Hypothesis failed, it still remains that IMT members have higher levels of ICS specific experience. This experience, combined with the higher levels of training could be the basis of Jensen's (2008) observation of IMT improving the implementation of ICS upon their arrival to her studied disaster response.

Of all of the ICS indicators and intervening variables included in this project, it is quite surprising that IMT members only showed a statistical significance to two of them. For all the other indicators, there is no statistical difference in ICS being implemented by IMT members as opposed to EMON members. The research does indicate that ICS is being implemented to a high degree by all responders. This conflicts with some previous research that ICS usage is spotty and random (Jensen, 2008, 2009; Jensen & Yoon, 2011; Neal & Webb, 2006). It indicates that ICS is more of a common practice among responders (Moynihan, 2009; Nicholson, 2003). 98.4% of respondents indicated that ICS was implemented on their responses. Some agencies simply say they are using ICS but do not truly implement it fully (Wenger, Quarantelli, & Dynes, 1989). In looking at the span of the other ICS indicators it appears that this may be changing over the years as well. ICS organizational structures are established on 91.5% of the responses and Incident Commanders are specifically designated on 94.3% of them. What is not seen though is a statistically significant difference in that these components are implemented more by IMTs than EMONs. In fact, for this study EMONS created an ICSORG and designated an IC more often than their IMT counterparts. For ICSORG, IMTs = 90.3% while EMONS = 92.3%. For ICDESIG, IMTs = 93.5%, EMONs = 94.1%. Across the span of ICS indicators, each individual indicator was implemented on at least two-thirds of all responses, regardless of IMT membership.

The results for IMT membership correlating with the remaining intervening variables are non-existent. With all the extant research on the benefits of the intervening variables (flexibility, delegation, interorganizational communication and coordination, leadership, role clarity, situational awareness, support, team cohesion and trust), IMTs are not statistically significantly linked to any. The survey responses show that each of the intervening variable exist for all respondents (IMT and EMON). However, there is no statistically significant difference between the two groups. Measured on a Likert scale from non-existent to moderate to high levels of existence, these qualities all exist at the moderate to high level for a majority (above 50%) for all respondents. There was also no correlation detected for IMT membership with any of these qualities. While these qualities do exist within the respondent's incidents, they are not dependent on the presence of an IMT.

The main hypothesis of this study looked at whether IMTs increased the perceived effectiveness of implementing ICS. However, IMT membership was not shown to have a statistically significant effect on the respondents' perception on the effectiveness or success of a response. As with all the other variables, the perceived levels of SUCCESS and OVERALLEFFECT were ranked quite high. On the Likert scale, the top three levels of SUCCESS was ranked as "Somewhat," "Mostly," and "Fully". For all respondents, Somewhat = 12.9%, Mostly = 52.6% and Fully = 31.9%, totaling 97.4% of answers across the three answers. IMTs ranked 96.8% and EMONs ranked 98.1% across the same three answers. OVERALLAFFECT yielded a higher level of results. For overall responses, 100% of the respondents answered across the top three answers. This resulted in IMT and EMON responses being 100% as well for the top three. So the perception of a response being effective and success is not at issue. However, there is no link to them being related to IMT membership.

Next, I tested the 10 ICS indicators, as well as the intervening variables, against the dependent variables of SUCCESS and OVERALLEFFECT. The results proved interesting. First, there was a strong correlation between the two DVs. SUCCESS and OVERALLEFFECT are correlated with a Kendall's tau-b = .394, p = .000. In examining the ties to the ICS indicators, SUCCESS was only correlated to two: ICDESIG and IAPPREP. OVERALLEFFECT was only correlated to ICDESIG. It is interesting that both perceptions of the success and effectiveness of responses link closely with the specific designation of lead official, an Incident Commander in this case. This supports previous research on the need for an identified leader within a disaster response (Donahue & Tuohy, 2006).

In addition to the links of the DVs with the ICS indicators, they also showed correlations to almost all of the individual intervening variables. Linking the respondent's perceptions of SUCCESS and OVERALLEFFECT to the respective intervening variables confirms the vast array of research on each variable. Without re-covering all of the literature review on each intervening variable, suffice it to say that each was demonstrated to be statistically significantly correlated with the success and effectiveness of the responses.

One variable in particular stands out as having been the only variable to have remained in the multivariate testing of the combined DVs. Throughout the multiple regression models run on the individual DVs and then the combination of both, TRUSTEXT was the sole remaining variable to have a statistically significant relationship. This supports the importance that trust plays in time of crisis. It serves as the substitute for the need for control measures of players within the response (Bachmann, 2001; de Man & Roijakkers, 2009; Dekker, 2004; Jagd, 2010; Mollering, 2005; Nooteboom, 2006; Oh, Chung, & Labianca, 2004; Reed, 2001; Shapiro, 1987; Vlaar, Van den Bosch, & Volberda, 2007; Wells & Kipnis, 2001). Especially during times of crisis, trust may be the only thing to remain when the structure fails (Weick, 1993). Trust is important in that it serves as the building block for other aspects needed during an emergency, like cooperation (Comfort, 1990; McAllister, 1995) and responsiveness to needed change (Cox, Jones, & Collinson, 2006; Schobel, 2009). Trust is also seen as having the ability to enhance attitudes, actions and performance (Costa, 2003; Costa & Bijlsma-Frankema, 2007; Dirks & Ferrin, 2001; Yang & Holzer, 2006).

However, trust is not an automatic quality within disasters. As the cliché goes in the emergency management realm, "The incident scene is not the time to trade business cards." It is something that must be developed before the emergency ever begins, through planning, training, or simply everyday interactions. Lutz and Lindell (2008) go so far as to state that the system of ICS is grounded in the relationships and trust of the responders involved.

RESEARCH CONCLUSIONS

I structured my research questions around obtaining an understanding of whether IMTs are actually a positive force during a disaster. In the absence of an IMT, the default response mode is assembling an ad hoc group (EMON) with each new response. Through an extensive literature review, I identified twelve attributes that were pervasive in the research as positively impacting disaster response. Thus, in addition to testing the perceived effectiveness of IMTs, I also strove to determine the existence of these attributes within the teams.

In examining these various attributes, only two test to a statistical significant difference between IMTs and EMONs. The first of these has to do with training levels of the respondents. Responders were asked to identify their highest level of ICS training. IMT members have a statistically significant higher level of training than EMON members. As McLennan, et al (2006) demonstrates, IMTs provide a ready core of ICS trained individuals to assist in a response. The importance of training is mentioned by numerous researchers (Annelli, 2006; Autrey & Moss, 2006; Bauer, 2009; Buchman III, 2005; Can, 2006; Carwile, 2005; Crichton et al., 2005; Donahue et al., 2009; Jensen & Yoon, 2011; M. K. Lindell et al., 2005; Lutz & Lindell, 2008; Mason, 2006; McLennann et al., 2006; Neal & Webb, 2006; Norton, 2007; Templeton, 2005). This study only analyzes levels of ICS training. This simply examines the depth of training, but takes no consideration of the width or breadth of responder's training. Research addresses the need for cross training with other teams or disciplines (Schaafstal, Johnston, & Oser, 2001). Training cannot simply focus on ICS, but must include realistic scenarios that teams are likely to face (Auf Der Heide, 1989; Paton & Flin, 1999). It is also advantageous for individual team members to have diverse training to guard against tunnel vision in their overall approach to different incidents (Dercole, 2006; Templeton, 2005).

The second attribute that exists has to do with prior experience using ICS during responses. This confirms McLennan's, et al (2006) evaluation of IMTs in the wildland fire realm. While this study shows higher levels of experience, it was not shown to have a significant impact on the perceived success or effectiveness of responses as discussed by other researchers (Carley, 1991; E. L. Quarantelli, 1996; Sahin, 2009). Nor did this higher level of experience ensure a higher level of coordination (Comfort, 2002).

As expected, IMT members had a higher level of both training and experience. The implications of these results confirm previous research. Donahue and O'Keefe (2007) tell us, "While ICS can be very useful in rationalizing management structures and can allow nonresponders to interface naturally with responders, to work well, ICS cannot be an unfamiliar 'disaster only' innovation" (pg 80). If responders are going to use the ICS, then they must <u>use</u> the ICS. As with almost every aspect of life, the more you do something, the better you become. Inversely, if you do not use it, you will lose it.

However, I also had to determine if IMTs were truly implementing the ICS. I identified ten actions that serve as benchmarks of implementation. Using the systems approach for effectiveness, I had to establish a multi-factored measurement tool. This measurement tool is based on two differing standards. The first is an output standard – the actual implementation of the ICS indicators. With this measurement tool, I sought to determine the perceived effectiveness of IMTs implementing the ICS in comparison with non-IMT responders implementing the ICS. The second is a perception standard – the individual responder's perception of the effectiveness of their response.

In measuring the ICS indicators, I did observe that each of the indicators is implemented to some degree by both IMTs and EMONs. The results show that ICS is being used to a high degree, by both IMTs and EMONs. In fact, 98.3% of respondents state that ICS is implemented on their incidents. Across the span of all the indicators, application of the respective indicators varies, confirming previous research (Jensen, 2008; Neal & Webb, 2006). However, for the individual indicators, they were all implemented a majority of the time, from 72.8% for use of the Planning P to 98.3% of implementing ICS. Prior research questions the efficacy of ICS as a whole (Buck, Trainor, & Aguirre, 2006; Comfort, Ko, & Zagorecki, 2004; Jensen, 2008; Jensen & Yoon, 2011; Lutz & Lindell, 2008; Neal & Phillips, 1995; Neal & Webb, 2006). However, this study demonstrates that respondents indicate that these same incidents were mostly or fully successful (93%). This confirms the results of researchers indicating that ICS is a valid response system (Bigley & Roberts, 2001; Cole, 2000; Lindell, Perry, & Prater, 2005; Perry, 2003). However, upon statistical analysis, none of the ICS indicators were shown to have a statistically significant difference in the application between IMTs and EMONs.

The only direct correlation identified between the use of ICS and perceived success/effectiveness is the designation of an Incident Commander. This correlation was not examined further as it is beyond the scope of this present study, which instead focuses on IMTs. The respondent's perception of Success of Response is also tied to the development of an Incident Action Plan. Overall Effectiveness deals with the respondent's perception of the outcome of the response. As such, Success of Response more closely tied to ICS implementation.

The consistency of applying the ICS varies among respondents, often leading to snags in a response (Hancock, 2009). IMTs are intended to provide consistency in doing what they are trained to do, regardless of disaster type or location. However, the results do not indicate that IMTs bring any greater consistency than is provided by EMONs.

To measure the second standard for the systems approach, I surveyed the respondents on their individual perceptions. There are two questions asked in different ways to measure the respondent's opinions about the success of the response. The analysis of the individual responses does not reveal a statistical difference between respondents who were part of an IMT or not. Success and overall effectiveness both rate at 98% or higher for all respondents. What fails is the connection with IMT membership.

With this negative result of the second standard, the main hypothesis of the study is not supported. So, ICS is implemented to a high degree, regardless of IMT or EMON membership. This implementation of ICS does impact the perception of the success or effectiveness of a response. The implications of this result are a mixed bag. On the one side, the use of the ICS is high. On the other side, implementing components of ICS, whether by IMTs or not, does not appear to impact effectiveness.

This study does confirm prior research of the impact of trust on response effectiveness (Comfort, 1990; Cox et al., 2006; Donahue, 2003; Lutz & Lindell, 2008; McKnight, Cummings, & Chervany, 1998; Schobel, 2009; Weick, 1993). This study shows that trust is tied to the respondent's perception of both dependent variables. This demonstrates the importance that responders at all levels, IMT member or not, need to place on trust, before and during a disaster.

STUDY LIMITATIONS

The format of this study is an online survey. The survey is presented to emergency response officials across the four states with FEMA Region VII. Responders are targeted for their potential of having responded to a large scale incident involving multiple organizations. From this convenience sample, respondents are encouraged to forward the survey to other responders they had worked with on these responses. Thus the respondents are either the result of a convenience or snowball sample. Generating participation in this way limits the generalization of the results of this study. I am not able to apply the results of this survey to the larger population of responders across the Region or nation. However, this research is an exploration into the use of IMTs. Review of research literature reveals no other research along the same lines at this study. The intent then is not to be confirmatory in nature, but to create a foundation for opening up future research.

The scope of this present study is that it is targeted to responders that have been part of a Type III response. This level of response is one the lasts more than one operational period and involves multiple agencies, presumably of differing disciplines. This study does not take into account lower level responses that may only last a short period of time or involved only one or a few different agencies. Also not considered in this study are the types or sizes of organizations or jurisdictions involved. Jensen (2009, 2001) looked at responses in smaller, more rural jurisdictions, often with volunteer personnel. She points out the perceptions of the individuals in the unique issues that they face. These types of issues are ignored in this current study.

Also not considered are responses that cross the boundaries between various levels of government (local, state, federal, territorial, or tribal). Responses of this nature carry many unique issues as well. And finally, this study is blind to the nature of the incident. Whether the emergency is manmade (terrorism) versus caused by nature may involve different stresses. Another aspect of incident type concerns the incident agent; fire, flooding, civil unrest, prison riot. Based on all these various permutations of developing an effective response, the question remains whether IMTs would be an added benefit or not within the various boundaries of others studies.

Finally, this study is also limited in examining the use of IMTs during the response phase. Other researchers have noted differences in the use of ICS during different phases of emergency management (Buck et al., 2006; Lutz & Lindell, 2008; Renaud, 2012). If there is a difference in the application of ICS during various phases, the potential impact of IMTs during the respective phases should also be examined.

The study is also limited in its design. This study is an online survey with a quantitative analysis of the results. This means that only responders that have access to email were even a possible participant. Also, the only interaction between the researcher and respondent is via email for distribution of the survey. This type of research design provides "Joe Friday" results – "Just the facts". It does not allow for a deeper, richer examination of respondent's answers in a one-on-one interview format. A qualitative research design examining the same parameters could provide a total different result. Previous field studies of IMTs (Donahue, 2003; McLennann et al., 2006; Templeton, 2005) demonstrated that IMT are a benefit to a response. Jensen (2008) commented on the perceived positive changes brought about by the arrival of an IMT. Results such as provided in these studies need to be examined further.

RECOMMENDATIONS

This study is an exploratory search into the world of IMTs. It seeks to examine what they do and what characteristics exist within the teams. From the literature review, there is no research identified that examines these same parameters. Use of IMTs in various aspects continues to expand as more disciplines become involved in the ICS (Crichton, Flin, & McGeorge, 2005; Crichton, Lauche, et al., 2005; Matthew & Maloney, 2009; McLennann et al., 2006; Meyers, 2014; Smith, 2011; Villa, 2013). As such, research needs to continue along this realm. There needs to be better understanding of IMTs as a whole. ICS is engrained in the NIMS standard as the on-scene command and management model (U. S. Dept. of Homeland Security, 2008b).

Practical Implications

The national response system is built around NIMS, from the providing of federal dollars in the form of grants to the reimbursement of recovery dollars following a disaster. The system is not going to change without a strong understanding of the need for change. Research can lead to an understanding of how to respond in the most effective manner. Future research can also demonstrate whether IMTs are or can be a part of that system. If monies are going to be spent on IMTs, then the best use of those monies needs to be determined. A local official or department head considering the development of an IMT needs to have a full understanding of what such a team brings to the table. From this study it is evident that IMT do not automatically take a response to a higher ICS level. As such, IMTs may not be beneficial in all types of disciplines, jurisdictions or responses. However, because they are still relatively a new concept in the emergency management realm, they warrant deeper examination. One of the questions I posed in developing this research design was seeking to answer the question, “what makes IMTs tick.” This question still remains.

Research Implications

There exists much research on work teams and performance. This type of team performance research needs to focus on IMTs. Research on the inner workings of IMT performance needs to occur. Research can be conducted on IMTs and EMONs to determine if there are any unique aspects that exist within them. This study determined that qualities such as trust, team cohesion, flexibility, etc exist within IMTs and EMONs, but not to a greater degree in one or the other. While this study seeks to identify some of the team characteristics, more can be done. I recommend a more qualitative study format for this. Field observations would allow researchers first-hand accounts of the interaction within the team to better identify team dynamics. Crichton (2005) has examined the use of team in the oil industry and McLennan et al (2006) has examined wildland fire response. More case studies need to be done to understand not only the benefits of IMTs but also the limitations. Just as much can be learned about a process by what it cannot do as by knowing what it can do.

Another aspect of research deals with the individuals involved in IMTs. Research exists on disaster stress, both during and post event. This research usually focuses in on the lead officials (IC) (K. Hall, 2010; Lake, 2004; Renaud, 2012), on responders as a whole (Jenkins, 1998; LaFauci Schutt & Marotta, 2011; North et al., 2002), or for the public at large (Epstein, Fullerton, & Ursano, 1998; Norris, Friedman, & Watson, 2002; Norris, Friedman, Watson, Byrne, & Kaniasty, 2002). Future research needs to identify the impact on individual responders working in the command structure, one or two steps removed from the incident scene. In doing their work, they are not subject to the same sights, smells and sounds as those responders actually on scene. However, they still have the stress of making potentially life and death decisions. They have limited resources and information and often face long hours. While not faced with the same physical dangers, they are exposed to similar psychological and emotional trauma. Responders and response agencies need to develop an understanding of the physical and psychological impact of working in this environment.

In a more practical sense, researcher must focus more on the interactions of individuals than on structure processes (Buck et al., 2006; Enrico L Quarantelli, 2008). Emergency management is a free-style activity, during response but also across all four phases. Emergency and disaster situations are fluid and ever-changing, and any system intended to respond to them must be just as dynamic. The findings of this study indicate the benefits of more training and experience more than the benefits of strict ICS adherence. Emergency response professionals, especially those responsible for oversight and training need to afford responders the best training, instilling interactions more than on processes.

FINAL COMMENTS

The debate continues on bureaucratic and hierarchical systems; specifically the ICS versus other structures like networks. The fact remains that the two are not mutually exclusive (Dawes et al., 2004; Rikoski, 2008; Uhr, 2009). In the middle of a disaster, responders are faced with a multitude of obstacles. They must not be distracted by the structure being implemented. As Kettl (2006) states, “The search for superior performance, not blind obedience to rules, must guide emergency response” (p 280).

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APPENDICES

Appendix A

Oklahoma State University Institutional Review Board

Date:	Thursday, March 19, 2015
IRB Application No	AS1519
Proposal Title:	The Efficacy of Incident Management Teams and Emergent Multi-Organizational Networks in the Implementation of the Incident Management System
Reviewed and Processed as:	Exempt

Status Recommended by Reviewer(s): Approved Protocol Expires: 3/18/2018

Principal Investigator(s):

Brett Bailey	David M. Neal
6467 S. 385 W Ave	210 Murray
Mannford, OK 74044	Stillwater, OK 74078

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

☒ The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1.Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval. Protocol modifications requiring approval may include changes to the title, PI advisor, funding status or sponsor, subject population composition or size, recruitment, inclusion/exclusion criteria, research site, research procedures and consent/assent process or forms
2.Submit a request for continuation if the study extends beyond the approval period. This continuation must receive IRB review and approval before the research can continue.
3.Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of the research; and
4.Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact Dawnett Watkins 219 Cordell North (phone: 405-744-5700, dawnett.watkins@okstate.edu).

Sincerely,

Hugh Crethar, Chair
Institutional Review Board

PARTICIPANT INFORMATION - OKLAHOMA STATE UNIVERSITY

Title: The Efficacy of Incident Management Teams and Emergent Multi-Organizational Networks in the Implementation of the Incident Management System

Investigator(s): Brett Bailey, M.S., Oklahoma State University

Purpose: The purpose of the research study is to identify the characteristics and group dynamics that exist within groups of emergency responders who make up the organizational structure of a disaster response. In particular, I will see whether different characteristics exist between pre-existing groups known as Incident Management Teams, and ad hoc group that come together simply as the result of being involved in a common response. These ad hoc groups are known as Emergent Multi-Organizational Networks.

What to Expect: Participation in this research will involve completion of one questionnaire, completely on-line. The questionnaire asks responders to identify various characteristics that existed within previous responses that they have been a part of. You will be asked to rate the level to which these characteristic existed, as well as comments to help justify your rating. In addition, you will be asked for demographic information; such as race, ethnicity, education level, agency type, years of experience, and levels of training and actual response experience. You will not be asked any specific personal information, such as name and identifiers (Social Security Number or date of birth). You may skip any questions that you do not wish to answer. You will be expected to complete the questionnaire once. It should take you about 20 minutes to complete.

Risks: There are no risks associated with this project which are expected to be greater than those ordinarily encountered in daily life.

Benefits: There are no direct benefits to you. However, you may gain an appreciation and understanding of how research is conducted.

Compensation: You will receive no compensation for participating in this research.

Your Rights and Confidentiality: Your participation in this research is voluntary. There is no penalty for refusal to participate, and you are free to withdraw your consent and participation in this project at any time.

Confidentiality: This survey will be conducted completely on-line using SurveyMonkey.com. No personal information will be collected, nor tracked. The only information that will be gathered is the responses to the survey questions. These answers will be stored by SurveyMonkey.com and will only be accessible by the Researcher listed above through the use of password protected database. The aggregate results will be kept by the Researcher for a period of three years after the study has been completed, in electronic format on a password protected computer or external hard drive.

Contacts: You may contact any of the researchers at the following addresses and phone numbers, should you desire to discuss your participation in the study and/or request information about the results of the study:

1. Brett Bailey, M.S., Murray Hall, Department of Political Science, Oklahoma State University, Stillwater, OK, 74078, 918-728-9167
2. David M. Neal, Ph.D. 210 Murray Hall, Department of Political Science, Oklahoma State University, Stillwater, OK 74078, 405-744-2524

If you have questions about your rights as a research volunteer, you may contact the IRB Office at 219 Cordell North, Stillwater, OK 74078, 405-744-3377 or irb@okstate.edu.

If you choose to participate: Please, click NEXT if you choose to participate. By clicking NEXT, you are indicating that you freely and voluntarily agree to participate in this study and you also acknowledge that you are at least 18 years of age. You are asked to only take this survey once.

It is recommended that you print a copy of this consent page for your records before you begin the study by clicking below.

Okla. State Univ.
IRB
Approved 3-19-15
Expires 3-18-18
IRB # AS-15-19

I am a graduate student at Oklahoma State University, conducting a research project on disaster response. The project is entitled "The Efficacy of Incident Management Teams and Emergent Multi-Organizational Networks in the Implementation of the Incident Management System." In addition to my studies, I have served as a police officer for the past 26 years and member of an Incident Management Team (IMT) for the past 15 years. My project seeks to determine the effectiveness of IMTs during disasters, as opposed to coordination by an ad hoc group of responders. I will attempt to determine the presence of various characteristics in both types of these responses.

This research gathers information using an online survey. The survey is a list of questions about responder's experiences responding to incidents. No personal information is gathered on any individual responder. The survey takes approximately 20 minutes to complete. I am seeking to make contact with emergency responders from various types of agencies (education, emergency medical, emergency management, dispatch/communications, fire, GIS, law enforcement, military, public health, public works, and volunteer organizations) throughout FEMA Region VII.

I am asking for your assistance in this effort. The information listed as part of this email includes a link to the questionnaire. Please take the time to take the survey. In addition, forward this email to emergency responders that you know or have worked with on past responses. This should include responders that are members of IMTs as well as those that are not. Your participation and assistance is greatly appreciated.

Sincerely,

Brett Bailey
PhD candidate
Oklahoma State University

Appendix B

Oklahoma State University Institutional Review Board

Date:	Tuesday, April 21, 2015	Protocol Expires:	3/18/2018
IRB Application No:	AS1519		
Proposal Title:	The Efficacy of Incident Management Teams and Emergent Multi-Organizational Networks in the Implementation of the Incident Command System		
Reviewed and Processed as:	Exempt **Modification**		

Status Recommended by Reviewer(s) **Approved**

Principal Investigator(s):

Brett Bailey
6467 S. 385 W Ave
Mannford, OK 74044

David M. Neal
210 Murray
Stillwater, OK 74078

The requested modification to this IRB protocol has been approved. Please note that the original expiration date of the protocol has not changed. The IRB office MUST be notified in writing when a project is complete. All approved projects are subject to monitoring by the IRB.

■ The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

The reviewer(s) had these comments:

Modification to change title to "The Efficacy of Incident Management Teams and Emergent Multi-Organizational Networks in the Implementation of the Incident Command System", and make minor changes to the survey instrument.

Signature :

Hugh Crethar, Chair, Institutional Review Board

Tuesday, April 21, 2015
Date

Exit this survey

PARTICIPANT INFORMATION - OKLAHOMA STATE UNIVERSITY

Title: The Efficacy of Incident Management Teams and Emergent Multi-Organizational Networks in the Implementation of the Incident Command System

Investigator(s): Brett Bailey, M.S., Oklahoma State University

Purpose: The purpose of the research study is to identify the characteristics and group dynamics that exist within groups of emergency responders who make up the organizational structure of a disaster response. In particular, I will see whether different characteristics exist between pre-existing groups known as Incident Management Teams, and ad hoc group that come together simply as the result of being involved in a common response. These ad hoc groups are known as Emergent Multi-Organizational Networks.

What to Expect: Participation in this research will involve completion of one questionnaire, completely on-line. The questionnaire asks responders to identify various characteristics that existed within previous responses that they have been a part of. You will be asked to rate the level to which these characteristic existed, as well as comments to help justify your rating. In addition, you will be asked for demographic information; such as race, ethnicity, education level, agency type, years of experience, and levels of training and actual response experience. You will not be asked any specific personal information, such as name and identifiers (Social Security Number or date of birth). You may skip any questions that you do not wish to answer. You will be expected to complete the questionnaire once. It should take you about 20 minutes to complete.

Risks: There are no risks associated with this project which are expected to be greater than those ordinarily encountered in daily life.

Benefits: There are no direct benefits to you. However, you may gain an appreciation and understanding of how research is conducted.

Compensation: You will receive no compensation for participating in this research.

Your Rights and Confidentiality: Your participation in this research is voluntary. There is no penalty for refusal to participate, and you are free to withdraw your consent and participation in this project at any time.

Confidentiality: This survey will be conducted completely on-line using SurveyMonkey.com. No personal information will be collected, nor tracked. The only information that will be gathered is the responses to the survey questions. These answers will be stored by SurveyMonkey.com and will only be accessible by the Researcher listed above through the use of password protected database. The aggregate results will be kept by the Researcher for a period of three years after the study has been completed, in electronic format on a password protected computer or external hard drive.

Contacts: You may contact any of the researchers at the following addresses and phone numbers, should you desire to discuss your participation in the study and/or request information about the results of the study:

1. Brett Bailey, M.S., Murray Hall, Department of Political Science, Oklahoma State University, Stillwater, OK, 74078, 918-728-9167
2. David M. Neal, Ph.D. 210 Murray Hall, Department of Political Science, Oklahoma State University, Stillwater, OK 74078, 405-744-2524

If you have questions about your rights as a research volunteer, you may contact the IRB Office at 219 Cordell North, Stillwater, OK 74078, 405-744-3377 or irb@okstate.edu.

If you choose to participate: Please, click NEXT if you choose to participate. By clicking NEXT, you are indicating that you freely and voluntarily agree to participate in this study and you also acknowledge that you are at least 18 years of age. You are asked to only take this survey once.

It is recommended that you print a copy of this consent page for your records before you begin the study by clicking below.

Okla. State Univ.
IRB
Approved 4·21·15
Expires 3·18·18
IRB # AS·15·19

2%

Next

Welcome to My Survey

Exit this survey

Thank you for participating in our survey. Your feedback is important.

4%

Appendix C

I am a graduate student at Oklahoma State University, conducting a research project on disaster response. The project is entitled "The Efficacy of Incident Management Teams and Emergent Multi-Organizational Networks in the Implementation of the Incident Command System." In addition to my studies, I have served as a police officer for the past 26 years and member of an Incident Management Team (IMT) for the past 15 years. My project seeks to determine the effectiveness of IMTs during disasters, as opposed to coordination by an ad hoc group of responders. I will attempt to determine the presence of various characteristics in both types of these responses.

This research gathers information using an online survey. The survey is a list of questions about responder's experiences responding to incidents. No personal information is gathered on any individual responder. The survey takes approximately 20 minutes to complete. I am seeking to make contact with emergency responders from various types of agencies (education, emergency medical, emergency management, dispatch/communications, fire, GIS, law enforcement, military, public health, public works, and volunteer organizations) throughout FEMA Region VII.

I am asking for your assistance in this effort. The information listed as part of this email includes a link to the questionnaire. Please take the time to take the survey. In addition, forward this email to emergency responders that you know or have worked with on past responses. This should include responders that are members of IMTs as well as those that are not. Your participation and assistance is greatly appreciated.

Link to Survey: https://www.surveymonkey.com/r/IMT-EMON

Sincerely,
Brett Bailey
PhD candidate
Oklahoma State University

Appendix D

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

PARTICIPANT INFORMATION - OKLAHOMA STATE UNIVERSITY
Title: The Efficacy of Incident Management Teams and Emergent Multi-Organizational Networks in the Implementation of the Incident Command System
Investigator(s): Brett Bailey, M.S., Oklahoma State University
Purpose: The purpose of the research study is to identify the characteristics and group dynamics that exist within groups of emergency responders who make up the organizational structure of a disaster response. In particular, I will see whether different characteristics exist between pre-existing groups known as Incident Management Teams, and ad hoc group that come together simply as the result of being involved in a common response. These ad hoc groups are known as Emergent Multi-Organizational Networks.
What to Expect: Participation in this research will involve completion of one questionnaire, completely on-line. The questionnaire asks responders to identify various characteristics that existed within previous responses that they have been a part of. You will be asked to rate the level to which these characteristic existed, as well as comments to help justify your rating. In addition, you will be asked for demographic information; such as race, ethnicity, education level, agency type, years of experience, and levels of training and actual response experience. You will not be asked any specific personal information, such as name and identifiers (Social Security Number or date of birth). You may skip any questions that you do not wish to answer. You will be expected to complete the questionnaire once. It should take you about 20 minutes to complete.
Risks: There are no risks associated with this project which are expected to be greater than those ordinarily encountered in daily life.
Benefits: There are no direct benefits to you. However, you may gain an appreciation and understanding of how research is conducted.
Compensation: You will receive no compensation for participating in this research.
Your Rights and Confidentiality: Your participation in this research is voluntary. There is no penalty for refusal to participate, and you are free to withdraw your consent and participation in this project at any time.
Confidentiality: This survey will be conducted completely on-line using SurveyMonkey.com. No personal information will be collected, nor tracked. The only information that will be gathered is the responses to the survey questions. These answers will be stored by SurveyMonkey.com and will only be accessible by the Researcher listed above through the use of password protected database. The aggregate results will be kept by the Researcher for a period of three years after the study has been completed, in electronic format on a password protected computer or external hard drive.
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1. Brett Bailey, M.S., Murray Hall, Department of Political Science, Oklahoma State University, Stillwater, OK, 74078, 918-728-9167
2. David M. Neal, Ph.D. 210 Murray Hall, Department of Political Science, Oklahoma State University, Stillwater, OK 74078, 405-744-2524
If you have questions about your rights as a research volunteer, you may contact the IRB Office at 219 Cordell North, Stillwater, OK 74078, 405-744-3377 or irb@okstate.edu.
If you choose to participate: Please, click NEXT if you choose to participate. By clicking NEXT, you are indicating that you freely and voluntarily agree to participate in this study and you also acknowledge that you are at least 18 years of age. You are asked to only take this survey once.
It is recommended that you print a copy of this consent page for your records before you begin the study by clicking below.

2%

Next

1

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

Welcome to My Survey

Thank you for participating in our survey. Your feedback is important.

4%

Prev Next

2

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

1. FEMA lists disaster responses in a tiered system from Type 1 to Type 5, with Type 1 being a large incident involving in excess of 500 responders per operational period lasting for multiple operational periods. A Type 3 response involves more than a single **AGENCY**, and lasts more than one operational period.
Have you ever been involved in a Type 3 or higher response where you were assigned to work in the Command Post?

- Yes
- No

6%

Prev Next

3

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

Please answer the following questions based on the last multi-agency, multi-operational period incident that you were involved in.

8%

Prev Next

4

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

2. Based on your answer to Question 1 of having been involved in a Type 3 or greater response, was the Incident Command System (ICS) used for this response?

- Yes
- No

10%

Prev Next

5

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

3. Was there a clear understanding of who was the lead official, often designated as the Incident Command (or Unified Command), for the response?

- Yes
- No

13%

Prev Next

6

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

4. For this incident, did the Incident Commander present a set of objectives to accomplish for each operational period?

- Yes
- No
- Unsure

15%

Prev Next

7

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

5. How successful do you feel the response was in accomplishing the objectives set by the Incident Commander?

Not at all successful	Not very successful	Somewhat successful	Mostly successful	Fully successful
○	○	○	○	○

Please explain why you rated this question the way you did.

17%

Prev Next

8

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

6. Was there an established ICS organizational structure for the response?

Yes

No

Unsure

19%

Prev Next

9

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

7. During the incident, were various ICS forms used for documenting and tracking the response?

- Yes
- No
- Unsure

21%

Prev Next

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

8. Was an Incident Action Plan (IAP) prepared for each operational period?

- ○ Yes
- ○ No

23%

Prev Next

11

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

9. If an IAP was prepared, was the ICS Planning P method used to develop it?

- Yes
- No
- Unsure

25%

Prev Next

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

10. If an IAP was prepared, was it distributed to response personnel and briefed for each operational period?

- Yes
- No
- Unsure

27%

Prev Next

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

11. Was a check-in/check-out system established to track on-scene resources?

- Yes
- No
- Unsure

29%

Prev Next

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

12. At the conclusion of your assignment at the incident, was there an official transfer to someone else replacing you in that function?

- Yes
- No

31%

Prev Next

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

13. What ICS function were you assigned while working in the Command Post?

- Incident Commander
- Liaison Officer
- Safety Officer
- Public Information Officer
- Operations Section Chief (to include any function under Operations)
- Planning Section Chief (to include any function under Planning)
- Logistics Section Chief (to include any function under Logistics)
- Finance / Administration Section Chief (to include any function under Finance / Administration)
- I was not assigned to a specific ICS function

33%

Prev Next

16

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

14. Upon initial arrival at the incident, did you have an understanding of what function you would be assigned?

- Yes
- No

35%

Prev Next

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

15. Once assigned, indicate your level of understanding of the expectations and responsibilities for how to perform your function?

No understanding	Minimal understanding	Average understanding	Significant understanding	Full understanding
○	○	○	○	○

Please explain why you rated this question the way you did.

38%

Prev Next

18

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

16. What is the approximate number of times that you have been assigned to this function during a live incident or planned event?

40%

Prev Next

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

17. What is the highest level of ICS training that you have received for the assigned function that you were assigned?

- I have had no ICS training
- ICS100 - Introduction to the ICS
- ICS200 - Basic ICS
- ICS300 - Intermediate ICS for Expanding Incidents
- ICS400 - Advanced ICS
- Position Specific Training

42%

Prev Next

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

18. What is the highest level of experience that you have in the ICS function that you listed above?

- No prior experience in performing that function
- Completed the above listed training only
- Shadowed another person performing the function
- Previously assigned to work the position
- Working to complete a Position Task Book (PTB) for the function
- Credentialed for the function

44%

Prev Next

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

19. Are you a member of a predesignated Incident Management Team (IMT) or Incident Support Team (IST)?

Yes

No

46%

Prev Next

22

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

20. Approximately how long have you been a member of the IMT or IST?

48%

Prev Next

23

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

21. What is the approximate size of your team (how many team members)?

50%

Prev Next

24

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

22. Indicate the type of IMT or IST that you belong.

- ◯ Type I - A National or State recognized team for incidents exceeding 500 personnel per operational period.
- ◯ Type II - A National or State recognized team for incident involving from 250-500 personnel per operational period.
- ◯ Type III - A multi-agency or multi-jurisdictional team for extended incidents, formed and managed at the State, regional or metropolitan level.
- ◯ Type IV - A local or regionally recognized team for expanded incidents managed at the city, county or regional level.
- ◯ Type V - A local, single agency team team for extended incidents managed at the local level.
- ◯ I am unsure what type of team it is.

52%

Prev Next

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

23. Does your team have members from multiple disciplines?

- Yes
- No
- Unsure

54%

Prev Next

26

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

24. Indicate the types of disciplines that are included on your team (check all that apply).

- [ ] Education
- [ ] Emergency management
- [ ] Emergency medical services
- [ ] Dispatch / communications
- [ ] Fire
- [ ] GIS / mapping
- [ ] Law enforcement
- [ ] Military
- [ ] Public health
- [ ] Public works
- [ ] Non-governmental organization (volunteer)
- [ ] Other (please specify)

56%

Prev Next

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

25. Indicate the amount of flexibility that you were allowed in making needed decisions and using resources to meet the needs of performing your assigned function.

Not at all flexible	Minimally flexible	Somewhat flexible	Significantly flexible	Fully flexible
○	○	○	○	○

Please explain why you rated this question the way you did.

58%

Prev Next

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

26. Indicate the degree of flexibility of the overall structure of the organization for meeting the needs of the response.

Not at all flexible	Minimally flexible	Somewhat flexible	Significantly flexible	Fully flexible
○	○	○	○	○

Please explain why you rated this question the way you did.

60%

Prev Next

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

27. Indicate the degree of authority that you were given to carry out the functions of your assignment.

No authority	Minimal authority	Limited authority	Significant authority	Full authority
○	○	○	○	○

Please explain why you rated this question the way you did.

63%

Prev Next

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

28. Indicate the level of information sharing back and forth between the various agencies involved in the response.

No sharing	Minimal sharing	Limited sharing	Significant sharing	Full sharing
○	○	○	○	○

Please explain why you rated this question the way you did.

65%

Prev Next

31

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

29. Indicate the level of coordination between the various agencies involved in the response.

No coordination	Minimal coordination	Limited coordination	Significant coordination	Full coordination
○	○	○	○	○

Please explain why you rated this question the way you did.

67%

Prev Next

32

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

30. Indicate the level of leadership provided in establishing a structure for the response by the Incident Commander setting overall goals of the response and creating a sense of teamwork to accomplish these goals.

No leadership	Minimal leadership	Limited leadership	Significant leadership	Strong leadership
○	○	○	○	○

Please explain why you rated this question the way you did.

69%

Prev Next

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

31. Indicate the level of situational awareness that you had in your assignment of the overall status of the response as it evolved.

No awareness	Little awareness	Limited awareness	Significant awareness	Full awareness
○	○	○	○	○

Please explain why you rated this question the way you did.

71%

Prev Next

34

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

32. Indicate the level of support provided to you by the local officials to allow you to carry out the functions of your assignment.

No support	Minimal support	Limited support	Significant support	Full support
○	○	○	○	○

Please explain why you rated this question the way you did.

73%

Prev Next

35

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

33. Indicate the level of cohesion (how well the group worked together) among the team that you worked with during the response.

Not at all cohesive	Minimally cohesive	Somewhat cohesive	Significantly cohesive	Fully cohesive
○	○	○	○	○

Please explain why you rated this question the way you did.

75%

Prev Next

36

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

34. Indicate the level of trust among the various individuals working within the your Command Post team.

No trust	Minimal trust	Limited trust	Significant trust	Full trust
○	○	○	○	○

Please explain why you rated this question the way you did.

77%

Prev Next

37

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

35. Indicate the level of trust you experienced in working with responders from other jurisdictions.

No trust	Minimal trust	Limited trust	Significant trust	Full trust
○	○	○	○	○

Please explain why you rated this question the way you did.

79%

Prev Next

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

36. Indicate how effective you feel the overall response was in meeting the needs of the incident.

Not at all effective	Minimally effective	Somewhat effective	Significantly effective	Fully effective
○	○	○	○	○

Please explain why you rated this question the way you did.

81%

Prev Next

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

The following questions will let us know a little about your background.

83%

Prev Next

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

37. What is your gender?

- Female
- Male

85%

Prev Next

41

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

38. What is your age?

- 18 to 24
- 25 to 34
- 35 to 44
- 45 to 54
- 55 to 64
- 65 to 74
- 75 or older

88%

Prev Next

42

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

39. What is your ethnicity? (Please select all that apply.)

- [ ] American Indian or Alaskan Native
- [ ] Asian or Pacific Islander
- [ ] Black or African American
- [ ] Hispanic or Latino
- [ ] White / Caucasian
- [ ] Prefer not to answer
- [ ] Other (please specify)

90%

Prev Next

43

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

40. What is the highest level of school you have completed or the highest degree you have received?

- Less than high school degree
- High school degree or equivalent (e.g., GED)
- Technical or trade school
- Some college but no degree
- Associate degree
- Bachelor degree
- Masters Degree
- Doctorate degree

92%

Prev Next

44

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

41. What type of organization do you work for?

- Private industry
- Local government
- County government
- State government
- Federal government
- Non-governmental organization
- Secondary education
- Post-secondary education
- Military

94%

Prev Next

45

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

42. What is the discipline of the organization that you work for?

- Education
- Emergency medical services
- Emergency management
- Dispatch / communications
- Fire
- GIS / mapping
- Law enforcement
- Military
- Public health
- Public works
- Non-governmental organization (volunteer)
- Other (please specify)

96%

Prev Next

46

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

43. How many years of experience do you have in this job?

98%

Prev Next

47

The Efficacy of IMTs and EMONs for Implementing ICS

Exit this survey

This concludes the survey. Thank you for your time in taking part in this research. Your participation is appreciated.

100%

Prev Done

Appendix E

This is a reminder email for the IMT Research Project. If you have already responded to or forwarded this email to other responders, you need take no further action at this time. If you have not responded to or forwarded this email on to other responders of all disciplines that may have been involved in large scale, multi-operational period incidents, I encourage you to do so at this time. They do not need to be IMT members. Having the widest array of responses will provide the best results for this research. The results of this survey will provide insight into the preparedness and ability of response agencies to respond effectively to large scale disasters.

The survey will close at the end of the day on Sunday, May 10. Your assistance and participation in this research project is greatly appreciated.

Link to Survey: https://www.surveymonkey.com/r/IMT-EMON

Sincerely,
Brett Bailey
PhD candidate
Oklahoma State University

Appendix F

CORRELATIONS OF ICS INDICATORS		IMT	SUCCESS	OVERALL EFFECT	ICSUSED	ICDESIG	ICOBJ	ICSORG	ICSFORMS	IAPPREP	PLANP	IAPBRF	CKIN	TRANSFER
IMT	Corr	1	.125	.054	.012	-.012	.170	.108	.142	.172	-.119	-.128	.119	.175
	Sig.	.	.166	.565	.900	.901	.066	.246	.122	.069	.246	.224	.193	.063
SUCCESS	Corr	.125	1	.394**	.118	.202*	.073	-.035	.086	.278**	-.099	.001	.052	.063
	Sig.	.166	.	.000	.182	.023	.402	.688	.323	.002	.312	.995	.553	.479
OVERALLEFFECT	Corr	.054	.394**	1	.067	.209*	.088	-.064	.081	.124	.040	-.055	-.001	.099
	Sig.	.565	.000	.	.469	.025	.335	.486	.375	.187	.696	.599	.987	.288
ICSUSED	Corr	.012	.118	.067	1	-.032	-.172	-.212*	-.027	.092	.017	-.010	-.026	-.069
	Sig.	.900	.182	.469	.	.726	.053	.021	.765	.326	.866	.924	.777	.457
ICDESIG	Corr	-.012	.202*	.209*	-.032	1	.182*	.022	.044	.161	.226*	.145	-.043	.048
	Sig.	.901	.023	.025	.726	.	.042	.812	.628	.086	.027	.168	.640	.606
ICOBJ	Corr	.170	.073	.088	-.172	.182*	1	.233**	.253**	.056	.348**	.321**	.098	.046
	Sig.	.066	.402	.335	.053	.042	.	.010	.005	.545	.001	.002	.272	.616
ICSORG	Corr	.108	-.035	-.064	-.212*	.022	.233**	1	.149	-.149	.248*	.127	.142	.133
	Sig.	.246	.688	.486	.021	.812	.010	.	.099	.108	.014	.223	.115	.149
ICSFORMS	Corr	.142	.086	.081	-.027	.044	.253**	.149	1	.117	.232*	.330**	.166	.149
	Sig.	.122	.323	.375	.765	.628	.005	.099	.	.200	.022	.002	.062	.102
IAPPREP	Corr	.172	.278**	.124	.092	.161	.056	-.149	.117	1	.	.	.043	.336**
	Sig.	.069	.002	.187	.326	.086	.545	.108	.200	.	.	.	.640	.000
PLANP	Corr	-.119	-.099	.040	.017	.226*	.348**	.248*	.232*	.	1	.410**	.264**	-.131
	Sig.	.246	.312	.696	.866	.027	.001	.014	.022	.	.	.000	.008	.201
IAPBRF	Corr	-.128	.001	-.055	-.010	.145	.321**	.127	.330**	.	.410**	1	.506**	-.113
	Sig.	.224	.995	.599	.924	.168	.002	.223	.002	.	.000	.	.000	.280
CKIN	Corr	.119	.052	-.001	-.026	-.043	.098	.142	.166	.043	.264**	.506**	1	.037
	Sig.	.193	.553	.987	.777	.640	.272	.115	.062	.640	.008	.000	.	.683
TRANSFER	Corr	.175	.063	.099	-.069	.048	.046	.133	.149	.336**	-.131	-.113	.037	1
	Sig.	.063	.479	.288	.457	.606	.616	.149	.102	.000	.201	.280	.683	.

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

CORRELATIONS OF INTERVENING VARIABLES

		IMT	SUCCESS	OVERALL EFFECT	FLEX IND	FLEXORG	AUTH	INFO SHARE	CO ORD	LEADERSHIP	SITA WARE	SUP PORT	COHE SION	TRUSTINT	TRUST EXT	FUNC INIT	FUNC UND	FUNC TIMES	ICS TRNG	ICS EXP
IMT	Corr	1	.125	.054	-.128	-.100	-.043	-.005	-.159	.080	-.178	-.087	-.046	.009	.083	.012	.069	.131	.662**	.250**
	Sig.	.	.166	.565	.153	.265	.638	.952	0.082	.385	.053	.337	.612	.924	.365	.898	.441	.114	.000	.003
SUCCESS	Corr	.125	1	.394**	.352**	.322**	.333**	.258**	.326**	.480**	.315**	.205*	.358**	.465**	.335**	.193*	.353**	.110	.166	.207*
	Sig.	.166	.	.000	.000	.000	.000	.003	.000	.000	.000	.018	.000	.000	.000	.032	.000	.165	.058	.011
OVERALL EFFECT	Corr	.054	.394**	1	.448**	.381**	.394**	.396**	.535**	.492**	.438**	.365**	.410**	.450**	.484**	-.040	.333**	.149	-.019	.154
	Sig.	.565	.000	.	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.666	.000	.068	.836	.070
FLEXIND	Corr	-.128	.352**	.448**	1	.648**	.547**	.452**	.443**	.453**	.437**	.433**	.266**	.378**	.257**	.019	.478**	.169*	-.096	.110
	Sig.	.153	.000	.000	.	.000	.000	.000	.000	.000	.000	.000	.002	.000	.003	.830	.000	.030	.272	.175
FLEX ORG	Corr	-.100	.322**	.381**	.648**	1	.414**	.303**	.289**	.421**	.350**	.350**	.272**	.244**	.209*	.010	.367**	.120	.029	.087
	Sig.	.265	.000	.000	.000	.	.000	.000	.001	.000	.000	.000	.002	.006	.017	.912	.000	.128	.742	.285
AUTH	Corr	-.043	.333**	.394**	.547**	.414**	1	.265**	.343**	.442**	.427**	.369**	.279**	.402**	.237**	.208*	.466**	.263**	-.001	.192*
	Sig.	.638	.000	.000	.000	.000	.	.002	.000	.000	.000	.000	.001	.000	.007	.023	.000	.001	.990	.020
INFO SHARE	Corr	-.005	.258**	.396**	.452**	.303**	.265**	1	.563**	.312**	.306**	.363**	.359**	.282**	.304**	-.018	.352**	.127	-.067	.092
	Sig.	.952	.003	.000	.000	.000	.002	.	.000	.000	.000	.000	.000	.002	.001	.843	.000	.110	.449	.265
COORD	Corr	-.159	.326**	.535**	.443**	.289**	.343**	.563**	1	.451**	.524**	.310**	.407**	.400**	.329**	.063	.426**	.105	-.218*	.012
	Sig.	.082	.000	.000	.000	.001	.000	.000	.	.000	.000	.000	.000	.000	.000	.492	.000	.189	.014	.884
LEADER SHIP	Corr	.080	.480**	.492**	.453**	.421**	.442**	.312**	.451**	1	.548**	.193*	.341**	.447**	.301**	.238*	.454**	.247**	.060	.304**
	Sig.	.385	.000	.000	.000	.000	.000	.000	.000	.	.000	.027	.000	.000	.001	.010	.000	.002	.501	.000
SIT AWARE	Corr	-.178	.315**	.438**	.437**	.350**	.427**	.306**	.524**	.548**	1	.417**	.301**	.479**	.304**	.112	.418**	.129	-.227*	.005
	Sig.	.053	.000	.000	.000	.000	.000	.000	.000	.000	.	.000	.001	.000	.001	.224	.000	.108	.011	.954
SUPPORT	Corr	-.087	.205*	.365**	.433**	.350**	.369**	.363**	.310**	.193*	.417**	1	.255**	.332**	.356**	-.063	.263**	.048	-.119	.057
	Sig.	.337	.018	.000	.000	.000	.000	.000	.000	.027	.000	.	.003	.000	.000	.490	.002	.541	.182	.492
COHE SION	Corr	-.046	.358**	.410**	.266**	.272**	.279**	.359**	.407**	.341**	.301**	.255**	1	.503**	.284**	.084	.337**	.078	-.006	.165*
	Sig.	.612	.000	.000	.002	.002	.001	.000	.000	.000	.001	.003	.	.000	.001	.357	.000	.328	.948	.046
TRUSTINT	Corr	.009	.465**	.450**	.378**	.244**	.402**	.282**	.400**	.447**	.479**	.332**	.503**	1	.402**	.129	.364**	.089	.123	.177*
	Sig.	.924	.000	.000	.000	.006	.000	.002	.000	.000	.000	.000	.000	.	.000	.169	.000	.274	.180	.038
TRUST EXT	Corr	.083	.335**	.484**	.257**	.209*	.237**	.304**	.329**	.301**	.304**	.356**	.284**	.402**	1	-.055	.053	-.072	.009	.077
	Sig.	.365	.000	.000	.003	.017	.007	.001	.000	.001	.001	.000	.001	.000	.	.556	.544	.373	.917	.355
FUNCINIT	Corr	.012	.193*	-.040	.019	.010	.208*	-.018	.063	.238*	.112	-.063	.084	.129	-.055	1	.217*	.178*	-.028	.229**
	Sig.	.898	.032	.666	.830	.912	.023	.843	.492	.010	.224	.490	.357	.169	.556	.	.016	.032	.760	.008
FUNCUND	Corr	.069	.353**	.333**	.478**	.367**	.466**	.352**	.426**	.454**	.418**	.263**	.337**	.364**	.053	.217*	1	.221**	.047	.157
	Sig.	.441	.000	.000	.000	.000	.000	.000	.000	.000	.000	.002	.000	.000	.544	.016	.	.005	.592	.055
FUNC TIMES	Corr	.131	.110	.149	.169*	.120	.263**	.127	.105	.247**	.129	.048	.078	.089	-.072	.178*	.221**	1	.131	.341**
	Sig.	.114	.165	.068	.030	.128	.001	.110	.189	.002	.108	.541	.328	.274	.373	.032	.005	.	.104	.000
ICSTRNG	Corr	.662**	.166	-.019	-.096	.029	-.001	-.067	-.218*	.060	-.227*	-.119	-.006	.123	.009	-.028	.047	.131	1	.332**
	Sig.	.000	.058	.836	.272	.742	.990	.449	.014	.501	.011	.182	.948	.180	.917	.760	.592	.104	.	.000
ICSEXP	Corr	.250**	.207*	.154	.110	.087	.192*	.092	.012	.304**	.005	.057	.165*	.177*	.077	.229**	.157	.341**	.332**	1
	Sig.	.003	.011	.070	.175	.285	.020	.265	.884	.000	.954	.492	.046	.038	.355	.008	.055	.000	.000	.

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

CORRELATIONS OF ICS INDICATORS & INTEVERVENING VARIABLES																											
		ICSUSED	ICDESIG	ICOBJ	ICSORG	ICSFORMS	IAPPREP	PLANP	IAPBRF	CKIN	TRANSFER	FUNCINIT	FUNCUND	FUNCTIMES	ICSTRNG	ICSEXP	FLEXIND	FLEXORG	AUTH	INFOSHARE	COORD	LEADERSHIP	SITAWARE	SUPPORT	COHESION	TRUSTINT	TRUSTEXT
ICS USED	Corr	1	-.032	-.172	-.212*	-.027	.092	.017	-.010	-.026	-.069	-.052	.145	.135	-.011	.078	.009	.065	.055	.138	.132	.156	.132	.048	.123	-.031	-.101
	Sig.	.	.726	.053	.021	.765	.326	.866	.924	.777	.457	.580	.105	.103	.903	.364	.924	.467	.546	.127	.147	.088	.150	.594	.178	.741	.274
IC DESIG	Corr	-0032	1	.182*	.022	.044	.161	.226*	.145	-.043	.048	-.101	.129	.012	.049	.085	.172	.077	.140	.316**	.338**	.246**	.167	.211*	.073	.267**	.259**
	Sig.	0726	.	.042	.812	.628	.086	.027	.168	.640	.606	.287	.151	.889	.596	.321	.055	.396	.123	.001	.000	.007	.070	.021	.424	.005	.005
IC OBJ	Corr	-.172	.182*	1	.233**	.253**	.056	.348**	.321**	.098	.046	-.073	-.070	-.155	.111	.086	-.015	-.114	-.046	.000	.050	.048	-.083	.093	.088	.046	.230*
	Sig.	.053	.042	.	.010	.005	.545	.001	.002	.272	.616	.431	.424	.056	.221	.309	.868	.197	.606	.996	.577	.598	.358	.296	.327	.615	.011
ICS ORG	Corr	-.212*	.022	.233**	1	.149	-.149	.248*	.127	.142	.133	.045	-.077	-.100	-.021	-.081	-.166	-.068	.073	-.075	-.075	-.116	-.121	.001	.055	.008	.095
	Sig.	.021	.812	.010	.	.099	.108	.014	.223	.115	.149	.632	.384	.220	.822	.339	.061	.447	.419	.406	.405	.201	.185	.996	.539	.934	.298
ICS FORMS	Corr	-.027	.044	.253**	.149	1	.117	.232*	.330**	.166	.149	-.052	.005	-.109	.106	.087	-.145	-.003	-.060	.024	.005	.051	.025	-.035	.119	.000	.119
	Sig.	.765	.628	.005	.099	.	.200	.022	.002	.062	.102	.572	.950	.178	.240	.300	.098	.974	.498	.785	.959	.568	.781	.691	.184	1.00	.189
IAP PREP	Corr	.092	.161	.056	-.149	.117	1	.	.	.043	.336**	.126	.061	.062	.351**	.237**	.199*	.152	.134	.276**	.186*	.188*	.101	.040	.256**	.120	.248**
	Sig.	.326	.086	.545	.108	.200	.	.	.	.640	.000	.182	.500	.452	.000	.006	.026	.093	.142	.002	.043	.042	.273	.657	.005	.203	.007
PLANP	Corr	.017	.226*	.348**	.248*	.232*	.	1	.410**	.264**	-.131	.045	-.037	.123	-.063	.126	-.080	.014	.192	.040	.187	.127	.207*	.055	.047	-.037	.128
	Sig.	.866	.027	.001	.014	.022	.	.	.000	.008	.201	.657	.709	.173	.538	.177	.418	.887	.055	.694	.065	.211	.040	.578	.642	.720	.206
IAP BRF	Corr	-.010	.145	.321**	.127	.330**	.	.410**	1	.506**	-.113	.060	-.122	-.100	-.074	.144	-.120	-.042	.000	-.129	.069	.187	-.040	-.054	.031	-.044	.053
	Sig.	.924	.168	.002	.223	.002	.	.000	.	.000	.280	.568	.224	.281	.477	.132	.237	.677	1.00	.214	.507	.074	.696	.596	.766	.677	.607
CKIN	Corr	-.026	-.043	.098	.142	.166	.043	.264**	.506**	1	.037	.158	-.044	.029	.080	.223**	-.037	.006	.057	-.036	-.023	.174	.031	.045	.042	.085	.038
	Sig.	.777	.640	.272	.115	.062	.640	.008	.000	.	.683	.086	.618	.719	.371	.007	.674	.946	.516	.688	.800	.052	.733	.610	.636	.354	.670
TRAN SFER	Corr	-.069	.048	.046	.133	.149	.336**	-.131	-.113	.037	1	-.002	.161	.184*	.133	.082	.190*	.176	.122	.079	.117	.117	-.003	-.080	.093	.141	.105
	Sig.	.457	.606	.616	.149	.102	.000	.201	.280	.683	.	.986	.072	.026	.147	.337	.033	.051	.179	.386	.199	.202	.974	.378	.306	.133	.256
FUNC INIT	Corr	-.052	-.101	-.073	.045	-.052	.126	.045	.060	.158	-.002	1	.217*	.178*	-.028	.229**	.019	.010	.208*	-.018	.063	.238*	.112	-.063	.084	.129	-.055
	Sig.	.580	.287	.431	.632	.572	.182	.657	.568	.086	.986	.	.016	.032	.760	.008	.830	.912	.023	.843	.492	.010	.224	.490	.357	.169	.556
FUNC UND	Corr	.145	.129	-.070	-.077	.005	.061	-.037	-.122	-.044	.161	.217*	1	.221**	.047	.157	.478**	.367**	.466**	.352**	.426**	.454**	.418**	.263**	.337**	.364**	.053
	Sig.	.105	.151	.424	.384	.950	.500	.709	.224	.618	.072	.016	.	.005	.592	.055	.000	.000	.000	.000	.000	.000	.000	.002	.000	.000	.544
FUNC TIMES	Corr	.135	.012	-.155	-.100	-.109	.062	.123	-.100	.029	.184*	.178*	.221**	1	.131	.341**	.169*	.120	.263**	.127	.105	.247**	.129	.048	.078	.089	-.072
	Sig.	.103	.889	.056	.220	.178	.452	.173	.281	.719	.026	.032	.005	.	.104	.000	.030	.128	.001	.110	.189	.002	.108	.541	.328	.274	.373
ICS TRNG	Corr	-.011	.049	.111	-.021	.106	.351**	-.063	-.074	.080	.133	-.028	.047	.131	1	.332**	-.096	.029	-.001	-.067	-.218*	.060	-.227*	-.119	-.006	.123	.009
	Sig.	.903	.596	.221	.822	.240	.000	.538	.477	.371	.147	.760	.592	.104	.	.000	.272	.742	.990	.449	.014	.501	.011	.182	.948	.180	.917
ICS EXP	Corr	.078	.085	.086	-.081	.087	.237**	.126	.144	.223**	.082	.229**	.157	.341**	.332**	1	.110	.087	.192*	.092	.012	.304**	.005	.057	.165*	.177*	.077
	Sig.	.364	.321	.309	.339	.300	.006	.177	.132	.007	.337	.008	.055	.000	.000	.	.175	.285	.020	.265	.884	.000	.954	.492	.046	.038	.355
FLEX IND	Corr	.009	.172	-.015	-.166	-.145	.199*	-.080	-.120	-.037	.190*	.019	.478**	.169*	-.096	.110	1	.648**	.547**	.452**	.443**	.453**	.437**	.433**	.266**	.378**	.257**
	Sig.	.924	.055	.868	.061	.098	.026	.418	.237	.674	.033	.830	.000	.030	.272	.175	.	.000	.000	.000	.000	.000	.000	.000	.002	.000	.003
FLEX ORG	Corr	.065	.077	-.114	-.068	-.003	.152	.014	-.042	.006	.176	.010	.367**	.120	.029	.087	.648**	1	.414**	.303**	.289**	.421**	.350**	.350**	.272**	.244**	.209*
	Sig.	.467	.396	.197	.447	.974	.093	.887	.677	.946	.051	.912	.000	.128	.742	.285	.000	.	.000	.000	.001	.000	.000	.000	.002	.006	.017
AUTH	Corr	.055	.140	-.046	.073	-.060	.134	.192	.000	.057	.122	.208*	.466**	.263**	-.001	.192*	.547**	.414**	1	.265**	.343**	.442**	.427**	.369**	.279**	.402**	.237**
	Sig.	.546	.123	.606	.419	.498	.142	.055	1.000	.516	.179	.023	.000	.001	.990	.020	.000	.000	.	.002	.000	.000	.000	.000	.001	.000	.007
INFO SHARE	Corr	.138	-316**	.000	-.075	.024	.276**	.040	-.129	-.036	.079	-.018	.352**	.127	-.067	.092	.452**	.303**	.265**	1	.563**	.312**	.306**	.363**	.359**	.282**	.304**
	Sig.	.127	.001	.996	.406	.785	.002	.694	.214	.688	.386	.843	.000	.110	.449	.265	.000	.000	.002	.	.000	.000	.000	.000	.000	.002	.001

CO ORD	Corr	.132	.338**	.050	-.075	.005	.186*	.187	.069	-.023	.117	.063	.426**	.105	-.218*	.012	.443**	.289**	.343**	.563**	1	.451**	.524**	.310**	.407**	.400**	.329**
	Sig.	.147	.000	.577	.405	.959	.043	.065	.507	.800	.199	.492	.000	.189	.014	.884	.000	.001	.000	.000	.	.000	.000	.000	.000	.000	.000
LEADERS HIP	Corr	.156	.246**	.048	-.116	.051	.188*	.127	.187	.174	.117	.238*	.454**	.247**	.060	.304**	.453**	.421**	.442**	.312**	.451**	1	.548**	.193*	.341**	.447**	.301**
	Sig.	.088	.007	.598	.201	.568	.042	.211	.074	.052	.202	.010	.000	.002	.501	.000	.000	.000	.000	.000	.000	.	.000	.027	.000	.000	.001
SITAWAR E	Corr	.132	.167	-.083	-.121	.025	.101	.207*	-.040	.031	-.003	.112	.418**	.129	-.227*	.005	.437**	.350**	.427**	.306**	.524**	.548**	1	.417**	.301**	.479**	.304**
	Sig.	.150	.070	.358	.185	.781	.273	.040	.696	.733	.974	.224	.000	.108	.011	.954	.000	.000	.000	.000	.000	.000	.	.000	.001	.000	.001
SUP PORT	Corr	.048	.211*	.093	.001	-.035	.040	.055	-.054	0.045	-.080	-.063	.263**	.048	-.119	.057	.433**	.350**	.369**	.363**	.310**	.193*	.417**	1	.255**	.332**	.356**
	Sig.	.594	.021	.296	.996	.691	.657	.578	.596	0.610	.378	.490	.002	.541	.182	.492	.000	.000	.000	.000	.000	.027	.000	.	.003	.000	.000
COHESIO N	Corr	.123	.073	.088	.055	.119	.256**	.047	.031	0.042	.093	.084	.337**	.078	-.006	.165*	.266**	.272**	.279**	.359**	.407**	.341**	.301**	.255**	1	.503**	.284**
	Sig.	.178	.424	.327	.539	.184	.005	.642	.766	0.636	.306	.357	.000	.328	.948	.046	0.002	.002	0.001	.000	.000	.000	.001	.003	.	.000	.001
TRUSTIN T	Corr	-.031	.267**	.046	.008	.000	.120	-.037	-.044	0.085	.141	.129	.364**	.089	.123	.177*	.378**	.244**	.402**	.282**	.400**	.447**	.479**	.332**	.503**	1	.402**
	Sig.	.741	.005	.615	.934	1.000	.203	.720	.677	0.354	.133	.169	.000	.274	.180	.038	0.000	.006	0.000	.002	.000	.000	.000	.000	.000	.	.000
TRUSTEX T	Corr	-.101	.259**	.230*	.095	.119	.248**	.128	.053	0.038	.105	-.055	.053	-.072	.009	.077	.257**	.209*	.237**	.304**	.329**	.301**	.304**	.356**	.284**	.402**	1
	Sig.	.274	.005	.011	.298	.189	.007	.206	.607	0.670	.256	.556	.544	.373	.917	.355	0.003	.017	0.007	.001	.000	.001	.001	.000	.001	0.000	.

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

VITA

William Brett Bailey

Candidate for the Degree of

Doctor of Philosophy

Dissertation: THE EFFICACY OF INCIDENT MANAGEMENT TEAMS AND EMERGENT MULTI-ORGANIZATIONAL NETWORKS IN THE IMPLEMENTATION OF THE INCIDENT COMMAND SYSTEM

Master Practicum: MAJOR INCIDENT RESPONSE MANUAL – TULSA POLICE DEPARTMENT

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