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INTEROPERABLE COMMUNICATIONS SYSTEMS: GOVERNANCE AND RISK

by

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December 2009

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This thesis explores how shared governance mitigates risk related to multi-agency, multi-discipline interoperable radio communications projects. Case study research focused on two California counties, Marin and Monterey, to discover how shared governance emerged to mitigate financial, managerial and discipline risk. The significance of this research identifies the elements of shared governance that can lead to the successful implementation of interoperable radio communications projects. Findings indicate that shared governance emerges over time and is influenced by existing professional relationships. Meta-leaders are individuals take the sum of their professional experience (roles) and use that experience to facilitate shared need and common understanding between all participants. Finally, public safety tradition and culture will impact the development of shared governance solutions and can inhibit or facilitate shared governance solutions.

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INTEROPERABLE COMMUNICATIONS SYSTEMS: GOVERNANCE AND RISK

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ABSTRACT

This thesis explores how shared governance mitigates risk related to multi-agency, multi-discipline interoperable radio communications projects. Case study research focused on two California counties, Marin and Monterey, to discover how shared governance emerged to mitigate financial, managerial and discipline risk. The significance of this research identifies the elements of shared governance that can lead to the successful implementation of interoperable radio communications projects. Findings indicate that shared governance emerges over time and is influenced by existing professional relationships. Meta-leaders are individuals take the sum of their professional experience (roles) and use that experience to facilitate shared need and common understanding between all participants. Finally, public safety tradition and culture will impact the development of shared governance solutions and can inhibit or facilitate shared governance solutions..

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I. INTEROPERABLE COMMUNICATIONS SYSTEMS: GOVERNANCE AND RISK

A. PROBLEM STATEMENT

In December 2004, the Federal Communications Commission required that all state and local public safety agencies narrowband all voice and data radio frequencies no later than the year 2013 (National Institute of Justice, 2008). Additionally, the Department of Homeland Security (DHS) SAFECOM communications program established interoperability requirements that must be met by all public safety agencies in order to qualify for a variety of Federal grant programs (SAFECOM, 2008). The stipulations of the narrow banded radio frequency requirement and interoperable communications guidelines require that public safety agencies invest substantial amounts of money in new radio technologies and to create cooperative, multi-agency governance agreements to achieve interoperability.

The current situation is one in which numerous, disparate radio systems that are not interoperable exist side-by-side. These radio systems are used as part of comprehensive public services to include first responders (police, fire and emergency services) and infrastructure support (public works—streets, water systems or public buildings). Public service jurisdictions sharing common borders often operate independent radio systems on entirely different infrastructures and cannot communicate. Additionally, these systems can be outdated and require a complete redesign and build to achieve narrowbanded, interoperable radio systems. This requires public safety groups to join together to leverage funding sources, management experience and develop requests for proposals for new systems including standard operating procedures, use agreements and shared governance.

Interoperability is dependent of the development on shared governance models for these new radio systems. It requires state, county and local

government organizations with competing priorities to set aside cultural and organizational differences to implement a common communications platform. Communication needs differ among public service disciplines (i.e., public works, police and fire) and require the design of radio communications systems that meet the needs of each group. The challenge is to bring together a variety of public service disciplines that compete for scarce resources of time, management capacity and finances under a common governance structure. This shared governance must address who owns the infrastructure, who decides the functionality of a new radio system, how is it maintained and managed into the future and how it is paid for.

Achieving interoperability is considerably less expensive for public service jurisdictions working collaboratively rather than individual jurisdictions building their own independent systems. Independent systems may result in the acquisition of a variety of hardware and software solutions that may not be interoperable with neighboring jurisdictions. The failure to establish shared governance will undermine any efforts toward interoperability since there will be no anchor point to sustain changes over the long term.

Shared governance is a critical element of interoperability. There are, however, risks associated with a shared governance model for multi-jurisdiction, multi-discipline interoperable radio communications projects. Risk is defined as identifying the uncertainties of facts, values, finance or culture requiring an iterative process to bring stakeholders together to identify and manage the risks of any project (Slovic, 2002). Financial risk can include determining how much each participating agency is responsible to pay for the infrastructure and maintenance of a system that will be in use for decades. Managerial risk can result in the loss of sole authority to determine standard operating procedures, training requirements and making changes to the overall system to best fit the individual agency needs. Discipline risk can require specific groups, such as fire and police professionals, to accept a communications system that might not directly benefit them in functionality or increased safety.

Interoperable radio technology is a changing landscape that requires participating public safety organizations to give up some level of control for the benefit of the larger group. As a result, the risks associated with the development of inter-organizational governance solutions that require consensus between competing public service organizations are often not well understood and can affect the success of interoperable communications system development. The challenge is to be able to identify and mitigate the risks associated with implementing multi-jurisdiction, multi-discipline interoperable radio communications projects.

B. RESEARCH QUESTION

How do intra-organizational teams develop shared governance structures that mitigate risk associated with multi-agency, multi-discipline interoperable radio communications projects?

The research question will explore how team characteristics and composition affect the governance of multi-agency, multi-discipline radio communications projects. Shared governance is the foundation for mitigating financial, managerial and discipline risk in these types of projects.

C. ARGUMENT

The successful completion of interoperable, multi-agency communication projects requires the development of a governance structure that becomes the foundation to set the vision, strategic initiatives and goals for the entire project. The SAFECOM (2008) Interoperability Continuum identifies five critical elements that include governance, standard operating procedures, technology, training and exercises, and usage. Governance is the most critical of these five elements and sets the framework through which participants can collaborate, set short term and intermediate priorities, and resolve conflicts. It is only after governance is established that the remaining elements of the continuum can be completed.

Without a governance structure in place, critical parts of interoperability projects may not be completed or projects may be delayed. For example, interoperable, multi-agency projects require that cities, special districts and legislative government bodies enter into legally binding finance agreements before any other part of the project can proceed. If there is no financing agreement in place, vendors will likely not bid on subsequent Request for Proposal releases. If there is no shared governance model in place for the project, making financing decisions could become unclear or muddled, resulting in lawsuits and a failed project even before it gets started.

Financial risk can exist on two distinct fronts. The first risk is how to pay for a new system that requires a substantial up front cost to numerous government entities with varied fiscal resources. Infrastructure and one-time project costs may be paid for using bonds, taxes, fees for service or private financing options. Each type of funding option results in a variety of risk to each participating jurisdiction depending on their financial stability. Finding consensus for a shared funding plan, agreed to by all participating jurisdictions, brings with it the risk of failing to pay for the entire communications system. The second risk is failing to develop a fee for service agreement that provides payment for on going maintenance and support costs for the communications system. As with one-time expenses, there are a number of possible cost sharing formulas that require all participating jurisdictions to agree on. Failing to achieve consensus in either of these areas of financial risk can increase the cost for individual jurisdictions.

Managerial risk is a second element that impacts each agency joining an interoperable radio project. Every special district, municipality and county government participating in these projects may not share the same view of supervision and management oversight. They are likely to have a variety of strategic plans, visions, goals and master plans that might conflict. Managerial risk exists when there are expectations of individual stakeholders in multi-jurisdictional projects such as interoperable radio systems. A shared governance

structure must define how voting and participation of large and small government is structured to reduce the managerial risk associated with reduced decision-making power as part of a collaborative group.

Discipline risk is tied to the variety of public service disciplines participating in interoperable radio projects. Law enforcement, fire, public works, information technology, radio technology, legal, policy and management are all disciplines that have influence in these types on projects. Each discipline brings a perspective that must be incorporated for the successful deployment of any interoperable radio system. Discipline-specific input is required to ensure the elements of the SAFECOM continuum are maintained at the most efficient and effective levels.

The nature of the problem is to anticipate elements of risk in the context of shared governance and to develop and implement strategies that eliminate or significantly reduce risk factors. Problems can emerge if a governance structure is not in place prior to the development of finical agreements, SOP's, the selection of technology solutions or training. Risk factors can include the failure to build associations with project members that are both task oriented and emotionally based. The blending of these relational elements into a shared governance model can be characterized as social complexity (Conklin, 2008).

Social complexity can exist in any single project where the participants are also connected to other teams or networks of individual stakeholders, committees, organizations, and departments that must buy in to proposed solutions (Conklin, 2008). Social complexity issues may impact the effectiveness of intra-organizational teams and are elements of risk that can affect the overall success of interoperable communications projects. Complexity issues can negatively impact intra-organizational, interoperable communication project and pose a previously unidentified risk factors. These risk factors can be minimized or eliminated if governance is addressed early in these projects.

D. SIGNIFICANCE

The purpose of this thesis is to conduct case study research and compare it to existing literature to determine how to mitigate the risk in the development and function of governance solutions for multi-agency, multi-jurisdiction interoperable radio projects. The two case studies for this thesis are based on original research from participant interviews, the review of multi-jurisdictional agreements and the researcher's perspective as a participant observer. The significance of this research will be to identify and provide best practices for mitigating risks associated with governance solutions that are not typically considered in the development of interoperable, multi-jurisdictional communications systems. The potential consumers of this research include public safety professionals who participate in intra-organizational groups for interoperable communications project. The best practices and lessons learned may provide guidance to better achieve success in these projects.

II. LITERATURE REVIEW

A. SUMMARY

The body of literature in total provides insight to guide government collaboration to complete multi-jurisdiction, multi-discipline interoperable radio communications projects. These sources include how to measure the effectiveness of projects through government strategy documents and how to develop legal agreements between multiple agencies and frameworks to build overall governance agreements for these systems. Additionally, the literature provides a basis to identify risk in the context of shared governance.

Overall, the literature supported two layers of oversight that shared governance in multi-jurisdiction, multi-discipline interoperable communications projects should have. The first are executive oversight teams responsible for creating a legal structure under which formal decisions are made (911 Insight, 2006). These teams are responsible for approving, for example, a budget or policy manual. Legal instruments such as a Joint Powers Agreement (JPA), Memorandum of Understanding (MOU) or similar agreements are specific examples of executive oversight documents. These legally binding documents are approved by the executive committee that is generally made up of department executives such as police chiefs and city and county Chief Executive Officer's.

The second element for achieving shared governance for interoperable communications projects are the creation of consensus teams from representatives of all participating organizations and departments. Consensus teams work together to develop elements of the project such as procedures, strategies and system design. Documents that support consensus can include Standard Operating Procedures (SOP), finance related documents (billing methods) and training manuals. Consensus teams complete the majority of the detail work for the policy groups acting as the final approvers for all participants.

The creation of legal agreements and procedure manuals are central to developing shared governance of multi-jurisdiction, multi-discipline interoperable communications projects. It is just as important to understand how individual behavior influences the development of shared governance. Executive committees and consensus teams are made up of individuals who represent a variety of disciplines, government types and departments. Each participant competes for his/her own needs that are discipline or agency specific. It is critical to understand how team characteristics, public safety culture and composition might impact the development of shared governance.

This review is divided into sections that describe how shared governance models for interoperable radio communication projects develop. The focus of research is to identify how shared governance is impacted by financial risk, managerial risk and discipline risk. Each type of risk can be viewed as a trigger requiring a response to mitigate the impact on shared governance.

Part one of the literature review covers government strategy documents. These documents support the development of multi-jurisdictional agreements for interoperable radio projects. These sources include government strategy documents, publications by public safety professional associations, as well as memorandums of understanding and strategic plans from existing interoperable systems. Part two examines literature that addresses elements of shared governance that are not always part of legal agreements, SOP or training documents. This literature source includes a discussion of uncertainty, risk, team characteristics and leadership as it relates to the function of consensus teams.

There is a lack of literature that is specific to how to mitigate risk as it relates to the function of executive oversight teams and consensus teams in a shared governance structure for interoperable radio communications projects. Published research on governance risk mitigation is limited and generally focused on private industry projects that involve businesses to working together to make profit. What is also lacking is a comprehensive discussion of how

financial, managerial and discipline risk can affect the overall shared governance of a multi-jurisdiction, multi-discipline public safety interoperable communications system.

B. GOVERNANCE STRUCTURE LITERATURE

The Department of Homeland Security developed the Interoperability Continuum as a basis to measure a region's interoperability. The Continuum is designed as a guide for public service organizations pursuing interoperability solutions to solve changing communications needs (Department of Homeland Security, 2008). The continuum identifies five areas to measure the success interoperability efforts that include: governance, standard operating procedures (SOP), technology, training and exercises and usage. Governance is the foundation on which stakeholders make strategic decisions and achieve shared goals. The importance of governance is reflected in state strategy documents as well (SAFECOM, 2005). The literature recognizes that interoperability requires the cooperation of all agencies, special districts and departments that function in the same geographical environment. Projects can only move forward when government organizations at all levels commit to finding a common solution to manage interoperability. Governance thus becomes the foundation for any interoperable system.

1. Literature from Professional Organizations

Two organizations that provide a comprehensive selection of literature for understanding the challenges associated with interoperable communication systems include SEARCH: The National Consortium of Justice Information and Statistics and Department of Homeland Security SAFECOM program (SAFECOM, 2008). These organizations offer examples of guidelines, strategies and academic studies for achieving interoperable systems. The literature provides solutions to solve information exchange problems that exist between disparate communications and data management systems. The focus of this

literature is oriented toward a macro view of interoperable projects. Professional magazines and journals provide perspectives on current events and insights into specific public safety communications projects. Case studies generally focus on statewide lessons learned and discipline specific reports. There is little information on developing governance models that are related to consensus teams and how governance risk is mitigated through their work.

2. Strategic Plans and Legal Agreements

Strategic plans for guiding the development of interoperable systems might be considered foundational documents for developing governance agreements. For example, a review of the *Monterey County Operational Area Emergency Communications System Strategic Plan* identifies specific technical areas to achieve a long-term solution to the countywide communications system (911 Insight, 2006). One observation of the summary is that there is no mention of developing governance as an overall goal. The challenge of research will be to identify what the risk to developing a successfully deployed interoperable radio project is if disparate participants fail to include governance as a guiding document for every strategic planning process or memorandum of understanding.

Joint Powers Agreements (JPA) and Memorandums of Understandings (MOU) are two types of legally binging agreements used in interoperable radio projects. These documents are typically vetted by risk managers, public safety executives, city and county chief executive officers and attorneys. These documents typically provide a basis for making executive leadership decisions that potentially impact the entire project, identify system requirements and establish cost sharing agreements for ongoing costs and infrastructure improvements. This literature does not typically reflect how organizational culture, individual agendas or what levels of risk public safety officials are willing to accept based on financial resources. They are foundational to interoperable radio projects and can provide an understanding to the formal structure of multi-

jurisdictional multi-discipline projects. They do not typically reflect how the cultures of participating agencies might impact overall governance of interoperable radio projects.

C. SOCIAL SCIENCE RESEARCH

1. Uncertainty and Risk

The implementation of multi-jurisdiction, multi-discipline interoperable communications project requires an understanding of how human relationships and interactions influence planning, implementation, and long-term project success. This is one area of literature that is rarely addressed as part of developing shared governance for interoperable communications projects. Finding consensus for all elements of a project of this magnitude begins with a number of uncertainties that must be defined in the context of risk. Once risk is identified, mitigation strategies can be developed to reduce the impact of risk on interoperable radio projects (Slovic, 2000, p. 234).

The early stages of the development of many interoperable radio system and shared governance solutions might be described as a wicked problem. Wicked problems are by their very nature so convoluted that there is no clear agreement on how they are defined or how to solve them (ScienceDaily, 2007). Fragmentation is an outcome of a wicked problem where individuals are more divided than untied. Information and knowledge is scattered among participants and individual, rather than collective, solutions are in competition. Fragmentation exists as uncertainty when participants hold to assumptions believed to be understood by all stakeholders (Conklin, 2008). Understanding how social complexity and fragmentation can negatively influence creating an interoperable system is not likely to be considered or incorporated into a strategic plan, MOU or RFP.

Once uncertainty is known, it can be mitigated as risk. Uncertainties about facts, values, finance or culture require an iterative process to bring stakeholders

together to identify and manage the risks of any project. Perceptions of executive oversight and consensus team members can undermine the successful application of any technology no matter where is it used. Researchers have not developed a comprehensive theory that answers the question of why major technological advances are unsuccessful due to the identification of minor risks or risk events that become negative public problems on a massive scale (Slovic, 2002). Research dating back to the 1980's recognizes that understanding the complex network of direct and indirect effects on risk is difficult due to the transdisciplinary nature of solving problems (Slovic, 2002). Compounding the challenge of successfully implementing technology projects is the lack of a comprehensive theory to integrate a technical analysis of risk with the cultural, social and individual response structures that shape the public experience of risk (Slovic, 2002).

The identification of risk factors occurs when consensus teams determine how projects will change the working environment for each participating agency and discipline. Risk management for interoperable radio projects should expand beyond how any specific technology impacts any specific public safety disciplines to include how finance agreements and shared governance strategies affect overall project management. Specific to this thesis is the reality that the stipulations of the narrow banded radio frequency requirements and interoperable communications guidelines require that all stake holders must invest substantial amounts of human resources to create cooperative, multi-agency relationships to achieve interoperability. The result is the development of common governance that will work to leverage funding sources, management experience and develop collective requests for proposals for new systems.

2. Finance and Risk

Literature linking governance, finance and risk is primarily focused on private industry and less on public administration. Dallas (2004) wrote extensively on evaluating the shared governance structures of private

corporations in the context of risk as part of developing investment strategies. In *Risk and Governance,* Dallas describes how a financial downturn in Europe was tied to the lack of a shared, multi-corporate governance agreement for conducting business. Businesses and corporations engaged in mutually beneficial business agreements with no shared governance to guide productivity and growth. Eventually individual corporate decision making without input from other businesses led to failures that negatively impact the broader financial markets. As a result of these failures, investment strategies began to include an evaluation of shared governance as part of the risk assessment of investment strategies.

Fight (2006) suggests that risk related to finance is subjective based on the financial characteristics of project participants. One potential fragmentation element can be tied to what one party defines as a manageable financial strategy will be unacceptable to another. Fight recognizes that social factors, including the influence of trade unions, can potentially impact the development of the financial element of a public project. He recommends two strategies to reduce financial fragmentations in multi-participant projects. The first is the completion of feasibility studies that include project goals, anticipated outcomes and alternative financing models. These studies allow participating agencies to analyze the fiscal impact of the project prior to committing fiscal resources. Second is due diligence tied to identifying and managing the financial risk in any project. This process includes gathering perspectives from legal, technical, political and subject matter experts.

Van Staveren (2006) examined how financial risk can impact construction projects specifically related to unknown ground conditions. The nexus to a multi-discipline, multi-jurisdiction interoperable radio projects is best understood when one considers that infrastructure costs can be unknown as a radio project is designed. Engineers and planners do not know how much hardware is required to build a system to the functional objectives identified by users. How many physical sites are needed to support the project? What is the cost to lease or

purchase sites for radio towers and support equipment? Van Staveren suggests that each risk can be managed based on widely accepted principles of risk allocation. Negotiation to determine who owns the risk is a key part of mitigation. Van Staveren proposed the following chart to demonstrate his concept of the levels of shared risk (see Figure 1).

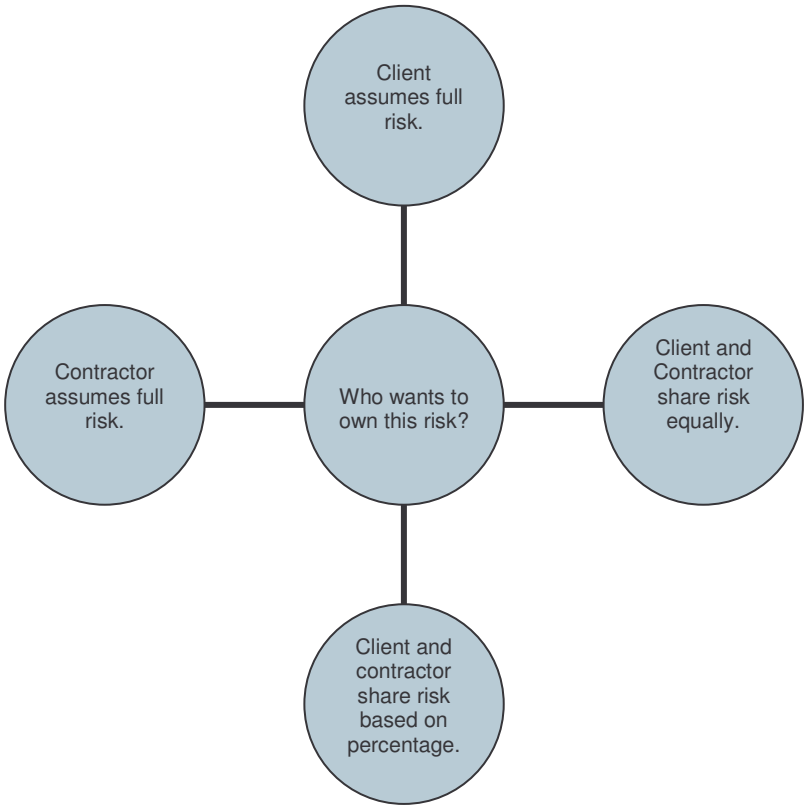

Figure 1. Risk Mitigation Chart (After Van Staveren, 2006)

The diagram shows four possible risk allocation scenarios where every risk is explicitly owed by one participant, shared in part or divided equally. While this model is used for ground-related risk for construction projects, it can be easily applied to risks that include performance, outside influences, changes in law and competing expectations across multiple organizations.

Literature sources on finance and risk suggests that the key to developing acceptable values and cost sharing for multi-agency projects is through a

common governance structure. The structure can be achieved through mutual agreements or contractual obligation. The lesson for developing shared governance for interoperable communications projects is to understand the importance of relying on consensus teams that provide a forum for sharing concerns and ideas that result in cooperative and inclusive resolutions for finance related issues.

3. Technology and Risk

Professional journals are one literature source for understanding how governance risk can be mitigated when vetting potential technology risk issues in public safety communications projects. For example, public safety users, specifically in the fire discipline, initially resisted the transition from analog to digital radio technology improvements because of a shortcoming of digital radio transmissions in high noise environment. Luna (2009) wrote in *Urgent Communications* magazine that radio vendors were moving forward to engineer digital radio technologies into communications systems assuming that the shortcoming high noise transmission failures would be solved as the technology evolved. This revelation created significant push back from public safety professionals who believed that the risk of injury or death would result from digital radio “upgrades”. Luna recommended that public safety professional organizations, such as the International Association of Fire Chiefs, should reach out to vendors to work in cooperation to solve these types of problems. In turn, vendors must be willing to cater to the needs of the various public safety and public service agencies to develop best practices to mitigate emerging radio technology shortcomings.

Risk associated with technology it typically defined in the context of the value of the technology itself Slovic (2000, p. 234). wrote that members of industrial societies must face the reality that the benefits of technology must be paid for with both money and lives. Economists continue to debate the value of a human life additionally the valuation debate plays out in wrongful death civil

cases across the Untied States today. This is a difficult problem that is compounded in public safety professions. Law and fire practitioners are hesitant to acknowledge that the transition to new technologies will likely have play a role in the injury or death of public safety professionals. Policy makers, in turn, must make benefit versus risk decisions related to technology enterprises.

4. Social Complexity and Emotion

The process of developing and implementing a common governance structure for any interoperable radio project requires an ongoing assessment of risk beyond how new radio technologies might improve or detract from the safety of public safety professionals. In addition to end users, there are for example; executive managers, risk managers, finance officers, attorneys and information technology professionals. These stakeholders add to the financial, managerial and discipline risks associated with shared governance of interoperable radio projects.

Dr. Jeff Conklin (2008) in *Wicked Problems and Social Complexity* stated that collaboration is a natural outcome where collective intelligence is part of socially shared cognition. However, in any multi-organizational multi-discipline project there are forces that inhibit collaboration driven by social complexity. Social complexity is defined by the reality that executive oversight teams and consensus teams are part of a social network. The network participants bring their own languages to define core concepts of projects. They have competing interests for project outcomes specific to their discipline. They may directly benefit from the project or be peripheral to it. Conklin found that the resulting fragmentation is accepted by project participants as inevitable with little effort to mitigate the negative impacts.

Emotions also compound the successful implementation of new technology and add another element of fragmentation to multi-jurisdictional projects. Slovic et al. (2002) examined how affect guides judgments and decision making. Affect is defined as, “the specific quality of ‘goodness’ or ‘badness’ (i)

experienced as a feeling state (with or without consciousness) and (ii) demarcating a positive or negative quality of a stimulus" (Slovis, 2002). Specifically, Slovic identified an inverse relationship between the perceived risk and the perceived benefit of using technology was linked to the strength of positive (or negative) affect associated with it. Feelings can have a significant impact on decision making. Studies referenced in Slovic's work demonstrated how affective memory influences investment decisions even when financial evidence points to more lucrative outcomes.

An example of the role of emotion specific to interoperable radio projects is found in the fire fighting profession. There was a perceived technology flaw in next generation, digital, hand held radios used by first responders. Hand held radios failed to transmit in high noise environments similar to working in a fire engulfed building. Digital radio technology was found to be a contributing factor in the on duty death of a number of firefighters. The initial reaction was for firefighters to rally against the use of digital technology because of the increase risk to fire fighter safety. Blogs and articles in trade journals began to appear decrying the use of digital technology and demanding the use of older, analog technology.[1]

Slovic's findings are supported in professional journal literature. Magnuson and Rusling (2009) in *National Defense* magazine cites Slovic's work and suggest that homeland security decisions can be based on emotion in political policy development. They suggest that the events of 9–11 created an atmosphere where feelings and gut instincts drove policy decisions. Emotional reactions might be described as knee jerks to significant events. They can, however; have significant impacts on delaying the deployment of interoperable radio projects.

There is a gap in the literature addressing how social complexity and emotion fit into the development of a shared governance structure for an

[1] An example of a blog that is focused on this issue can be viewed at http://blog.tcomeng.com/index.php/2008/firefighters-distrust-of-digital-radio-system-grows/.

interoperable radio project. This research thesis will provide additional insight into how these risk factors affect intra-organizational coordination. Case study research for this thesis will examine how risk tied to wicked problems, social complexity and emotion can be mitigated though a discourse between various stakeholders and a clear picture of a project can emerge.

4. Social Amplification and Risk

Leiss (2003) completed research on the social amplification of risk that provides a foundation for developing strategies to manage perceived risk. While this work was not specific to interoperable radio communication projects, his insights are applicable to these types of projects. Leiss described a framework to explain how risk is amplified in the context of information sources, channels, societal filters and institutional or social behaviors (see Figure 2).

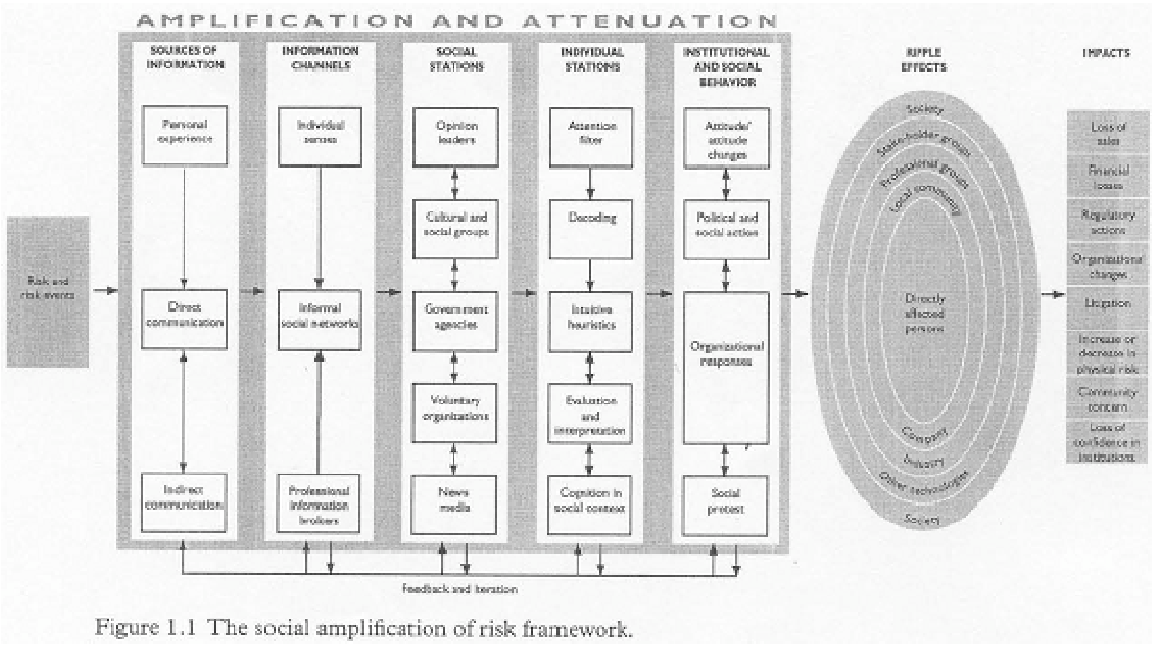

Figure 2. The Social Amplification of Risk Framework (From Leiss, 2003)

In the context of interoperable radio projects, this framework is helpful in providing opportunities to anticipate how social impacts, such as the perception

that digital radio technology will put public safety practitioners at a higher levels of overall risk as opposed to existing technology, might amplify the actual risk associated with the emerging technology.

5. Relationships

Johnson (2009) developed an interoperability formula to measure the effectiveness of interoperable communications projects (see Figure 3).

$$I=(2P+2T)xR$$

I—Effective Interoperability

P—Planning

P—Policy (or governance)

T—Training

T—Technology

R—Relationship.

Figure 3. Interoperability Formula (Johnson, 2009)

The formula is not intended to be a mathematical equation, but expresses one view of the variety of factors that can impact the success of an interoperability project. Johnson suggests that governance agreements should be completed at the front end of any interoperable project. Governance includes memorandums of understanding or standard operating procedures that are critical for resolving problems that occur at any point of a project. He also includes relationships as a critical element of achieving success in interoperable

projects. The article includes a “snapshot” survey that identifies funding as the most significant challenge for interoperable projects. Interestingly, funding is not part of Johnson's formula (2009).

Johnson (2009) views relationships as a force multiplier for interoperability projects. Relationships might be considered a soft element these types of projects, however; relationships can mean the difference between the successful implementation of a system and a project delayed by unresolved governance risk factors.

6. Leadership and Mentoring

Marcus, Dorn and Henderson (2005) suggested that the participation of *meta-leaders* is one strategy for mitigating risk. They defined a meta-leader as an individual that can influence and build a collaboration of effort beyond their own organization. These leaders are skilled in bridging differences between jurisdictional boundaries, a variety of agencies or departments and gaps between public and private service. Meta-leaders are able to mitigate risk because they build consensus between individuals and groups that do not share the same strategic initiatives or goals. The ability to create relationships, provide guidance and create momentum across a variety of disciplines minimizes risk factors when they occur in the course of multi-jurisdictional, multi-discipline projects.

Meta-leadership requires the ability to shift between interpersonal skills and leading a group. Snowden and Boone (2007, p. 5) build on this idea of meta-leadership writing that adept leaders understand the context in where they are working. These leaders have the flexibility to change leadership behaviors and how decisions are made in the context of large groups where rank may not have the same positional power as part of a specific organization. In addition to the skill of leading in multi-jurisdictional, multi-discipline projects, these leaders

prepare their departments for structural changes in business practices and policies that reflect regional solutions rather than department specific goal achievement.

One bi-product that naturally emerges from a meta-leadership perspective is mentoring. Mentoring can be expanded beyond traditional one on one counsel to the guidance and development of the larger group. Lichtenstein, Uhl Bien, Marion, Seers, Orton, and Schreiber, (2006, p. 3) write that this focus on broader, complex groups requires the leader to think beyond their particular discipline and adapt multi-discipline projects to meet the needs of other groups. The meta-mentor must transcend the individual view that the individual organization drives any project and expand the aggregate perspective to include multiple organizations, strategic initiatives and goals.

7 Problem Solving Strategies

There are examples in literature for public safety professions that guide decision making through an iterative process. Community policing theory recommends the SARA problem-solving model to address quality of life issues in neighborhoods (Aspland, 1996). SARA is an acronym that stands for Scanning, Analysis, Response and Assessment. The process serves as a guide to determine the type of issues that exist (Scanning), to identify the factors that created the issues (Analysis), to develop a plan to address the issue (Response) and finally to evaluate the success of the response and make adjustments as needed (Assessment). This model can be applied to many different types of problems including mitigating risk in most problem types.

Slovic (2000) recommends, specific to hazard management, that the more scientific and lay perspectives that are applied to a problem, the greater the likelihood of achieving a positive outcome for developing a solution. The reality is that no single discipline has the “answer” to complex problem solving projects. This view may also apply to governance solutions for managing technology.

D. SUMMARY AND CONCLUSION

The literature offers foundational insight to develop risk mitigation strategies of shared governance structures for multi-jurisdictional multi-discipline interoperable radio communication projects. Literature suggests that participants understand the culture, expectations and level of knowledge for each jurisdiction and discipline. Government strategy documents, MOU's and RFP documents are the critical legal documents that support these projects, however; these agreements do not reduce issues of fragmentation. Social complexity studies provide understanding on how to transition the uncertainty of wicked problems to identified risks in the development of a shared governance structure.

The literature suggests that relationships are a key element to mitigating risk in large scale communications projects. As projects progress, leaders will emerge who can transcend jurisdictions and disciplines. These meta-leaders provide a basis for facilitating change, overcoming objections and leading others to a cooperative solution for multi-discipline multi-jurisdictional projects. Additionally, understanding how risk can be amplified to benefit shortsighted political or professional biases reduces the ability for a minority to undermine a multi-discipline project. Finally, utilization of proven problem solving models in public safety disciplines can also be used as a foundation for responding to identified risks even if those risks emerge later in a project.

What is missing in the literature is a nexus between private and public governance models. Private industry is building evaluation tools to minimize risk in governance and financial agreements that require cooperation between different corporations, companies and businesses. Multi-discipline, multi-jurisdictional projects in a shared government setting are less likely to incorporate these types of tools. Individual jurisdictions and disciplines are more likely to focus on technology issues and behave myopically seeking to preserve their own goals and initiative rather than working toward what is best for the group. The

literature is not focused to guide meta-leaders through the development and implementation of multi-agency, multi-discipline radio technology projects.

This oversight to incorporate governance is common for communication projects as interoperability goals create a system of systems where software or infrastructure link existing systems rather than bringing them together (Hawkins, 2008). Creating a comprehensive governance structure can result in mitigation strategies that reduce financial, managerial and discipline risk. Overall the body of literature provides insight as to how shared governance for interoperable communication systems might be achieved. This thesis will compare two case studies against literature and identify common threads for mitigating risk associated with shared governance of multi-jurisdictional multi-discipline communications projects.

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III. METHODOLOGY

A. METHODOLOGY—CASE STUDY

Research for this thesis focused on how risk factors associated with financing, managerial decision making and the needs of specific disciplines impact shared governance models that are specific to interoperable communications projects. The outcome of this research identified common strategies and recommendations to understand and mitigate the risks associated with shared governance models used in interoperable communications projects. Specifically, case studies were used to understand the factors influencing consensus teams and how responding to these factors can mitigate the risks associated with shared governance models.

There is lack of research that links factors influencing consensus in a shared governance model used to manage interoperable radio communication projects. Specifically, there is little social science research explores how consensus teams manage risk for multi-jurisdictional multi-discipline communications projects in a shared governance environment. Yin (2009) defines the case study research method as an empirical inquiry to investigate a contemporary phenomenon within its real-life context. The case study method is appropriate when research is centered on how and why questions and does not require control of behavioral events. Additionally, a case study is helpful when the boundaries between context and phenomenon are not clear and multiple sources of evidence are used.

B. SAMPLE POPULATION

For this project the case study method was used to study two multi-jurisdictional, multi-discipline interoperable radio projects in two California counties, Monterey and Marin. Both counties have a shared a governance solution in place for their respective radio projects.

Marin County deployed an interoperable radio system over nine years ago. The governance structure has representation of all stakeholders for managing the interoperable radio system. The leadership group is now working to address access and capacity issues resulting from too many users accessing the radio system. The Marin County case provides an opportunity to gain an understanding of how risk factors influencing consensus operate within established shared governance models to manage interoperable radio system upgrades with changing performance demands.

Monterey County is focused on replacing the existing voice and data radio communications system and is currently reviewing responses to a Request for Proposal process. Project participants include all cities located within Monterey County, the county and special districts. The Monterey County case study provides an opportunity to better understand risk factors influencing consensus in the development of finance strategies and governance agreements and how they impact planning and implementation of a replacement interoperable radio system.

C. DATA COLLECTION METHODOLOGY

The data collection methodology included interviews of senior public safety professionals who are currently participating in the development of governance structures for interoperable radio communications projects. Interview participants represent public safety (police and fire), critical support (information technology) and executive management (government CEO's). The interviewees hold executive level or CEO positions in public safety, support services, and third-party consultant services. Data collection included a review of the formal documents (MOU's and JPA's) that form the legal foundation for these projects.

D. ANALYSIS

Open coding of the interview data was used to identify common threads that influence consensus in interoperable radio communication projects. The

threads the emerged from the open coding were compared with legal documents to determine if the formal agreements support or detract from consensus team behaviors. Open coding, interviewer notes and comparative analysis of legal documents provided insights into how inter-organizational teams and legal agreements influence financial, managerial and discipline risk within interoperable communication radio communications governance models.

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IV. ANALYSIS

The analysis is based on information gathered from five interviews representing private industry and government participants in the Monterey County and Marin County interoperable radio communications projects. Participants were asked a series of seven questions in an open response format with follow up questions for clarification of answers. The focus of the questions were designed to reveal the "how" of developing shared governance solutions and the "how" of managing the fiscal, managerial and discipline risks associated with shared governance models. The "how" of developing shared governance is presented in the context of roles, disciplines and leadership. The "how" of managing risk is presented in the context of emergence, conflict management, cultural forces and shared governance structures. Interview questions were designed to explore sub-components of the main research question: How do intra-organizational teams develop shared governance structures that mitigate risk associated with multi-agency, multi-discipline interoperable radio communications projects?

Open coding was used to identify common themes within the interview data. Each participant was assigned a number of one though five to maintain confidentiality and are referenced in Column One in the tables below. Column two identifies the themes that emerged from each interview. Column Three lists specific interview responses to support the themes listed in Column Two.

The analysis of interview data is grouped into two categories (Develop Shared Governance and Risk Management) as defined in the main research question. Develop shared governance focuses on the factors that shape the emergence of meta-leadership, management practices and facilitating change in the context of multi-discipline, multi-jurisdictional radio communications projects that require finding consensus between participants. Risk Management focuses

on how shared governance functions to mitigate risk associated with fiscal, management and discipline issues that can potentially impact radio communications projects.

A. (HOW) DEVELOP SHARED GOVERNANCE

The development of shared governance solutions emerges from individual roles, disciplines and leadership. Participant *roles* are described in the context of specific jobs as well as individual, task oriented skills. For example, interviewees reported that the role and commitment of executive managers is critical to the success of shared governance projects. Specifically, executive managers have the positional authority to require subordinates to cooperate and be productive members of consensus teams. *Discipline* influences are oriented around subject matter expertise. Middle managers and practitioners provide specific insight related to the functional needs and objectives of any interoperable radio project. *Leadership* is significant to both consensus and policy teams. Interviewees detailed how leadership influenced the development of a shared governance solution from across all jurisdictions and disciplines. The common element of leadership was the presence of meta-leadership skills and abilities to see past a specific professional expertise and provide input that was relevant to the project as a whole.

1. Roles

What was your role in the development of the governance structure for this project? See Table 1.

Table 1. Participant Roll

Participant Number	Role	Comments
1	Visionary	The ability to see and understand how regulations, system shortcomings and existing culture must change to achieve future goals and system requirements.

Participant Number	Role	Comments
1, 4, 5	Subject Matter Expert	Participants provided insight to others related to specific knowledge (i.e., technology, public safety culture issues) that was not known by other participants.
1, 3	Futurist	Recognized how narrowbanding requirements would impact radio frequency use over the long term. Assist others to develop a "long view" of the project. "Rather than meet a short term deliverable, we are able to focus one or two years down the line."
2, 3, 5	Facilitator	Acted on information gathered from informal conversations to start the evaluation and change process. Worked as part of a team to reach out to individual department heads to better understand the specifics of the project.
1, 2, 5	Collaborator	Leveraged past relationships in other projects to build a consensus team for the interoperable radio project.
2	Comprehension	"I need to demonstrate I understand your issue."
1, 2	Communicator	Assist others to understand the complexity and scope of the project.
3	Focus	Recognize that although players change, the project should always consider the needs of the user over the needs of an individual and keep all participants oriented to user driven solutions
4	Trouble Shooter	"We solve problems." Individuals with subject matter expertise worked together on operations committees.

2. Disciplines

Which public safety discipline (police, fire, communications, etc.) had the greatest impact on the development of the governance structure and why? See Table 2.

Table 2. Discipline Impact

Participant Number	Discipline with greatest impact	Comments
1, 5	City and County Executive Administrators	"It takes (executive managers) telling people we are in this together." They facilitate understanding that participants will not get everything they want for a specific discipline.
2	Law	Law professionals are trained to work independently. This culture leads to a level of unwillingness to see other participant's points of view.
2	Fire and Law Executives	They struggled with understanding a strategic view of all jurisdictions and disciplines and what all users needed in a shared governance solution. They also did not have the authority to commit to regional solutions without consulting their CEO's.
2, 3, 5	Existing Governance Teams	The interoperable communications system is "their baby". It is their project and if they are not involved from the beginning, it will not succeed. Conversely, the structure and participants did not facilitate balanced decision making as low percentage jurisdictions had the positional power to over rule or ignore needs of larger capacity jurisdictions. "The (policy team) commissioned a strategic plan, out of this came a recommendation to modify process and make frequencies more efficient."
1, 3	Information Technology	They were the provider of communications services and underwrote the cost of radio technology services. "There was a core relationship between IT and users based on

Participant Number	Discipline with greatest impact	Comments
		fees for service and what customers get for it." Their influence on the finance aspect of the project was significant as the imbalance of participating agencies would be required to pay for the level of service they were receiving.
3	Fire	"Fire is much more cooperative because of mutual aid relationships."
4	Public Works	Their leadership was closely tied to all other disciplines and jurisdictions and facilitated communication.

3. Leadership

Who were the leaders that emerged in the development of the governance? See Table 3.

Table 3. Governance Leaders

Participant Number	Discipline with greatest impact	Comments
1, 3	Public Administrative Executive Officer	The individual represents the Chief Administrative Officer for the county government. This person, "was respected, intelligent and articulate. They had a role with lots of the players." "Spearheaded by one individual—If he goes away it creates a leadership vacuum that is unknown if someone would be able to step into the role."
2	Public Works Executive	The individual leveraged significant events to initiate a complete replacement of an over used system and had the personal motivation to make things equitable between user agencies. This executive, "worked for the chiefs for 29 years." The executive was trusted.

Participant Number	Discipline with greatest impact	Comments
2, 3	City Managers	They were the key to radio system change because their support brought the right people to the table. They were also the key to selling the finance element of the project to the policy boards (i.e., city councils)
2	Consultants	Facilitated building common understanding of issues facing all jurisdictions and disciplines. They were issue specific and subject matter experts. (Issue specific: strategic planning, technology acquisition) They identified issues requiring shared governance solutions.
3	Information Technologies Executive Leaders and Mangers	IT was administering communications technology and resources. One manager, "recognized the reality of the radio replacement issues and brought it up the chain of command in IT."
3, 5	Existing Shared Governance Teams	This group stepped forward to fill the leadership gap as the radio technology needs morphed into a multi-discipline, multi-agency project. "It prevented the need to create a separate JPA because they represented the authority and the end users." One shared governance team endorsed the collaborative process of the consensus groups. Members of these shared governance teams participated on consensus teams and had the background when making policy decisions. "It would be difficult for a sub groups (consensus teams) to pull the wool over the groups (policy teams) eyes."
3	Users	Their needs stay consistent over time and are a critical part of identifying radio system needs. Shared governance allowed for the voice of supervisors and line staff to communicate their needs and concerns on consensus teams.
4, 5	Police and Fire Mid-Manager	One fire participant was known to other jurisdiction and discipline stake holders and had two levels of subject matter expertise related to radio technology and the fire discipline. "It is the relationships that you build in the non-emergency environment."

Participant Number	Discipline with greatest impact	Comments
		One participant was a member of the fire discipline and one from the police discipline had the ability to grasp the technology issues and were willing to be mentored by others partnering on consensus teams from a different jurisdiction or discipline.

B. (HOW) RISK MANAGEMENT

All of the interviewees reported that the mitigation of fiscal, managerial and jurisdictional risk in a shared governance environment takes time. The elements of emergence, conflict management, cultural forces and governance can all detract from or support collaborative responses to risk issues in multi-discipline, multi-jurisdictional radio communications projects. *Emergence* was defined as the process where individuals participating in policy and consensus teams begin to norm into a cohesive group. A culture within shared governance exists distinct from the jurisdictions and professions of the members. *Conflict Management* was described as a process that resulted from the emergence of policy and consensus teams. Conflict resolution was the result of spending time together and working through details, no matter how tedious, for the purpose of resolving risk and conflict issues. This process was present throughout the life of each shared governance solution of a radio communications project. *Cultural forces* are those beliefs, mores, expertise and understanding specific to jurisdictions and disciplines. Interviewees described how these forces impacted the shared governance process. For example, fire discipline members use common tactics and the same type of equipment in every fire station. This culture of standardization makes it easier for fire professionals to understand the concept of interoperability in a radio communications system. *Governance* was defined by one interviewee in one word—wrangler. A wrangler worked to bring all jurisdictions, disciplines, and individuals together for the common purpose of developing and implementing an interoperable radio communications project.

Shared governance was the result of bringing disparate and conflicting views of participants together to create a common reference point to built shared vision and goals to implement the project.

1. Emergence

What were unanticipated issues that the governance structure was required to address? See Table 4.

Table 4. Unanticipated Issues

Participant Number	Unanticipated Issue	Comments
1, 5	Lack of Formal Governance that led to consensus.	"It sounded like we stumbled into a collaborative process for the radio communications project. It started a collegial discussion and sort of gelled and it did not have a lot of governance and I am surprised it has worked as long as it had without governance. We left these meetings with a high level of consensus and understood that there were other people not in the room that we had to have their consensus as well." "The unplanned outcome was that we sent hours and hours in different groups addressing different element that in doing the little thinks, we created large pieces of governance with little push back from policy groups."
1, 4, 5	Not knowing your talent.	"You are stuck with whoever shows up when you use a consensus show up if you want to model. Regardless who shows up, the conclusions have to be palatable to the broader constituency and somehow we knew that going in." The technical and managerial skill level was unknown between jurisdictions and disciplines. There was no effort to measure individual participant's skill sets. "For a long time, any time we had a change of players we had to start over at ground zero. They had no understanding of the

Participant Number	Unanticipated Issue	Comments
		technical aspect or scope of the projects. They were not interested. They were place fillers."
1	Lack of participation by specific jurisdictions.	"When we felt decisions being made that were not being made in the best interest of one or more groups we would say wait a minute."
1	Losing key players in the project.	This happened because of retirement, reassignments and changing agencies. One challenge was to absorb what they brought to the project.
1	Consensus creep	"A downside to consensus is drift, scope creep, because there is a diffused leadership base. When you set or change direction it takes an aggregate psyche or intellect to do it rather than a singular project manger that says TIME out, you are leaving the foul lines. We are better about that…this is how our culture has evolved to enforce those norms among ourselves to it works."
1, 2, 3, 4, 5	Managing the perception that a single jurisdiction or individual was in control of the radio communications system.	"People perceived the radio communications project as a 'land grab' control by (a specific jurisdiction) and based on the experience with (a previous multi-jurisdictional project)."
2	Recognizing that the jurisdictions and disciplines involved in the regional radio project did not have the expertise for specific project elements.	This required the hiring of outside expertise. (communications engineer)
2	Lack of political support	Policy team members did not know about the issues with public safety radio communications.
2	RFP development	Past practices where jurisdictions designed the system and vendors built it led to significant cost over runs and systems that did not function as designed. There needed to be an alternative to the RFP process. (Solution: The vendor are required to design and build)

Participant Number	Unanticipated Issue	Comments
2, 5	Shared Governance Policy Team voting	Jurisdictions with minority use of the system had full voting rights over jurisdictions that used the majority of the system. Policy team members did not have sufficient authority to make decisions without delaying the project to consult with their supervisors.
2, 4	Failure to train	Training plan: The lack of a comprehensive and timely training plan leading to system failures. Changing technology: Users did not know how new technology worked. "The coverage issues were known, however; there was a misunderstanding on the participant's part because of not knowing what 97 percent coverage meant. The 97 percent contract with (the vendor) was not 97 percent of the county and participants believed 97 percent meant they would solve the coverage holes."
2, 3	Discipline specific executives refusing to participate.	This required consensus teams to meet with specific individuals to resolve their issues.
1, 2, 3, 5	Fiscal	Financial Meltdown: "The unanticipated issue was the financial melt down and the ability to finance is sketchy because of the financial uncertainty." "It is always a catalyst for change**.** The economic crisis was a barrier because it caused jurisdictions to ask how can we afford a new system in this economic environment? It took the individual agencies doing their own thing (building independent radio communications projects) off the scale because it was more about the economy of scale." Cost: Shared fiscal resources: Grant awards: A finance consensus team had an informal understanding that we were all in this together financially. "We would collectively look for grants and if successful, whatever could go for infrastructure would and what

Participant Number	Unanticipated Issue	Comments
		was left over would be split between the users. That detail was not captured in any documentation." One jurisdiction was awarded a grant but consensus team members had changed and the jurisdiction did not follow the informal agreement. "We waited too long to stand up finance. It did not happen." This was a lesson learned and a formal finance agreement was developed and accepted by policy teams as a result. Cost: Allocation: One jurisdiction was underwriting the cost to other jurisdictions and required the development of an agreement to correct the inequity of cost allocation. Cost: Overall expense: There was no demonstrated need to justify the high cost of replacing the regional radio communications system. Cost: Legal: Site visits identified legal challenges to RFP processes as potential, unanticipated expenses.
3	Underestimating how the success of the radio system would lead to overuse as other jurisdictions wanted to join.	During significant events, the system capacity was exceed by public safety disciplines.
3	Managing for uncertainty and risk	The absence of a project manager leaves the project exposed to managerial, discipline and fiscal risk.

2. Conflict Management

How was conflict managed in the group? See Table 5.

Table 5. Conflict Management

Participant Number	Conflict Issue/ Conflict Resolution	Comments
1	Executive Order	A meta-leader, "pointed out that all the city managers had signed off on the project and the representative of a specific jurisdiction said, 'I guess we are going to do this then.'"
1	Time out/Slow down	"When we felt decisions being made that were not being made in the best interest of one, or more, smaller groups we would say wait a minute." "People used to come to the table and throw done. Our response was to buy time and kick it to a different sub-committee or bring it to a different committee. We diffused by deflecting."
1, 3	Lack of participation as a motivator.	Shared governance decisions did not reflect the needs of non-participating agencies and that motivated department heads to send representative to the table to resolve issues. "Mitigation of an individual decision maker: inclusion and frequent face to face meetings. They have to be regularly scheduled and people have to show up. If they don't show up, that means they are not doing their work." Managers of specific discipline groups attended meeting sporadically and did not have a vested interest in the radio project.
1, 2	Complainers (grenade throwers) were invited to participate on consensus and functional teams.	This allowed for needs, perceptions and risk issues to be identified and addressed. "Let them have their say and then used the tactic of telling people who would not cooperate that he would go with them to their policy councils and let them explain why necessary (public safety functions) would not have radio access during a storm and flood threat." "You always want to invite the thorns to the table…always. Because they will become you

Participant Number	Conflict Issue/ Conflict Resolution	Comments
		best friends. Shutting them out only makes it worse. It self validates they are right that it is a bad system." Turning the grenade thrower around. Transformation: 1) Social interaction outside the work place that developed additional trust and credibility. For example, attending a conference where down time and networking opportunities resulted between grenade throwers and committed consensus team members. "Complainers were invited to become part of the group."
1, 3, 5	Relationships	Conflict issues were known before formal meetings and professional relationships allowed for strategy development prior to the meeting to address the concern. "Without relationships you wont even get to the first base, they wont let you into the ball park. Relationships = long term credibility and honesty and the fact that they you are in it for the community issue and not for personal gain." "Relationships are the key because no matter what you put on paper a road block will happen and it will be through relationships that it will get us through." "Relationships are key in that is allows for issues to be resolved informally."
1, 2, 3, 4	High level executive involvement	CAO and CEO representation on policy, consensus and functional teams gave high level perspectives on conflict issues and resolution. "Leading down a path. The key to changing how things work is to make them understand the issues for your county (region) has their own sets of emergencies." "The city mangers all signed on. (A project

Participant Number	Conflict Issue/ Conflict Resolution	Comments
		meta-leader) met with the city managers to explain the (radio) project to give them insight." The city managers were made to understand that the fiscal issue answering the question: Why are we paying more for what we already have? "Once they understood the money issues, the technology was a mute point. If the money is being taken care of…we will take it. Technology was no longer an issue." Group Dynamics in the first year—conflict management. Refereed by a department head and was part of the consensus team from the beginning and attends every meeting. One executive was very connected with other department heads and would talk to consensus team member's supervisors if they were impeding the process.
1	Failure to see the nexus between regional needs versus local needs.	Some jurisdictions were viewed as dragging their feet. This required a specific outreach to address local needs from a regional perspective.
2	Demonstrating the need for a new radio communications system.	Department executives and policy team members did not understand the needs of users and shortcomings of the system.
3, 5	Using Consultants	"Consultants role is ancillary. However the consultant recognized the importance of governance and they try to provide advice without stepping on toes." "We hired a consulting firm to guide up through the process in an impartial way. This was significant to bridging the relationship issues." "The consultant helped us to define the functional objectives. The benefit of a third party made all the difference. It helped understand interference and in building coverage. It took the guidance and leadership

Participant Number	Conflict Issue/ Conflict Resolution	Comments
		of the IT Department and the consultant to get all the minds around it."
1, 3, 4, 5	Consensus Teams	"For interoperable communications you really need to put in the work to bridge different departments and disciplines to develop the SOP." "You could say that people are a little more free and easier in the consensus environment and then when it comes to the more rigid environment of the ECUAC you have that as background and a little more comfort that the consensus process turned out a good product." "Recognizing that governance for a group is different than running your own agency. You will have to compromise. It is never going to perfectly equitable for everyone and some will be willing to compromise for the greater group." "The operations (consensus) group was able to define the issues—perceived and otherwise and begin to address them. They have met for three years. The group representation has stayed consistent." "You have to spend time together, grinding through the issues and coming to a place to realize we need to make a compromise here to achieve the most reliable level of communication support. Working through fine details—some meetings you accomplish a little and others you accomplish more. The advantage is that you build relationships and credibility. You end up with a consensus agreement that everyone can live with." "The unplanned outcome was that we sent hours and hours in different groups addressing different element that in doing the little thinks, we created large pieces of governance with little push back from policy groups."

Participant Number	Conflict Issue/ Conflict Resolution	Comments
1	Informal/Off Line Communication	When conflict existed, the members of the consensus team let each other know and developed a strategy off line to lead to a constructive solution. "Handled informally and then we talk it through and make the effort to resolve it. We put is on the agenda, we say—we are hearing this."
3	Fiscal agreements insuring cost sharing and project participation.	"Governance and grants goes hand in hand. Regionalization and governance is grants. It requires cooperation. The grants require jurisdictions them to be interoperable." "You have a plan and governance so you are positioned to get the grant money or be more prepared to spend it if you get it."

3. Cultural Forces

How did tradition and culture impact the interoperable project? See Table 6.

Table 6. Impact of Culture and Tradition

Participant Number	Tradition/Culture Impact	Comments
1, 2, 3, 5	Policy Team business practices and function	Existing policy teams embraced a tradition of conducting business through consensus over many years. This was the example modeled in consensus teams as the project got started. "Recognizing that governance for a group is different than running your own agency. You will have to compromise. It is never going to perfectly equitable for everyone and some will be willing to compromise for the greater group."

Participant Number	Tradition/Culture Impact	Comments
		Negative—There must be communication at the policy team level. Meeting minutes must build a history of the project in the event something goes wrong and you can no track back how a project went wrong. The absence of these business practices creates significant delays in fixing problems.
1, 2, 3	Jurisdiction and discipline views	Larger jurisdictions viewed themselves as more important to the project. This resulted in conflict at consensus and policy team. "The challenge was to change the mind set of public safety chiefs to see that public works was just as an important of a public safety. Chief would all argue that a road worker should not have immediate access to the system." Protecting turf was a impediment to moving the radio communications project forward. Traditional jurisdictional boundaries led to suspicion that informal leaders on census teams were working to expand their turf.
1	Finance—Underwriting other jurisdictions	The existing fee structure created an inequity between jurisdictions providing radio communication services. Project participants were to pay their full share in the new project that was substantially more expensive than in the past.
1	Jurisdictional delays in decision making	Consensus team members reflected specific behaviors (filibuster and attrition) to outlast their opposition. These behaviors were accepted as normal for specific jurisdictions.
1	Government takes a long time to move.	"Things like this take a long time in local government take a long time. In my observation, police and fire professionals, until they get further along in their career, have no patience for that. "It takes a lot of work to herd all these cats together."

Participant Number	Tradition/Culture Impact	Comments
		Police and fire professionals are raised in a 911 mindset. Respond, handle and move on.
1, 2	Politics	All participants are driven by politics and decisions must be balanced against this reality.
1, 3	Consensus Team behavior	"This was more of what we did and learned on our own. We came together as a rag tag group and over time the norms and culture developed thought a consensus environment." "The norming (indoctrination into the culture of the consensus team) process is shortened when individual players are able to come together off line and prepare a plan."
1	On-going, existing tension between jurisdictions	There were longstanding tensions between jurisdictions, departments within jurisdictions and disciplines.
2, 3, 4	Independence of jurisdictions and disciplines	Each group did things a certain way and did not work cooperatively. This was tied to both business practices and technology use. Jurisdictions in the same region used different radio systems developed independently and were not interoperable. Law groups are not trained to do teamwork. They grow up in a profession where you are taught to complete tasks as a single unit. This culture creates barriers to work in a collaborative environment. Law professionals were the greatest challenge to change the mindset that public safety was not only just and fire services. "Information Technology and Public Works organizations are more like police in that they stay internally focused and are much less likely to work outside of their sphere. It is localized to them." "The lines in the sand were driven by discipline more than agency. These issues

Participant Number	Tradition/Culture Impact	Comments
		were resolved through refereeing and political activity behind the scenes."
2	Accepting the status quo.	The radio system does work, we know it and there is nothing we can do about it.
2, 3	Cooperation within disciplines.	"Fire is much more cooperative because of mutual aid relationships. Police are more likely to go on their own."
3, 5	Culture of the Individual	The culture of the individual exists in every jurisdiction and discipline. There is much more variability of what an individual will contribute rather than a group. "In a paramilitary organization, they go top down, the chief makes the call. In this situation, the culture of the individual drives the decision not necessarily the user." "The department heads change but the user needs stay consistent. You can figure out the culture of the system is easier than the culture of the individual. We interview until we hear over and over the same need. But the decision is made by one individual who is in touch with those needs but may ultimately make their own decision." "People bring their own biases to the table whether they are personal, organizational, jurisdictional or professional biases. Sometimes these biases are built on a long history that sometimes can't be clearly defined."
3, 4, 5	Discipline specific traditions	Law: The law discipline rotates positions within a specific department. There are times when consensus teams get a law representative who rotates in and does not want to be there. Civilian: It is different with non-sworn/civilian. The civilian have some passion for being involved. Civilians are generally assigned to the same IT for their career.

Participant Number	Tradition/Culture Impact	Comments
		Changing tradition---Information technology and radio communications: Information Technology professionals are becoming involved in radio communications. And as a result, they do not have a 911, 24/7 emergency response mindset. They are experiencing a shift how they must conduct business. "Primarily Fire is active with ICS (Incident Command System). Law partners are not. There are some that are trying and showing some improvement." Disciplines worked in stovepipes with information, mission and goals with little coordination between them. "The compartmentalization's throughout the 70–80–90. The cities and county desire to do everything their way is eroding into you can't do it that way anymore."
5	Emerging Culture of Government	"The players have changed and the politics have changed. New managers realize they need cooperative agreements to get the most bang for their buck." Members representing disciplines and jurisdictions are assuming leadership positions in shared governance, consensus and policy teams. The result is their focus becomes less organization specific centered and more regionally focused.

4. Governance

How did the governance structure support the implementation of the project? See Table 7.

Table 7. Governance Structure Support

Participant Number	Governance Structure Support	Comments
1, 5	Policy Team development	"The project brought (the policy team) to a higher level of governance. It got us past long standing organizational disagreements because members had to work side by side and brought a level of humanity to the table rather than a strict professional atmosphere. "Executive level participants carry a little more weight because they have a higher level and authority with policy boards—these individuals have the juice to make changes in the governance structure. These projects need a CAO and without this the fire, police, and IT spin without a place to go for direction."
1, 2, 3, 4, 5	Consensus Team emergence	The consensus group, "became a self directed team to gather together and start working this." A team was established to look at the existing radio systems failings and conduct case studies of potential replacement models. The teams included representatives from multi-jurisdictions and multi-disciplines. The project leader put together an operations committee whose membership was by invitation only. Selections were based on who was good at their discipline (fire, police, dispatch), who understood the technology. Consensus teams emerged from policy groups. This took time but it made all the difference for a positive outcome. Consensus teams became troubleshooters. They had both technical and field expertise to bridge the gap between technology and use. Negative—"Police Chiefs will get bored and send Lieutenants. They get bored and send sergeants. They get board and send a cop and you lose your entire strategic thinking."

Participant Number	Governance Structure Support	Comments
		"A policy team is not a consensus organization. But policy teams endorse the collaborative process of the consensus groups. Policy team members participate in the sub-groups and have the background. It would be difficult for a sub groups to pull the wool over the groups eyes."
1, 3	Developing a broad view of the project	"We left these meetings with a high level of consensus and understood that there were other people not in the room that we had to have their consensus as well." Consensus team members knew there would be decisions made that would have to get past jurisdictions that had no representatives at the table. They worked through the problem until they reached a solution that non-represented groups would accept. The existing governance did not represent all users and there were few people to drive the project.
1	Individual membership on both policy and consensus teams.	Almost every member of the policy team was a participant on consensus teams. People live in both worlds. It created collaboration since we know each other outside of the project environment.
1	Negative—Informal consensus team development results in failing to focus on all elements of the project.	"There were a lot of elements that went beyond the technical, fiscal, marketing communications, training later, public outreach. There is nobody and there still isn't that is laying them into a project management strategy to be sure they are starting and stopping at the right time to avoid unnecessary delays in the project."
1	Negative—Management by committee	The early informal development of governance resulted in project management by committee. There was not a lot of individual leadership on consensus teams. Early on the team lacked direction.

Participant Number	Governance Structure Support	Comments
1, 3, 5	The norming of consensus team.	"We came together as a rag tag group and, over time, the norms and culture developed though a consensus environment." "The culture took years to work out. The issue was that we constantly had new people showing up and had to explain things over and over. It slowed us down. We had to norm as a group. This was process required for us to go through." The existing governance did not represent all users and there were few people to drive the project. "You have to spend time together, grinding through the issues and coming o a place to realize we need to make a compromise here to achieve the most reliable level of communication support. Working through fine details—some meetings you accomplish a little and others you accomplish more. The advantage is that you build relationships and credibility. You end up with a consensus agreement that everyone can live with."
1, 4	Governance teams and mitigating conflict.	"When conflict exists the members of the team let each other know that leads to constructive solutions—it is handled informally and then we talk it through and make the effort to resolve it. We put is on the agenda, we say—we are hearing this. It goes back to locking everybody in the herd." "There are some members that are wranglers to bring stragglers together and it is informal for the most part at the consensus team level. Conflict becomes known, the herd puts it one the table for discussion, we resolve it and move it further down the path." Consensus teams had the flexibility to change how information was presented to resolve concerns by discipline. This also resulted in developing teaching strategies to

Participant Number	Governance Structure Support	Comments
		explain elements of the project that might not have been cleat to all impacted groups. “We managed conflict by including all users in Functional Objective meetings. County IT talked about the realities of interference and no one else really knew how bad the system really was. We had no choice but to upgrade.”
1, 2, 3, 5	Governance and relationships	“Relationships are key in that is allows for issues to be resolved informally. People would come to meetings loaded for bear. If certain department heads showed up, you knew it was going to be bad. Most of the time we knew a particular individual was coming, and so we had time to work on it before he showed up.” “It all boils down to cost. It all comes down to the participating partner’s ability to pay. Even if you come up with a great formula…it does not work for us. In this case it was not so much of a problem but more about *building the political and relationship bridges* to get it built to get the primary players comfortable with the formula and wiling to carry the ball and get the policy board to approve it.” Prior relationships led to the identification of individuals who had a track record of collaboration and cooperation. “A lot of hard work, a lot of relationships, a lot of patience, and the ability to have the right people in the group.” Consensus teams created outreach teams to meet with key decision makers that had concerns with the project. In a more intimate environment, a trust relationship developed and these key individuals supported the project. “Relationships are the key because no matter what you put on paper a road block will happen and it will be through relationships will get us through.”

Participant Number	Governance Structure Support	Comments
1, 5	Organizational Chart	"People used to come to the table and throw done. Our response was to buy time and kick it to a different sub-committee or bring it to a different committee. We diffused by deflecting—it was the model of the policy team—the culture creep happened to the benefit of consensus teams." "The players sitting in chairmanship roles we highly placed in county and city government was helpful and their style was collaborative nature was significant and helpful in resolving conflict. They were much broader in their approach. This is our system not the city not the county it is OUR system."
1, 2	Membership	Membership to policy teams was typically defined by MOU or other agreement. Membership to consensus teams was extended to anyone who wanted to participate. The open membership model brought participants to the table that became future leaders of the project. "They went to the public safety, engineers, dog catchers, public works….everybody had input into the expectations for performance." Membership should include an independent voice to mitigate the risk of the perception that one specific jurisdiction is taking over the project.
3	Failing to develop governance.	"Governance is an area where we see an under investment. Governance is the most important when compared to the other elements of the SAFECOM continuum. The investment is small, but it comes early on. That is often with agencies don't make investments. No governance leads to problems: unsuccessful projects, dissatisfaction, cost overruns, and schedule delays."

C. CONCLUSION

Interviewees describe the process of developing shared governance and managing risk as on going. They believe that shared governance must continue to evolve and adapt to the changing environments of finance, jurisdiction and discipline. Shared governance will function as the *wrangler* of individuals and groups to mitigate risk issues, changes in technology and public service needs for radio communication support.

V. FINDINGS AND CONCLUSIONS

The analysis of the data gathered indicates that the mitigation of risk issues in a shared governance structure is multi-faceted. Common threads across the case studies revealed that developing a shared governance solution for multi-agency, multi-discipline interoperable radio communications projects required individuals to take on roles in addition to their specific job assignments. Other individuals with the leadership skills to bridge jurisdictions and disciplines emerged as meta-leaders to act as wranglers bringing disparate participants together. Public safety disciplines, law and fire, were identified as having the most significant impact on shared governance potentially creating barriers to the emergence of governance early in the process. This changed as the law and fire participant view of the project transitioned from a discipline centric focus to a multi-agency, multi-discipline focus.

Developing risk mitigation strategies through shared governance occurred as uncertainty was defined in the context of fiscal risk, managerial risk or discipline risk. Risk that was not addressed through existing shared governance structures was likely to manifest as conflict. Cultural forces existing in specific jurisdictions and disciplines contributed to magnifying risk on one hand but created opportunities to mitigate risk on a project wide scale. Policy and consensus teams were required to work through the conflict. The resolution of risk issues likely to result in changes to the overall governance model. The focus of this chapter will be to expand on these key findings focusing on how they mitigate risk in a shared governance environment.

A. (HOW) DEVELOPING SHARED GOVERNANCE

1. Roles

Individuals take the sum of their professional experience (roles) and use that experience to the benefit of multi-jurisdiction, multi-discipline

projects. These leaders leverage significant events, project goals and prior relationships to facilitate shared need and common understanding between all participants.

Interviewees described participants who represented a variety of public and private jurisdictions that included county, municipal and special district government structures. They were from multiple disciplines that included executive management, law fire, information technology and public works. Experience related to their specific position might be considered anchor points that brought subject matter expertise to the development of the shared governance teams. Specific expertise, however; was not necessarily the critical element in achieving shared governance on consensus teams. Meta-leadership skills were more valuable to achieve collaboration on consensus teams. Meta-leadership skills include understanding the needs of all stake holders in a communications project, leveraging significant events to facilitate change at a regional level, demonstrating a shared need and common understanding across multiple disciplines and governments as well as understanding and communicating a long view of these projects.

Interviewees discussed the importance of leveraging significant events to facilitate change on shared governance, consensus teams. Specific to interoperable communications, significant events emerged from emergency; all hazard events as well as rules and standards changes for the use of radio communication technology. The meta-leadership skill is to fully understand the impact of these events and how they influence individual agencies and disciplines. For example, the FCC radio frequency narrowbanding requirement required all public service organizations to change the backbone of emergency communications equipment. There was clear financial risk as the expense of converting individual agencies radio systems to a narrow banded format would be substantial cost as opposed to creating a shared system at a significant savings. The challenge for meta-leaders was to guide executive leaders to

understand that the loss of individual radio systems did not mean a loss of control in managing radio communication systems.

Meta-leaders were skilled at understanding and communicating a long view of these projects. One participant described meta-leaders as being a *wrangler*. Wranglers recognized that decisions made in policy and consensus teams would impact the needs of users not present or represented in these forums. Long view project success required an understanding that the aggregate decision would impact these stake holders and solutions must include their perspectives even when they were not voiced. Wranglers also looked beyond short term project goals out two years or longer keeping a long term perspective on how a specific project impacts a shared communications system.

Interviewees all pointed to relationships as a key to understanding the needs of stakeholders in communications projects. They indicated that participants in multi-jurisdictional, multi-discipline radio projects had previously worked together in other venues and projects. These shared experiences created an environment where informal communications facilitated problem identification and resolution prior to engaging in a formal discussion at policy team levels. It allowed for consensus team members to share specific expertise that might otherwise be lost in formal meeting settings. For example, information technology professionals do not typically work in a 24/7 environment as do public safety practitioners. Interviewees indicated that informal conversations to talk through the differences between 8 to 5, Monday through Friday work commitments and 24/7 service expectations resulted in a clearer understanding of competing needs in that existed on consensus teams. Conversely, prior relationships also allowed participants to identify individuals whose focus was not oriented around reaching consensus and to develop strategies toward neutralizing those persons who created barriers to establishing shared governance.

Demonstrating a shared need and common understanding across multiple disciplines and governments is closely tied to finding the balance between a regionally based radio communications system and single agency systems.

Interviewees all agreed that achieving consensus in a shared governance environment required the participation of a consultant with specific expertise in the development and deployment of public service radio communications systems. Consultants were narrowly focused on specific tasks such as developing a strategic plan, RFP and project management. They act as mediators with a broad focus on public service aggregate needs rather than discipline specific requirements. As non-affiliated third parties, consultants bring credibility to projects assisting with teaching the technical aspects of systems, keeping the focus of the projects on end users rather than department executives and constantly reminding stake holders that these systems are theirs; not a vendor's or a consultant's. Consultants bring a meta-leadership perspective to these projects and can also function as mentors to develop the meta-leadership skills of project participants. This aspect of a consultant's role becomes important after they leave a project when participants in policy and consensus teams take singular responsibility for shared systems.

2. Disciplines

Public safety professionals, law and fire, participation on shared governance teams to reflective of their tactical view of problem solving. They can assess problems and respond effectively in a short period of time. This view of problems solving can detract from shared governance teams. Shared governance emerges over time and can require months or years to develop.

The law and fire disciplines were identified as the disciplines that had the greatest impact on the development of shared governance structures. Their influence was directly related to how they provide emergency services to the public. Law and fire disciplines can be described as emergency response professionals. The emergency response perspective focuses on a 911 mindset where practitioners are trained to respond to and stabilize emergency situations. The benefit of law and fire perspectives on consensus teams is that they bring

skills to assess problems, develop action plans and implement solutions quickly. The challenge they present to consensus teams is that the emergency response mindset can be discipline centric and does not lend itself to the strategic, long view of interoperable radio projects.

Public safety professional development is generally scenario based with significant time spent on preparing for what was described as “the big one.” The distraction of this perspective was that interoperable radio solutions for public safety jurisdictions did not always include the perspectives of other system participants such as information technology, public works or transportation assets. Additionally, the immediate need of deploying technology for public safety professionals can result in a desire to move as quickly as possible. This can detract from the need to fully understand the overall impact of installing and using new technology in an interoperable radio communications environment.

In the context of shared governance, consensus teams functioned as a buffer between public safety needs and other participants in interoperable radio projects. Consensus team meetings and informal contacts outside of the regular meetings facilitated to change discipline centric views to a broader strategic view of system impact, security issues, jurisdiction needs and discipline requirements. Interviewees observed that time in position and managerial experience lessened the impact of a narrow view of these projects. Long-term participation on consensus teams was identified as a key to balancing the 911 perspective with a more strategic view of interoperation radio projects.

3. Leadership

Existing policy and consensus teams significantly influenced how shared governance developed. Executive managers with a much broader view of interoperable projects were typically the early facilitators. Discipline specific managers were less likely to view a project from an aggregate perspective. These team members can be described as stove

pipe leaders. The leadership responsibility began to shift later in the project as discipline centered managers caught the vision of the project.

Interviewees described the emergence of leaders in the context of existing teams and disciplines in the development of shared governance solutions. Existing shared governance policy teams led as collective groups to direct the development of the interoperable radio communication systems. Policy teams functioned from the perspective of cooperation and modeled that behavior for consensus teams formed as part of the shared governance process. For both case studies, members of existing policy teams also served on consensus teams. These participants brought a level of scope and perspective that transcended the entire project and was critical to overall project success.

Executive managers (i.e., City, County and Special District CEO's) were the leaders with the positional power to drive interoperable radio projects. Their support of the development of shared governance significantly reduced jurisdictional and discipline challenges to policy and consensus teams. Executive managers had prior relationships with other executive managers on previous projects and were able to work cooperatively on regional interoperable radio solutions. Interviewees commented that the communication between executives facilitated the sharing of information on elements of radio projects that were not completely understood by all participating executives. Their effectiveness on policy and consensus teams was dependent on their ability to act as wranglers reducing the risk of scope creep. Executive managers possessed the authority to support decisions as participants on policy and consensus team.

Interviewees reported that meta-leaders from the law and fire disciplines began to emerge after the project began developing momentum. Momentum, for example, resulted from recognizing that the radio frequency narrowbanding deadline of 2013 required significant changes to how radio communication for public safety was achieved. Interviewees commented that as law and fire

participants began to “catch the vision” of the scope of interoperable radio projects and the value of shared governance; they began to step up to lead from a long-view perspective.

B. (HOW) RISK MANAGEMENT

1. Emergence

Shared governance emerged as uncertainty was identified and addressed as risk. Risk was viewed from three perspectives: fiscal, managerial and discipline. Each risk type required policy and consensus teams to develop strategies that included collaboration and cooperation and reflect the needs of all jurisdictions and disciplines. Shared governance practices changed when necessary to manage emerging project risk over the term of the project.

Unanticipated issues can be defined as risk emerging from uncertainty. Shared governance teams provided the guidance to develop and implement risk mitigation strategies for these issues. Interviewees reported that unanticipated issues were drivers that changed how shared governance structures functioned. Unanticipated issues were primarily centered on fiscal risk, followed by management risk and finally, discipline risk. Consensus teams were the venue where unanticipated issues were addressed and mitigation strategies resulted. Policy teams codified the work of consensus teams by creating policies, entering into legally binding agreements and modifying existing ones.

Unanticipated fiscal risk issues emerged from the failing economy and informal financial agreements in the early stages of the projects. The FCC narrowbanding requirement was announced in December 2004 prior to the financial meltdown. Interviewees stated that prior to the meltdown, consensus team members were more focused on developing technical solutions to the radio projects. It was expected that there would be a significant cost to upgrade the radio system, but it was not a priority in the early stages of the project to

determine how to pay for them. Members of policy teams agreed informally to jointly pursue funding opportunities and to share grant awards to offset the overall impact of the project. Over time, policy team members left due to retirements or promoting to positions out of the area. The unanticipated issue was that the new members of the policy team did not acknowledge informal agreements and the aggregate group lost opportunities to share grant funds. The result was a lesson learned that even informal agreements required the development and implementation of legally binding agreements by policy teams. These agreements served as a roadmap for future decisions.

A positive outcome of the financial meltdown was that the reality of shrinking tax revenues brought jurisdictions to the project. Some jurisdictions did not initially want to participate because their overall communications costs were likely to increase. This was due, in part, to the reality that larger jurisdictions paid a disproportionate share of the overall cost of the existing radio system. One outcome of the interoperable radio communications project was to bring equity to cost sharing. Individual jurisdictions realized that the cost of building their own radio system was much more expensive than participating in a regional one. Consensus teams became responsible to guide individual administrators and policy teams to understanding these differences.

Unanticipated management risks were tied to the voting rights of policy teams for decisions that impacted the radio systems as a whole. Interviewees reported that legacy agreements in the form of MOU's gave each participating jurisdiction one equal vote. The risk of a equally weighted vote meant that jurisdictions that used the majority of the system capacity could be outvoted by the majority of smaller jurisdictions. Policy decisions would be legally binding regardless of the impact on larger use agencies. This model of policy team management did not require consensus between all users. The implementation of a weighted voting system may balance this inequity, however; implementation would require changing the legal document that guides the radio project.

Interviewees reported that potential solutions were worked out at a consensus team level prior to consideration by policy teams.

Discipline risk issues centered on how users believed technology functioned. For example, interoperable radio system users, regardless of discipline, did not understand how talk groups impacted a shared resource pool of limited radio frequencies. Request for Proposal responses identified a specific percentage of coverage guaranteed by the system design. Users with little or no radio technology background made assumptions about what 95 percent coverage meant and were wrong. The risk was that users became frustrated with how the system worked and blamed each other, or the vendor, for the failures, perceived or real. The risk was that if these issues were not explained and resolved, users would abandon the interoperable radio system and build their own. Mitigation was tied to developing and implementing comprehensive training programs for all participants at all levels of management and use.

2. Conflict Management

Conflict was typically created by individual participants focused on single issues. Conflict was generally resolved by meeting individually to discuss the concern or slowing down the process and talking through the issue at the consensus team level. Consensus team members understood that issues raised by a single individual were likely representatives of other participants.

Interviewees identified specific strategies to mange conflict in both the development of shared governance agreements and between stakeholders participating on consensus teams. These strategies were focused on management and discipline risk issues. Conflict in the consensus team environment was manifested primarily by individuals seeking to protect their own jurisdictions first and disciplines second. Interviewees stated that these individuals were typically focused on a single issue and were not consistent attendees at consensus team meetings.

Mitigation strategies for conflict related to discipline risk centered on single issue participants. Single issue participants were described as grenade throwers that showed up and threw out a single issue with no suggestions to improve or resolve the problem and then move on. Chronic obstructers or single-issue objectors, also known as grenade throwers, were neutralized by inviting them to the table to participate in the larger project. Their issues were discussed at consensus team meetings and further vetted through informal relationships outside of team meetings. Research data showed that investing the time at consensus team level to address grenade throwers may lead overall positive outcomes on consensus teams. In some circumstances, grenade throwers became some of the most ardent supporters of the interoperable radio projects. Single issue resolutions challenges were deferred over multiple consensus team meetings to allow for the time to understand how the issue might impact the larger project. Single issues were indicators of more significant challenges in the scope of the larger project.

Conflict management strategies also worked to mitigate management risk issues. Management risk to interoperable radio projects included “foot dragging” at policy boards of participating agencies. Interviewees described foot dragging as failing to approve legally binding agreements that were required to move the project forward. The mitigation strategy was to attend policy board meetings with a representative group of consensus team members as experience indicated that there were typically misunderstandings of those that were not part of project policy or consensus teams.

The final risk mitigation strategy identified by interviewees was to use consultant. The role of a consultant was defined as a third party function with a single focus such as developing a strategic plan or request for proposal. Consultants have no loyalty to a jurisdiction or discipline. Their function should be to guide policy and consensus team members through a process of understanding project objectives and goals from a macro perspective.

3. Cultural and Traditional Forces

Existing traditions and culture impacted the development of shared governance solutions. Shared governance teams leveraged interoperable communications projects outcomes to change traditional views of public safety services and fiscal responsibilities. Interoperability was a driver that re-focused discipline and jurisdictional myopic views to a multi-discipline, multijurisdictional perspective.

Interviewees reported that tradition and culture created challenges in the development and implementation of interoperable radio communications projects that shared governance teams were required to address. Tradition and culture impacts are discussed as they relate to fiscal, managerial and discipline risk. Tradition issues were related to cost sharing, status quo perspectives and job assignment timelines. Culture issues included inter-organizational tension, policy team management styles and the individual versus organizational decision-making processes.

Fiscal risk was tradition based and linked to cost sharing agreements where existing radio communications expenses were not equally shared. This inequity was known by radio communications partners but was never corrected. The issue was recognized at both policy and consensus teams. The overall cost of the new system would include cost-sharing increases that included both the expense of new equipment and establishing equal sharing of overall cost. The risk was that participating jurisdictions would not agree to increased cost sharing expenses. This was mitigated by policy and consensus team leaders explaining to participating jurisdictions the realities of the existing inequity.

A second tradition based, fiscal risk was a common view held by some executives who questioned if the project expense was really necessary. Interviewees reported that since existing communications systems seemed to work “as is”, there was no need to replace or update them. What executive leaders did not understand was that while public safety disciplines could use

existing radio systems, system capacity problems and narrow banding requirements required significant financial investment to mitigate these issues. Interviewees recognized that is was necessary to spend time with executive leadership groups and one on one meetings to explain the specifics of system needs and technical solutions required to fix them.

Tradition based discipline risk was related to assignment time limits for law professionals. Law executives are typically moved through a variety of positions in a specific department to build experience throughout a variety of assignments. Interviewees stated that the associated risk to interoperable radio projects occurred when individuals assigned to policy and consensus teams lack motivation to be involved or participate as productive members of the teams. These individuals were described as filling a seat and buying time until they rotated out of the position. This became less of a discipline risk issue over time as the importance of the radio communications project required that participating jurisdictions assigned individuals that could be advocates for their department's not passive participants.

Culture issues were oriented around managerial and discipline risk. Interviewees identified the most significant culture issue as inter-agency tension that existed prior to the start of the radio communications projects. The tension was not specifically linked to a particular event but manifested over time as competing needs and service goals escalated into mistrust. This tension decreased over time as legacy members of policy and consensus teams left the project. A second mitigation factor was tied to the development of relationships and partnerships over time. Team members began to get past perceptions as shared governance emerged to develop regional solutions for interoperable radio projects. A third mitigation strategy was to include a consultant that brought a third party, neutral perspective. The presence of the consultant eliminated perceptions and facilitated solutions based on demonstrated facts and needs of participating jurisdictions and disciplines.

A second cultural impact on the development of shared governance was directly related to how the policy team made decisions. Interviewees stated that existing policy teams had MOU's in place prior to the creation of consensus teams. The "culture" of policy teams was to discuss issues in a less formal setting where there was an assumption that participants would act in the best interest of the group. The culture of decision making migrated into consensus teams tasked with developing solutions for interoperable radio projects. What did not exist were formal documents that detailed decisions, agreements and directions. This detracted from the overall effectiveness of consensus teams when early participants on these teams were not present to verify or support previous informal agreements. Interviewees described these situations as lessons learned and worked to include more formal agreements as consensus team solutions were made.

A final culture issue was expressed in the context of the competing cultures of the individual versus the culture of the user. Interviewees described the culture of the individual as reflective of the paramilitary nature of public safety organizations. Individual department executives are responsible to be the final decision making authority on every issue. As executive leaders change, so do their visions. In contrast, the culture of the user was described as staying consistent and static. Change in the user's culture happens over long periods of time. Interviewees reported that the culture of the user should be the driver of interoperable radio communications projects. Discipline and jurisdiction risk can result when the sole executive resists changes that would benefit the large user community. This "culture" risk is mitigated by continued dialogue with individuals who have final decision-making authority for organizations.

4. Governance

Shared governance formed as policy teams and consensus teams began the work of creating solutions for interoperable radio communications projects. The emergence of how teams functioned took

both spending time together and working to accomplish project objectives (time and grind). Policy and consensus teams became less contentious the longer they worked through the variety of risk issues that faced interoperable radio communications projects.

Interviewees reported that shared governance decision-making was a key foundational element that determined how successful an interoperable radio system from both a technology and management perspective. Within the governance structure, consensus teams functions as forums that brought individuals together side by side to identify risk issues, work through long standing, inter-organizational conflicts and brought credibility to the project at both jurisdictional and discipline specific levels. Interoperable radio projects require a view that public safety is not just police and fire but public works, information technology and executive managers. Shared governance functioned to allow all participants to understand the needs and requirements of all disciplines. It allowed policy and consensus teams to act as a unit when working to mitigate any type of risk. Consensus teams were self-directed groups that were leaderless in nature. Key decision makers were members of both policy and consensus teams. These individuals were described as meta-leaders that bridged the flow of information to facilitate project wide decision-making processes.

Governance requires an investment of time that equates to the salary cost of participants. This was an area that interviewees described as the most under invested. The benefit to the interoperable radio project was that jurisdictions had a level of buy with the commitment of time. This, in turn, reduced management risk issues related to jurisdictions. Interviewees reported that governance required a year or more to develop where early consensus groups were rag tag in nature and, over time, developed a culture that was more project focused and less jurisdiction and discipline specific. Long-term governance solutions also led to succession of meta-leaders as participants cycled out of the project to be replaced by a member that understood the history and culture of the group.

C. CONCLUSION

This purpose of this thesis was to answer the question: How do intra-organizational teams develop shared governance structures that mitigate risk associated with multi-agency, multi-discipline interoperable radio communications projects? The results of this research revealed that successful shared governance solutions to interoperable radio communications projects are directly related to the skill and abilities of participants to develop relationships that transcend managerial and discipline centric viewpoints. Relationships bring trust and credibility that radiate beyond consensus teams through departments, jurisdictions and ultimately elected policy boards that approve legal agreements and budgets.

The transformation of public service traditions and culture is a logical outcome through the process of developing shared governance for interoperable radio communications projects. What worked in the past does not necessarily positively contribute to successful shared governance models. Policy and consensus teams acts as filters to incorporate the positive elements of legacy traditions and cultures and facilitate changes to best practices for shared governance solutions.

A key part of building relationships was “time and grind.” Time and grind is the process that policy and consensus teams go through in the development of shared governance solutions. There is no substitute for the investment of time with the purpose of grinding through details of a project. The process will result in detours that require meta-leaders (or wranglers) that keep the groups on target to successfully deploy interoperable radio communications projects. Relationships, facilitating traditional and cultural change and time and grind all work collectively to mitigate risk issues specific to the emergence of shared governance solutions.

The focus of the thesis centered on two types of groups, policy teams and consensus teams, which exist in a shared governance model. One discovery was the identification of a third type of teams in a shared governance model.

Interviewees identified objective teams as laundry list groups that are focused on tasks such as developing functional objectives for radio communications projects. These groups are typically open to any one interested in participating and are more likely to bring grenade throwers. They are limited in scope, short term and did not exist long enough to develop norms or become part of the shared governance culture. Future research might be conducted into the impact of objective teams on the development of shared governance for interoperable radio communications projects.

In conclusion, the mitigation of risk in shared governance models was characterized by one interviewee in the context of three questions:

1. How much does it cost? (Fiscal Risk)
2. Who has the power? (Managerial Risk)
3. What is in it for me? (Discipline Risk)

A successful shared governance solution will incorporate strategic initiatives, goals and objectives that create an environment that results in meta-solutions to interoperable projects. Shared governance moves beyond simply answering these questions. It shapes the emerging public service culture of creating and maintaining a safe community, providing exceptional service to the full range of public safety professionals and developing and maintaining a positive collaboration between them.

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