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An investigation of the factors that influence electronic information sharing between state and local agencies

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AN INVESTIGATION OF THE FACTORS THAT INFLUENCE ELECTRONIC INFORMATION SHARING BETWEEN STATE AND LOCAL AGENCIES

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To my advisor Dr. Peter Kelle
and
To my parents Aysel and Burhan & my sister Ozlem

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ABSTRACT

This study investigates the factors that influence local government participation in electronic information sharing with state agencies. Although electronic information sharing has the potential to help government agencies to increase productivity and performance, improve policy-making and provide better public services to the citizens, there is still little information available about the factors that antecede electronic information sharing between local and state agencies.

Synthesizing the pertinent literature on interagency information sharing and well-established theories such as diffusion of innovations theory, critical mass theory and social exchange theory, this study proposes that local government participation in electronic information sharing with state agencies will be determined by electronic information sharing characteristics, agency characteristics, and environmental characteristics.

This study employs both quantitative and qualitative research techniques. The first part of the study involves the collection and analysis of survey data from local law enforcement agencies to test the proposed research framework and hypotheses. The second part of the study involves the collection and analysis of qualitative data related to a major state-local electronic information sharing initiative to seek additional support for the findings of the quantitative data analysis, as well as identify factors that remained undiscovered in the quantitative analysis.

The findings of these studies suggest that electronic information sharing characteristics, agency characteristics, and environmental characteristics, as well as other factors tend to influence local agency participation in electronic information sharing

initiatives. The study has a number of theoretical and practical implications. It contributes to the state of the knowledge in the information systems, public administration and management domains. The findings of this study are important and relevant to federal, state and local government agencies and the directors and IT managers of these agencies. Once the factors that facilitate or hinder participation in electronic information sharing initiatives are identified, specific strategies can be developed to increase electronic information sharing among government agencies. Based on findings of the quantitative and qualitative studies, a preliminary set of strategies is offered, which could be potentially used to increase local agency participation in electronic information sharing initiatives.

CHAPTER 1. INTRODUCTION

This study investigates the factors that influence local government participation in electronic information sharing with state agencies. In this chapter, the motivation for this study is discussed and the underlying research question is introduced. Then, the concept of electronic information sharing and related terms are described. Finally, an outline of the dissertation chapters is provided.

1.1 Motivation

In 1993, the Clinton-Gore administration initiated a comprehensive reform project known as "National Performance Review" (NPR) to improve government operations and services. NPR contained several recommendations to streamline government processes with a specific emphasis on the use of information technologies (IT) to achieve this goal. An accompanying report, "Reengineering through Information Technology," specifically addressed the issues of implementing an electronic government, providing necessary support mechanisms, as well as strengthening IT leadership in governments (Beyah and Gallivan 2001). Moreover, in 1999, the National Science Foundation (NSF) established a "Digital Government Research Program" to support projects that address the improvement of agency, interagency and intergovernmental operations, and government/citizen interactions through the use of information technologies (NSF 1999).

However, studies examining the success of governmental information systems have found mixed results. Cleveland (1989) argued that use of information technologies to improve information flows would result only in positive impacts with few negatives (cf. Rocheleau 1997). Research supported this argument by demonstrating that the introduction of new processes/technologies and a business-like approach in running

government operations led to positive outcomes (Beyah and Gallivan 2001, Box 1999, Durst and Newell 1999). On the other hand, research also showed that billions of dollars were spent on IT projects that failed to provide the expected outcomes (Beyah and Gallivan 2001, Box 1999, Durst and Newell 1999, Rocheleau 1997). Therefore, effective management of IT in public sector remains as an important issue that has yet to be fully addressed.

Research has shown that information sharing among government agencies has the potential to increase the productivity and performance of government operations, improve policy-making and provide better services to citizens. In this respect, information sharing between state and local governments is an important part of intergovernmental information sharing and, hence should be promoted. For example, September 11, 2001 terrorist-related events have shown the importance of information sharing among federal, state and local law enforcement agencies in order to protect the safety of citizens by combating crime and terrorism. As Whiting and Chabrow (2001, p. 2) point out, "The intelligence gaps among law enforcement agencies became obvious in the aftermath of the terrorist attacks. Two of the suspected hijackers, for example, reportedly were on an INS watch list. But that information never found its way to the Federal Aviation Administration…" As the investigation into these attacks continues, the Federal Bureau of Investigation, Customs Service, the INS, the Central Intelligence Agency, the National Security Agency, as well as other law enforcement and intelligence agencies are trying to share information on an extraordinary scale.

> "There is no single agency or computer network that integrates all homeland security information nationwide… Instead, much of the information exists in disparate databases scattered among federal, state, and local entities. In many cases, these computer systems

> cannot share information…Databases used for law enforcement, immigration, intelligence, and public health surveillance have not been connected in ways that allow us to recognize information gaps or redundancies. As a result, government agencies storing terrorism information, such as terrorist "watch lists," have not been able to systematically share that information with other agencies. These differences can sometimes result in errors if, for example, visa applications and border controls are not checked against consistent "watch lists." It is crucial to link the vast amounts of knowledge resident within each agency at all levels of government" (White House 2002, p. 55)

Information sharing between state and local governments of course expands beyond the criminal justice system and covers every domain of public life ranging from economic development to education, and municipal services to health care. In spite of the enormous amount of information collected by state and local agencies, bringing together an array of agencies engaged in diverse activities with differing and sometimes competing cultures is not an easy job (Whiting and Chabrow 2001).

Even though interagency information sharing is a common goal, currently, the extent of information sharing in government agencies is limited and does not go beyond the transfer of mandated documents (Dawes and Bloniarz 2001). Although government administrators recognize the importance of electronic information sharing among government agencies and the significant benefits it can provide to policy-makers, agencies, and to the public in general, government agencies face several technological, organizational, political and economic barriers to electronic information sharing (Dawes 1996, Landsbergen and Wolken 2001, Rocheleau 1997).

One of the issues addressed in the above-mentioned NSF research initiative involved promoting research that supports information sharing, data integration and interoperability among government agencies (NSF 1999). However, a review of past

literature indicates that academic research on electronic information sharing among government agencies has been very limited in general. In particular, no academic research addressing local agency participation in electronic information sharing with state agencies has been conducted. Dawes, who is one of the most active researchers in this area, mentions that although her research team has done an extensive literature search, they were "unable to uncover any significant research regarding this issue" (Dawes et al. 1997b, p. 9). She further argues that, even though various scholars and government agencies have begun talking about the issues related to state-local information sharing initiatives, relatively little progress has been made to advance practice and theory in this area. The purpose of this study is to address this important research gap by examining the major factors that influence local agency participation in electronic information sharing initiatives with state agencies.

1.2 Research Question

Given the gaps in the pertinent literature, this research effort investigates the following research question:

> What factors influence local government participation in electronic information sharing with state agencies?

In order to answer this research question from a socio-technical perspective, it is critical to examine technological phenomena within the contexts in which they are embedded (Orlikowski and Iacono 2001). Hence, this study focuses on the contextual effects of the technology, organizations and environmental conditions that may influence local agency participation in electronic information sharing initiatives with state agencies. Therefore, this effort addresses the following sub-questions:

How do characteristics of electronic information sharing influence local agency participation in electronic information sharing with state agencies? (Technological Context)

How do agency characteristics influence local agency participation in electronic information sharing with state agencies? (Organizational Context)

How do environmental characteristics influence local agency participation in electronic information sharing with state agencies? (Environmental Context)

This study employs both quantitative and qualitative techniques to investigate the factors that influence local agency participation in electronic information sharing with state agencies. The first part of the study involves the collection and analysis of survey data from local agencies to test the proposed research framework and hypotheses. The second part of the study involves the collection and analysis of qualitative data related to a major state-local electronic information sharing initiative to seek additional support for the findings of the quantitative data analysis, as well as identify factors that remained undiscovered in the quantitative analysis.

1.3 Definitions

In order to discuss the factors that influence local agency participation in electronic information sharing, it is first necessary to clarify the concept of electronic information sharing and its related terms. The definition of information used in this study builds upon the definition of the term data. Data can be defined as "raw facts or elementary descriptions of things, events, activities, and transactions, that are captured, recorded, stored, and classified, but not organized to convey any specific meaning" (Turban 2003, p. 15). Examples of data shared between state and local agencies include the exchange of an individual health record between a local medical agency and a state

agency such as the Office of Disease Prevention and Health Promotion (ODPHP), or the exchange of a traffic accident record between a local law enforcement agency and a state agency such as the Department of Public Safety (DPS). Information can be defined as "useful data whose form and content are relevant and appropriate for a particular use" (Alter 2002, p. 714). Examples of information shared between state and local agencies include the exchange of aggregate substance abuse treatment reports between local medical agencies and state health agencies, or the exchange of wanted person profiles between local and state law enforcement offices. Jarvenpaa and Staples (2000, p. 130) state, "information sharing embeds the notion of 'willingness to share.' Volition distinguishes information sharing from involuntary information reporting. Information sharing is a voluntary act of making information available to others…sharer could pass information on, but doesn't have to." Finally, electronic information sharing refers to sharing information through the use of information and communication technologies such as email, EDI, Internet, intranets/extranets, networks, shared databases, etc. Examples of electronic information sharing between state and local agencies include linking individual client-based records between local and state health agencies, or consolidating criminal justice information from different agency legacy systems and computer platforms into an online data warehouse.

1.4 Dissertation Chapters

The remainder of this dissertation is organized as follows:

Chapter Two – Literature Review: In the second chapter, previous theoretical models of interagency information sharing are reviewed. Then, diffusion of innovations theory, critical mass theory, and social exchange theory are discussed.

Chapter Three – Research Framework and Hypotheses: In the third chapter, the research framework guiding the investigation of the factors that influence local agency participation in electronic information sharing with state agencies is introduced. Based on the review of the pertinent literature and the proposed research framework, specific hypotheses are then developed.

Chapter Four - Research Methodology and Data Collection: In the fourth chapter, the research methodology is justified and the two studies that were utilized to address the research question are discussed. For the quantitative study, the sample, unit of analysis and respondents are introduced. Afterward, the questionnaire development process is described. Finally, the data collection process is discussed and the data analysis strategy is summarized. For the qualitative study, the unit of analysis and case selection process are outlined. Then, specific steps used in the data collection efforts, as well as informant characteristics are discussed. Finally, the data analysis strategy and steps that were employed to increase the validity and the reliability of the findings are explained.

Chapter Five - Research Results and Findings—Study I (Survey): In the fifth chapter, the results from the survey are reported. A comprehensive discussion of the data analysis techniques utilized to develop valid and reliable instruments, as well as the approach utilized to formally test the hypotheses are provided. The results obtained from the statistical analyses are then discussed. Finally, themes that emerged from a series of open-ended questions are reported.

Chapter Six - Research Results and Findings—Study 2 (Case Study): In the sixth chapter, the results of the case study are presented. A description of the case is provided, followed by a discussion of the findings.

Chapter Seven - Discussion and Conclusion: In the seventh chapter, first, detailed discussions of the results obtained in the quantitative and qualitative studies are provided. Then, the limitations of the study are addressed. The theoretical and practical contributions are presented, followed by a discussion of future research directions. Finally, conclusions are drawn concerning the dissertation effort.

Next chapter provides a review of the relevant literature upon which this dissertation builds. First, the previous theoretical models of interagency information sharing are reviewed. Then, diffusion of innovations theory, critical mass theory, and social exchange theory are discussed.

CHAPTER 2. LITERATURE REVIEW

This chapter provides a review of the relevant literature upon which this dissertation builds. In the first section, the previous literature on interagency information sharing is reviewed to gain an understanding of the context for electronic information sharing between state and local government agencies. In the second section, literature on technology adoption, based on diffusion of innovations theory, critical mass theory and social exchange theory is discussed to shed light into the antecedents of participation in electronic information sharing.

2.1 Previous Theoretical Models of Interagency Information Sharing

A review of the literature indicates that research on information sharing among government agencies is very limited. In this section, two previously developed models of interagency information sharing are discussed.

The earliest research conducted in the area of interagency information sharing was a study carried out by Dawes (1996). In the first phase of this study, Dawes reviewed the pertinent literature to identify the benefits and barriers associated with interagency information sharing. Table 2-1 lists the benefits and barriers identified in this study. Chapter 3 incorporates a discussion of these benefits and barriers.

In the second phase, Dawes conducted a survey in the state of New York and measured the attitudes of state government managers towards the benefits and barriers identified in the literature, solicited opinions about the importance of selected elements of information sharing projects, and examined the policies and tools used to govern information sharing activities. The focus of this survey was the shared use of program information produced or held by state agencies. Program information was defined as

"both paper and machine readable data that document the nature, content, and operation of public programs," and information sharing was defined as "exchanging or giving other executive agencies access to program information" (Dawes 1996, p. 382).

Table 2-1: Benefits and Barriers Associated with Interagency Information Sharing (Dawes 1996)

Category	Benefits	Barriers
Technical	• Streamlines data management • Contributes to information infrastructure	• Incompatible technologies • Inconsistent data structure
Organizational	• Supports problem solving • Expands professional networks	• Organizational-self interest • Dominant professional frameworks
Political	• Supports domain-level action • Improves public accountability • Fosters program and service coordination	• External influences over decision making • Power of agency discretion • Primacy of programs

80% of the state government managers in the study stated that information sharing provided beneficial results. Among the most important benefits spelled out by these managers were, (a) better, more integrated planning, (b) policy development and program implementation across agencies, (c) more comprehensive and accurate data for decision making and problem solving, (d) more productive use of scarce staff resources, and (e) better interagency and professional relationships.

40% of the managers that participated in the study mentioned their concerns about the risks of information sharing such as, information sharing (a) uses limited agency resources for benefits that have to be shared with others, (b) limits managers' judgment in decision-making, and (c) can result in misinterpretations and criticism by outsiders. The study also showed that for successful information sharing initiatives among government

agencies, (a) a legal framework and formal policies that guide information sharing decisions and activities (such as interagency agreements, general legislative authority), and (b) effective tools that guide the management of shared public data (such as statewide and agency information inventories, technical standards for electronic data, common data definitions, and information clearing houses) were necessary.

Based on the findings of her study, Dawes (1996) proposed a theoretical model of interagency information sharing, which is shown in Figure 2-1.

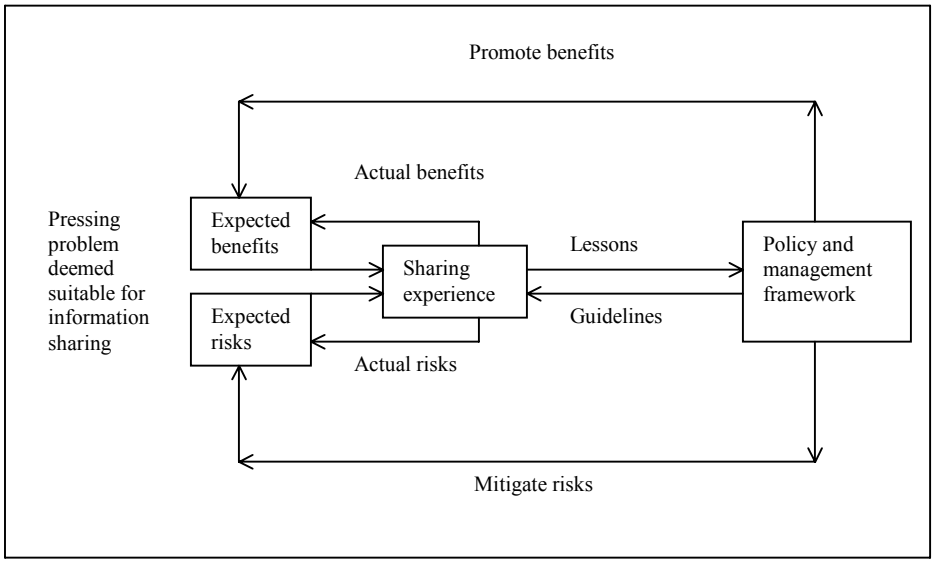

Figure 2-1: Theoretical Model of Interagency Information Sharing (Dawes 1996)

This model proposes that the initial driver for interagency information sharing is the existence of a pressing problem that requires information sharing. Moreover, it argues that agencies form perceptions about the potential benefits and risks of information sharing based on their previous sharing experiences. The policy and management framework deployed influences the information sharing process. Sharing experiences, in turn, produce actual benefits and risks to the participants, form the basis

for future expectations, and produce lessons for a general policy and management framework that could be utilized in the future.

The theoretical model developed by Dawes provides a useful model that takes the benefits and risks of information sharing into account and emphasizes the necessity of a policy and management framework to promote the benefits and mitigate the risks.

However, the Dawes study is limited in certain important respects. Even though the Dawes article was published in 1996, the study was conducted in early 1990's. Therefore, it fails to capture the issues related to more recently developed information technologies, which can enable and facilitate electronic information sharing between agencies. Moreover, Dawes (1996) does not differentiate between electronic or paper based information sharing. In terms of the benefits and barriers involved, certain differences between paper-based information sharing and electronic information sharing may exist. Another issue is that Dawes' model relies on the experiences of state government managers. The model has yet to be tested at the local government level.

The second study in this area was conducted by Landsbergen and Wolken (2001), who specifically focused on electronic interagency information sharing (interoperable information systems), extending the theoretical model developed by Dawes (1996).

The authors reviewed the previous research on interoperability, information resource management, information technology in the public sector, and intergovernmental relations. A list of barriers and recommendations were generated, which helped these scholars develop their expanded model of interagency information sharing. The authors conducted two case studies as well. One concentrated on environmental reporting and another investigated GILS (Geographic Information Locator

Service). In selecting these two cases, the authors focused more on understanding what innovators and members of expert agencies thought about interoperability rather than a range of agencies with varied levels of expertise. By interviewing federal and state officials, they collected data from five states- Kansas, Massachusetts, Ohio, Texas, and Washington- where GILS and environmental reporting had been implemented to a fairly significant degree. Based on the results of their case studies the authors updated their theoretical model, which is depicted in Figure 2-2.

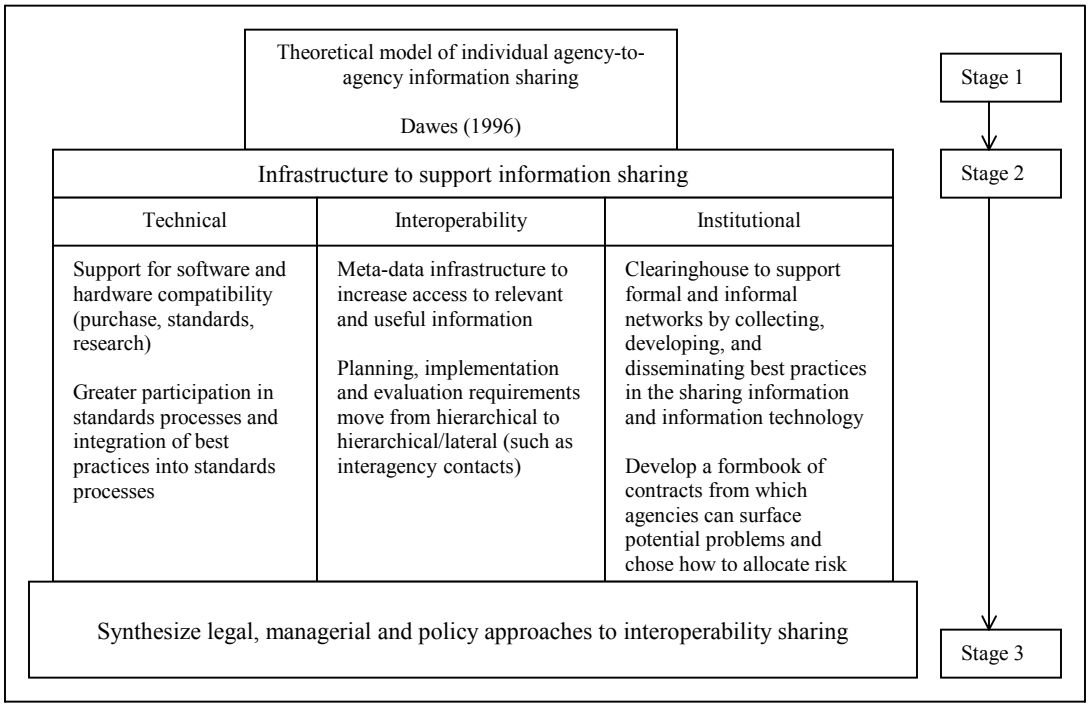

Figure 2-2: Extended Theoretical Model of Interagency Information Sharing (Landsbergen and Wolken 2001)

As mentioned above, Landsbergen and Wolken (2001) developed their model based upon Dawes' earlier framework. They criticize Dawes' theoretical model of interagency information sharing, stating that agencies in Dawes' investigation participated in interagency information sharing because they were driven by clear and tangible benefits, as well as strong political pressures to share information.

The authors argue that these kinds of isolated situations (i.e., strong pressures to share information) will not be sufficient to provide explanations for future cases, especially when the pace of technological change is highly dynamic. Therefore, they suggest that, based on the experiences of these agencies an infrastructure to support information sharing should be implemented and legal, managerial, and policy approaches developed and harmonized to increase information sharing.

According to the authors, the principal contribution of their model is its emphasis on the need for an infrastructure and legal, managerial and policy approaches to maintain interagency information sharing. They identify that, for successful interoperable systems, it is necessary to:

(a) understand that interoperability meant information sharing,

(b) identify critical success factors in the development of interoperable systems,

(c) develop a strong federal/state architecture, and

(d) recognize the importance of technical standards and develop better systems to support government standards settings (Landsbergen and Wolken 2001).

However, the Landsbergen and Wolken study is limited in one important respect. When investigating interagency information sharing issues, the authors focused on understanding the experiences and viewpoints of technologically advanced government agencies rather than those of the average government agency, which may be relatively unfamiliar with these initiatives. Given the limited accumulated knowledge related to electronic information sharing at an average government agency, Landsbergen and Wolken's findings may not generalize to government agencies that are unaccustomed to electronic information sharing.

As mentioned above, Dawes' (1996) study investigated interagency information sharing issues at the state level. Similarly, Landsbergen and Wolken (2001) specifically focused on federal-to-federal and federal-to-state interoperability. Even though many similar issues may exist in electronic information sharing between state and local governments, there is a need for further investigation that specifically focuses on local government agencies. Local governments are not simply scaled-down models of federal or state government agencies. Local agencies tend to fall behind state and federal government agencies in terms of financial and technological resources and, therefore, they might face greater risks and costs in participation in electronic information sharing initiatives. Moreover, local government employees might have limited IS skills and training compared to state agencies due to human resource issues and limited funding dedicated to training initiatives. These issues, among many other characteristics unique to local agencies, require an investigation of the factors that influence local government participation in electronic information sharing initiatives.

2.2 Theoretical Foundations

Diffusion of innovations theory, critical mass theory and social exchange theory can provide important insights into the factors that influence local government participation in electronic information sharing with state agencies. In following subsections, these theories are briefly discussed. A description of the research framework based on these theories used in this study follows in Chapter 3.

2.2.1 Diffusion of Innovations Theory

Diffusion of innovations (DOI) theory has been used by many IS researchers to explain the adoption and diffusion of information technologies. An innovation is an idea,

practice, or an object that is perceived as new by an individual or another unit of adoption (Rogers 1995, Zaltman et al. 1973). Similarly, Daft (1978) defines an organizational innovation as "the adoption of an idea or behavior that is new to the organization adopting it" (cf. Swanson 1994, p. 1070). Therefore, an innovation need not necessarily refer to a technology. It may refer to a renewal in terms of thought and action as well (Thong 1999). Also, as Rogers (1995) points out, the boundaries of an innovation may not be very distinct. Potential adopters may perceive an innovation being highly related to another new idea or a bundle of new ideas. Hence, it is possible to investigate the factors that influence local government participation in electronic information sharing with state agencies through a lens of diffusion of innovations theory, as participation in such initiatives typically requires the introduction of new technologies, as well as new ways of thought and action.

Rogers (1983, 1995) identifies five innovation attributes that determine the adoption of innovations. These five attributes include relative advantage, compatibility, complexity, observability, and trialability, which have been extensively utilized by many researchers in order to explain the adoption and diffusion of IT innovations. Among these attributes, only relative advantage, compatibility, and complexity have been consistently identified as critical adoption factors (Kwon and Zmud 1987).

When conceptualizing the determinants of organizational innovation adoption, research suggests that it is necessary to look at different contexts (Thong 1999). Looking at the innovation attributes, as suggested by Rogers, constitutes only one of the many possible perspectives. Therefore, technological innovation research has determined several variables for studying organizational adoption in addition to innovation

characteristics. For example, Damanpour (1991) argued that organizational innovations are affected by individual, organizational and environmental factors. Kwon and Zmud (1987) identified five predictors that may impact any of the six stages of IT implementation (initiation, adoption, adaptation, acceptance, routinization, infusion), -user community characteristics, organizational characteristics, technology characteristics, task characteristics, and environmental factors. The framework developed by Tornatzky and Fleischer (1990) proposed that technological context, organizational context, and environmental context influence the process by which innovations are adopted. Rogers (1995) posited that individual leader characteristics (attitudes towards change), internal characteristics of the organizational structure and external characteristics of the organization to be the independent variables related to organizational innovativeness. Grover (1993) proposed that organizational factors, policy factors, environmental factors, support factors, and system-related factors determine the adoption of interorganizational information systems. Thong (1999) identified four elements of context that affects the adoption of technological innovations by organizations, -characteristics of the organizational decision makers, characteristics of the technological innovation, characteristics of the organization, and characteristics of the environment in which the organization operates.

Similar lenses have been used to investigate the adoption of computer technologies in public sector organizations. Bingham (1976) identified four categories of factors that affect adoption of computer technologies, -organizational characteristics, demand for computing, community environment, and organizational environment. Perry and Kramer (1979) investigated the effects of extra-organizational characteristics,

intra-organizational characteristics, and innovation attributes as the key determinants of the adoption of computer technologies by local government agencies.

2.2.2 Critical Mass Theory

Another perspective used to explain the adoption of innovations has been the "critical mass theory," which looks at innovations that require collective action and collaboration among potential participants (Bouchard 1993). Bouchard (1993) states that an organization's decision to engage in a collective action will be dependent on its perceptions of what the group is doing, not on the characteristics of the innovation. She further argues that an organization's participation decision will depend on the number of the organizations that have already participated and/or soon plan to participate, who these participants are and their level of contribution. Kuan and Chau (2001) refer to the same issue, arguing that an organization's decision to adopt a technology is influenced by its business partners and competitors. They also state that, in many cases, the final decision may have nothing to do with the technology itself or the organization.

Grewal et al. (2001) reported that several diverse research streams have investigated this mimicking behavior of organizations as the "bandwagon effect," which suggests that, in some cases, organizations will engage in certain activities just because other organizations do.

Another unique characteristic of critical mass theory involves the creation of positive network externalities. Positive network externalities (Katz and Shapiro 1985), or network benefits, arise as a direct function of the number of the current adopters (Fichman and Kemerer 1993). Lou et al. (2000) state that network externalities have two main effects on adoption. First, as more and more users adopt a technology, potential

users find the technology more attractive. Second, current users have incentive to persuade non-adopters to use the technology. Bouchard (1993) suggests that a "collective innovation doesn't provide advantages per se to its adopter, it is the reciprocation by others that the innovation becomes advantageous" (p. 366). Since the benefits of adoption largely depend on size of the community of the adopters, organizations benefit from increasing returns on adoption as the network keeps growing (Fichman and Kemerer 1993).

Since electronic information sharing between state and local agencies requires the participation of several agencies, critical mass theory can provide important insights to understand local agency participation in these initiatives.

2.2.3 Social Exchange Theory

Research shows that several theory bases (transaction-cost theory, organizational theory, and political economy theory) have been used in the literature to explain interorganizational cooperation (Bensaou and Venkatraman 1994). Kumar (1996) criticizes interorganizational information systems literature because of the emphasis placed on technological and rational/economical perspectives. He argues that, in addition to these perspectives, a socio-political view should also be incorporated into the analysis.

As stated by Premkumar and Ramamurthy (1995), "social exchange theory provides the foundation for the study of relationships between organizations" (p. 306). According to social exchange theory, the outcomes of an organization's behavior will be based on the responsive behavior of the other participants within the relationship (Son et al. 2000). The main emphasis of this perspective is that the relationship between organizations does not necessarily need to be directly related to any economic outcomes

(Hallen et al. 1991, Humphreys et al. 2001). Social exchange theory has been used by IS researchers as the theoretical background to investigate different antecedents of interorganizational relationships through a lens of non-economic aspects that effect the formation of relationships such as power, trust, interdependency, and the like (Prekumar and Ramamurthy 1995). Humphreys et al. (2001) posit that social exchange theory lays a suitable base for studying non-profit making interorganizational transactions. Therefore, it is possible to utilize the social exchange theory to investigate the social aspects of information sharing between state and local government agencies.

Trust and power are the two most commonly studied aspects of social exchange theory. Trust has been identified as a fundamental element for successful interorganizational systems (Hart and Saunders 1997, Karahannas and Jones 1999, Williams 1997). Research suggests that trust leads to communication openness and information sharing, commitment between organizations and therefore increases cooperation (Bakos and Brynjolfson 1993, Kumar 1996, Ratnasingham and Kumar 2000). Trust-based relationships can provide invaluable benefits regardless of the interdependence structure between the trading partners (Geyskens et al. 1996). Perceived benefits such as trading partners' satisfaction, information sharing, long-term investments, and building the reputation of trading partners develop from trust. Kumar (1996) states that trading partners that trust each other can generate greater profits, serve customers better, and can be more flexible.

Emerson (1962) emphasizes the role of power in exchange relationships stating that the relative powers of the parties in a relationship are determined by their relative dependence to each other (cf. Hallen et al. 1991). "Power is defined as the capability of a

firm to exert influence on another firm to act in a prescribed manner (Hart and Saunders 1997, p. 24). Therefore, it is possible that the powerful actor in a relationship can influence the other party to comply with its own needs (Hallen et al. 1991). This approach assumes that the weaker party's actions will be influenced by the fact that the stronger party can control its rewards and sanctions (Saunders and Clark 1992). The role of power in interorganizational relationships has been studied based on interdependencies between organizations. Dependence of one party to the other party in an exchange relationship is related to the need to maintain the relationship to achieve the desired goals (Ganesan 1994). Most of the research in this area has investigated the dependencies between organizations and, hence, the power relationships based on interorganizational resource acquisitions (Saunders and Clark 1992). However, Saunders and Clark (1992) criticize power studies, stating that these studies do not address the extent to which power can force an organization to engage in a certain activity in which it would not otherwise do so. They further claim that, "if an organization would have taken a certain activity anyway, power was not the cause for the action's occurrence. For instance the action may have taken because of perceived benefits to the organization" (p. 10-11). They strongly suggest that interorganizational systems research should take issues such as benefits/costs into account. Their assertion proves the suitability of synthesizing the aforementioned theory bases to investigate the antecedents of electronic information sharing between state and local agencies.

Table 2-2 provides a high level summary of the factors that have been studied in the literature as the determinants of adoption of organizational and interorganizational information systems based on the three theoretical bases discussed above (Bouchard

1993, Chau and Tam 1997, Chwelos and Dexter 2001, Damanpour 1991, Dawes 1996, Fichman and Kemerer 1993, Frambach and Schillewaert 2002, Ganesan 1994, Grover 1993, Hart and Saunders 1997, Kuan and Chau 2001, Masetti and Zmud 1996, Premkumar et. al. 1994, Premkumar and Ramamurthy 1995, Ratnasingham and Kumar 2000, Rogers 1983, 1995, Saunders and Clark 1992, Swanson 1994, Thong 1999, Tornatzky and Fleischer 1990, Zaheer, et al. 1998, Zaltman et al. 1973).

Based on the literature reviewed in this chapter, the following chapter introduces the research framework designed to examine the factors that influence local government participation in electronic information sharing with state agencies. Specific hypotheses are then formulated to test the proposed research framework.

Table 2-2: Summary of Factors that Influence Adoption of Organizational and Interorganizational Information Systems

Decision Maker Characteristics	System (Technology) Characteristics
- Innovativeness - IS knowledge - Attitude towards change - Age - Education - Exposure to media - Information preferences and exposure	- Relative advantage - Compatibility - Complexity - Observability - Triability - Benefits - Costs - Barriers - Ease of use - Perceived importance of standard compliance, interoperability and interconnectivity - Task-technology compatibility - Satisfaction with the existing system
Organizational Characteristics	**Environmental Characteristics**
- Size - Employee IS knowledge - Information intensity - Financial costs - Centralization - Organizational slack - Complexity of managerial structure - Quality of human resources - Knowledge barriers - Reward systems - Support systems - Employee preferences - Organizational readiness Technological Financial - Skilled technical force - Availability of resources - Complexity of the existing IT infrastructure - Top management support - Senior management attention - Nurturing of champions - Technical capability	- External influence - External pressure - Governmental incentives, pressures - User community - Network externalities - Competitive intensity - Critical mass - Persuasion - Power - Trust - Environmental instability - Communication channels - Price intensity - Communication openness - Market forces - Market uncertainty - Collaboration - Vendor marketing efforts - Presence of project champion

CHAPTER 3. RESEARCH FRAMEWORK AND HYPOTHESES

In this chapter, the research framework designed to examine the factors that influence local government participation in electronic information sharing with state agencies is presented. Based on the review of the pertinent literature and the proposed research framework, specific hypotheses are then developed.

3.1 Research Framework

Synthesizing the theoretical foundations and the pertinent literature reviewed in the previous chapter, the following research framework (Figure 3-1) was developed to investigate the factors that influence local government participation in electronic information sharing with state agencies.

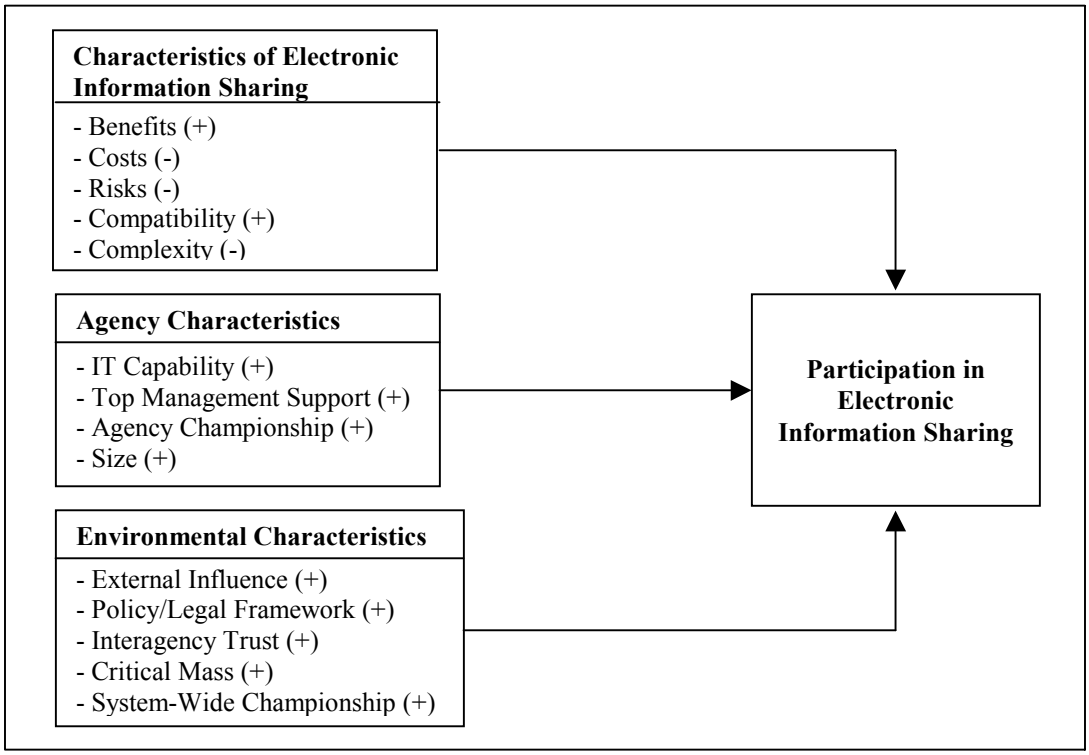

Figure 3-1: Research Framework: Factors that Influence Local Agency Participation in Electronic Information Sharing with State Agencies

Building upon a socio-technical perspective, which posits technological phenomena should be examined within the contexts in which they are embedded (Orlikowski and Iacono 2001), this research framework proposes that local agency participation in electronic information sharing with state agencies will be strongly influenced by: (a) characteristics of electronic information sharing (technological context), (b) agency characteristics (organizational context), and (c) environmental characteristics (environmental context).

3.1.1 Characteristics of Electronic Information Sharing

Characteristics of electronic information sharing refer to the attributes of electronic information sharing. The influence of characteristics of technological innovations on the adoption process has been frequently studied in the IS literature (e.g. Kwon and Zmud 1987). As Grover (1993) points out, over twenty-five innovation characteristics have been studied in the literature including, relative advantage, compatibility, costs, complexity, trialability, divisibility, etc. (i.e. Cragg and King 1993, Huff and Munro 1989, Premkumar et al. 1994). This study focuses on the following characteristics, which are discussed in detail in Section 3.2:

(a) Benefits of electronic information sharing

(b) Costs of electronic information sharing

(c) Risks of electronic information sharing

(d) Compatibility of electronic information sharing

(e) Complexity of electronic information sharing

The innovation adoption literature argues that as different adopters can perceive the characteristics of an innovation differently, researchers should take perception-based

characteristics of innovations into account rather than the primary characteristics which are inherent characteristics of the technology that do not vary across settings and organizations (Downs and Mohr 1976, Moore and Benbasat 1991). Based on these suggestions, this study focuses on perceived characteristics of electronic information sharing.

3.1.2 Agency Characteristics

Agency characteristics refer to the internal characteristics of the local agency that might impact participation in electronic information sharing with state agencies. Research has shown that the organization provides a rich source of structures and processes that constrain or facilitate the adoption of innovations (Tornatzky and Fleischer 1990). A number of organizational characteristics have been studied in the IS literature including, technological competence, IT infrastructure, quality of human resources, top management support, size, etc. (i.e. Iacovou et al. 1995, Premkumar and Ramamurthy 1995, Wixom and Watson 2001). This study focuses on the following characteristics, which are discussed in detail in Section 3.2:

(a) IT capability

(b) Top management support

(c) Agency championship

(d) Size

3.1.3 Environmental Characteristics

Environmental characteristics refer to the characteristics of the environment in which the local agency operates. Research has shown that the influence of the external environment, such as the social and relational context, as well as the regulatory context

cannot be ignored (O'Callaghan et al. 1992). A number of environmental characteristics have been studied in the IS literature including, external influence, government regulations, market uncertainty, supplier relationships, power, trust, critical mass, etc (i.e. Bouchard 1993, Grover and Goslar 1993, Sabherwal and King 1995). This study focuses on the following characteristics, which are discussed in detail in Section 3.2:

(a) External influence

(b) Policy/legal framework

(c) Interagency trust

(d) Critical mass

(e) System-wide championship

3.1.4 Participation in Electronic Information Sharing

Participation in electronic information sharing refers to the extent to which a local agency shares information electronically with state agencies. This study adopts volume and diversity dimensions of electronic information sharing as surrogate measures for capturing certain aspects of participation in electronic information sharing, which are described in Chapter 4.

3.2 Hypotheses

In this section, specific hypotheses for each of the factors identified in the research framework are developed.

3.2.1 Characteristics of Electronic Information Sharing

The economics of participation in a collaborative effort stem from a cost/benefit standpoint (Chau and Tam 1997). One of the most consistent determinants of technology adoption is relative advantage, which encompasses several different types of benefits

such as economic gains and social prestige, as well as different types of costs or risks associated with the adoption (Rogers 1995, Kwon and Zmud 1987). In this study, relative advantage is decomposed into three factors, and each factor is treated separately.

3.2.1.1 Benefits

Benefits refer to the perceived potential gains of participating in electronic information sharing with state agencies. Research shows that perceived benefits play an important role in organizational adoption of innovations (Robinson 1990, Mansfield 1993, cf. Frambach 2002). Reduced costs and increased productivity due to streamlined data management, increased accuracy and timeliness of the information collected, centralized source and support for current information, more accurate, comprehensive data for problem solving, expanded professional networks, improved public image, and greater integration and coordination of government services are found to be among some of the benefits of interagency information sharing (Dawes 1996). Similarly, based on a literature review and interviews with government managers, Landsbergen and Wolken (2001) classified the benefits of interoperable systems as increased effectiveness, efficiency and responsiveness in government operations. Hence, it is hypothesized that:

H_1: Benefits will have a positive effect on local agency participation in electronic information sharing with state agencies.

3.2.1.2 Costs

While benefits of participation in electronic information sharing with state agencies can be significant, agencies constantly consider and assess the costs of such participative initiatives. Costs refer to the perceived potential costs of participating in electronic information sharing with state agencies. Costs of participation might be related to the costs of acquiring the necessary technology for participation including

setup costs, running costs, migration costs, integrating/interfacing costs, as well as the training costs.

Landsbergen and Wolken (2001) state that agencies usually lack the resources for sharing information electronically and, thus, it is difficult to encourage their participation in a system where the benefits are ill-defined and costs are unclear or uncertain. Since information sharing with other agencies diverts resources from other agency priorities (Dawes 1996), it is difficult for agencies to use their limited resources to make information available for the benefit of another agency when they already have serious and much more pressing information systems needs (Landsbergen and Wolken 2001). Similarly, de Ven (1976) states that participation in an interagency relationship entails "loosing some of its freedom to act independently when it would prefer to maintain control over its domain and affairs and that it must invest scarce resources and energy to develop and maintain relationships with other organizations, when the potential returns on this investment are often unclear or intangible" (cf. Weiss 1987, p.95). In the absence of profitability or return on investment, the cost of implementation might be the only single most important variable in public sector (Perry and Kraemer 1979). Therefore, only the agencies that have slack resources can afford costly innovations, can absorb failure, and can explore new ideas in advance of the actual need (Damanpour 1991). Hence, it is hypothesized that:

H_2: Costs will have a negative effect on local agency participation in electronic information sharing with state agencies.

3.2.1.3 Risks

Similar to costs, organizations also consider and assess the risks associated with participative ventures. Risks refer to the perceived risks of participation in electronic

information sharing with state agencies. There are certain risks of information sharing, primarily due to making the information collected by an agency available to outsiders. One concern is that agencies want to have full control over the data collected and sharing might result in openness to public scrutiny, and invite external evaluation or criticism. Other agencies can question the accuracy or validity of the shared information and can challenge the image of the responsible agency. Political interference can also threaten the policy-making power of the agencies. Another risk associated with interagency information sharing involves the misinterpretation or misuse of shared information. Information collected by an agency might be highly sensitive. Sharing this information might result in problems related to privacy rights of individuals (Dawes 1996, Landsbergen and Wolken 2001, Rocheleau 1997). Electronic information sharing can exacerbate matters, as it presents its own set of security risks, which require comprehensive safeguards. If the interagency connections are not secured, electronic information sharing can easily invite unauthorized access and misuse of information. Hence, it is hypothesized that:

H_3: Risks will have a negative effect on local agency participation in electronic information sharing with state agencies.

3.2.1.4 Compatibility

Compatibility refers to the degree to which participation in electronic information sharing with state agencies is perceived as being consistent with existing information systems, tasks, and the current needs and objectives of the local agency (Moore and Benbasat 1991). Different types of compatibility can be identified. Technological compatibility refers to the compatibility of the information technologies required for participation in electronic information sharing with the existing applications and

information systems. Tornatzky and Fleischer (1990) state that the fit of the available technology with the organization's current technology plays an important role in technology adoption decisions. Caudle et al. (1991) surveyed public sector managers to discover the most important IS issues, finding that the integration of technologies was the most important issue of concern. 91% of the respondents stated that the integration of data processing, office automation technologies and telecommunication networks is required to prevent the incompatibility of technologies. Research has also shown that the incompatibility of the hardware, software and telecommunication networks negatively affected participation in interagency information sharing (Dawes 1996, Dawes 1997b, Landsbergen and Wolken 2001).

Organizational compatibility refers to the compatibility of the changes introduced by electronic information sharing with existing operating practices, functioning, culture, and current objectives. Organizational compatibility can be thought of as the organizational fit of the system introduced. It also includes the system's impact on the employees' attitudes regarding change, convenience of change, power shifts etc. (Kwon and Zmud 1987). Participation in electronic information sharing might require changes in the existing operating practices and tasks; and might introduce new ways of completing work. Research shows that the incompatibility of the new systems with existing work procedures decreases the likelihood of adoption (Premkumar and Ramamurthy 1995). Compatibility of an innovation with the existing value and belief systems and past experiences or with the previously adopted ideas of the potential adopters can also facilitate or inhibit its adoption. Research suggests that past experiences of the potential adopters with similar innovations can lead to both positive

and negative outcomes. Landsbergen and Wolken (2001) state that lack of an experience base, institutional memory, and awareness of sharing opportunities present an important organizational barrier to successful, interoperable interagency systems. Accumulated experience at the organizational level in terms of having a history of working together with other agencies, similar project experience, and prior innovations are among the important factors that affect an agency's absorptive capacity in terms of acquiring new ideas and systems. Research shows that organizations that have past innovation experiences in one area or type also tend to innovate in others (Damanpour 1991). Newcomer and Caudle (1991) posit that previous agency experience with information technology is a major determinant of adoption of new technologies. Norris (1999) states that a history of innovativeness leads to a positive organizational climate and facilitates adoption of technologies by local governments. An important aspect of organizational compatibility is the congruency of electronic information sharing with the current needs and objectives of the agency. Hage (1975) states that the desire to cooperate is strongly related to the existence of a clear technological imperative or a functional necessity (Hage 1975, cf. Weiss, 1987). Innovation research suggests that unless a real internal need exists, an organization would be unlikely to adopt a new innovation (Premkumar and Ramamurthy 1995). Electronic information sharing between state and local government agencies might require the participation of different stakeholders that have different needs, goals, and priorities. These objectives sometimes may not match or can even conflict. Therefore, the compatibility of the interagency information system with the self-interests of the stakeholders is an important factor in the success of these systems. Landsbergen and Wolken (2001) support this claim by stating that it is

necessary to make all the agencies involved equal parties to the information sharing arrangements. They further imply that information sharing among government agencies can only be accomplished when it is perceived to be in those agencies' own self-interests. Hence, it is hypothesized that:

H_4: Compatibility will have a positive effect on local agency participation in electronic information sharing with state agencies.

3.2.1.5 Complexity

Complexity refers to the degree to which participation in electronic information sharing with state agencies is perceived as a relatively difficult process (Moore and Benbasat 1991). Based on Zaltman et al.'s (1973) classification, two levels of complexity can be identified. First, electronic information sharing may contain complex ideas. Second, the implementation of electronic information sharing may be complex. Research has shown that complexity of a technology is a major factor that affects the adoption decision. Newcomer and Caudle (1991) state that ease of use is an important indicator of public information systems success. Complex technologies require more skills and effort and therefore reduce the likelihood of the adoption of technology. Hence, it is hypothesized that:

H_5: Complexity will have a negative effect on local agency participation in electronic information sharing with state agencies.

3.2.2 Agency Characteristics

3.2.2.1 IT Capability

IT capability refers to the availability of technological resources and expertise within the local agency that enable participation in electronic information sharing with state agencies. As stated by Premkumar and Ramamurthy (1995), interorganizational

information systems are complex systems, composed of database, hardware and telecommunications technologies. Participation in such systems requires a certain level of IT infrastructure. The lack of sufficient IT capability has been found to be an important barrier in participation in interorganizational information systems (Premkumar and Ramamurthy 1995). Newcomer and Caudle (1991) stated that the existence of adequate equipment in an agency is a major determinant of adoption of new technologies. Dawes et al. (1997a, b) found that differences in the technological capabilities of agencies limited the participation in state-local information sharing initiatives.

Tornatzky and Fleischer (1990) state that the introduction of new technologies can result in changes in the required skill sets of employees. Therefore, the skill set of the available personnel is an important factor that constrains the introduction of new technologies. Organizations that employ well-trained and experienced personnel tend to incur fewer costs in terms of training and equipment when new innovations are in place. Particularly, for older industries that are undergoing a new wave of modernization, the relationship with the labor quality and new technology becomes extremely important (Tornatzky and Fleischer 1990). Norris (1999) posits that local governments have argued that their employees were not very well-trained in using information technologies and this inadequate training resulted in resistance to change, resistance to use, and, the inability to utilize information technologies to their capacity. Similarly, Perry and Danziger (1980) showed that one of the most important factors in the adoption of computer applications by local government was staff competence. Hence, it is hypothesized that:

H_6: IT capability will have a positive effect on local agency participation in electronic information sharing with state agencies.

3.2.2.2 Top Management Support

Top management support refers to the commitment from top management to provide a positive environment that encourages participation in electronic information sharing with state agencies. Research has shown that without support from the top management, an innovation is less likely to be adopted. Top management support has been consistently found to play an important role in the adoption and implementation of information systems, in general, and interorganizational information systems in particular (Premkumar and Ramamurthy 1995, Grover 1993). Hence, it is hypothesized that:

H_7: Top management support will have a positive effect on local agency participation in electronic information sharing with state agencies.

3.2.2.3 Agency Championship

Agency championship refers to the existence of a single person within the agency who is committed to introducing the electronic information sharing initiative to the agency. Research suggests that in information systems that require the participation of several organizations, the presence of an internal sponsor in each participating organization is very important to provide the necessary leadership, as the existence of a system-wide executive sponsor and a project champion is not always sufficient (Volkoff et al. 1999). Garfield (2000) showed that the presence of a network of site champions was important for the success of networked systems. She discovered that two types of champions - user and technical - existed within each organization. User champions guided the use of the system, promoted the system to other users, and facilitated organization-wide acceptance of the system. Technical champions, who ensured that the system operated smoothly and effectively, were found to be more important than user champions in terms of user buy-in. Moreover, Norris (1999) found that the existence of a

champion was one of the most important facilitators in the adoption of technologies by local governments. Hence, it is hypothesized that:

H_8: Agency championship will have a positive effect on local agency participation in electronic information sharing with state agencies.

3.2.2.4 Size

Research has provided contradictory results about the effects of organizational size on the adoption of innovations. On one hand, some researchers have argued that larger size fosters innovation adoption due to greater organizational resources and economies of scale. On the other hand, others have disputed to these arguments by stating that smaller agencies are more likely to adopt innovations because of their greater flexibility (Grover 1993).

Based on the findings of public policy literature, Bingham (1976) proposed that city size was positively related to the adoption of technological innovations. He observed that larger cities were more likely to adopt innovations. Similarly, Brudney and Selden (1995) discovered that size positively affected the adoption of computers in local governments. Norris (1999) also found that city population, as a measure of city size was a key determinant in the number and type of cutting-edge information technologies adopted. He stated that larger cities would adopt more sophisticated and advanced information technologies compared to smaller cities as they (a) had greater financial resources, (b) were in more need of these technologies, and (c) had superior institutional ability such as IT departments to support these technologies.

Moreover, Brudney and Selden (1995) suggested that size is an important element that facilitates technology adoption because it determines the context of the information-processing environment of the local government agencies. The information processing

environment of an organization is defined as the "the magnitude and scope of information which must be handled by the organization in its on-going activities" (Danziger 1979, p. 149). According to Brudney and Selden (1995), organizational size can be used as a proxy for a government's information-processing environment. As the size of an organization increases, the capacity and complexity of the facilities required to continue its operations, as well as the demands for its services also increases, justifying the need for the adoption of certain information technologies. Hence, it is hypothesized that:

H_9: Size will have a positive effect on local agency participation in electronic information sharing with state agencies.

3.2.3 Environmental Characteristics

3.2.3.1 External Influence

External influence refers to the persuasive power that external entities exercise on the agency. External influence can take the form of encouragement or pressure and can vary from no encouragement or pressure to recommendations, requests, or providing incentives or imposing penalties.

Research in economics and political science points out that intergovernmental influence in general, and the influence of one level of government on another in particular, presents a significant factor in the adoption of innovations by local governments. Bingham (1976) points out that intergovernmental grants, transfers, and technical assistance contribute to the adoption of innovations by local governments (Bingham 1976). He further argues that government agencies providing the grants design them in a way that the other agency seeking the grant would take action in the desired fashion. As previously mentioned, electronic information sharing requires participation of several stakeholders, creating greater conflicts of interest. Heeks (1999) suggests that

the gap between the stakeholder objectives and motivations can be minimized in several ways. In order to alter stakeholder motivations to support the introduction of a new technology, a reward or punishment system can be utilized. Markus and Keil (1994), mention that if new systems are not reinforced by incentives (financial, social etc.) they are likely to fail (cf. Rocheleau 1997). Similarly, Garfield (2000) found out that without adequate financial support statewide systems were less likely to succeed to create the required buy-in. Hence, it is hypothesized that:

H_{10}: External influence will have a positive effect on local agency participation in electronic information sharing with state agencies.

3.2.3.2 Policy/Legal Framework

Government regulatory activity can either encourage or discourage technology adoption (Tornatzky and Fleischer 1990). As stated by Aman and Mayton (1993), agencies can only collect information about the subject delegated to them and, most of the time, they are unaware of whether and under what circumstances they can share the information they have collected with another agency (cf. Landsbergen and Wolken 2001). Landsbergen and Wolken (2001) revealed that interoperability and information sharing between federal and state government agencies are difficult to achieve because of the uncertainties about the legislative authority of the government agencies to collect and disseminate information.

In addition, research identifies inconsistent data structures as an important barrier to electronic information sharing between agencies. Even though the agencies might be willing to share information, different data definitions and not having nationwide policies to enforce standardized data transmissions make electronic information sharing very difficult. Moreover, based on an extensive literature review and case studies,

Landsbergen and Wolken (2001) discovered that although there were some sort of ad hoc information sharing agreements among agencies, uniform contracts and federal law and policy as well as economic and budgetary mechanisms were necessary to achieve interoperability. Hence, it is hypothesized that:

H_{11}: Policy/legal framework will have a positive effect on local agency participation in electronic information sharing with state agencies.

3.2.3.3 Interagency Trust

Interagency trust refers to the belief that a state agency will perform actions that will result in positive outcomes for the agency and it will not perform actions that would result in negative outcomes (Anderson and Narus 1984, 1990). The main outcome of trust is to provide an agency with an optimistic anticipation of the behavior of another agency in an interorganizational relationship (Hart and Saunders 1997), as the participants are expected to recognize and protect the rights and interests of all others engaged in the joint endeavor (Hosmer 1995).

Danziger et al. (1982) state that organizational actors are usually biased about the information that is produced by other actors outside of their control (cf. Rocheleau 1997). Research identifies mutual interagency trust as a precondition to sharing information (Dawes 1996, Landsbergen and Wolken 2001, Thorelli 1896, Williams 1997). Landsbergen and Wolken (2001) point out that due to the lack of mutual trust among agencies, each agency ends up collecting its own information about the same subject, as they tend to be concerned about the validity and accuracy of the data collected by other agencies. Hence, it is hypothesized that:

H_{12}: Interagency trust will have a positive effect on local agency participation in electronic information sharing with state agencies.

3.2.3.4 Critical Mass

Critical mass refers to number of the agencies that are participating or planning to participate in the electronic information sharing initiative, who these participants are, and their level of contribution. As mentioned before, according to critical mass theory, an organization's decision to be engaged in a collective action will be dependent on its perceptions of what the group is doing, and not on the characteristics of the innovation. Research has shown that state and local government agencies are affected by the actions taken by other state and local agencies in the adoption of innovations. Polices and practices started by some governments were found to spread to others (Norris 1999). Moreover, Bingham (1976) has shown that the cities adopting innovations were located in close proximity to other innovation-adopting cities. Hence, it is hypothesized that:

H_{13}: Critical mass will have a positive effect on local agency participation in electronic information sharing with state agencies.

3.2.3.5 System-Wide Championship

System-wide championship refers to the existence of a single person or organization that is committed to implementing and overseeing the electronic information sharing initiative at the higher level. Research has shown that a system-wide champion is essential to gather interest in the program and to coordinate its implementation, especially early in the implementation process (Garfield 2000). The existence of project champions was found to be the key enabler of successful implementation in 83% of the information systems that were studied by Runge (1985). Landsbergen and Wolken (2001) stated that interoperability projects among government agencies were more easily implemented when there was common executive leadership. Hence, it is hypothesized that:

H_{14}: System-wide championship will have a positive effect on local agency participation in electronic information sharing with state agencies.

In this section, specific hypotheses were put forth to enable the research model to be empirically tested. A total of fourteen hypotheses were derived, which are summarized in Table 3-1. In the following chapter, the research methodology is justified and two studies that were utilized to address the research question are discussed in detail.

Table 3-1: Research Hypotheses

Hypothesis Number	Specific Hypothesis
H_1	Benefits will have a positive effect on local participation in electronic information sharing with state agencies.
H_2	Costs will have a negative effect on local agency participation in electronic information sharing with state agencies.
H_3	Risks will have a negative effect on local agency participation in electronic information sharing with state agencies.
H_4	Compatibility will have a positive effect on local agency participation in electronic information sharing with state agencies.
H_5	Complexity will have a negative effect on local agency participation in electronic information sharing with state agencies.
H_6	IT capability will have a positive effect on local agency participation in electronic information sharing with state agencies.
H_7	Top management support will have a positive effect on local agency participation in electronic information sharing with state agencies.
H_8	Agency championship will have a positive effect on local agency participation in electronic information sharing with state agencies.
H_9	Size will have a positive effect on local agency participation in electronic information sharing with state agencies.
H_{10}	External influence will have a positive effect on local agency participation in electronic information sharing with state agencies.
H_{11}	Policy/legal framework will have a positive effect on local agency participation in electronic information sharing with state agencies.
H_{12}	Interagency trust will have a positive effect on local agency participation in electronic information sharing with state agencies.
H_{13}	Critical mass will have a positive effect on local agency participation in electronic information sharing with state agencies.
H_{14}	System-wide championship will have a positive effect on local agency participation in electronic information sharing with state agencies.

CHAPTER 4. RESEARCH METHODOLOGY AND DATA COLLECTION

This study employs both quantitative and qualitative techniques to investigate the factors that influence local agency participation in electronic information sharing initiatives with state agencies. The first part of the study includes the collection and analysis of survey data from local agencies to test the proposed research framework and hypotheses. The second part of the study involves the collection and analysis of qualitative data related to a major state-local electronic information sharing initiative to seek additional support for the findings of the quantitative data analysis and to identify additional factors that are not discovered in the quantitative part.

This chapter provides an overview of the approach employed to research methodology selection and describes the above-mentioned studies that are utilized to address the research question. First, the combination of quantitative and qualitative methods is justified. Then, a comprehensive description is provided for each study.

4.1 Research Methodology

Research methodology is a "structured set of guidelines or activities to assist in generating valid and reliable research results" (Mingers 2001, p. 242). Even though it is always desirable to select a methodology that maximizes generalizability, realism, and precision (McGrath 1982), all research methodologies are inherently flawed in some respect (Dennis and Valacich 2001). The limitations of using one research perspective can be addressed by using an alternative approach that compensates for another's weaknesses.

Kaplan and Duchon (1988) state that no one approach to research can provide the richness that information systems as a discipline needs for further advancement.

Moreover, these authors address the need and desire for combining quantitative and qualitative methods.

Quantitative research is "generally characterized by a methodology of formulating hypotheses that are tested through controlled experiment or statistical analysis" (Kaplan and Duchon 1988). Examples of quantitative methods include survey methods, laboratory experiments, formal methods (e.g. econometrics) and numerical methods such as mathematical modeling (Myers 1997). The underlying assumption in quantitative research is that research designs should be based on the positivist approach. Positivism assumes an objective reality, which can be described by measurable properties that are independent of the researcher and research instruments. The positivist approach "has its origins in a school of thought within the philosophy of science known as 'logical positivism' or logical empiricism" (Lee 1991, p. 343). Logical positivism advocates a research approach that satisfies the standards of the "natural science model" of scientific research, dealing with positive facts and observable phenomena.

On the other hand, qualitative research "involves the use of qualitative data to understand and explain social phenomena" (Myers 1997). Examples of qualitative methods include action research, case study research and ethnography. The most common qualitative data collection methods include observations, interviews and questionnaires, documents and texts, and the researcher's impressions and reactions (Myers 1997). Most of the time qualitative research methods are described by their interpretive perspective, which assumes that methods of natural science are inadequate to study social reality (Lee 1991). Studies based on the interpretive approach assume that people create and associate their own subjective meanings of reality as they interact with

the world around them. Depending upon the underlying philosophical assumptions of the researcher, qualitative research may or may not be interpretative. For a discussion of the research epistemologies, please refer to Orlikowski and Baroudi (1991). The intent of this part is not to discuss these approaches in detail, but to justify the combination of the quantitative and qualitative methods.

Although most IS researchers prefer utilizing either a quantitative or qualitative methodology in isolation, there has been an increasing number of studies that advocate the benefits of combining one or more research methods (Gable 1994, Kaplan and Duchon 1988, Lee 1991, Mingers 2001, Ragin 1987). As Kaplan and Duchon (1988) point out, combining quantitative and qualitative methods instates both testability and context into the research. Using multiple methods increases the robustness of results because findings can be strengthened through cross-validation. This can be achieved when disparate data sources converge or when an explanation is developed to account for the data when they diverge (Kaplan and Duchon 1988).

Moreover, combining these methods may lead to a richer understanding of the phenomena under investigation. By incorporating multiple modes of analysis into the design, additional insights may be revealed that would otherwise remain undiscovered via a single methodological approach. Good examples of combining multiple methods include Markus' (1994) study on electronic mail and Trauth and Jessup's (2000) paper on groups support systems.

Based on the above discussions, this study employs both quantitative and qualitative methods to gain a richer understanding of the phenomena of interest. In the following sections, each study is discussed separately. Section 4.2 describes the

quantitative study, which utilized a survey methodology. Section 4.3 describes the qualitative study, which employed a case study methodology.

4.2 Research Methodology and Data Collection—Study I (Survey)

The quantitative part of the study included the collection and analysis of survey data from local agencies to test the proposed research framework and hypotheses. In this section, the research methodology and data collection process utilized in the quantitative study are explained. First, the research methodology is justified. Then, the sample, unit of analysis and respondents are introduced. Afterward, the questionnaire development process is discussed in detail. Finally, the data collection process and analysis strategy are explained.

4.2.1 Research Methodology

Given the purpose of the quantitative part of the study, survey research methodology was found appropriate. Survey research is one of the most popular methods used by the information systems researchers (Newsted et al. 1998). Survey research is the systematic gathering of information from respondents for the purpose of understanding and/or predicting some aspect of the behavior of the population of interest (Tull 1986). Survey research can be described as a mode of inquiry that involves the collection and organization of systematic data and the statistical analysis of the results (de Vaus 1995, Marsh 1982, Glock 1967). In survey research:

(a) a large number of respondents are chosen to represent the population of interest,

(b) systematic questionnaire or interview procedures are used to elicit information from respondents in a reliable and unbiased manner, and

(c) sophisticated statistical techniques are applied to analyze the data (Singleton, 1980).

The survey method was deemed appropriate based on a number of reasons. First of all, the purpose of the quantitative part of the study was to test the proposed research framework and hypotheses to gain an understanding of the factors that influence local agency participation in electronic information sharing with state agencies. Therefore, it was necessary to employ a methodology that permitted theoretical propositions to be tested in an objective fashion. The main advantage of survey research is that it gives the researcher a quantitative method for establishing relationships and making generalizations about known populations.

Second, in order to test the hypothesized relationships, it was important to use a methodology that would allow the values and relations of constructs to be determined in a systematic way. Survey research is one of the most effective techniques available for the study of attributes, values, beliefs and motives (Sharma 1983). It is not an exaggeration to point out that this method is the only method where generalized information could be collected systematically from organizations (Sharma 1983). Third, in order to obtain a reasonable sample size to statistically test the research framework and hypotheses, as well as to increase the accuracy of the findings, it was necessary to obtain data from a large portion of the selected sample. Using a survey research methodology, the researcher can describe large and heterogeneous populations more efficiently and economically. Therefore, in order to answer the research questions and test the research framework and hypotheses, survey methodology served as an appropriate tool.

4.2.2 Sample, Unit of Analysis and Respondents

In this section, the sample, unit of analysis and informants are introduced.

4.2.2.1 Sample

The sampling frame for this study consisted of the local law enforcement agencies in the state of Louisiana. More specifically, 378 agencies comprised the sampling frame, which included all of the police departments and the sheriff's offices in Louisiana. Please refer to Section 4.2.4.1 for a discussion of how the agency list was obtained. The study targeted law enforcement offices because of three main reasons:

(a) law enforcement agencies play a critical role as sources of information needed to fight crime and terrorism and to protect the safety of citizens,

(b) there is an urgent need for improved interagency information sharing among law enforcement agencies, and

(c) for the above-mentioned reasons, there is a pressing need for research directed specifically toward understanding the factors that affect law enforcement agencies' participation in electronic information sharing initiatives.

The study sample was restricted to the state of Louisiana for four main reasons:

(a) the way the local governments are structured and operate might show variation among different states. Limiting the sample to Louisiana ensured that the effects of the factors that are not included in the research framework, but might differ from one state to another, were controlled,

(b) in order to attain a reasonable response rate it was necessary to target a sample that could be easily accessed. Limiting the sample to Louisiana made the data collection process easier and increased the response rate,

(c) in the context of the entire study, there was value in surveying a sample that would be consistent with the case investigated in the qualitative part of the study. Since the case study focused on a local-state electronic information sharing initiative in Louisiana, limiting the survey sample to Louisiana made it possible to combine the insights provided by the case study and the survey, and

(d) the study addresses a particularly salient issue in the state of Louisiana. The results can provide state and local agencies useful information to enhance electronic information sharing initiatives in the state.

4.2.2.2 Unit of Analysis and Respondents

An important step in research design is to determine the unit of analysis--or the unit about which statements are being made. In this study proposed theory, data collection and statistical analyses were conducted at the organizational level. Therefore, the unit of analysis for this study was the individual agency.

The survey was sent to the sheriffs/police chiefs and they were asked to either fill out the survey themselves, or pass it to the person who is most involved in their agency's information sharing initiatives. Seidler (1974) states that informants who are knowledgeable about a particular organization can answer questions about generalized patterns of behavior at the organization level. Sheriffs and police chiefs are the key decision-makers and are the most knowledgeable people in sheriff's offices and police

departments respectively. Therefore, they were identified as the most appropriate informants for this study.

4.2.3 Questionnaire Development

In this section the operalization of the constructs and the efforts put forward to ensure content validity are discussed.

4.2.3.1 Operalization of the Constructs

Special emphasis was given to the operalization of the constructs in the research framework. The items were primarily derived from previously tested survey instruments to take advantage of well-tested psychometric measures (Straub 1989). Most of the constructs were operationalized by modifying these previously validated scales, as direct use of previous instruments was not always possible. A few new items were constructed based on the statements in the literature, which is a common approach followed by researchers when previous instruments are not available (Grover 1993). Moreover, each construct was measured by using multiple indicators to capture the underlying theoretical dimensions effectively (Premkumar and Ramamurthy 1995). Table 4-1 provides a summary of the operalization of the constructs along with corresponding references.

The lists of items for benefits and risks were generated based on key studies in this area (Dawes 1996, Dawes et al. 1997a,b, Landsbergen and Wolken 2001). This approach is similar to the approach followed by MIS researchers in identifying and operationalizing the benefits and barriers for the adoption of information technologies and technological innovations (Chau and Tam 1997, Grover 1993, Saunders and Hart 1993). The items used to measure costs were adopted from Premkumar et al. (1994) and Chau and Jim (2002). Compatibility and championship (agency level and system-wide)

items were modified from Grover (1993) and Premkumar and Ramamurthy (1995). Complexity and top management support items were modified from Grover (1993).

Table 4-1: Operalization of the Constructs

Variables	Operalization	References
Benefits	16 items	Dawes (1996), Dawes et al. (1997a,b) Landsbergen and Wolken (1998)
Costs	4 items	Premkumar et al. (1994) Chau and Jim (2002)
Risks	5 items	Dawes (1996), Dawes et al. (1997a,b) Landsbergen and Wolken (2001)
Compatibility	5 items	Grover (1993) Premkumar and Ramamurthy (1995)
Complexity	2 items	Grover (1993)
IT Capability	8 items	Thong (1999), Grewal et al. (2001) Premkumar and Ramamurthy (1995)
Top Management Support	3 items	Grover (1993)
Agency Championship	2 items	Grover (1993) Premkumar and Ramamurthy (1995)
Size	2 items	Grover (1993) Brudney and Selden (1995)
External Influence	5 items	Chwelos et al. (2001)
Policy/Legal Framework	2 items	Dawes (1996), Dawes et al. (1997a,b) Landsbergen and Wolken (2001)
Interagency Trust	3 items	Zaheer et al. (1998)
Critical Mass	3 items	Bouchard (1993)
System-Wide Championship	2 items	Grover (1993) Premkumar and Ramamurthy (1995)
Participation	4 items	Massetti and Zmud (1996)

The items measuring IT capability were adapted from Thong (1999), Grewal et al. (2001), and Premkumar and Ramamurthy (1995). External influence items were

modified from Chwelos et al. (2001). Interagency trust items were modified from Zaheer et al. (1998). Items used to measure size were adopted from Grover (1993) and Brudney and Selden (1995). Critical mass items were adopted from Bouchard (1993). Policy/legal framework questions were developed based on the literature concepts (Dawes 1996, Dawes et al. 1997a,b, Landsbergen and Wolken 2001).

The measures for participation in electronic information sharing were developed following the two dimensions for interorganizational information systems proposed by Massetti and Zmud (1996), which included volume and diversity. In order to capture these dimensions of participation, respondents were asked four questions: (a) approximately what percentage of all information shared between their agency and state agencies was shared electronically, (b) approximately how long their agency had been sharing information electronically with state agencies, (c) the different types of information that were shared electronically between their agency and state agencies, as well as the percentage of each type of information that was shared electronically, and (d) the extent of particular communication types used by their agency to share information electronically with state agencies. Please refer to Appendix A for the constructs, items, and the corresponding references.

4.2.3.2 Content Validity and Pre-Test

"Content validity of a measurement instrument for a theoretical construct reflects the degree to which the measurement instrument spans the domain of the construct's theoretical definition. It is the extent to which a measurement instrument captures the different facets of a construct" (Rungtusanatham 1998, p. 11). Straub states that content validity shows whether all the instrument measures are "drawn from all possible

measures of the properties under investigation" (Straub 1989, p. 150). For an instrument to demonstrate content validity, the items in the instrument must be drawn from a universal pool of the items, which represent that construct's entire domain (Straub 1989). Straub recommends that experts who are familiar with the phenomena should review the instruments to ensure content validity.

After the survey was developed it was pre-tested by domain experts in academia and practice before the data was formally collected. The domain experts were chosen based on their knowledge about the topic and/or research methods, availability and willingness to help. Those experts were asked to carefully examine the instrument and give feedback on the content, wording, and clarity of the questions in particular and to provide any comments on the instrument in general. The domain experts included people with different areas of expertise: academic experts in methodology, information systems, marketing and statistics, as well as practitioners from the local government agencies.

In the first phase of the pre-test, academicians reviewed the questions, scales, instructions and the appropriateness of the questions and language for the target population. They provided valuable feedback on the instrument both in written and oral form. Several revisions were made to the survey instrument based on the feedback from the academicians.

In the second phase of the pre-test, practitioners from local government agencies reviewed the survey instrument to confirm the appropriateness and sensitivity of the questions, the language, and the presentation of the survey. In addition, several other elements of the survey package including the pre-notice letter, cover letter, etc. were reviewed by the experts. The survey was also pilot-tested in a face-to-face meeting with

two individuals who work in a local law enforcement agency. The practitioners provided valuable feedback on the instrument both in written and oral form. Based on the feedback from the academicians and practitioners the survey instrument was revised. The changes that were made included clarifying some of the items and wordings, changing the format of the questionnaire, and re-sequencing the questions.

Based on the above discussions, in this study content validity could be reasonably confirmed on both theoretical and practical grounds. The constructs were operationalized based on the relevant content domain drawn from a proven research stream. Moreover, the instrument was pre-tested by domain experts to ensure that content validity was established. Other types of validity as well as reliability are discussed in Chapter 5.

4.2.4 Data Collection Procedures

In this section, the steps followed in mailing list construction and survey administration are discussed.

4.2.4.1 Mailing List Construction

As mentioned earlier, sheriffs and police chiefs were identified as the appropriate informants for this study. All the survey-related elements (pre-notice letters, cover letters, survey questionnaire, follow-up letters, etc.) were personalized and sent directly to those individuals (Dillman 2000).

Considerable effort was exerted to ensure that a valid mailing list was complied. The following steps were taken in order to construct an updated list of the names and addresses of all the sheriffs and police chiefs in Louisiana:

(a) Two initial contact lists (one for Sheriffs and one for Police Chiefs) were obtained from the Louisiana Highway Safety Commission (LHSC). These two lists

included the names, addresses, phone and fax numbers of all the sheriffs and police chiefs in Louisiana.

(b) In order to ensure that these two lists were up-to-date, I contacted Louisiana Sheriff's Association (LSA) and Louisiana Association of Chiefs of Police (LACP). LSA provided a list of all the Sheriff's Offices in Louisiana, which included the names, addresses, phone and fax numbers of all sheriffs. This list is also available online at: http://www.lsa.org/Louisiana_Sheriffs__Associatio/Sheriff_s_Directory/sheriff_s_directory.html. Similarly, LACP provided a list of all the Police Departments in Louisiana, which included the names, addresses, phone and fax numbers of all police chiefs. Please refer to Appendix B for a copy of the letter provided to LACP in order to obtain this list.

Separate procedures were used to compile the list for the Sheriff's Offices and Police Departments, which are described in the following subsections.

4.2.4.1.1 Mailing List Construction for Sheriffs/Sheriff's Offices

The two lists that were obtained from LHSC and LSA were compared and no inconsistencies were found. After comparing these two lists, the names of the sheriffs were double checked with the "Elected Officials Database"[1] which is available online at the Louisiana Secretary of the State website. Again, no inconsistencies were found. Phone calls were made to every 6th Sheriff's Office (systematic sampling) to verify the sheriffs' names and addresses. No inconsistencies were found.

[1] Louisiana Secretary of the State has a web page called "Elected Officials Database" on its website which enables you to search the Elections Division's Statewide Elected Officials Database to find Statewide and Multi-Parish Elected Officials, All Elected Officials in a Parish, and All Elected Officials in an Office (i.e. All Sheriffs). This database includes up-to-date information on more than 4,500 statewide elected officials.

4.2.4.1.2. Mailing List Construction for Police Chiefs/Police Departments

The two lists that were obtained from LHSC and LACP were compared and some inconsistencies were found between those two lists. The following inconsistencies were observed:

(a) in some cases, the mailing addresses did not match,

(b) in some cases the names of the police chiefs did not match, and

(c) in some cases neither the names of the police chiefs nor the mailing addresses matched.

For those agencies where no inconsistencies were observed, phone calls were placed to every 6th Police Department (systematic sampling) on the list and the police chiefs' names and addresses were verified. No inconsistencies were found. If any part of the contact information for an agency was not the same in both lists, a phone call was made to that agency to verify the mailing address and the name of the current chief. Moreover, if the contact address was a street address rather than a P.O. Box Number, those addresses were searched at an online telephone directory named "Telephone Directory: Switchboard Internet Yellow Pages and White Pages" which is available at http://www.switchboard.com/default.asp?MEM=1

In the second step, the names of all the police chiefs were checked with the "Elected Officials Database" which is available online at the Louisiana Secretary of the State website. A few inconsistencies were observed and phone calls were made to those agencies to verify the names of the current chiefs.

After all these efforts, a final list was compiled for the sheriffs and police chiefs in Louisiana.

4.2.4.2 Administration of Survey Instruments

In this section the administration of the paper and web-based versions of the survey is discussed.

4.2.4.2.1 Paper-based Version of the Survey

In order to ensure the highest achievable response rate, Dillman's (2000) "Tailored Design Method" (TDM) was adopted in the design and implementation of the survey questionnaire. TDM is a set of interconnected procedures for conducting high-quality surveys with a greatly improved potential for obtaining acceptable response rates (Dillman 2000). The underlying elements of the TDM consist of: (a) reducing the costs for being a respondent, (b) providing rewards for completing the survey, (c) creating respondent trust, and (d) tailoring the survey to specific populations by optimizing available technological options to increase the survey response rate. Dillman provides detailed instructions on how to guarantee these underlying elements throughout each step of the survey design and implementation. These particular instructions were followed in this study and are explained in grater detail in the following subsections:

1) The Pre-Notice Letter: A brief pre-notice letter was sent to all agencies (a total of 378 agencies) to notify them that in a few days they would be receiving a questionnaire for an important research project and their responses would be greatly appreciated. The pre-notice letters were personalized for each agency, addressed directly to the current sheriff/chief with personalized salutations. The pre-notice letters included the name and contact information of the primary investigator, the LSU logo, and were signed by using a blue colored signature stamp. 9 ½" x 4" white craft envelope with LSU Logo and primary investigator's address was used to send out the pre-notice letters. The

names and addresses of the respondents were directly printed on the envelopes rather than onto labels as recommended by Dillman (2000). Please refer to Appendix C for a copy of the pre-notice letter.

2) Survey Package: A week after the pre-notice letter, the survey packet was mailed to the same 378 agencies. The survey package included the following items:

a) Cover letter: A cover letter was included, which explained the details of the survey. The letter described the purpose and importance of the study, assured confidentiality of the responses, and stated that participation was voluntary. The cover letters were personalized for each agency, addressed directly to the current sheriff/chief with personalized salutations. The cover letters included the name and contact information of primary investigator, the LSU logo, and were signed by using a blue colored signature stamp (Dillman 2000).

The cover letters indicated that the survey could also be filled out online and included a URL for the web-based survey, which was also personalized for each agency. Moreover, the cover letters contained directions on how survey results/findings could be requested. Please refer to Appendix D for a copy of the cover letter.

b) The questionnaire: The survey package included a 6-page paper questionnaire. Adhering to those principles suggested by Dillman (2000), goals of the survey design were to prepare a survey that was attractive in appearance and was easy to complete.

The front cover page of the survey included a title, LSU logo, instructions, and acknowledgements to attract interest and create trust. Acknowledgments included special thanks to my primary contact people in the Louisiana Sheriff's Association and Louisiana

Commission on Law Enforcement for their contributions of time and effort throughout the development of this survey.

The format and layout of the survey was designed in a manner to keep the number of the pages at the minimum and reduce the time needed to fill out the questionnaire. The ideas and recommendations of my LSA and LCLE contacts helped me to create a layout that resembled those of the reports that the law enforcement officers were familiar with. Moreover, as recommended by Dillman (2000) sections of questions were created based on their content, and personal questions were placed at the end.

On the introduction and first page of the paper-based questionnaire, the agencies were reminded that the survey could also be filled out online and the URL for the web-based survey was provided. Please refer to Appendix E for a copy of the questionnaire.

c) Reply envelope: The survey package included a 6 ½" x 9 ½" white craft envelope for respondents to return the surveys. The envelope was printed with postage-paid business reply mail and addressed to the primary investigator.

d) Postcard: The survey package included a postcard that could be used by the respondents to request a summary of the study results/findings. A 4 ¼" x 5 ½" white postcard was used. The postcard was printed with postage-paid business reply mail and addressed to the primary investigator. Please refer to Appendix F for a copy of the postcard.

e) Outside Envelope: The four components discussed above -questionnaire, cover letter, return envelope, and postcard to request study findings- were assembled and inserted into an envelope. The survey package was assembled in a way to guarantee that all the four enclosures would come out of the envelope together when the respondent

opened it. 7 ½ " x 10 ½ " brown craft business envelope containing LSU logo and primary investigator's address was used to send out the survey package. The names and addresses of the respondents were directly printed on the envelopes (Dillman 2000).

3) Thank You/Reminder Postcard: A week after the survey package was sent, thank you/reminder postcards were mailed to the agencies. The purpose of this postcard was to thank the respondents who had already returned their questionnaires and to remind the others to complete and return the questionnaires as soon as possible. The postcard also included the personalized URL address for the web-based survey as well as an invitation to call for a replacement questionnaire if needed.

A 5 ½" x 8 ½" ivory postcard was used. One side contained the LSU logo and primary investigator's address. The names and addresses of the respondents were directly printed on the reverse side. Please refer to Appendix G for a copy of the thank you/reminder postcard.

4) Replacement Questionnaire: As recommended by Dillman (2000), three weeks after the original survey package and two weeks after the thank you/reminder postcards were sent a replacement survey package was sent to those agencies that had yet to respond. The replacement survey package was similar to the original survey package and included a follow-up cover letter, a replacement survey, a self-addressed postage paid business reply envelope, and the postcard to request the study findings/results.

The format and the content of the follow-up cover letter were similar to those of previous contacts, but it also included certain different elements in order to encourage the recipients to respond. For example, it conveyed to the recipient that other agencies had responded. It reemphasized the social usefulness of the survey and implied that the

accuracy of the results depended upon the return of the questionnaire. It also mentioned the replacement questionnaire and included a note of appreciation for taking the time to respond. Please refer to Appendix H for a copy of the follow-up letter.

4.2.4.2.2 Web-based Version of the Survey

In order to increase the survey response rate, a web-based version of the paper survey was also implemented as an additional convenience to informants. Web-based surveys offer a number of advantages to both the researchers and the survey respondents. They are easily accessible, easy to fill out, and consume less time for the respondents. For the researcher, web-based surveys offer a faster response rate and make the data collection and analysis processes easier. Web-based surveys offer automatic coding of the responses, which can be easily downloaded to a spreadsheet or a data analysis package avoiding manual data entry.

In the design and implementation of the web-based survey, the guidelines provided by Dillman (2000) for Internet surveys were followed. The Web-based survey was designed in a simple way to make it possible for the agencies with older, less powerful computers and web browsers, and poorer Internet connections to easily receive and respond to the survey.

An introductory message was provided at the beginning of the survey. The content of this introductory message was similar to that of the cover letter. It explained the details of the survey such as the purpose and importance of the study, confidentiality of the responses, voluntariness of the participation, etc. Acknowledgments included special thanks to my primary contact people in the Louisiana Sheriff's Association and Louisiana Commission on Law Enforcement for their contributions of time and effort

throughout the development of the survey. Moreover, the name and the contact information of the primary investigator were included in this section.

Questions in the web-based survey were presented in a conventional format similar to the format of the paper-based survey (Dillman 2000). Since responding to web-based surveys might require knowledge of which computer functions to use, specific instructions on how to take each necessary action for answering the questions were provided as needed. As stated by Dillman (2000), the inappropriate use of color is one of the biggest threats to effective web questionnaires. Therefore, the use of color was restrained in the design of the web-based survey to maintain the measurement properties of the questions.

In order to avoid the differences in the visual appearance of the questionnaire due to web browsers, operating systems, screen size, etc. the survey was viewed and tested on several different computers that were configured differently than the one that the survey was prepared.

The web-based survey was created using WebSurveyor Software Version 3.0. The survey was published on the ISDS Department's server and the URL for the survey was http://cvoc.bus.lsus.edu/SS/wsb.dll/aakbul1/survey.htm

In order to keep track of the surveys returned and limit the number of times each agency could submit responses to the survey, a unique ID was assigned to each agency, and each agency was directed to the survey's URL in the following format: http://cvoc.bus.lsus.edu/SS/wsb.dll/aakbul1/survey.htm?ID=1111.

Once the responses to the web-based survey started to arrive, the survey data and unique identification numbers were immediately exported into separate excel

spreadsheets in order to ensure the confidentiality of the responses. Then, based on the unique identification numbers the agencies that had already responded were removed from future mailing lists.

This unique URL was included in the cover letters and in the survey questionnaires. Agencies were reminded that they could fill out the survey online if they wished to do so. Including the unique URL's in the paper-based version of the surveys made it possible to keep track of the agencies that had responded to the paper-based surveys. Once the responses to the paper-based survey started to arrive, the survey data and unique identification numbers were manually entered into separate excel spreadsheets in order to ensure the confidentiality of the responses. Then, based on the unique identification numbers the agencies were removed from the further mailing lists.

4.2.4.3 Summary of the Strategies Used for Increasing the Survey Response Rate

The following list provides a summary of the strategies used for increasing the survey rate:

(a) Two versions of the survey were designed and implemented: a paper-based survey and a web-based survey. The web-based version option was provided as an additional convenience to informants.

(b) Questions in the web-based survey were presented in a conventional format similar to that was used in the paper-based survey.

(c) The visual presentation of the survey was designed in a way similar to those of the forms that are familiar to law enforcement officers.

(d) The survey instrument was pre-tested by academicians and practitioners.

(e) The survey was kept as short as possible. During the pilot-test the time that took to complete the survey was recorded as 15-20 minutes.

(f) All the survey elements (pre-notice letter, survey questionnaire, cover letter, follow-up reminders) were personalized and were directly addressed to each sheriff and police chief.

(g) Self-addressed postage paid return envelopes and study results request postcards were provided to the informants to ensure that they would not incur any mailing costs.

(h) Sponsorship was provided from LSA and LCLA. Even though direct use of these agency names were not possible due to political considerations, an acknowledgement to the coordinators of two major state-wide electronic information sharing project was included in the survey cover page and web-survey introduction page.

(i) As an incentive to participate in the survey, a summary of the study results/findings was offered to the agencies.

(j) Throughout the design and implementation process of the surveys, the guidelines suggested by Dillman (2000) were followed.

4.2.5 Data Analysis Strategy

The quantitative data collected via the survey were analyzed by performing the following statistical tests. The data analysis strategy and the specific techniques employed are discussed in greater detail in Chapter 5.

(a) Descriptive statistics were calculated to describe the characteristics of the responding agencies and individuals.

(b) An exploratory factor analysis was conducted to ensure convergent and discriminant validity and reliability of the survey instrument.

(c) Adherence to the assumptions of factor analysis was assessed.

(d) The items that were extracted by the factor analysis were used to create summated scales for each variable in the research framework.

(e) A stepwise multiple regression was conducted to test the research framework and the hypotheses.

(f) Multicollinearity and adherence to the assumptions of multiple regression were assessed.

To gain a better understanding of the factors that influence local agency participation in electronic information sharing with state agencies, the survey instrument also included three open-ended questions. The responses to these questions were coded at the word or line/sentence level. Each word and/or line/sentence was either (a) coded into one of the categories that were pre-determined based on the factors in the research framework, (b) coded into a new category that was not pre-determined but had emerged during the survey, (c) coded into multiple categories, or (d) or not coded if it was found out to be unrelated to the factors that affect local agency participation in electronic information sharing initiatives.

4.3 Research Methodology and Data Collection – Study II (Case Study)

The qualitative part of the study included the collection and analysis of qualitative data related to a major state-local electronic information sharing initiative that was being carried out in the state of Louisiana. Specifically the purpose of qualitative data collection and analysis was to seek additional support for the findings of the quantitative

data analysis, identify the factors that were not discovered in the quantitative part and thereby gain a better understanding of the factors that influence local agency participation in electronic information sharing with state agencies.

This section begins by justifying the use of case study methodology to further explore the research question. Then, the unit of analysis and case selection process are outlined. Afterward, specific steps used in the data collection efforts as well as informant characteristics are discussed. Finally, the data analysis strategy and methods that were employed to increase the validity and the reliability of the findings are explained.

4.3.1 Research Methodology

Given the purpose of the qualitative part of the study, a case study approach was found appropriate. In recent years, case study research has become a popular methodology in the information systems domain and has been used by many researchers such as Orlikowski and Baroudi (1991), and Alavi and Carlson (1992).

Case study research involves systematically gathering information about a particular person, social setting, group, organization or an entire community to permit the researcher to effectively understand how it operates or functions (Berg 1995). According to Yin (1989, pg. 3), a case study is an inquiry that: "Investigates a contemporary phenomenon within its real-life context, when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used."

Key characteristics of case study research that apply to this research can be summarized as follows (Benbasat 1987, p. 371, Stone 1978, p. 146):

(a) Phenomenon is examined in its natural setting.

(b) Data are collected by multiple means.

(c) One or few entities (person, group, or organization) are examined.

(d) No experimental controls or manipulation are involved.

(e) Changes in site selection and data collection methods could take place as the investigator develops new hypotheses.

(f) The results derived depend heavily on the integrative powers of the researcher.

(g) The focus is on contemporary events.

(h) The research addresses "why" and "how" questions rather than frequency or incidence.

As it can be understood from these characteristics, case studies are very useful for studying contemporary issues in real-world settings when 'how' or 'why' questions are being posed and they contribute "uniquely to our knowledge of individual, organizational, social and political phenomena" (Yin 1989- cf. Kumar and Crook 1999, p. 25). In this respect, a case study approach is particularly useful for this study as the purpose of the study was to gain an understanding of individual, organizational, social and political issues that shape local agency participation in electronic information sharing initiatives.

Case studies are suitable for the exploration, classification, and hypothesis development stages of the knowledge building process (Benbasat 1987). However, they can also be conducted in order to provide an initial test of hypotheses (Dixon 1987). Confirming theories or hypothesis by the presentation of supporting case study data (Foreman 1971, Stone 1978) is also possible. Therefore, I believe that the case study approach serves as an excellent tool to provide additional support for the findings of the

quantitative data analysis and to explore the factors that were not discovered via the quantitative analysis.

4.3.2 Unit of Analysis and Case Selection

In case study research "the unit of analysis identifies what constitutes a 'case', and a complete collection of data for one study of the unit of analysis forms a single case" (Darke et al. 1998). The unit of analysis may be an individual, a group, an organization or it may be an event or phenomenon.

The case that is investigated in this study focuses on a major state-local electronic information-sharing project (The State of Louisiana Uniform Motor Vehicle Accident Report Program) that has been carried out in the state of Louisiana. Therefore, the unit of analysis is this single interagency information sharing initiative. The purpose of this electronic information sharing initiative is to facilitate electronic sharing of traffic crash data between state agencies (Louisiana Highway Safety Commission) and local agencies (local law enforcement agencies). The initiative is discussed in detail in Chapter 6.

From a case selection standpoint, this case proved to be an ideal one to study for a number of reasons. First, in order to satisfy the objectives of the qualitative part it was necessary to find a project that was being carried out between state and local government agencies in general and state and local law enforcement agencies in Louisiana in particular. In this respect, The State of Louisiana Uniform Motor Vehicle Accident Report Program provides a rich case to examine the complex context of electronic information sharing between state and local governments as well as the factors that may affect local law enforcement agencies' participation in electronic information sharing initiatives.

Second, it was important to find a case where I was familiar with both the phenomenon and the setting under study. Since my committee and faculty members were knowledgeable about the history of the data-sharing initiative, this condition was satisfied. Third, it was necessary to find a case where access to data resources could be gained. Since the Louisiana Highway Safety Commission agreed to support the study, to provide access to key informants in their agency, and help solicit the participation of local law enforcement agencies the third objective was also met. Therefore, based on the purpose for which the case study was conducted and the resources available to me as the researcher, this initiative proved to be an ideal case.

4.3.3 Data Collection

The data for this case study was collected through two steps, which are discussed in the following subsections.

4.3.3.1 Preliminary Data Collection

Collecting case study data from case participants can be a difficult process. Hence, it is important that the researchers prepare themselves with sufficient background information about the case. In order to become familiar with the case under investigation, I did the following:

(a) I collected secondary data about the electronic information sharing initiative through the Web.

(b) I attended a meeting of Traffic Records Committee to become familiar with the potential informants and gain a better understating of the case.

(c) One of my committee members gave a short presentation about my research and afterward, I administrated a short questionnaire to the members of the

Traffic Records Committee who were present at that meeting. The survey questionnaire and the findings can be found in Appendix I.

(d) I conducted some informal conversations with knowledgeable informants from state and local agencies.

(e) I discussed the case several times with my committee members.

(f) I obtained feedback of a faculty member who is an expert in state and local governments.

Table 4-2 summarizes the preliminary data collection process including the data collection methods and data resources.

Table 4-2: Preliminary Data Collection Methods and Resources

Data Collection Methods
• **Secondary data:** Collected secondary data about the electronic information sharing initiative through web sites • **Observations:** Attended a meeting of Traffic Records Committee • **Preliminary Survey:** Administrated a short questionnaire to a small group of state and local agencies at the Traffic Records Committee meeting • **Informal Conversations:** Conducted some informal conversations with knowledgeable informants from state and local agencies • **Meetings:** Participated in regular meetings with faculty to discuss the case; obtained the recommendations of an expert in state and local governments
Data Resources
• Knowledgeable informants from state and local agencies • Academicians • Secondary data resources

4.3.3.2 Interviews

After the preliminary data collection step, I conducted semi-structured interviews with key informants. Although the primary focus of the study was the local agencies, it was necessary to interview knowledgeable individuals in the state agency that was implementing and overseeing the electronic information sharing initiative to gain a better understanding of the initiative and the factors that affected local agency participation in this initiative.

4.3.3.2.1 Agencies and Informants

All the agencies and informants interviewed in this study were chosen on the basis of their willingness to participate in the study and their proximity to facilitate data collection efforts and minimize costs.

A total of fourteen people were interviewed from the following 3 different types of organizations. Table 4-3 provides a summary of informants by agency type and job title.

State agency: Four people were interviewed from Louisiana Department of Public Safety. Three of these people were from Louisiana Highway Safety Commission, which is a unit of Public Safety and one person was directly from Louisiana Department of Public Safety. The titles of the interviewees include Executive Director, Planning Coordinator, Statistician and Information Technology Project Leader. All of these individuals were directly involved in this electronic information sharing initiative.

Local law enforcement agencies: Eight people from local law enforcement agencies were interviewed. This included both agencies that are participating and agencies that are not participating in this initiative. The titles of the individuals that were

interviewed include Computer Analyst/911 Supervisor, Chief Deputy, Grants and Programs Administrator, Data Processing Administrative Manager, Data Administrator, Lieutenant, Chief of Police, and Supervisor of Criminal Records.

Table 4-3: Summary - Informant Characteristics

	Agency Type	**Agency**	**Title**
1	State Agency	Louisiana Highway Safety Commission	Statistician
2	State Agency	Louisiana Highway Safety Commission	Executive Director
3	State Agency	Louisiana Highway Safety Commission	Planning Coordinator
4	State Agency	Louisiana Department of Public Safety and Corrections	IT Project Leader
5	Law Enforcement Association	Louisiana Sheriff's Association (Implementing interagency system)	LA State-Level ARMMS Coordinator
6	Law Enforcement Association	Louisiana Commission on Law Enforcement (Implementing interagency system)	Integrated Criminal Justice System Program Coordinator
7	Local Agency	Sheriff's Office (Not participating in this initiative)	Computer Analyst/ 911 Supervisor
8	Local Agency	Sheriff's Office (Not participating in this initiative)	Chief Deputy
9	Local Agency	Sheriff's Office (Not participating in this initiative)	Grants and Programs Administrator
10	Local Agency	Sheriff's Office (Not participating in this initiative)	Data Processing Administrative Manager
11	Local Agency	Police Department (Participating in this initiative)	Data Administrator
12	Local Agency	Sheriff's Office (Participating in this initiative)	Supervisor of Criminal Records
13	Local Agency	Police Department (Participating in this initiative)	Lieutenant
14	Local Agency	Police Department (Participating in this initiative)	Chief of Police

Law enforcement associations: Two people from law enforcement associations were interviewed. One individual was from Louisiana Sheriff's Association, who was the Louisiana State-level ARMMS Coordinator (LSAC) and LSA Mobile Training Environment (MTE) Director on Law Enforcement. The other person was from Louisiana Commission on Law Enforcement. His title is ICJIS (Integrated Criminal Justice System) Program Coordinator. Even though these associations are not directly involved in the case study electronic data sharing initiative, they are currently responsible for implementing and over-seeing two similar state-local electronic information sharing projects (ARMMS and ICJIS) and they have first-hand experience with local law enforcement offices. The findings of those two interviews are not included here but are incorporated into the final discussion of the study findings in Chapter 7.

4.3.3.2.2 Obtaining Participation of Agencies and Informants

If the research topic is particularly relevant to an organization and the specific research question is one that the organization needs to address, then it is more likely that the organization will provide access to their people and resources (Darke 1998).

One of the responsibilities of LHSC includes providing increased accuracy, accessibility, and timeliness of traffic crash data in order to develop and implement a program to prevent traffic accidents in Louisiana. Therefore, the success of this electronic information sharing initiative is an important concern to them. In this respect, it was not difficult to gain the support of LHSC for this research. Moreover, since the study addressed an issue that was also important to law enforcement associations, their participation was also easily obtained. On the other hand, obtaining the participation of informants from local law enforcement has been difficult. A list of agencies that might

be interested in this study was obtained from LHSC. This list included the names of the agencies and the names and contact information of potential informants in these agencies. The list contained agencies that are participating/not participating in this electronic information sharing initiative.

I initially contacted these referred agencies either by phone or email and was able to arrange 3 interviews. One more interview was arranged with an agency that was not on this initial list provided by LHSC through one of my committee members. As the number of interviews was not deemed sufficient, a second attempt was made to solicit participation from local agencies. For this purpose, I contacted LHSC for their help. LHSC contacted some of the local agencies and asked them whether they would be willing to participate in a short interview. With the help of LHSC 3 more interviews were arranged.

4.3.3.2.3 Interview Process

As mentioned above a total of fourteen people were interviewed from state agencies, local agencies and law enforcement associations. Among those fourteen interviews, eleven interviews were conducted in person whereas the remaining three were conducted via the phone. The length of the interviews ranged from 25 minutes to 2 hours with the phone interviews being the shorter in duration. At the beginning of each interview the interviewee was asked for his/her permission to tape-record the interview. All the interviewees granted permission to record the interviews. All interviews except three were taped. In one case, the interview was being conducted over the phone and the use of speakerphone lowered the quality of the reception and therefore the speakerphone was deactivated. In another case, the interviewee couldn't clearly hear me when the

speakerphone was on, so again the speakerphone was deactivated. In the third case, the interviewee said that it might not be necessary to tape record the conversation. During these un-taped interviews, handwritten notes were taken. The interviewees didn't appear to be restrained by the taping except in one case. In this particular case, I was asked to turn off the tape recorder while the interviewee was discussing some sensitive political issues.

4.3.3.3 Interview Instruments

Four different interview instruments were prepared prior to conducting the interviews. Two separate interview instruments were prepared for local agencies that are participating and not participating in the electronic information sharing initiative under investigation. A separate interview instrument was prepared for informants from the state agency and another one was prepared for the informants from the local agency associations. Please refer to Appendix J for the interview instruments.

The instruments were prepared based on the theory bases that were described in Chapter 2. These included open-ended questions to solicit the opinions of the informants about the factors that influence local agency participation in electronic information sharing initiatives. Prior to the interviews the instruments were examined by the academicians and revised based on their feedback.

During the interviews, instruments were present in order to remind the interviewer to cover all the factors. Due to the varying perspectives of the informants the interviews followed a semi-structured fashion. Because data analysis and data collection overlap when utilizing this form of study, the content of the interviews changed slightly as new factors were discovered.

4.3.4 Data Analysis Strategy

In data analysis the researcher examines, categorizes, tabulates, or recombines the evidence collected to address the initial propositions of his/her study. Data analysis is one of the most difficult parts of the case study approach as there are not many previously developed strategies or techniques for this purpose (Eisenhardt 1989, Yin 1994).

Miles and Huberman's (1994) book is among one of few sources to guide researchers in qualitative data analysis process (Yin 1994). Miles and Huberman (1994) state that data analysis consists of three concurrent flows of activity: data reduction, data display and conclusion drawing/verification.

Data reduction is the "process of selecting, focusing, simplifying, abstracting, and transforming" the collected data (Miles and Huberman 1994, p.10). Researcher can reduce the data in written-up field notes or transcriptions by writing summaries, coding, teasing out themes, making clusters or partitions, etc.

Data display is an "organized, compressed assembly of information that permits conclusion drawing and action" (Miles and Huberman 1994, p.11). In this step, the researcher can make uses of matrices, graphs, charts, networks, etc. to organize the data into an easily understandable and analyzable form.

Conclusion drawing is the process of drawing meanings from data by "noting regularities, patterns, explanations, possible configurations, causal flows and propositions" (Miles and Huberman 1994, p.11). Conclusions drawn by the researcher are verified as he/she proceeds by checking back with previous notes, searching for opinions of other individuals, looking for replicate findings in another data set, etc. The techniques offered by Miles and Huberman (1994) and discussed above were used to

guide the analysis of the qualitative data. The coding efforts used for data reduction process are explained below, whereas the data display and conclusion drawing processes are incorporated into the qualitative results discussion, which can be found in Chapter 5.

4.3.4.1 Coding

Each recorded interview was transcribed and stored in a Word document. After completing the majority of interviews, the interview data were coded. The following options were available for coding at this point:

(a) coding the data at the word level,

(b) coding the data at the line level,

(c) coding the data at the sentence level, and

(d) coding the data at the paragraph level.

Coding at the sentence level was initially considered but it was found that by coding only at the sentence level was resulting in a loss of meaning that needed to be captured. Therefore, to be able to conserve the completeness and meaningfulness of the interview data, coding at the paragraph level along with the sentence level were found appropriate for this study.

Prior to coding, all the transcripts were reviewed first and later each individual interview was coded one by one. Each sentence and/or paragraph was either (a) coded into one of the categories that were pre-determined based on the factors in the research framework, (b) coded into a new category that was not pre-determined but had emerged during the interviews, (c) coded into multiple categories, or (d) or not coded if it was found out to be unrelated to the factors that affect local agency participation in electronic information sharing initiatives.

4.3.5 Reliability and Validity

Even though there are no pre-established standards in qualitative research to ensure the quality of the data analysis and the accuracy of the findings, there are certain measures that can be taken to achieve this goal. A detailed discussion of these methods can be found in literature (Miles and Huberman 1994, Lincoln and Guba 1993, and Patton 2002). In this section, the methods that were employed to increase the validity and the reliability of the findings of this case study are briefly discussed.

The first and most important step in analyzing case study evidence is to have an analytic strategy to help the researcher to (a) treat evidence fairly, (b) produce compelling conclusions, and (c) rule out alternative interpretations (Yin 1984). For this purpose Yin (1984) suggests two general strategies:

(a) relying on theoretical propositions that lead to the case study, and

(b) developing a descriptive framework for organizing the case study.

The first approach is preferred in helping the researcher successfully analyze the case study evidence. One of the strengths of this study comes from using this more preferred approach. Parallel to this strategy, the case study objectives and design were guided by the research model, which was developed through a review of the pertinent literature that provided a strong theoretical foundation.

Another strength of the study comes from applying an iterative two-step data analysis process. As Yin (1998, p. 250) states, " case study investigators practice 'analysis' during data collection." Conducting data collection and data analysis hand in hand helped me to revise the data collection and/or data analysis processes according to the rich insights that I gained during data collection. The second step of data analysis,

which was the major case study analysis, took place after the data collection is completed.

Miles and Huberman (1994) state that in qualitative research, the issues of validity and reliability depend on the skills of the researcher. According to the authors in order to establish reliability and validity, the researcher should:

(a) have some familiarity with the phenomenon and the setting under study,

(b) develop strong conceptual interests, and

(c) use a multi-disciplinary approach as opposed to focusing on a single discipline.

To gain familiarity with the case, I utilized a number of data collection methods and collected data from various resources. This preliminary data collection process is discussed above in Section 4.3.3.1. In order to develop strong conceptual interest and understanding, I collected and analyzed quantitative data in an overlapping fashion with the qualitative data collection and analysis. To avoid the problems associated with a single-discipline focus, I conducted a detailed literature review in the domains of information systems, management, and public administration and developed a research framework by synthesizing well-established theory bases from different disciplines.

In addition to the strategies explained above, the following principles discussed in Yin's study (1984) were followed to establish validity and reliability of the study findings: (a) using multiple sources of evidence, (b) creating a case study database, and (c) maintaining a chain of evidence.

By using multiple sources of evidence (triangulation) researcher can address an extensive range of historical, attitudinal, and behavioral issues (Yin 1984). In this study

triangulation of resources included interviewing members from a variety of stakeholders (state agencies, local agencies, law enforcement associations) and interviewing multiple local agencies. Triangulation of methods included using different forms of qualitative methods (initial questionnaire that collected qualitative data, informal meetings, observations, secondary data collection, etc.).

Creating a case study database requires organizing and documenting the data collected for the case study. For this purpose as suggested by Yin (1984) the case study notes were stored in a manner to ensure easy retrieval of data. Moreover, individual tables summarizing major findings of each interview were created. These tables included direct quotes from interviewees.

Maintaining a chain of evidence requires that one can move from one portion of the case study to another with clear cross referencing to methodological procedures and to the resulting evidence (Yin 1984). In order to maintain a chain of evidence to increase the reliability of information provided in the case study, I provided direct quotations from the interviews to support the study conclusions, and made every attempt to ensure that that no original evidence was lost and the study conclusions could be traced back to the original data.

In the next chapter, a comprehensive discussion of the data analysis techniques utilized to develop valid and reliable instruments, as well as the approach utilized to formally test the hypotheses are provided. Then, the results obtained from the statistical analyses are discussed.

CHAPTER 5. RESEARCH RESULTS AND FINDINGS STUDY I (SURVEY)

This chapter provides a comprehensive discussion of the data analysis techniques utilized in the quantitative part of the study and the results obtained. First, survey response rate and analyses of missing data and non-response bias are discussed. Second, sample characteristics are reported. Third, the steps taken to establish validity and reliability of the survey instrument are explained. Fourth, the statistical tests that are performed to test the research framework and hypotheses are discussed and the results obtained from these tests are presented. Finally, themes that emerged from a series of open-ended questions are reported.

5.1 Survey Response

In this section, survey response rate and analyses of missing data and non-response bias are discussed.

5.1.1 Response Rate

The sampling frame for this study consisted of the local law enforcement offices in the state of Louisiana. The sample size was 378. Out of these 378 agencies, 136 of them returned the survey, yielding a response rate of 36%. Of the 136 surveys returned 11 of them were incomplete and hence were dropped from subsequent analyses, yielding 125 usable responses and a usable response rate of 33%.

5.1.2 Analysis of Missing Data

Missing data refers to "information not available for a subject (or case) about whom other information is available." (Hair et al. 1998, p. 38). Missing data might be caused by the respondent's refusal to answer one or more questions.

In this study, systematic patterns of missing data were not encountered in the data set except for the question related to the level and the IT knowledge of a champion in the state agency, who supported and promoted electronic information sharing initiatives with the local agency (system-wide championship). Hair et al. (1998) recommends that in the cases where a nonrandom pattern of missing data is present, the most efficient solution is to delete the case(s) or variable(s) with missing data. Therefore, this question and the associated responses were removed from further consideration. In other cases where random missing data were infrequent, the missing data were addressed via mean replacement, as recommended by Hair et al. (1998).

5.1.3 Analysis of Non-Response Bias

Non-response bias is an important source of bias in survey research. If it is not addressed properly, it can lead to conclusions that differ systematically from the actual situation in the population. Extrapolation methods, which compare early respondents to late respondents, can be used to predict non-response bias (Armstrong and Overton 1977 and Churchill 1991). Since late respondents require prompting to respond and are therefore apparently less eager, they are likely to be similar to non-respondents. Thus, if late respondents and early respondents do not differ in certain characteristics, it is less likely that non-respondents will differ significantly from respondents (Compeau and Higgins 1995). Consistent with prior research, non-response bias was assessed by using extrapolation methods. The midpoint of the data collection period was used as the cutoff point for distinguishing between early and late respondents. 62.4% of the responses (78 out of 125) was from early respondents and the remaining 37.6% was from late respondents (47 out of 125).

To ensure that the early respondents and late respondents did not systematically differ, these two groups of respondents were compared based on demographic data including agency characteristics (number of employees, population of the area served, and budget) and respondent characteristics (agency tenure, position tenure, age, gender, and education) using independent samples t-tests to check for equality of means. SPSS was used as the statistical analysis tool.

Before conducting the t-tests, Levene's statistic was calculated for each analysis to ensure comparable variances between groups. Levene's statistic tests the null hypothesis that the error variances are equal across groups (Rosnow and Rosenthal 1991). If the significance value for the Levene test is not significant ($p > 0.05$), then the t-test results that assume equal variances for both groups can be used. If the significance value for the Levene test is significant ($p < 0.05$) then the t-test results that do not assume equal variances for both groups must be used. In this study, Levene's statistic revealed no significant error variance differences in each of the analyses except for gender which was significant at the $\alpha = 0.05$ level. Therefore, the t-test result used for gender did not assume equal variances for both groups.

No significant differences were found between the early and late respondents at the $\alpha = 0.05$ level. Based on these findings, response bias could be confidently ruled out in this study. Please refer to Table 5-1 for an assessment of non-response bias between early and late respondents.

Moreover, to gain a deeper understanding of responding versus non-responding agencies, the response rates from sheriff's offices and police departments were examined. It was found out that 23 out of the 65 Sheriff's Offices (35.38%) and 98 out of the 313

Police Departments (31.31%) had returned the survey (N=4 missing). These results revealed that there was not a significant difference between sheriff's offices and police departments in terms of the response rates.

Table 5-1: Assessment of Non-Response Bias

	N	Mean	Std. Dev.	t-value	d.f.	Sig*
1. Num. employees				.774	116	.441
Early Respondents	76	60.55	117.24			
Late Respondents	42	43.81	103.36			
2. Population				-.014	115	.989
Early Respondents	75	25,700.57	63,114.54			
Late Respondents	42	25,883.86	72,080.60			
3. Budget				-.118	80	.907
Early Respondents	53	3,044,462.51	5,702,742.44			
Late Respondents	29	3,216,150.72	7,303,817.62			
4. Agency Tenure				1.295	113	.198
Early Respondents	75	13.63	9.66			
Late Respondents	40	11.27	8.52			
5. Position Tenure				1.274	111	.205
Early Respondents	74	6.26	6.82			
Late Respondents	39	4.68	5.00			
6. Gender**				-1.641	60.73	.106
Early Respondents	75	.08	.27			
Late Respondents	41	.20	.40			
7. Age				.550	113	.584
Early Respondents	74	3.04	1.01			
Late Respondents	41	2.93	1.15			
8. Education				-.084	112	.933
Early Respondents	74	1.36	.61			
Late Respondents	40	1.38	.63			

* p-value of 2-tail t-test
** equal variances are not assumed

5.2 Sample Characteristics

The final sample consisted of 23 Sheriff's Offices (19.01%) and 98 Police Departments (80.99%.). The number of employees in the agencies varied from 1 employee to 704 employees. The average number of the employees in the respondent agencies was 54.99 (SD=112.34) employees. The population of the area served by

agencies ranged from 188 to 460,000, with an average population of 25,766.3 (SD= 66,163.07). The annual operating budget of the agencies varied from $9,600 to $35,000,000 with an average value of $3,105,181.51 annually (SD = $6,270,979.28).

Of the total individual respondents that have reported their gender (N=116), 87.9% (N=102) were males and 12.1% (N=14) were females. 7.8% (N=9) of the respondents were between the ages (20-30), 25.2% (N=29) of the respondents were between the ages (31-40), 33.0% (N=38) of the respondents were between the ages (41-50), 27% (N=31) of the respondents were between the ages (51-60), and 7% (N=8) of the respondents were 61 years old or above.

69.3% (N=79) of the respondents were high school graduates, whereas 25.4% (N=29) held bachelor's degrees. 4.4% (N=5) had master's degrees. 29 of the 79 high school graduates (36.70%) reported that they also had some other types of education, such as a few years of college or police training. Tables 5-2 and 5-3 summarize the sample characteristics.

Table 5-2: Sample Characteristics-1

	# Employees	Population	Budget	Agency Tenure	Position Tenure
N Valid	118	117	82	115	113
N Missing	7	8	43	10	12
Mean	54.59	25,766.37	3,105,182	12.81	5.72
Median	17.00	7,000.00	765,000	12.08	3.00
Mode	1.00[a]	2,000.00	3,000,000	2.00[a]	1.00[a]
Std. Dev.	112.34	66,163.07	6,270,979	9.31	6.28
Minimum	1.00	188.00	9,600	.04	.00
Maximum	704.00	460,000.00	35,000,000	40.00	25.00

a Multiple modes exist. The smallest value is shown

The average length of service in the current agency was 12.81 years (SD=9.31) with a minimum tenure of 0.04 years and a maximum tenure of 40 years. The length of the tenure in the current position averaged 5.72 years (SD=6.28) with a minimum tenure of 0 years (almost two weeks) and a maximum tenure of 25 years.

Table 5-3: Sample Characteristics-2

	Frequency	Percent	Valid Percent
1. Agency Type			
Sheriff's Office	23	18.4	19.01
Police Department	98	78.4	80.99
Valid	121	96.8	100.0
Missing	4	3.2	
Total	125	100.0	
2. Age Group			
20-30	9	7.2	7.8
31-40	29	23.2	25.2
41-50	38	30.4	33.0
51-60	31	24.8	27.0
61+	8	6.4	7.0
Valid	115	92.0	100.0
Missing	10	8.0	
Total	125	100.0	
3. Gender			
Male	102	81.6	87.9
Female	14	11.2	12.1
Valid	116	92.8	100.0
Missing	9	7.2	
Total	125	100.0	
4. Education			
High School	79	63.2	69.3
Bachelor's	29	23.2	25.4
Master's	5	4.0	4.4
Doctorate	1	.8	.9
Valid	114	91.2	100.0
Missing	11	8.8	
Total	125	100.0	

The titles of the survey respondents included: sheriff, chief of police, assistant chief, captain, sergeant, lieutenant, investigator, communications supervisor, supervisor of department of records, supervisor criminal records, data processing administration manager, patrolman, office manager, secretary, and administrative assistant. The majority of the survey respondents were higher ranked employees such as chief, assistant chief, captain, lieutenant, etc.

5.3 Assessment of Validity and Reliability

In this section the steps that were taken to establish validity and reliability of the survey instrument are discussed.

5.3.1 Assessment of Convergent and Discriminant Validity

In order to claim the validity of an instrument it is necessary to have both convergent and discriminant validity (Trochim 2002). Convergent validity refers to the state when items measure their intended construct and no other construct, whereas discriminant validity is confirmed when the construct as a whole differs from the other constructs (Straub 1989).

There are two types of approaches that can be used to assess the validity of an instrument: classical and contemporary approaches (Bagozzi et al. 1991). Classical approaches include multitrait-multimethod (MTMM) technique (Campbell and Fiske 1959) or principal components factor analysis (Straub 1989), whereas the contemporary approaches include confirmatory factor analysis utilizing maximum likelihood extraction such as structural equation modeling (SEM). In recent years the use of SEM techniques for instrument validation and testing has become popular in the IS Domain. However, the use of this technique requires a large sample size. As a rule of thumb, 20

observations per each item would be needed to analyze a comprehensive measurement model. Therefore, given the number of factors in the model and the sample size, the most commonly used classical approach to instrument validation "principal components factor analysis" was adopted to refine the measurement items and to test validity.

Factor analysis is a multivariate statistical technique that is used to analyze the structure of the correlations among a large number of variables based on a set of common underlying dimensions (Hair et al. 1998). Factor analysis helps the researcher to determine whether a certain set of items do or do not constitute a construct (Straub 1989). In factor analysis, (a) separate dimensions of the structure are identified and the extent to which each variable is explained by each dimension is determined, and (b) the number of variables is reduced through summarization and data reduction (Hair et al. 1998).

To test for instrument validity principal component factor analysis utilizing promax with Kaiser normalization rotation technique was performed. SPSS statistical package was used. As stated by Hair et al. (1998) the choice of an orthogonal or oblique rotation should be made on the basis of particular needs of a given research problem. If the purpose is to reduce the number of original variables, regardless of how meaningful the resulting factors may be, orthogonal rotation methods will be appropriate. However, if the purpose of the factor analysis is to obtain several theoretically meaningful factors or constructs, an oblique solution is the appropriate approach. In this study, promax rotation, an oblique rotation method, was chosen over orthogonal rotation methods since the independent variables are not assumed to be completely unrelated. This conclusion is reached because, "realistically, very few factors are uncorrelated, as in orthogonal rotation" (Hair et al. 1998, p. 111).

5.3.1.1 Adherence to Assumptions in Factor Analysis

Hair et al. (1998) recommends that the researcher should ensure that the data matrix has sufficient correlations to justify the application of factor analysis. The Kaiser-Mayer Olkin's Measure of Sampling Adequacy (MSA) test and Bartlett's Test of Sphericity were conducted to assess the suitability of the survey data for factor analysis. Table 5-4 shows the results of these tests. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy is a statistic which indicates the proportion of variance in the variables which is common variance, i.e. which might be caused by underlying factors. This index ranges from 0 to 1, reaching 1 when each variable is perfectly predicted without error by the other variables. The measure can be interpreted with the following guidelines: (.90) or above is marvelous, (.80) is meritorious, (.70) is middling, (.60) is mediocre, (.50) is miserable and below (.50) is unacceptable. In this study, Kaiser-Mayer Olkin's Measure of Sampling Adequacy (MSA) is .766, which is close to meritorious.

The Bartlett test of Sphericity is a statistical test for the presence of correlations among the variables (items). It indicates whether your correlation matrix is an identity matrix, which would indicate that the variables (items per specific construct) are unrelated. The significance level gives the result of the test. Small values (less than .05) indicate that the data do not produce an identity matrix and, hence, are suitable for factor analysis. Larger values indicate that the data produce an identity matrix and, hence, are not suitable for factor analysis. In this study, significance level for Bartlett's Test of Sphericity is .000, which means that the data are appropriate for factor analysis.

The results of Kaiser-Mayer Olkin's Measure of Sampling Adequacy (MSA) and Bartlett tests show that the data meet the fundamental requirements for factor analysis.

Table 5-4: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.766
Bartlett's Test of Sphericity	Approx. Chi-Square	4,760.162
	df	1,176
	Sig.	.000

5.3.1.2 Factor Analysis Results

Data were factor analyzed using principal component factor analysis utilizing promax rotation with Kaiser normalization technique and missing cases were replaced by means. Following Chin et al. (1997) and Nunally and Berstein (1997), a combination of the Kaiser-Guttman Rule (Eigenvalues greater than one) and scree plot were utilized to determine the most appropriate component solution. Table 5-5 shows the results of the principal component factor analysis.

The factor analysis indicated that the pool of items captured twelve distinct factors including the dependent variable. The items that did not load properly or had cross loadings were dropped. As a result, two of the factors, compatibility and agency championship, were no longer considered for subsequent analyses.

The ultimate solution demonstrated both convergent validity and discriminant validity. Referring to Table 5-5, convergent validity was established because all the items loaded strongly on their associated factors (loading >.50) and each of the factors loaded stronger on their associated factors rather than on any other factors (Chau and Tam 1997).

Discriminant validity can be assessed by comparing the average variance extracted (AVE) values associated with each construct to the correlations among constructs (Staples et al. 1999).

Table 5-5: Factor Analysis Results

Factor Loadings*												
Items	**BEN**	**RISK**	**ITC**	**EXINF**	**TRUST**	**PART**	**TMS**	**MASS**	**SIZE**	**PLF**	**COST**	**CPLX**
BEN 1	.882											
BEN 2	.866											
BEN 3	.843											
BEN 4	.815											
BEN 5	.793											
BEN 6	.788											
BEN 7	.785											
BEN 8	.778											
BEN 9	.777											
BEN 10	.759											
BEN 11	.754											
BEN 12	.724											
RISK 1		.869										
RISK 2		.813										
RISK 3		.807										
RISK 4		.801										
RISK 5		.716										
ITC 1			.896									
ITC 2			.841									
ITC 3			.779									
ITC 4			.749									
ITC 5			.728									
EXINF 1				.874								
EXINF 2				.863								
EXINF 3				.721								
EXINF 4				.577								
EXINF 5				.572								
TRUST 1					.881							
TRUST 2					.803							
TRUST 3					.778							
PART 1						.902						
PART 2						.814						
PART 3						.709						
PART 4						.560						
TMS 1							.889					
TMS 2							.849					
TMS 3							.668					
MASS 1								.846				
MASS 2								.822				
MASS 3								.638				
SIZE 1									.982			
SIZE 2									.968			
PLF 1										.855		
PLF 2										.771		
COST 1											.878	
COST 2											.824	
COST 3											.645	
CPLX 1												.886
CPLX 2												.860

* Loadings < .40 not shown

BEN: Benefits, RISK: Risks, ITC: IT Capability, EXINF: External Influence, TRUST: Interagency Trust, PART: Participation, TMS: Top Mng Support, MASS: Critical Mass, SIZE: Size, PLF: Policy/Legal Framework, COST: Costs, CPLX: Complexity

AVE "measures the percentage of variance captured by a construct by showing the ratio of the sum of the variance captured by the construct and its measurement variance" (Gefen et al. 2000, p. 66) and can be calculated by the following equation:

$$AVE = \frac{\Sigma\lambda_i^2}{\Sigma\lambda_i^2 + \Sigma(1 - \lambda_i^2)}$$

λ_i represents the factor loading for a particular item that measures a construct. Table 5-6 represents the results of the discriminant validity analysis.

Table 5-6: Discriminant Validity Analysis

Constructs	BEN	RISK	ITC	EXINF	TRUST	PART	TMS	MASS	SIZE	PLF	COST	CPLX
BEN	**.798**											
RISK	.047	**.803**										
ITC	-.006	-.363	**.801**									
EXINF	.134	-.301	.419	**.733**								
TRUST	.110	.015	.212	.263	**.822**							
PART	.057	-.466	.645	.571	.173	**.757**						
TMS	.402	-.195	.181	.374	.306	.149	**.808**					
MASS	.223	-.012	.075	.161	.459	.059	.388	**.774**				
SIZE	.029	-.035	.214	.100	.063	.235	.040	.010	**.975**			
PLF	.051	-.026	.308	.331	.392	.303	.167	.270	.121	**.814**		
COST	-.048	.331	-.442	-.338	-.099	-.491	-.113	.040	-.043	-.162	**.789**	
CPLX	.071	.127	-.387	-.247	-.296	-.410	-.123	-.157	-.123	-.326	.207	**.873**

Note. The bold diagonal elements are the square root of the variance shared between the constructs a their measures (i.e., the average variance extracted). Off diagonal elements are the correlations between constructs. For discriminant validity, the diagonal elements should be larger than any other corresponding row or column entry.

BEN: Benefits, RISK: Risks, ITC: IT Capability, EXINF: External Influence, TRUST: Interagency Trust, PART: Participation, TMS: Top Mng Support, MASS: Critical Mass, SIZE: Size, PLF: Policy/Legal Framework, COST: Costs, CPLX: Complexity

Diagonal elements show the square root of the AVE, whereas the off-diagonal elements show the correlations among constructs. In order to claim discriminant validity, the diagonal elements should be larger than any other corresponding row or column entry

(Staples et al. 1999). According to table 5-6 each construct sufficiently differs from the other constructs. Therefore, the measures demonstrate discriminant validity.

As mentioned above, twelve factors were extracted from this study (eleven independent variables and one dependent variable). These factors are benefits, risks, costs, complexity, IT capability, top management support, external influence, policy/legal framework, size, interagency trust, critical mass and participation (dependent variable). To ensure that these factors explain at least a specified amount of variance, the percentage of variance criterion approach was used.

Table 5-7 gives a summary of the eigenvalues, variance explained, and cumulative variance explained by the factor solution. The extraction sums of squared loadings group gives information regarding the extracted factors or components. For principal components extraction, these values will be the same as those reported under initial eigenvalues.

In a good factor analysis, a few factors explain a substantial portion of the variance and the remaining factors explain relatively small amounts of variance, which is the case in these results. Even though there is no absolute threshold that can be adopted, in social sciences where information is often not precise as in natural sciences, a combination of factors that accounts for 60% of the total variance (and in some cases even less) is deemed satisfactory (Hair et al. 1998). The results in the above table show that first few factors accounts for a large percentage of the total variance and the twelve factors that are extracted account for 75.865% of the total variance. Based on these findings it can be concluded that these twelve factors can be used to investigate the research question.

Table 5-7: Eigenvalues and Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
Comp.	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	10.639	21.712	21.712	10.639	21.712	21.712	9.640
2	6.320	12.898	34.610	6.320	12.898	34.610	4.914
3	3.800	7.756	42.365	3.800	7.756	42.365	4.273
4	3.580	7.306	49.671	3.580	7.306	49.671	5.226
5	2.155	4.397	54.069	2.155	4.397	54.069	4.009
6	2.018	4.118	58.187	2.018	4.118	58.187	3.773
7	1.788	3.649	61.836	1.788	3.649	61.836	4.454
8	1.689	3.446	65.283	1.689	3.446	65.283	3.327
9	1.541	3.145	68.427	1.541	3.145	68.427	2.498
10	1.316	2.686	71.113	1.316	2.686	71.113	2.977
11	1.203	2.456	73.569	1.203	2.456	73.569	3.999
12	1.125	2.296	75.865	1.125	2.296	75.865	2.541

5.3.2 Assessment of Reliability

An important step in instrument validation is to test the instrument for reliability to ensure measurement accuracy (Straub 1989) that is to minimize the measurement error. Reliability refers to the state when a scale yields consistent measures over time (Straub 1989). Several types of reliability are defined in the literature. Internal consistency tends to be a frequently used type of reliability in the IS domain. In this study Cronbach's alphas, which are calculated based on the average inter-item correlations, were used to measure internal consistency. As stated by Straub (1989, p. 151.), "high correlations between alternative measures or large Cronbach's alphas are usually signs that the measures are reliable."

Table 5-8 shows the results of the reliability analysis. The Cronbach's alpha values range from 0.6347 to 0.9499. There is no standard cut-off point for the alpha coefficient, but the generally agreed upon lower limit for Cronbach's alpha is .70, although it may decrease to .60 (Hair et al. 1998) or even .50 (Nunnally 1978) in exploratory research.

Table 5-8: Reliability Analysis

Variables	**Cronbach α**	**AVE**
Benefits	.9499	.6372
Costs	.7907	.6220
Risks	.8929	.6443
Complexity	.8042	.7623
IT Capability	.8717	.6416
Top Management Support	.8302	.6524
Size	.9531	.9507
External Influence	.8590	.6416
Policy/Legal Framework	.7971	.5377
Interagency Trust	.8787	.6754
Critical Mass	.8333	.5995
Participation	.6347	.5731

In order to make sure that the low Cronbach alpha value for the dependent variable construct does not cause a problem, a more stringent test of reliability, which involves assessing the amount of variance captured by a construct's measures in relation to the amount of variance due to measurement error, was also performed (Fornell and Larcker 1981). In order to claim reliability, the variance extracted by the construct's measure (Average Variance Extracted-AVE) should be greater than 0.50. Referring to

Table 5-8, all the AVE values for the constructs, including the participation construct, are higher than 0.50. Therefore, all the reliabilities in this study are deemed acceptable.

5.4 Hypothesis Testing

In this section, the statistical tests that are performed to test the research framework and hypotheses are discussed and the results obtained from these tests are presented. First, the required sample size is explained. Then, the regression analysis and results from hypotheses testing are reported. Finally, the assumptions of regression analysis are assessed.

5.4.1 Power Analysis and Required Sample Size

The sample size used in multiple regression has a direct effect on the statistical power of significance testing and the generalizability of the results (Hair et. al 1998). The researcher can determine the sample size needed to detect relationships between independent and dependent variables for certain types of statistical tests and number of independent variables, given the expected effect size, the α level, and the power desired (Ferguson and Ketchen 1999, Hair et al. 1998).

Table 5-9 below shows the sample size needed in multiple regression analysis for given effect sizes and number of independent variables at a power level of 0.80 and an α level of 0.05. The table is prepared by using G*Power, a general power analysis program that performs high-precision statistical power analyses for the most common statistical tests (Faul and Erdfelder 1992).

Based on the above discussions, to achieve sufficient statistical power for multiple regression for eleven independent variables, a minimum of 59 subjects are required to attain 80% power for large effects (Faul and Erdfelder 1992). Therefore, the minimum

required sample size for this study is 59 responses. Since there were 125 usable responses in the sample, the sample size requirement for multiple regression is met.

Table 5-9: Sample Size Required for Power=0.80 and Alpha=0.05

# Independent Variables	Effect Size Small=0.02	Effect Size Medium=0.15	Effect Size Large=0.35
4	602	85	40
5	647	92	43
6	688	98	46
7	725	103	49
8	759	109	52
9	791	114	54
10	822	118	57
11	850	123	59
12	878	127	61
13	904	131	64
14	929	135	66
15	954	139	68
16	977	143	70

5.4.2 Regression Analysis

The stepwise multiple regression method was used to test the hypotheses of the study. SPSS was used as the statistical analysis tool. The dependent variable for this test was participation in electronic information sharing and the independent variables were benefits, costs, risks, IT capability, top management support, size, external influence, policy/legal framework, interagency trust, and critical mass.

IT capability, external influence, risks, costs and complexity were found to be significant determinants of participation in electronic information sharing, whereas benefits, top management support, size, policy/legal framework, interagency trust, and

critical mass were statistically excluded from the model by the stepwise regression method. Tables 5-10 and 5-11 show the statistics for the variables that were excluded from the model and retained in the model respectively. Table 5-11 also depicts the model summary statistics resulting from the regression analysis. For a detailed discussion of the multiple regression analysis, please refer to Appendix K.

Table 5-10: Excluded Variables

Independent Variables	Beta in	t-value	Significance
Size	.110	1.871	.064
Benefits	.035	.590	.557
Top Mngt Support	-.107	-1.722	.088
Critical Mass	-.035	-.582	.562
Interagency Trust	-.035	-.558	.578
Policy/Legal Framework	.033	.515	.607
Beta in: Standardized regression coefficients (β) that would result if the variable were entered into the equation at the next step.			

Stepwise multiple regression consists of an automatic search procedure that develops the best subset of the independent variables. Basically, this search method develops a sequence of regression models, at each step adding or deleting an independent variable. The criterion for adding or deleting an independent variable can be stated equivalently in terms of error sum of squares reduction, coefficient of partial correlation, t statistic, or F statistic (Neter et al. 1996). In order to ensure that the excluded variables were not removed due to their significance being masked by multicollinearity, correlations between the excluded and included variables were examined. Referring to Table 5-6, none of the excluded variables appeared to be highly correlated with the

variables that were included in the final model. Therefore, it can be concluded that none of the excluded variables were dropped from the model due to multicollinearity.

Table 5-11: Regression Results Explaining Participation

Independent Variables	**Beta**	**t-value**	**Significance**
IT Capability	.327	4.501	.000***
External Influence	.286	4.346	.000***
Risk	-.190	-2.975	.004**
Complexity	-.157	-2.486	.014*
Cost	-.154	-2.315	.022*
Model Summary F = 36.15 p = .000 α = .05	R= .777	R^2= .603	Adj. R^2= .586

Beta: Standardized regression coefficients (β)
* denotes significance at the $p < .05$
** denotes significance at the $p < .01$
*** denotes significance at the $p < .001$

Stepwise multiple regression consists of an automatic search procedure that develops the best subset of the independent variables. Basically, this search method develops a sequence of regression models, at each step adding or deleting an independent variable. The criterion for adding or deleting an independent variable can be stated equivalently in terms of error sum of squares reduction, coefficient of partial correlation, t statistic, or F statistic (Neter et al. 1996). In order to ensure that the excluded variables were not removed due to their significance being masked by multicollinearity, correlations between the excluded and included variables were examined. Referring to Table 5-6, none of the excluded variables appeared to be highly correlated with the

variables that were included in the final model. Therefore, it can be concluded that none of the excluded variables were dropped from the model due to multicollinearity.

Figure 5-1 provides a summary of the regression results explaining local agency participation in electronic information sharing.

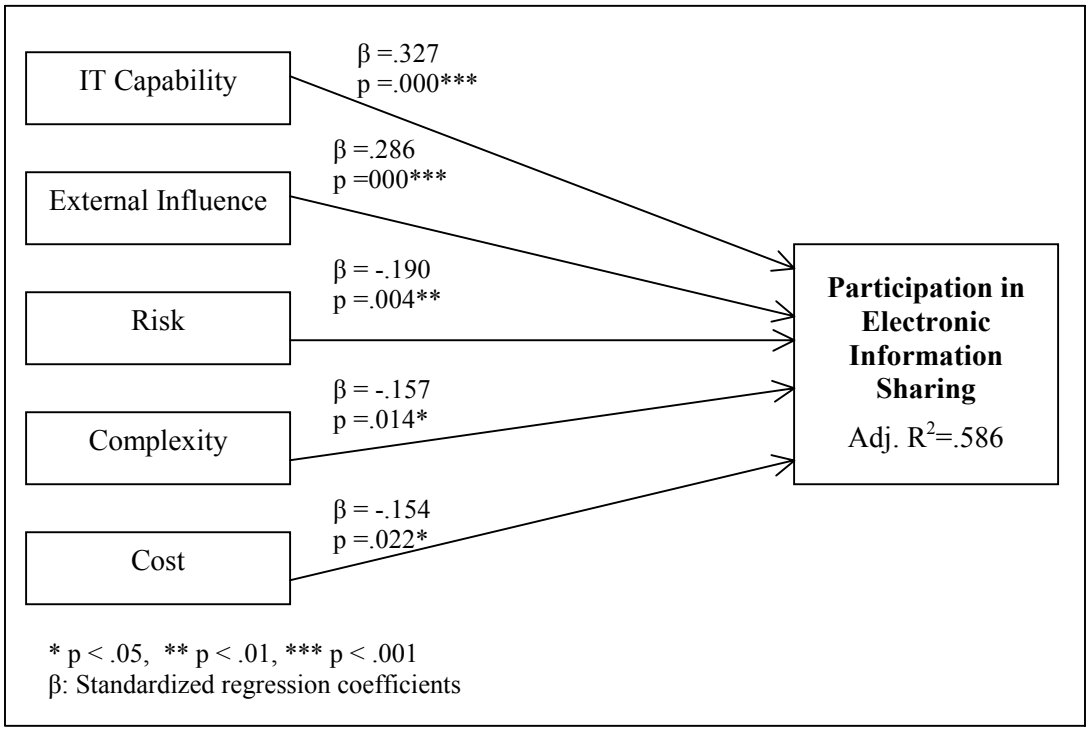

Figure 5-1: Factors that Influence Local Agency Participation in Electronic Information Sharing with State Agencies

The results of the multiple regression shows that there is a regression relation between the dependent variable and the set of five independent variables ($F^* = 36.15 > F_{.05, 5, 119} \approx 2.29$ and $p = .000 < .05$) at the α=.05 level. Moreover, the results show that the five independent variables remaining in the model explain up to 58.6% (Adjusted R^2) of the variance in participation in electronic information sharing. The results obtained from hypotheses testing are summarized in Table 5-12.

Table 5-12: Summary of Results from Hypotheses Testing

	Hypotheses	Results
H_1	Benefits will have a positive effect on local agency participation in electronic information sharing with state agencies.	Not Supported
H_2	Costs will have a negative effect on local agency participation in electronic information sharing with state agencies.	Supported
H_3	Risks will have a negative effect on local agency participation in electronic information sharing with state agencies.	Supported
H_5	Complexity will have a negative effect on local agency participation in electronic information sharing with state agencies.	Supported
H_6	IT capability will have a positive effect on local agency participation in electronic information sharing with state agencies.	Supported
H_7	Top management support will have a positive effect on local agency participation in electronic information sharing with state agencies.	Not Supported
H_9	Size will have a positive effect on local agency participation in electronic information sharing with state agencies.	Not Supported
H_{10}	External influence will have a positive effect on local agency participation in electronic information sharing with state agencies.	Supported
H_{11}	Policy/legal framework will have a positive effect on local agency participation in electronic information sharing with state agencies.	Not Supported
H_{12}	Interagency trust will have a positive effect on local agency participation in electronic information sharing with state agencies.	Not Supported
H_{13}	Critical mass will have a positive effect on local agency participation in electronic information sharing with state agencies.	Not Supported

Hypothesis H_1 examined the effects of benefits on local agency participation in electronic information sharing with state agencies. Specifically, the hypothesis suggested that benefits of electronic information sharing would have a positive effect on local agency participation in electronic information sharing. The analysis did not yield a β coefficient that was significantly different than 0 ($p = .557 > .05$) and eliminated this

variable from the model. Therefore, the results obtained from the multiple regression test did not support this hypothesis.

Hypothesis H_2 examined the effects of costs on local agency participation in electronic information sharing with state agencies. Specifically, the hypothesis suggested that costs of electronic information sharing would have a negative effect on local agency participation in electronic information sharing. The analysis revealed a β coefficient that was significantly different than 0 ($p = .022 < .05$) and in the hypothesized direction. Therefore, the results supported this hypothesis.

Hypothesis H_3 examined the effects of risks on local agency participation in electronic information sharing with state agencies. Specifically, the hypothesis suggested that risks of electronic information sharing would have a negative effect on local agency participation in electronic information sharing. The analysis revealed a β coefficient that was significantly different than 0 ($p = .004 < .05$) and in the hypothesized direction. Therefore, the results supported this hypothesis.

Hypothesis H_4 examined the effects of compatibility on local agency participation in electronic information sharing with state agencies. Specifically, the hypothesis suggested that compatibility would have a positive effect on local agency participation in electronic information sharing. Hypotheses H_4 was not tested, as it was found that the items used to measure compatibility did not demonstrate sound psychometric properties during the final stage of the instrument validation.

Hypothesis H_5 examined the effects of complexity on local agency participation in electronic information sharing with state agencies. Specifically, the hypothesis suggested that complexity of electronic information sharing would have a negative effect

on local agency participation in electronic information sharing. The analysis revealed a β coefficient that was significantly different than 0 ($p = .014 < .05$) and in the hypothesized direction. Therefore, the results supported this hypothesis.

Hypothesis H_6 examined the effects of IT capability on local agency participation in electronic information sharing with state agencies. Specifically, the hypothesis suggested that IT capability would have a positive effect on local agency participation in electronic information sharing. The analysis revealed a β coefficient that was significantly different than 0 ($p = .000 < .05$) and in the hypothesized direction. Therefore, the results supported this hypothesis.

Hypothesis H_7 examined the effects of top management support on local agency participation in electronic information sharing with state agencies. Specifically, the hypothesis suggested that top management support would have a positive effect on local agency participation in electronic information sharing. The analysis did not yield a β coefficient that was significantly different than 0 ($p =0.088 > p=0.05$) and eliminated this variable from the model. Therefore, the results did not support this hypothesis.

Hypothesis H_8 examined the effects of agency championship on local agency participation in electronic information sharing with state agencies. Specifically, the hypothesis suggested that agency championship would have a positive effect on local agency participation in electronic information sharing. Hypotheses H_8 was not tested, as it was found that the items used to measure agency championship did not demonstrate sound psychometric properties during the final stage of the instrument validation.

Hypothesis H_9 examined the effects of size on local agency participation in electronic information sharing with state agencies. Specifically, the hypothesis suggested

that size would have a positive effect on local agency participation in electronic information sharing. The analysis did not yield a β coefficient that was significantly different than 0 ($p = 0.064 > .05$) and eliminated this variable from the model. Therefore, the results did not support this hypothesis.

Hypothesis H_{10} examined the effects of external influence on local agency participation in electronic information sharing with state agencies. Specifically, the hypothesis suggested that external influence would have a positive effect on local agency participation in electronic information sharing. The analysis revealed a β coefficient that was significantly different than 0 ($p = .000 < .05$) and in the hypothesized direction. Therefore, the results supported this hypothesis.

Hypothesis H_{11} examined the effects of policy/legal framework on local agency participation in electronic information sharing with state agencies. Specifically, the hypothesis suggested that policy/legal framework would have a positive effect on local agency participation in electronic information sharing. The analysis did not yield a β coefficient that was significantly different than 0 ($p = .607 > .05$) and eliminated this variable from the model. Therefore, the results did not support this hypothesis.

Hypothesis H_{12} examined the effects of interagency trust on local agency participation in electronic information sharing with state agencies. Specifically, the hypothesis suggested that interagency trust would have a positive effect on local agency participation in electronic information sharing. The analysis did not yield a β coefficient that was significantly different than 0 ($p = .578 > .05$) and eliminated this variable from the model. Therefore, the results did not support this hypothesis.

Hypothesis H_{13} examined the effects of critical mass on local agency participation in electronic information sharing with state agencies. Specifically, the hypothesis suggested that critical mass would have a positive effect on local agency participation in electronic information sharing. The analysis did not yield a β coefficient that was significantly different than 0 ($p = .562 > p = .05$) and eliminated this variable from the model. Therefore, the results did not support this hypothesis.

Hypothesis H_{14} examined the effects of system-wide championship on local agency participation in electronic information sharing with state agencies. Specifically, the hypothesis suggested that system-wide championship would have a positive effect on local agency participation in electronic information sharing. Hypotheses H_{14} was not tested due to missing data.

5.4.3 Evaluating the Results for the Assumptions of Regression Analysis

In the section above, statistical significance test was used to evaluate the relationship between independent and dependent variables. In regression analysis there are also two other basic issues that need to be addressed:

(a) measuring the degree and impact of multicollinearity, and

(b) meeting the assumptions underlying regression. Each of these issues are considered in the following subsections.

5.4.3.1 Test of Multicollinearity

One of the issues that needs to be addressed in multiple regression is the impact of multicollinearity. Collinearity refers to the association (correlation) between two independent variables, whereas multicollinearity refers to the correlation among three or more independent variables. Multicollinearity reduces a single independent variable's

predictive power by the extent to which it is associated with other independent variables (Hair et al. 1998). Existence of multicollinearity can affect the interpretation of the results. Highly collinear variables can distort the results or make them unstable and thus not generalizable. Therefore, in order to maximize the prediction power from a given set of independent variables, it is important to test for multicollinearity.

In this study multicollinearity was tested by calculating VIF (Variance Inflation Factor) and tolerance values as suggested by Hair et al. (1998). SPSS was used to conduct these tests.

Table 5-13: Collinearity Statistics

Independent Variables	**Tolerance**	**VIF**
IT Capability	.632	1.583
External Influence	.771	1.296
Risks	.814	1.229
Complexity	.840	1.191
Costs	.751	1.331

VIF measures "how much the variance of the estimated regression coefficients are inflated as compared to when the independent variables are not linearly related" (Neter et al. 1989, p. 408). The VIF's for all the factors were significantly lower than the upper limit 10, suggesting that there were no multicollinearity effects. In addition, tolerance values for each factor were calculated. Tolerance is the proportion of each variable's variance not shared with the other independent variables. Small tolerance values (below 0.2 or 0.1) indicate collinearity. Table 5-13 reports the results of the multicollinearity

test. In this study all tolerance values were above .63, indicating very low levels of multicollinearity. For this data, none of the variables appeared to be highly correlated with other variables, meaning that the model does not suffer from multicollinearity effects.

5.4.3.2 Test of Underlying Assumptions

It is suggested that certain assumptions should be met while conducting regression analysis, to ensure the validity of the results obtained from the analysis. The assumptions that apply to this study are, linearity, homoscedasticity, and normality. The following paragraphs discuss each one of those assumptions, the tests utilized to asses these assumptions and the results obtained. Please refer to Appendix L for the outputs of all the tests that are run to check these assumptions.

The assumption of linearity was tested through an analysis of residuals and partial regression plots as recommended by Hair et al. (1998). First a scatter-plot of the studentized residuals and the predicted values was created using Stata, which is a powerful statistical package developed by the Stata Corporation. The scatter-plot did not exhibit a nonlinear pattern, thus ensuring that the overall equation was linear. Second, partial plots for each independent variable in the model were created to ensure each independent variable's relationship with the dependent variable is also linear. For each of the five variables, no nonlinear pattern was observed in the partial regression plots, thus meeting the assumption of linearity for each independent variable.

Homoscedasticity is another assumption of regression, which deals with the constancy of the residuals across values of independent variables. The assumption suggests that the "variance of the residuals at every set of values for the independent

variable is equal" (Miles and Shevlin 2001, p.99). In this study this assumption was tested through an examination of the residuals as recommended by Hair et al. (1998). The analysis of studentized residuals showed no pattern of increasing or decreasing residuals, which indicated that the assumption of homoscedasticity was met.

The assumption of normality was tested by using a normal probability plot and performing the Kolmogorov-Smirnov goodness-of-fit test, as recommended by Hair et al. (1998). In the normal probability plot, a normal distribution is indicated by a straight diagonal line and the residuals are plotted along the diagonal. If a distribution is normal, the residual data points closely adhere to the diagonal. The normal probability plot was created using SPSS, which showed that the values fell along the diagonal with no substantial or systematic departures. Thus, the residuals appeared to represent a normal distribution. The Kolmogorov-Smirnov test can be used to test the null hypothesis that the population distribution from which the data sample is drawn conforms to a normal distribution. A low significance value (generally less than 0.05) indicates that the distribution of the data differs significantly from a normal distribution. The Kolmogorov-Smirnov statistic was calculated using SPSS, which showed that the distribution follows a normal distribution ($p = 0.20$).

5.5 Results from the Open-Ended Questions

The survey instrument included three open-ended questions to gain a better understanding of the factors that influence local agency participation in electronic information sharing with state agencies. For each question, responses where categorized based on the major factors (or themes) identified in the quantitative study. In this section, the answers to these three questions are presented.

The first open-ended question asked about the major barriers to successful electronic information sharing initiatives between local and state agencies. Specifically, the question was: "In your opinion, what are the major barriers to successful electronic information sharing initiatives between local and state agencies?"

Table 5-14 reports the frequency of responses, grouped according to the major factors. Percentages are also shown in the table.

Table 5-14: Major Barriers

Factors	**Frequency**	**Percent**
Costs	75	36.23
IT Capability	37	17.87
External Influence	27	13.04
Policy/Legal Framework	14	6.76
Compatibility	14	6.76
Other	13	6.28
Risks	7	3.38
Politics	6	2.90
Benefits	4	1.93
Complexity	3	1.45
Interagency Trust	3	1.45
Top Management Support	2	0.97
System-Wide Championship	2	0.97
Total	207	100.00

An analysis of the answers obtained showed that one of the major barriers for local agencies to participate in electronic information sharing was the cost of electronic information sharing. Agencies were highly concerned about the costs associated with participation and reported that they lacked the required financial resources. Another

frequently cited barrier was related to the IT capability of the agencies, which included the lack of IT equipment and trained IT personnel. External influence in terms of lack of financial and technological assistance as well as support was also among the frequently cited barriers. Information systems that were incompatible or difficult to use were also found to be inhibiting the local agencies to participate in electronic information sharing initiatives. Lack of an adequate policy/framework including legislation, laws, standards, security, etc., that organizes electronic information sharing initiatives was also among the frequently cited barriers. Local agencies were also concerned about the limited benefits and risks of electronic information sharing as well as political issues. Lack of mutual trust, lack of top management support, and system-wide championship were also revealed as barriers to electronic information sharing, although to a lesser extent. Other cited barriers included lack of willingness to share information and two-way sharing of information, inhibitions to chance, and lack of cooperation.

The second open-ended question asked about the most important factors for successful electronic information sharing initiatives between local and state agencies. Specifically, the question was: "In your opinion, what are the most important factors for successful electronic information sharing initiatives between local and state agencies?"

According to the respondent agencies, the most important factors for successful electronic information sharing initiatives between state and local agencies included: availability of funding and equipment, assistance from state and/or federal government in the forms of training, technical and financial support, clear standards, guidelines and legislative mandates, tangible benefits, compatible and easy-to-use systems, mutual trust among agencies, reduced risks, organized efforts and full participation from all agencies.

Local agencies also mentioned that other factors, such as willingness to share information and high level of cooperation between agencies were also important for the success of electronic information sharing initiatives.

Table 5-15 reports the frequency of responses, grouped according to the major factors. Percentages are also shown in the table.

Table 5-15: Major Facilitators

Factors	**Frequency**	**Percent**
External Influence	49	26.78
IT Capability	25	13.66
Costs/	20	10.93
Policy/Legal Framework	20	10.93
Other	17	9.29
Compatibility	10	5.46
Benefits	14	7.65
Interagency Trust	10	5.46
Complexity	6	3.28
Risks	6	3.28
System-Wide Championship	3	1.64
Critical Mass	3	1.64
Total	183	100.00

The third open-ended question asked about the incentives for local agencies that were necessary to increase their participation in electronic information sharing initiatives with state agencies. Specifically, the question was: "In your opinion, what incentives are necessary for local agencies to participate in electronic information sharing with state agencies?" Table 5-16 reports the frequency of responses, grouped according to the major factors. Percentages are also shown in the table.

Table 5-16: Major Incentives

Factors	Frequency	Percent
External Influence	105	42.51
Costs	64	25.91
IT Capability	44	17.81
Benefits	11	4.45
Policy/Legal Framework	7	2.83
Other	9	3.64
Complexity	3	1.21
Risks	2	0.81
System-Wide Championship	1	0.40
Top management Support	1	0.40
Total	247	100.00

According to the respondent agencies, the major incentives necessary for local agencies to participate in electronic information sharing with state agencies included: availability of funding and equipment, financial assistance and help with the costs of electronic information sharing, grants to procure equipment, training and implementation assistance, tangible benefits for their agencies, legislative support, standardization and formalized guidelines for use and dissemination of information, user-friendly software, reduced risks of electronic information sharing initiatives and support from top management.

Local agencies also mentioned that other incentives, such as mutual information sharing (as opposed to one-way information transfer from local agencies to state agencies), an honest desire for cooperation from the state agencies, regular meetings, appreciation certifications for participating agencies, etc. would motivate local agencies to participate in electronic information sharing with state agencies.

In the next chapter, the results of the case study are presented. A description of the case is detailed, followed by a discussion of the findings. The conclusions that may be drawn from the findings of the quantitative and qualitative studies are then discussed in Chapter 7.

CHAPTER 6. RESEARCH RESULTS AND FINDINGS STUDY II (CASE STUDY)

In this chapter, the results of the case study are presented. First, a description of the case is provided, followed by a discussion of the findings. Evidence of the findings is presented via the inclusion of supporting quotes from the interviews that were conducted.

6.1 Description of the Case: The State of Louisiana Uniform Motor Vehicle Accident Report Program

The Louisiana Highway Safety Commission (LHSC) is responsible for developing and administering the state's traffic safety program. Louisiana's highway safety program is designed to reduce traffic crashes and the resulting deaths, injuries and property damage. Programs and projects are administered in accordance with uniform guidelines promulgated by the National Highway Traffic Safety Administration (NHTSA) and the Federal Highway Administration (FHWA). There are eighteen Highway Safety program guidelines, however, NHTSA and FHWA have identified nine as National Priority Program Areas (NPPA). The nine NPPA's are considered the most effective in reducing highway deaths and injuries. These include Impaired Driving, Occupant Protection, Speed, Traffic Records, Emergency Medical Services, Police Traffic Services, Motorcycle Safety, Pedestrian and Bicycle Safety, and Roadway Safety. In order to reduce the number and severity of traffic crashes, it is necessary that all programs work in a coordinated and cohesive fashion (LHSC 2002a).

Traffic crashes and the resulting deaths and injuries cost society millions of dollars each year. The estimated cost per fatal crash is over $2.7 million, and the cost of each fatality is over $800,000. The total cost of fatal traffic crashes in Louisiana in 1999 was over $2.243 billion. There were 951 fatalities in 831 crashes, 459,000 injuries and

107,000 incidents of property damage. The estimated cost to the state was $7.5 billion. 280,000 police man-hours were expended, and $41 million were diverted for lawsuits (LHSC 2002a, 2002c).

Traffic Records was assigned as one of the national priority program areas because this information is critical for framing and supporting new legislation, implementing safety programs, making highway improvements and increasing enforcement efforts. The goal of this program area is increased accuracy, accessibility, and timeliness of traffic records. Electronic information sharing among agencies facilitates this goal by providing timely, accurate and cost-effective data collection, as well as timely and valid problem identification and decision-making.

In 1998, LHSC initiated a major program to improve traffic accident reporting and electronic information sharing among local and state agencies. Three key elements of this program were:

(a) a revised accident report format – the "Revised State of Louisiana Uniform Motor Vehicle Accident Report",

(b) a re-designed centralized database for traffic incident records, and

(c) a Web-enabled data entry capability to facilitate on-line entry of traffic accident data by local law enforcement agencies. Figure 6-1 shows the Web-enabled Uniform Motor Vehicle Traffic Crash Reporting System.

A permanent Traffic Records Committee (LaTRC), which has representatives including information services specialists, policy makers, data providers, and data-users from around the state, was formed and a Traffic Records Incentive Grant was obtained from the NHTSA to facilitate program implementation. In late 1998, ninety police

academy instructors were trained on the requirements for completing the revised crash report. These instructors provided training to an estimated 10,000 police officers, deputies, and troopers. After revising the report, the crash file database was also completely revised and data was transferred to a relational database to facilitate easier manipulation of the data and greater flexibility (LHSC 2002b).

Figure 6-1: State of Louisiana Uniform Motor Vehicle Traffic Crash Reporting System (LHSC 2002d)

As a part of this effort, LHSC initiated a project to promote traffic accident data entry over the Internet into the centralized database. A consulting firm was hired to develop a system that would enable sheriff's offices and police departments to enter

traffic accident data directly into the database over the Department of Public Safety (DPS) secured web application. Moreover, for agencies that did not want to utilize data entry over Internet, a software application that could be easily linked to the centralized database was developed. The use of a centralized database would simplify the process of data collection, analysis, and decision-making, while reducing costs, errors, and duplication of efforts.

The system is discretionary in the sense that there are no federal or state government rules to dictate the use of the system. The agencies are required to report particular data to the state but there are no requirements as to how it will be reported. Among the 378 agencies, only 16 agencies are providing data via the DPS web application or other electronic means. The current status of the electronic information sharing initiative is the following:

(a) 12 agencies enter crash data on the DPS secured web application,

(b) 4 agencies have stand-alone applications and transfer the data to the state electronically using the software application provided to them,

(c) Some agencies have stand-alone applications and transfer the data to the state via hard copy for data entry,

(d) Some agencies still prefer to use traditional paper files, and transfer the data to the state on hard copy for data entry, and

(e) Some agencies do not report any crash data at all.

At the aggregate level, the lack of electronic information sharing by local law enforcement agencies is resulting in millions of dollars spent for duplicated data collection and data entry. In addition, critical information is delayed or missing. Access

to timely, relevant, and accurate information is needed to determine appropriate policies and improve decision-making to reduce loss of life, injuries, and property damage. Since the project's inception, the participation rate of local law enforcement agencies remains low, despite the concerted efforts of LHSC.

6.2 Findings

In this section, the findings of the case study are presented, organized by the major factors that were discovered during data analysis. The factors that were earlier theorized to affect local agency participation (please refer to Chapter 3 for a description of these factors) are discussed first, followed by the new factors that surfaced during the field investigation. Table 6-1 below summarizes the key study findings.

6.2.1 Characteristics of Electronic Information Sharing

6.2.1.1 Benefits

Benefits emerged as a frequently cited factor influencing local agency participation in this initiative. The case study showed that the participant agencies thought that participation in the electronic information sharing initiative helped them to achieve certain benefits such as increased information accuracy and timeliness, streamlined data management, and improved decision-making.

> "We moved to this system, which requires less effort for us. I think there are certain benefits to us…. It facilitates instant feedback and we can see where actually the problems are." (Informant from a participating local agency)

> "The original plan was we were supposed to enter the data into their system and we actually could run a computer query against the data and be able to pull information and statistics." (Informant from a participating local agency)

> "Internet is wonderful. How quickly you can retrieve your data." (Informant from a participating local agency)

Table 6-1: Barriers To Local Agency Participation in Electronic Information Sharing

Characteristics of Electronic Information Sharing

Benefits
- Lack of perceived benefits, lack of awareness of potential benefits.

Costs
- Agencies have budget constraints. Participation in electronic information sharing causes extra costs associated with implementation/maintenance/support/manpower.

Compatibility
- Not consistent with current agency needs and objectives, existence of other media/systems and satisfaction with other systems.
- Requires changes in current task allocation.
- Not compatible with existing systems, numerous standalone systems, requires double entry.

Complexity
- Difficulties in using the system, not-user friendly.

Agency Characteristics

IT Capability
- IT skills of the employees are limited. Agencies lack the required infrastructure for participation in electronic information sharing.

Top Management Support
- Lack of interest and support from agency directors. Particularly due to limited agency resources, particularly due to inhibitions to change.

Agency Championship
- Lack of a champion in the agency who understands the technology and the benefits it could provide.

Size
- Small agencies perceive more barriers in terms of financial/IT/human resources.
- Large agencies have heavy workloads; have difficulty in diverting resources from other priorities.

Environmental Characteristics

External Influence
- Limited/no contact with state agency and assistance.

Interagency Trust
- Problematic relationships, lack of trust.

Critical Mass
- Not aware of agencies successfully participating.

Policy/Legal Framework
- Lack of legislation that supports electronic information sharing.
- Lack of commitment from local agencies.
- Lack of binding contacts, reward and punishment systems.

System-Wide Championship
- Lack of system-wide championship for implementing/overseeing/marketing/funding the initiative.
- Lack of marketing. Not enough agencies are aware of the initiative.

Other Factors

Vendor Influence
- Vendors' vested interest in continued use of their services.

Politics, Resistance to change
- Politics, personal issues, resistance to change.

"The benefits are, well, to expedite the process, to make reports available to us and public on time…It is not time consuming at all. It frees up my other personnel to do the job that I need them to do. It benefits us a lot." (Informant from a participating local agency)

"What initiated was the fact that…we would be able to query our own data in their system and they would built a separate Internet screen that we could get in and we would get our statistics back and they would store and maintain the data. That was the reason why we went for it. Otherwise we didn't care whether the state got our information or not. It would cost us money and we would get nothing out of it." (Informant from a participating local agency)

"What motivated me is the fact that this would be simply wonderful. The data is readily available at my fingertips and it is paperless. In the long turn we will computerize the whole process and use Internet and hard copies would be destroyed. It was the main thing, going paperless… Information is available to us to research and retrieve… Motivation was to have information readily available to us. As soon as the deputy enters, once he submits it, I can see it." (Informant from a participating local agency)

"It provides a lot of benefits. I would not want not to have it. What we are doing is much easier right now." (Informant from a participating local agency)"

Informants from the state agency pointed out that particularly the agencies that could create a linkage between this system and their other applications were achieving great benefits by using the system.

"A lot of people simply say as far as the Internet goes, we have one city that did a wonderful job in using the Internet and taking the data supplied from the Internet transactions to load into their own personal system. It is (city/agency name omitted). They have a systematical approach they use. Other people could do that, but they really don't want to. (City/agency name omitted) enters into the Internet and we take the data, and we enter it into our database and we send sequential files, data file transferred back to (city/agency name omitted) and (city/agency name omitted) in turn loads it into their database and they use it." (Informant from state agency)

"They load the data into their database and use it for their own system. They link it to the criminal's database so they have a benefit there…Actually for the ones that are using it, the Internet actually is a better approach for them." (Informant from state agency)

It was also found that non-participant agencies' perceptions about the benefits of the system were low or they were not aware of the potential benefits. Informants from the state agency mentioned that the lack of awareness of the benefits was a major problem in obtaining agency participation.

> "One of the problems that we have had with getting some of the larger enforcement agencies on has to do with either a lack of understanding of how it can assist them in getting information more quickly, more reliably, more accurately into the system and also has to do with entrenchment their operational procedure within these particular departments." (Informant from state agency)

> "There is a myriad of reasons. The data processing department of larger cities, they have a lack of understanding of how getting information can assist them." (Informant from state agency)

It was found that one of the major reasons for low perceived benefits was related to the problems with the initial system configuration. When the system was first introduced to the local agencies, it included front and back-end edits, dependencies, and cross-reference checks. The reason to include these features was to increase the quality of data by preventing error prone data entry. However, these features slowed down the data entry process to a great extent. Moreover, the reports that had mismatching data were falling into a pending situation and it was becoming impossible for the agencies to retrieve their own data. State agency representatives explained the problems with the initial system configuration as follow:

> "There is history there. The state of Louisiana used to get the data from the locals to put it into a database. We paid for data to be entered. Then we refused to give it to the locals again. It fulfilled the needs of the state and the second part of the equation was 3-5 years late. And that caused many problems. Because cities couldn't use it at all." (Informant from state agency)

> "One of the biggest things that we had to overcome with Louisiana Highway Safety is the black hole theory. The people enter data into our

> system and they never see it again. That is what we tried to overcome. They give data to Highway Safety now and get their file back" (Informant from state agency)
>
> "A lot of people have said: "Why should I enter my data into your system first before I can enter it into my system? Am I missing something here?" So they won't do it." (Informant from state agency)

Due to these problems some agencies perceived the system as benefiting the state agency only while placing an extra burden on local agencies. Therefore, the local agencies felt like they didn't have anything to gain from participating in this initiative and, thus, were reluctant to cooperate. The study informants mentioned that information sharing required resources and they didn't feel motivated to use their limited resources as the immediate gain was not for their agency itself, but for the state agency.

> "It was a one-way street. They wanted us to enter the data, they didn't want to give us anything in return, which means that there would be no benefits for us to do that." (Informant from a non-participating agency)
>
> "We may have been willing to get the personnel to do the data entry if we had access to all the data. But it was a deal where once you enter it they won't allow us to use it back…They don't want to give anything back, so there is no benefit to us. (Informant from a non-participating local agency)
>
> "Here is the problem. It was going to be extra work for us. And we would get nothing in return for it. So we would be forced to assign someone like (person name omitted) or we may have to hire someone additionally to do the data entry. But they were not going to allow us access their database. So it was plus for them minus for us. There were no benefits for us. So we wanted to continue to do it the way we do it now." (Informant from a non-participating local agency)

6.2.1.2 Costs

One of the most frequently cited barriers to local agency participation was related to the costs/lack of resources. Participating agencies were found to be financially better off, or they were able to obtain grants from federal government sources to support their participation in this initiative.

"(Agency name omitted) has got money and they know what they are doing. They wanted a system and they had the finances." (Informant from state agency)

"Yes, there were costs involved. But we got grants from the federal government. There are law enforcement grants for agencies… there were some costs incurred for security. Computer operations division had to secure our connections." (Informant from a participating local agency)

"They (referring to non-participating agencies) need to get grants. Actually the state will tell them which grants to apply for. Our grants people learned it from our communications and asked if we could do that." (Informant from state agency)

"There are a lot of poor parishes and poor little towns that got one or two police officers and they got old cars, they are not really funded very well." (Informant from state agency)

"I would say budgetary constraints. The biggest factor is a lot of these solutions don't come cheap." (Informant from state agency)

"Then it becomes a money issue. With our agency the big concerns of having everything we want is money mainly. It takes money and resources to do it" (Informant from a non-participating agency)

"In the local offices out there, in the small offices, it becomes a workforce issue. Who's going to enter the data, who is going to maintain the equipment, who is going to purchase the equipment, who is going to pay the salaries of the people that we have to hire to do the work?" (Informant from state agency)

Study informants mentioned that the local agencies wanted the state agency to pay for the costs involved in participating in this initiative.

"One of the bigger problems is that all costs money. We are asking for them to change. They are saying: "OK, you pay for the change." It is a difficult situation. We got some ideas of how we can resolve it. I think within the next couple of years through some federal grants, the chances are higher that we can bring it together." (Informant from state agency)

"We actually talked with them about the entry over the Internet. We looked at it. At that time we didn't have the Internet connection. So it was one of those kinds of deals, buy us an Internet connection." (Informant from a non-participating local agency)

However, even though the state agency was providing the computer equipment to the local agencies at no cost, in a lot of cases it was not enough for the local agencies. Most of the local agencies also lacked the time and personnel to participate in this initiative. It was discovered that many agencies were too limited in terms of staff and budget to train even one person to enter data via the Internet.

> "One of the major costs of implementation was that of the time involved in data entry, especially for small agencies in which the data entry function is assigned to a single unit." (Informant from a non-participating local agency)

> "Lots of people began to argue about the cost of putting the data to get it in time and all these kinds of things." (Informant from state agency)

> "In some places it comes out to work load." (Informant from state agency)

> "Actually they were going to provide us the computer, but like the chief was saying we lacked the personnel too." (Informant from a non-participating local agency)

> "And the biggest problem is time. Because we are so short of staff now, I don't have time to focus on getting the right connectivity, not to mention that there will be some money involved in that." (Informant from a non-participating local agency)

6.2.1.3 Compatibility

Compatibility emerged as a frequently cited factor influencing local agency participation in this initiative. One of the dimensions of organizational compatibility has to do with the compatibility of electronic information sharing with the current agency needs and objectives. It was found that non-participant agencies did not really perceive an internal need for participating in this initiative.

> "It all depends on the objectives of the agency, and their needs. Those guys (referring to non-participating agencies) didn't perceive the need to do it. I know there are other agencies that are also looking into mobile data type of crash data collection in the vehicles." (Informant from state agency)

> "Agency needs are really important, state wants us to do something, always forgets about what we need." (Informant from a non-participating local agency)

Another related dimension of organizational compatibility refers to the compatibility of electronic information sharing with the existing operations of the agency. Non-participant agencies were satisfied with their existing systems and/or the existing way of crash report submission to the state and they felt that participation in this initiative would require changes in the existing operating practices and tasks and introduce new ways of doing things for the employees and, thus, cause extra burden on the agency in terms of financial, technological and human resources.

> "It is the old standard axiom; if it is not broken, why bother to fix it? If they have a system that is working, that satisfies them, then why should they change? And that is one of the things that we were running into." (Informant from state agency)

> "I think there is a learning curve, with some of the older people in terms of years of service becomes a very difficult issue for them to re-educate and to change an entire process of getting information into a system." (Informant from state agency)

> "Those guys if their office is functioning well the way it is they don't want to change that …Those guys do what is more comfortable to them and what they feel like that is most efficient for them. That keeps the paper (sending paper-based crash reports instead of participating in electronic information sharing) involved in." (Informant from state agency)

> "A lot of times the basic decision may require a change in policy that will allow you a new way of transmitting. Somebody who knows nothing about technology, so rather than changing, she continues with the same way." (Informant from state agency)

> "Those agencies using the Internet, they already have some workforce that is already intact. They didn't have to go out and hire extra personnel to do the work, it was more of a easy transformation for them." (Informant from state agency)

Another issue that was discovered is that electronic information sharing was not considered among the priority areas by some of the local agencies. Considering other law enforcement duties, citizen expectations, administrative challenges, electronic sharing of crash data often had to take a back seat to more pressing issues of the agencies.

> "We have 3-4 other computer projects. We would like to finish first things first. They are more important to us than accidents." (Informant from a non-participating local agency)

> "Those people who are making the major decisions are elected officials. Which means that their primary concern is to respond to what the citizens consider to be the priority." (Informant from state agency)

> "Police agencies respond to what their public considers to be priorities. In city of (city name omitted), traffic crashes are not a priority but murders are, so the emphasis is always directed towards the criminals as opposed to the traffic violations. Priorities determine where dollars are spent." (Informant from state agency)

Moreover, it was found that some agencies didn't even feel the need to collect crash related data.

> "A lot of people still think that crash data is insignificant. They might not even be collecting the data themselves, they don't collect, they don't have a need." (Informant from state agency)

> "Other cities not having the expertise or having vested interest did not choose to get on board. Because a lot of agencies don't use crash data anyway. Not one single bit. This is the fact of life." (Informant from state agency)

In terms of technological compatibility, participant agencies mentioned that they didn't have any problems in integrating/interfacing the system with their existing applications.

> "Integration was not a problem. That was fine…. Yeah, they were compatible." (Informant from a participating local agency)

> "It was very easy to integrate. We are already on a network. We have our records management system. The system is the same system. If you have

a lot of different software programs, then it would be difficult to make them talk to each other." (Informant from a participating local agency)

However, integration of technologies was still an important issue of concern for both local and state agencies. Even though there were several agencies electronically collecting crash data, they were all on different systems, which made electronic sharing difficult.

"(City/agency name omitted) Police for instance just went on the entering in crashes or accidents on the Internet now. Well, we are not ready to do that, we have a proprietary system that, if we try to do it now it is going to be double entry; enter it here and there. I would like to build a bridge in between." (Informant from a non-participating local agency)

"(City/agency name omitted) wanted to do it but they have a software that they use, that is not compatible with ours." (Informant from state agency)

6.2.1.4 Complexity

Complexity was another factor that affected local agency participation in this initiative. It was found that compared to non-participating agencies, participating agencies perceived the system to be easier to use and user friendly.

"It is very easy to use, very user friendly. It was designed similar to the crash report that is used…they took the report and created an identical report. We fill in the blanks and submit it to the state. One by one. We don't do batch processing because if some field is wrong, the report will be rejected. We correct it and resubmit it. We get it back as a flat file." (Informant from a participating local agency)

"We did a pilot with one shift. The software was loaded and we got feedback from them. We figured out how to print, we got hands-on; saw how much user friendly it was." (Informant from a participating local agency)

"We were initially using a mainframe system and keying in data to the system, which required a lot of effort. We moved to this one because it is easier to use. It is a little bit more up-to-date. It is in a format that is easier for the user." (Informant from a participating local agency)

> "Yes, I think forms are easy to read, easy to use." (Informant from a participating local agency)

The case study showed that some agencies tried the system initially, but because of its complexity they decided not to use it anymore.

> "Sometimes they (referring to the web-based system) are difficult. They are down a lot. Like one of the girls that enter the information they will get all the way to the end of data entry form and maybe they are doing some work, they are on the system and the next thing they know is they have to re-enter all the information again. If I knew it, I would think twice…" (Informant from a participating local agency)

> "It wasn't the best of systems in the beginning. There were some issues that we had to work out, ease of use. Accessibility was there, but ease of use, and understanding and so on wasn't there." (Informant from state agency)

> "But the city of (city name omitted) tested the Internet initially told us that it took too long to get into the system, which is correct. And they made a decision based upon that they couldn't use the Internet. The person inside the police department that unlike (city name omitted) they couldn't figure out how to take the data back and do things with it." (Informant from state agency)

6.2.2 Agency Characteristics

6.2.2.1 IT Capability

IT capability emerged as a frequently cited factor influencing local agency participation in this initiative. In general, the level of technological competence was higher in participating agencies. These agencies seemed to have already acquired a certain level of IT infrastructure and their employees were better trained in using information technologies.

> "(Parish/agency name omitted) Sheriff's Office is another sophisticated agency at the local level." (Informant from state agency)

> "Once again it just depends on what their needs are and how technologically advanced they are…They are very sophisticated (referring to a participating agency).

We get the Internet data from them; we send them back a flat file. They take the flat file, clean it again and put it into their own system and do all their queries. They are sophisticated." (Informant from state agency)

"Probably the one that does it better than anybody else because they have good IS people on it is the city of (city/agency name omitted)." (Informant from state agency)

"The disparity of people is so great. (Parish/agency name omitted) Sheriff's Office…(Person name omitted) he is probably the most sophisticated data person at any local level in Louisiana. He was one of the very first people to use the Internet. He has got his own database, and he does all kinds of nice jobs. He combines all of the agencies together. Very very knowledgeable guy." (Informant from state agency)

"The basic computer knowledge is not that bad because what we are doing is very specific." (Informant from a participating local agency)

"A lot of them in background came up through literally hands-on. There has been some formal training of course, but mainly it has been picking up a PC and working on it or something like that. I think the other agencies, especially in our area, I guess are very competent, and their systems are very advanced. (name omitted, referring to a participant agency) Police for instance just went on the entering in chrashes or accidents on the Internet now." (Informant from a non-participating local agency)

"Yes, my employees are comfortable with computers." (Informant from a participating local agency)

"We have around 759 employees and about 550 of them are on computers. Traffic Division is smaller. We have 12 people to enter crash data." (Informant from a participating local agency)

"Once we receive the report, we put it into computer through crash browser and get the flat file back. In the future to expedite things, the process of our data entry will be eliminated. The deputies will enter over the laptops." (Informant from a participating local agency)

"Yes, we have computer division. We get help from city information services office and we also have our own personnel in house." (Informant from a participating local agency)

"Most of the new deputies are not computer literate but familiar with computers. In addition to being physically fit and passing a psychological test, they have to be able to use computers." (Informant from a participating local agency)

It was found that relatively low computerization level of the local agency operations and the limited IT skills of the employees were important barriers to participation.

> "They don't have the equipment to actually support the concept of what is required for electronic sharing. They might not even have systems in their own environment." (Informant from state agency)

> "There are some agencies that are not wired for the Internet… Some of them are not currently hooked up to the Internet because of a resistance to change." (Informant from state agency)

> "IT knowledge within the agencies is minimum. Even within large agencies, IT is not an area that sheriff's offices have traditionally put a lot of time, money and effort into…. Mid size to large agencies few of those even have IT staff. If they do have an IT staff, it is usually one or two people." (Informant from state agency)

> "The level of computer literacy and competence at each department varies quite a bit. … We signed up (Parish/agency name omitted) Sheriff's Office to enter data on the Internet two years ago, a year and a half ago, we bought them a computer…. We entered into an agreement with them to enter data on the Internet, which is one of our ways of gathering information. We didn't realize when we did that; we believed that they had someone on staff that was capable of doing the work. We discovered after the fact that the party that was going to do the work turned to be an old deputy that really didn't know much about the Internet" (Informant from state agency)

> "We actually talked with them about the entry over the Internet. We looked at it. I think the sheriff wanted to do it. At that time we didn't have the Internet connection." (Informant from a non-participating local agency)

A lot of times employee fears and concerns about the new technology were observed.

> "But the biggest fear with the latest project is the people sit down and type down a report and where is the letter "S"? You don't realize some people just still don't know how to type. We realized that we had some guys that didn't know how to type." (Informant from a non-participating local agency)

> "I have done a brief survey just to get an idea about their basic computer knowledge, and how comfortable they feel typing and stuff. And roughly I would say about half of the guys were kind of scared when they looked at the keyboard." (Informant from a non-participating local agency)

> "Older officers, officers that have been on the job for a period of time, that are away of school for a period of time, tend to be afraid of the technology." (Informant from state agency)

Another related issue that was brought up was that the agencies usually had limited personnel that possesed the necessary IT skills to do the data entry for participation in this system. And moreover, the high turnover rate in local agencies was found to be leaving holes in IT-savvy staff, which contributed to the dissipation of the projects.

> "Let me tell you what happened in (city/agency name omitted)... They are no longer on the Internet but they were…The police chief didn't know the Internet but this secretary, she runs the office and she does the report, she does all the corresponding. She saw the Internet and she liked it and she talked to her chief and we bought her a computer, hooked them up and she started to enter the information on the Internet. They do about 300-400 wrecks a year. But she ended up quitting last year so we went up there, talked to that chief eventually about training somebody to get back to the computer. They are going back to paper. But, there you have a person, who was doing what needs to be done, doing a good job, same thing with (city/agency name omitted), when we went to visit (city/agency name omitted) that guy quit and they had a problem with somebody doing the work. It is like the champion thing we have talked about. You take that a step further that in many departments, it is just not a champion, it is actually somebody to physically do the work…So they have a computer, they are not using it. They have nobody who knows how to do it. So in that case we have an issue with the turnover, I don't know if they will ever use the Internet again." (Informant from state agency)

6.2.2.2 Top Management Support

Top management support emerged as a frequently cited factor influencing local agency participation in this initiative. A lot of times, the top management was not aware of the potential uses of crash information or was not familiar with current technology.

Lack of interest from top management to participate in electronic information sharing was also among the barriers.

> "The chief, we have a lot of chiefs and sheriffs in this state like I told you a while ago, that might not be exactly up with technology, so if they don't want to, they are not willing to we cannot do it. So that is a political consideration. That is also very important, in fact probably more important then technology. Technology is not the answer. Technology is there. It is sitting in front of you. All you have to do is just to pick it up and use it. The problem is convincing the agency heads to use it." (Informant from state agency)

> "You have a lot of chiefs and a lot of sheriffs and various officials at the local level that a lot of them don't know that traffic data can be used. A lot of them don't know the uses. A lot of them don't understand that they got a wealth of information right there." (Informant from state agency)

> "They (referring to a non-participant agency) have 3 times more accidents than we do. That would benefit them more. They will need to get a new chief to do that." (Informant from a participating local agency)

> "If your administration is not supportive, if they are afraid of change, if there is no one to motivate them; then it will not occur." (Informant from a participating local agency)

> "Those agencies (referring to non-participant agencies) need to talk to their administrators. If their supervisors are reluctant, you can't push it. Then you need to talk to computer operations, IT people, and have them explain the advantages of connection. You can get so much information almost in real time where in some agencies there is a delay." (Informant from a participating local agency)

> "You need to tell them (referring to non-participant agencies) to go to Traffic Committee meetings with an open mind. The chief has to go with an open mind. If he goes with a closed mind, nothing will change. That's because they don't want to be told what to do. They don't want challenge and struggle. But we have to accept the challenge. More agencies have to exchange info." (Informant from a participating local agency)

It was observed that, in participating agencies, top management was more supportive of adoption of technologies in general and this electronic information sharing initiative in particular.

> "Our sheriff is very supportive." (Informant from a participating local agency)
>
> "In some agencies there is resistance. Our chief pretty much relies on his support staff to make recommendations. And he pretty much goes along with what we say we need to do." (Informant from a participating local agency)
>
> "Their administration is not allowing them (referring to a non-participant agency). Probably their chief. Our sheriff and colonels were for it. Sharing among all the agencies. All administration encouraged me to do it. I said we need computers; they gave us computers." (Informant from a participating local agency)
>
> "If there is some technology that will help our agency to do our job better, do it easier, he (referring to his/her chief/sheriff) goes for it." (Informant from a participating local agency)
>
> "We were concerned about it. But we were kind of pushed through it by the sheriff at the time. The sheriff really said we got to do it and so we did." (Informant from a participating local agency)
>
> "Now they have a new chief. He is a little younger and more aggressive. They are on the Internet too. They want to do well. These people really want to do the right thing." (Informant from state agency)

The study showed that, at times, willingness to share information occurred at the line level, but these people were either reluctant to bring it up or they received little or no support from their management.

> "One of the things that we tried to do, we formed a Traffic Records Committee. It allowed us to bring representatives of the major police departments together on a monthly basis so that we can share information pertained to the technology, pertained to the needs of getting a better system of gathering a reliable and timely data… There are two representatives that come from each department. It is usually the technical person within the traffic records unit and usually the police officer who may be the administrator of that particular section…The problem you have to understand is, these positions are generally low at the hierarchy of the police department. So even though they may recognize that the change is necessary and it would be better if the changes were made, sometimes gaining access to the ultimate decision-maker is a hard thing to do." (Informant from state agency)

"A lot of people at the local levels and one individual may understand but he may not have any support from his chief or administration." (Informant from state agency)

"We have a lot of other departments; where there may be a clerk or a supervisor or maybe an MIS director in the department that would really like to use one of these products, but they can't get their chief to go along with it. " (Informant from state agency)

The reverse was also common, willingness to share at the top levels didn't always trickle down to the lower levels of the agency.

"Here is another problem. We have a convention every summer of all the police chiefs in Louisiana and I usually go to it. We have a booth, we have a computer, and we have the Internet and all the stuff. We have a police chief comes by and he says: "I really liked that. I really want to do that." Well he goes home and I have his business card and I call him the next week and I end up talking to his secretary. His secretary is the one who sells the accidents reports, she is the one at the computer desk and she is the one that is going to do the work. She says, 'I ain't doing that.' Guess what, they are not going to do it. But the chief is not the one to talk to. It is the secretary. So that's one of things I messed up with (Parish/agency name omitted), I didn't have the right person to tell me yes or no. All I got to do was to convince the secretary, the chief has already agreed to do it… And at the small departments the secretary runs the office. So once again that is another political consideration, and a personal one, it has got nothing to do with the technology. Technology is not an issue there. We are going to give them a computer, we are going to give them Internet access but the person who does the work says: 'I am not doing that, I won't do that.' They don't do it." (Informant from state agency)

"It even gets down to the clerical level. You may have an office clerk who would be responsible for entering that data and 'my workload is already to heavy, I don't want to do it.' Even if the police chief or the sheriff want to do it, the clerk may not and he might have enough influence where 'it is OK, don't worry about it'." (Informant from state agency)

"Sometimes the chief says you need to talk to some officer; who is working a shift, he is the only one who knows about the Internet. He may end up not doing it." (Informant from state agency)

6.2.2.3 Agency Championship

The study showed that that the presence of a champion within the agency was another factor that affected local agency participation in this initiative. It was found that in participating agencies there was an individual who understood the benefits of the system and provided leadership in pursuing it.

> "So (city/agency name omitted) Police Department was the first major department to use the Internet. That was primarily because they had one individual there who has understood the needs and the uses. Because of him we got the Internet, we bought them some computers." (Informant from state agency)

> "In (city/agency name omitted) there was a lieutenant down there who knew Access who wanted to use it and he convinced them." (Informant from state agency)

> "We are going to go all paperless. Our colonel and sheriff are very motivated. He wants to see that before he retires. If there is someone motivated high in the office, it is easy." (Informant from a participating local agency)

> "In each of the cases where agencies decided to participate there was an individual who understood these capabilities, understood what it could do for their agency and some of them took it to inside the agency. In some cases they were able to convince the chief." (Informant from state agency)

An informant from the state agency mentioned that it was very difficult to obtain participation from local agencies without the existence of an enthusiastic and committed individual who would play a vital role in overcoming resistance and promoting the implementation of the project.

> "Back to that champion thing, it is somebody that just doesn't care, and a lot of times, the not caring is really creating the problem…. If we don't have a person to depend on, we can't convince them." (Informant from state agency)

> "We need to have someone inside the agency to get them on board. (Informant from state agency)

6.2.2.4 Size

An interesting finding of the study was related to the effect of agency size on local agency participation. The case study showed that even though larger agencies were more likely to participate in electronic information sharing as they had more financial resources, had superior institutional capabilities such as data entry clerks and IT staff to support electronic information sharing, larger agency size didn't always lead to greater participation. On one hand, some large agencies achieved a great success in participating in this initiative. On the other hand, some other larger departments that were initially participating in this initiative had to back out either because of their heavy workload related to their other law enforcement duties or because of the large amount of crash data they had to enter into the system, which slowed down their operations.

> "And again, they have been largest cities to some degree. Actually the ones that are using it, the Internet is actually a better approach for them. Because they probably have the personnel in place already who is actually responsible for doing the work. I mean in a lot of cases, where the state crash reports there is legislation that they have to provide the reports to general public. So a lot of people have those same kind of constraints that they have to follow. So they actually have the staff in place already. A lot of people have a traffic records division within their agency... Those agencies using the Internet, they already have some workforce that is already intact. They didn't have to go out and hire extra personnel to do the work. It was more of a easy transformation for them." (Informant from state agency)

> "(Parish/agency name omitted) Sheriff's Office is another sophisticated agency at the local level. These are large departments. (Parish/agency name omitted) does about 15,000 a year and (parish/agency name omitted) 20,000 a year. They support each other. These people have their act together. They are the exception rather than the rule…" (Informant from state agency)

> "Some cities don't want to use the Internet. (City/agency name omitted) Police Department, which is the largest department in the state… Internet didn't work for them… One of the problems of (City/agency name omitted) PD (Police Department) is, their data entry personnel is not

> devoted to just traffic crash information data entry. They are doing criminal investigation, homeland security information, so the amount of time devoted to it certainly does not present a large portion of their workload. So as a result of that their city backs up in terms of getting the information in a timely basis." (Informant from state agency)

The case study also showed that small agencies, especially the ones in less developed communities, usually lacked the financial, technological and human resources, as well as the interest in participating in these initiatives.

> "In this state because across the state in Louisiana the educational levels vary so much, and so many of people in these small departments are not computer literate…" (Informant from state agency)

> "You live in a little town in Louisiana; the state in Baton Rouge is a million miles away. They don't care. We are lucky that they mail us the reports anyway." (Informant from state agency)

> "And in the minds of some of the smaller law enforcement communities there is no benefit to do it. So they don't feel the need." (Informant from state agency)

> "The smaller guy nobody forces them to do it, and they don't see any benefits, so why should they do it?" (Informant from state agency)

On the other hand, contrary to these findings, it was also found that small agencies could be more innovative and willing to participate in these initiatives especially in the cases where top management support was present.

> "Some of them adopted, (city/agency name omitted) Police Department, (city/agency name omitted), (city/agency name omitted), (city/agency name omitted) those 4 are over a 1,000 a year and small but significant departments." (Informant from state agency)

> "We have had some good success with our smaller departments because of the limited amount of crash report entry that they have. One of the problems that we have with some of our larger departments was the number of the crashes that they were dealing, they were concerned about the speed of entry…" (Informant from state agency)

> "One of smaller agencies was (city/agency name omitted). They do a great job on getting us the reports." (Informant from state agency)

"You will be surprised. Sometimes you get these little departments that are very interested, they want to do this. The town of (city/agency name omitted) for example, (city/agency name omitted) they only do 300 wrecks a year. We bought them a computer, that chief over there found about this, he came to us and we bought them a computer and they are doing the stuff on the Internet. That is just an example." (Informant from state agency)

"(City/agency name omitted) is another one. (City/agency name omitted) is a community by (Parish name omitted). That chief found out. He heard some other people talking. We bought them a computer and I have been working with that woman and she enters all the information on the Internet they are not really big. They do about 300 a year, but now she had got all her data." (Informant from state agency)

"Another one is (city/agency name omitted) Police Department. They just started now. They do about 1,500 or maybe 2,000 a year. They started on the Internet. Now that chief down there is a young chief he just took over, he is very computer literate, he knows all about this stuff and he wanted to do it. And the two women that do data entry they are not they were not real computer literate to start with. But they were interested in learning. So went down there we worked with them and they have been one of our better agencies because they care." (Informant from state agency)

6.2.3 Environmental Characteristics

6.2.3.1 External Influence

In terms of external influence, it was observed that state agency was exerting every effort to obtain participation from local agencies. These efforts varied from encouragement to recommendation and providing incentives to exposing to penalties. In some cases these efforts worked well, in others it didn't.

"I wanted to do it 3 years ago. To have a state law introduced so if they didn't mail us the wrecks, they wouldn't get the supplemental pay, that didn't work." (Informant from state agency)

"We continue to pursue it. What we have tried to do is to give the opportunity by forcing the system, sending the programming, providing data processing people, offering the expertise such as IBM, etc. We offered those services in case programming needed to be done to afford them to change. We offered to pay for it. In some agencies they accepted

our assistance, and it worked well, but some agencies decided that they did not want to do it." (Informant from state agency)

"So I got to get on the phone, call them, tell who I am and tell them why we need it. It is very challenging sometimes." (Informant from state agency)

"We offered the training to everybody in the state." (Informant from state agency)

"We gave them a federal grant that they are supposed to use for the computer." (Informant from state agency)

"Author: Can you give any incentives?
Informant from state agency: We tried that but we are really at the mercy of these departments."

"We went down there. We worked with them and they have been one of our better agencies." (Informant from state agency)

"If I had the time I would go over there and sit down with the chief, spend sometime with him. You can do some stuff on the phone. But you really have to go there and really talk to them." (Informant from state agency)

"Yes, they (referring to LHSC) encouraged us. They put their proposal forward and it sounded good at the time and we agreed to do it." (Informant from a participating local agency)

"Highway Safety approached our traffic division. We go to the traffic records committee meetings. Lieutenant told me to go and serve in the committee with him… We looked at this for a while. It was 5 years ago. We did a lot of reeducation and planning. We moved to Internet in 2000." (Informant from a participating agency)

"Actually, Highway Safety tells them what grant to apply for." (Informant from a participating agency)

"Had he not given us those reports we would have contacted the mayor, unless the chief was elected because in some small towns, the chief of police is elected. If he is elected, the mayors cannot tell him what to do. In many cases, the chief is appointed by the mayor. In those cases you can call the mayor and you can put pressure on the mayor and he can make the chief do it. We have done that. Let me give you a good example of that manifest itself. We had little town in North Louisiana a couple of years ago. I get a request from them from the mayor's office, from one of the

> people in the counselor's office. It is one of these towns that has got one of the state highways goes to the middle of town, they got a bunch of cross streets, and there is this major intersection and they have a bunch of accidents there. They want to put up a light. So the first question the highway department is going to ask them is 'How many accidents have you had in that intersection?' They say, 'I don't know' so they call me. Guess what. They have never sent me a report. So there is nothing in the database that will help. I get this chief on the phone and I say 'You know if you had been sending reports to us all along I could help you now.' Then they say 'aaa' then they begin to understand. What is even better is if the mayor calls me. And I say, "You know mayor, your chief under law is supposed to send us all these reports. If we had been getting them, we could have had a little history and we could tell you." And then they begin to realize. So that happens periodically. That does happen." (Informant from state agency)

6.2.3.2 Policy/Legal Framework

One of the barriers that emerged during the case study was the lack of legislation that requires electronic sharing of crash data. As mentioned earlier, the system is discretionary in the sense that there are no federal or state government laws to dictate the use of the system. The agencies are required to report particular data to the state but there are no requirements as to how it will be reported. It was found that lack of legislation was one of the biggest concerns of the state agency.

> "Legislation and marketing absolutely." (Informant from state agency)

> "Basically, to my knowledge I would find the biggest problem with the submission of data crash reports, is in the legislation or the lack of legislation. No one is really forced to submit crash data. There are no penalties if you don't." (Informant from state agency)

> "It is not a situation that we felt that we could command. As long as the information is provided to us in a useful form so we have it for our traffic crash manual then they have met the dictates of the law. They are giving us information, maybe it wasn't in the manner in which we wanted it but at least they are giving us a tape file or something where we can actually get the crash information. And legally that is all they have to do." (Informant from state agency)

"But the biggest deal is the lack of legislation." (Informant from state agency)

Another factor that was frequently mentioned which might be related to lack of legislation was the lack of commitment from the local agencies.

"(City/agency name omitted) demanded and city of (city/agency name omitted) did not follow through. On the other side, they have designed their own database and agreed to give it to the state and then for whatever reason they backed out of that. Our hands are tied. We can't tell them "you have to do this." (Informant from state agency)

"One of the problems is that when a sheriff leaves the new one takes over and does not keep using the system, as there is nothing binding." (Informant from state agency)

"So all of a sudden they take on their own to design a database that's going to be client-server, which they specifically argued against in their initial meeting. But that happens a lot in government when you got new people coming and this kind of stuff. Everybody has got his or her own ideas. The prior commitments are gone…. Nobody cares what the previous administration puts into place. Seldom in government do they carry an assessment of what is there and what is it going to cost me to change and all these kind of stuff? New politician comes in, takes off on his own." (Informant from state agency)

Study informants mentioned that without an effective legal mandate and binding contracts successful interagency information sharing would be difficult to achieve.

"I think to get statewide acceptance, acceptance has to be executed by demand, by law. I think one of the things certainly needs to reconciled is the penalty provisions for those agencies that don't do the things that they are supposed to be doing." (Informant from state agency)

"There is no real hammer that would say you have to do it. I think if you confront that issue, people will be looking for the most useful way to give the crash information needed. But first of all they would have to be forced to do it." (Informant from state agency)

"It is really a good system. But those to me are the biggest problems. No teeth in the law and marketability. I mean, there needs to be some type of forced legislation that forces you to do whatever you are supposed to do. I mean the only penalty there is if you don't submit well, you won't be allowed to all the legislation grant programs and the grant money in your area." (Informant from state agency)

> "Under public safety we have a lot of agencies, motor vehicles, state police, highway safety... The state police have to control that agency. The head of state police actually is the appointee of the governor. That makes it easier for us to try to take whatever initiative it is to be the best that could be when it comes to crashes. It is a big need. And if the legislation enforces, then each crash will become available." (Informant from state agency)

> "But I still think everybody comes across the same type of problems. I mean some states have legislation, say for example Kentucky. They have legislation that is enforced. Every time those guys get up and give their presentation, but yeah you have forced legislation." (Informant from state agency)

When an interviewee from a non-participant agency was asked to comment on other interagency information sharing projects that his agency is participating in, he stated that participation in the other systems were mandated by law, and he made the following interesting comment:

> "Thank goodness it is state mandated reporting; LIBRS (Louisiana Incident Based Reporting) and UCR (Uniform Crime Reporting). It is a national thing; we have to report nationally LIBRS and UCR…the reason why I say it was a good thing was that was because it is mandated, the software vendor we used. Because it is mandated throughout the state they can come in to make those program changes for us at no cost because it is mandated. So it hasn't been a major burden reporting those sorts of data elements to the state to make it compliant with our system…" (Informant from a non-participating local agency)

6.2.3.3 Interagency Trust

During the case study interagency trust was not a frequently cited factor. A few of the study informants mentioned that there was limited communication and understating between local and state agencies and there have been some difficult times in the past. Others stated that trust was not an issue that they were concerned with.

> "It is Louisiana political issues. It is not a data issue. It is not a systems issue. It is a lot of history of bad relationships between the state and the locals. And there are many people coming on board and have concerns about how negative things used to be." (Informant from state agency)

"I think that there have been certain problems and difficulties in the past…There are some issues of trust..." (Informant from state agency)

"State is only interested in only what the state wants not what the locals. And there is not much cooperation. The biggest attitude to overcome is that." (Informant from a non-participating local agency)

"No, we don't have problems sharing the information with them." (Informant from a participating local agency)

"It has been my experience once we get past the technology problem and we have a system that is beneficial to both them and us, the sharing of data is not an issue. The only time I have found that to be problem, has been with one parish. (Parish/agency name omitted) Parish doesn't want to send us copies of their fatal reports until the district attorney has finished processing them. That is a political consideration and it all has to do with one parish. But nowhere else do I have an issue." (Informant from state agency)

6.2.3.4 Critical Mass

The case study showed that local agencies were affected by the actions of similar agencies when they were making their decisions to share information electronically. Study respondents from both local and state agencies agreed that using agencies that are successfully participating in electronic information sharing helped in motivating non-participating agencies.

"They allowed me to go out and view other agencies. That helped me a lot, to visit other agencies and see their automation." (Informant from a participating local agency)

"I will meet with those guys today. I will tell them about it. If we have it, they will want to do it too." (Informant from a non-participating local agency)

"One of the things we do. We show them. We have also gone to some other cities and have shown them in other departments." (Informant from state agency)

"In fact one of the things we do with the Internet is that every time I go in and talk to somebody about the Internet is that I tell them everybody else is using it. So they want to call them, they can talk to them, and

> sometimes yes they do that and yes, when they do that it does help." (Informant from state agency)
>
> "A lot of departments operate the same, a very similar way. So I will tell, lets say I went to (city/agency name omitted); I was trying to sell them the Internet. One of the first things that I tell them is that 'you know it is already being used by (parish/agency name omitted) Sheriff's Office and (parish/agency name omitted)' especially somebody at their size that they can relate to. So yes, I do that and that does help." (Informant from state agency)

Another related important issue was also discovered. The abilities and resources of the state agency were limited. Therefore, the state agency targeted other individuals/agencies that could serve as successful benchmarks and utilized their help to promote the system.

> "We have used some local people too. We have this big conference every summer, the Traffic Records Conference. In the past we have brought some local people with us to give some presentations to show how it benefits the local level. Any meeting that we have, the traffic records meeting that you went to, we have a lot of local participation. We did that on purpose. The task force that were about ready to establish to consider the data elements for the new crash report will have a lot of local participation in it. So everything we do, that's why we are using this traffic records committee. We invite local participation. Especially from he major departments. The major cities and the bigger sheriff's offices. We have a very difficult time devising a form or doing anything at the state level without local participation. And then coming and saying you need to do this. They already give us problems. But now we can say, "well we may not have used your department, but we used this one, this one, and this one. We did ask a lot of them. And that helps a lot." (Informant from state agency)

6.2.3.5 System-Wide Championship

During the case study another most frequently cited factor was system-wide championship. The study showed that especially in an initiative that required participation from different agencies with different, often conflicting self-interests, the existence of an individual/agency was very important to gather interest in the initiative and to coordinate

its implementation. Particularly, informants from the state agency agreed on the need for such an individual or agency.

> "It is really a time consuming and very labor-intensive effort. You almost have to physically go to these departments and sit down with them, find out how computer literate they are, find out what their personal interests are, find out if the chief even cares about the data. You know there are all these issues, these are very important issues." (Informant from state agency)

> "The conclusion unfortunately that we come to, in many cases it is not the technology that is stopping us. It is the lack of internal communication, organized cooperation. That is a very difficult barrier to overcome." (Informant from state agency)

> "As a result, we have to do as much a selling process as we do helping them to get set up. You have to really go in there and tell them you know this is what you can do." (Informant from state agency)

The state agency pointed out that, they didn't get any state funding for this initiative and their resources were limited in overcoming the resistance and encouraging participation by balancing the variations in agency demands and expectations, securing the resources and robustly promoting the implementation of the project.

> "Another problem is that I am doing this all by myself. I am the only person who is doing this at the state level. I could use a staff of people to do this, right, but it is unfortunate I got 300 police departments, 60 sheriff's offices and 9 state police troops to deal with…It is very intensive to work with one department, and I have got several cities that I would like to do electronic transfer." (Informant from state agency)

> "I just don't have time to deal with them. I have got to handle (parish/agency name omitted). We have got (city/agency name omitted) problems. I got all these different things to do. It is very labor intensive to contact the department, talk to the chief, talk to the people, see what their needs are, go meet with them, maybe bring (person name omitted) back to sit down and discuss all this stuff and it has got nothing to do with technology. You got to convince them, that is the problem. Once we cross that bridge, we get that finished." (Informant from state agency)

> "Because the Commission on Law Enforcement has ample federal dollars available to assist law enforcement agencies on that side of the house

(referring to criminal justice information sharing projects). Where there is no agency in Louisiana, which has that type of the money on the traffic side of the house. If you are looking for an agency to help, it is basically us. That traffic records is only one of the priority in the programs that I run. I run nine programs, traffic records is just one of those programs." (Informant from state agency)

"We (referring to LHSC) and the DOTD (Department of Transportation and Development) are the champions now… The state doesn't care. We are the only people that care. The LHSC is the only people who care, and the DOTD. DOTD cares because they want the location information. The state police do not even care. They used to do data entry till the mid- 80's then they got rid off it. That is why LHSC does it now. State police does not even have an analyst. They don't even analyze their own data…The only two agencies at the state level that care about this are LHSC and DODT, that's it. And the state law doesn't have any teeth in it, so we are very constrained in our ability. There are some states that give millions of dollars at the state level for traffic records. We don't get a penny. Everything we do is federally funded. We don't get a solid penny of state money to do any of this. That is another issue that is very important. There are states like North Carolina, that give millions, the legislature appropriates millions of dollars to their Highway Safety and their Highway Patrol to do exactly what we are talking about: tying all these local people. The state here does not care. They don't care. They don't care. So we get no, and I am emphasizing, no state money. None. Every penny we give to LSU is all federal funds. If we don't get any federal money that is not going to happen. That is difficult when the state doesn't care. We have a lot of problems, financial wise, and staff wise. It is a big issue. That is why I keep emphasizing the technology is not the issue. The issue is the money and the caring and somebody at the higher up -level understanding the need for all of this. We went to state of Iowa several years ago. They have a model in Iowa that the federal government funded. Doing exactly what we are talking about here. In fact it is an Access database system that links all the different departments in Iowa together and they use a fiber optic network to transfer data around. Very very sophisticated. When we went on that meeting the person that greeted us, was their head of Public Safety. He was intimately involved with that…It makes a big difference when the people at the top care. You just can't get much done." (Informant from state agency)

Another factor that emerged during the study, which might be linked to lack of system-wide championship, is marketing. The study showed that there were many agencies that were not even aware of this initiative.

"Who would do the marketing, that is a good question?" (Informant from state agency)

"There are a lot of issues. But I think overall with the Internet probably was the biggest problem that I see is marketing. I just don't know if enough people are aware, that is actually there and the benefits that are there. I don't know if the marketing strategies have focused on enough of the law enforcement communities in the US. We focus on the large ones, because that is where the majority of the crashes are. But a lot of people out there just don't know about the Internet." (Informant from state agency)

"Marketing, it is really one of the biggest issues, how do you make people aware, how do you identify what you have, how do you prove your that your theory will actually work?" (Informant from state agency)

"But I think the Internet is a very useful tool. I think it needs to be marketed to a point where more people are aware of it." (Informant from state agency)

"But those to me are the biggest problems. No teeth in the law and marketability." (Informant from state agency)

" It is a pretty good system now. I would hope more people would take advantage of it. But how do you market it, what do you do? How do you get the world out? I don't know." (Informant from state agency)

When one of the non-participating agencies was contacted for an interview, the police chief mentioned that he was not aware of this initiative and he asked me to request the state agency contact him to provide more information.

"I don't know what you are talking about…. Nobody told me about it." (Informant from a non-participating local agency)

"We have DSL connection, we have the Internet. Depending on how the queries would work, what statistics we would be able to do, I wouldn't mind considering it." (Informant from a non-participating local agency)

Another non-participating agency had stated that they decided not to participate in this initiative because they were not going to be able to retrieve their data back. When the current capabilities of the system were explained to this agency, the interviewee said that they didn't hear about those developments and he added that:

> "If they are giving us a different product today it may be interesting to us today. They have never told us. We didn't want to do it because we were basically taking over their work." (Informant from a non-participating local agency)

6.2.4 Other Factors

6.2.4.1 Vendor Influence

During the case study a factor that was previously unconsidered emerged. It was found that most of the hardware and software being used by local agencies were procured from different vendors under long-term contracts. Study informants mentioned that, given the lack of IT knowledge in the local agencies, vendors played an important role in local agencies' IT decisions.

> "There is such a lack of knowledge. When the smaller agencies look for expertise who ever they go to, automatically that person becomes the Bible. Whatever that individual says, that is all they believe in. And the problem is in many cases those consultants are not up-to-date with what is going on. The technology changes so fast. Unless you are really involved in it in a daily basis, you don't recognize the changes that are occurring. Every vendor got different systems and their primary purpose is to sell you their system because that puts the money into their pocket." (Informant from state agency)

> "They are under the impression that they have a vendor that promised them some software couple of years ago, and they thought that this vendor could create a data entry screen for the crash report…They didn't realize the work that was involved." (Informant from state agency)

Moreover, when the state agency started this initiative the local agency vendors felt that their vested interests in continued use of their services by local agencies were being threatened. Since vendors had a vested interest in maintaining continued development of solutions for the local agencies, they objected to local agencies' participation in the initiative.

> "Their vendors, all these vendors when they saw the system they said, 'Oh, that is going to cause you double entry.' Why did they say that?

They had a vested financial interest in saying that doesn't happen. There is no financial incentive for them. There is a financial incentive for the vendors to say, 'Oh, we can produce a crash report for you for a slight fee half a million, one or two millions or whatever it can be.' So the vendors were really politic to get it." (Informant from state agency)

6.2.4.2 Resistance to Change and Politics

Other factors that were discovered during the case study were related to resistance to change and politics.

"We have a very big law. The law says crash information must be submitted to the Department of Public Safety. But there is no penalty involved. So our hands are tied. The police administrative says, 'I am not going to send it in.' So it is a persuasion, it is a political thing, it is coercion, it is need this, need that." (Informant from state agency)

"Remember, it is not the technology. That is not the problem. Technology is the easy part. It is all the politics that is the issue." (Informant from state agency)

"We had a sheriff last year. He is a retired state police officer. He should know better. He refused to use the form. He used the old form. The old form went out in 1999. He still uses it…that is a very big political issue. Most people don't like him. They don't want to talk to each other. I called the state police. They don't want to talk to him either." (Informant from state agency)

"So I had to call the sheriff and try to convince him. What happened was, his deputy worked at the fatality and mailed it to me as they were supposed to, but it is on the old form. That's a good example. I had to convince the sheriff of the need to use the form that is legally required. He says he doesn't like it. So strictly on a personal level, there is not a penalty, I can't do anything." (Informant from state agency)

"So once again that is another political consideration, and a personal one, it has got nothing to do with the technology. Technology is not an issue there. We are going to give them a computer, we are going to give them Internet access but the person who does the work says, 'I am not doing that, I won't do that.'" (Informant from state agency)

"You are going to find that so much of at the local level it is political. We went to city of (city/agency name omitted) about 2 years ago. The chief had a heart attack so he was out. The assistant chief was running the office. He was telling me that their City Hall had just purchased for the

police department a CAD system, which is a computer aided dispatch system and didn't tell him about it. Their engineers, their city hall, and the police department and their computer people, they didn't talk to each other." (Informant from state agency)

"It is really easy to sit down here and talk. You look at all this stuff and you see things and they don't want to listen. They have their own council. They have their own vendor, their own way of doing things." (Informant from state agency)

"We have some chiefs in the state that refuse to send us any accidents. They don't want to. It is against law. But we can't make them. There is a law, but the law has no teeth in it so we cannot enforce it. It is political… In fact last year, there was on little department in north Louisiana that, they work about maybe, oh I don't know, maybe, 2-3 hundred a year that is a pretty good number, no 200, maybe 200 a year. All those 200 were fatalities so I had to call this chief. He said, 'I know about this law, I need to talk to my attorney and see if I can do it;' he didn't want to do it. Finally I had to have my boss write them a letter and we finally convinced and now he is sending us the reports. It has nothing to do with technology, he had the reports it was just a political consideration of having to talk to this guy. We have another chief who still to this day refuses to send us reports because we didn't give him a grant a couple of years ago. He got all pissed off. So these are a lot more important issues than the technology." (Informant from state agency)

"We are working through the process of trying to convince the powers within every that agency, it is a very difficult thing for us. We recognized immediately that we needed additional expertise we went to (person name omitted). Lets just face facts. (Person name omitted) coming from (institution name omitted) wanted to talk to technology experts within the (city/agency name omitted) PD (Police Department), they see him as a threat. He comes in with all the new concepts and if the new technology guy in (city/agency name omitted) says, 'Yes, you are right, we should be doing this.' Then the administrator says, 'If (Person name omitted) knew we should be doing it why didn't you know we should be doing it?' It is not just a yes or no answer; you go to work through politics associated with it." (Informant from state agency)

"There is another issue why people don't want to give data to the State, there is (city/agency name omitted). Their concern is who owns the data. They gave us a crash report we put it into a dataset, and their concern is if they give it electronically something different will happen. It is not really." (Informant from state agency)

The following chapter discusses the conclusions that may be drawn from the findings of the quantitative and qualitative studies. Moreover, the limitations and the contributions of the study are discussed, and suggestions for further research are proposed.

CHAPTER 7. DISCUSSION AND CONCLUSION

This chapter discusses the findings, limitations, and contributions of the study, and future research directions. First, detailed discussions of the results obtained in the quantitative and qualitative studies are provided. Then, the limitations of the dissertation are addressed. The theoretical and practical contributions are presented, followed by a discussion of future research directions. Finally, conclusions are drawn concerning the dissertation effort.

7.1 Discussion

The purpose of this dissertation effort was to investigate the factors that influence local agency participation in electronic information sharing with state agencies. To achieve this goal, a research framework was developed and two separate, but related studies were conducted. The findings of these studies generally support the proposed research framework. Table 7-1 provides a summary of the findings from the quantitative and qualitative studies. In the following subsections, these findings are discussed in greater detail and recommendations concerning how to increase local agency participation in electronic information sharing initiatives are provided.

7.1.1 Characteristics of Electronic Information Sharing

7.1.1.1 Benefits

Hypothesis H_1 examined the effect of benefits on local agency participation in electronic information sharing with state agencies. Specifically, the hypothesis suggested that benefits of electronic information sharing would have a positive effect on local agency participation in electronic information sharing. In the quantitative study, the effect of benefits on local agency participation was found to be insignificant.

Table 7-1: Summary of the Findings

	Hypothesis	Quantitative Study*	Qualitative Study**
H_1	Benefits will have a positive effect on local participation in electronic information sharing with state agencies.	Not Supported	Supported
H_2	Costs will have a negative effect on local agency participation in electronic information sharing with state agencies.	Supported	Supported
H_3	Risks will have a negative effect on local agency participation in electronic information sharing with state agencies.	Supported	Weak Support
H_4	Compatibility will have a positive effect on local agency participation in electronic information sharing with state agencies.	Not Tested	Supported
H_5	Complexity will have a negative effect on local agency participation in electronic information sharing with state agencies.	Supported	Supported
H_6	IT capability will have a positive effect on local agency participation in electronic information sharing with state agencies.	Supported	Supported
H_7	Top management support will have a positive effect on local agency participation in electronic information sharing with state agencies.	Not Supported	Supported
H_8	Agency championship will have a positive effect on local agency participation in electronic information sharing with state agencies.	Not Tested	Supported
H_9	Size will have a positive effect on local agency participation in electronic information sharing with state agencies.	Not Supported	Mixed
H_{10}	External influence will have a positive effect on local agency participation in electronic information sharing with state agencies.	Supported	Supported
H_{11}	Policy/legal framework will have a positive effect on local agency participation in electronic information sharing with state agencies.	Not Supported	Supported
H_{12}	Interagency trust will have a positive effect on local agency participation in electronic information sharing with state agencies.	Not Supported	Moderate Support
H_{13}	Critical mass will have a positive effect on local agency participation in electronic information sharing with state agencies.	Not Supported	Moderate Support
H_{14}	System-wide championship will have a positive effect on local agency participation in electronic information sharing with state agencies.	Not Tested	Supported

* Supported: Statistically significant ($p <= .05$), Not supported: Statistically insignificant ($p > .05$).
** Supported: Frequently cited, Moderate Support: Moderately cited, Weak Support: Rarely cited, Mixed: Cited in both directions.

Therefore, the quantitative study results did not support this hypothesis. However, in the qualitative study benefits emerged as a frequently cited factor. The case study showed that the participant agencies thought that participation in the electronic information sharing initiative helped them to achieve certain benefits such as increased information accuracy and timeliness, streamlined data management, and improved decision-making. On the other hand, non-participant agencies' perceptions about the benefits were low or they were not aware of the potential benefits of participating in this initiative.

One possible explanation of this discrepancy between the findings of the quantitative and qualitative studies is that even though local agencies are aware of the potential benefits of electronic information sharing in general, this does not necessarily mean that they would find a particular electronic information sharing initiative similarly beneficial to their agency. This might be due to the differences among the agencies in their expectations, assumptions, or knowledge about the key aspects of the electronic information sharing initiative including its benefits. Another conclusion that might be drawn is that what matters for participation in electronic information sharing initiatives is not whether agencies agree on the potential benefits, but rather whether those benefits are salient in relation to their agency's current circumstances (Chau and Tam 1997). In this respect, the effect of benefits on participation in electronic information sharing should be examined in relation to the agencies' ability to participate in such initiatives and take advantage of their benefits.

Based on these findings, it can be argued that benefits might influence local agency participation in electronic information sharing initiatives with state agencies.

Therefore, in order to increase local agency participation in such initiatives, promotional efforts could be targeted at non-participant agencies to increase their awareness of the benefits of electronic information sharing. Moreover, electronic information sharing initiatives could be designed in a way to benefit all the participant agencies. When considering electronic information sharing projects, potential benefits could be taken into consideration along with intra-agency needs and abilities to assimilate electronic information sharing technologies.

7.1.1.2 Costs

Hypothesis H_2 examined the effect of costs on local agency participation in electronic information sharing with state agencies. Specifically, the hypothesis suggested that costs of electronic information sharing would have a negative effect on local agency participation in electronic information sharing. Both quantitative ($\beta = -.154$, $p = .022$) and qualitative study results supported this hypothesis. Moreover, the themes that emerged from the open-ended survey questions also provided strong support. Cost of participation in electronic information sharing was found to be a factor in local agencies' participation decisions.

It was observed that local agencies were highly concerned about the costs associated with participation in electronic information sharing initiatives such as set-up costs, maintenance costs and training costs. Local agencies usually have limited resources compared to state and federal agencies. Costs of participation and lack of resources hinder their abilities to take part in electronic information sharing initiatives. Many local agencies have inadequate computer hardware and software. Hence, the set-up and maintenance costs associated with new, state-of-the-art computer systems that

would be compatible with state systems are considered as additional expenditures for local agencies. In addition, in general, the employees in these agencies have limited IS skills. This requires them to be trained to catch up with new technologies, and training diverts resources from other activities.

Based on these findings, it can be argued that costs influence local agency participation in electronic information sharing initiatives with state agencies. The level of local agency participation in such initiatives can be increased through financial assistance in general, and specific technology grants in particular. It might prove helpful to clearly communicate the information about the availability of these grants, as well as how to obtain them to local agencies. Instead of creating a competitive environment for local agency technology grants, the process of allocating grants could be made more inclusive, meaning that all agencies could be considered for these grants. Moreover, educational and promotional programs could be implemented to make local agencies realize that in the long run, the benefits achieved through participation in electronic information sharing will justify the investments made. Another approach might be to consider using an Application Service Provider (ASP), where the burden of system design, development, and maintenance could be outsourced to a common third-party. Furthermore, state agencies could assist with the costs associated with ASP service provision.

7.1.1.3 Risks

Hypothesis H_3 examined the effect of risks on local agency participation in electronic information sharing with state agencies. Specifically, the hypothesis suggested that risks of electronic information sharing would have a negative effect on local agency

participation in electronic information sharing. In the qualitative study, risks of electronic information sharing did not emerge as a frequently cited factor. On the other hand, the quantitative study results supported this hypothesis (β= -.190, p = .004). In the quantitative study, risk factor exhibited a strong relationship with local agency participation in electronic information sharing. Moreover, the themes that emerged from the open-ended survey questions also provided support for this hypothesis.

It was discovered that local agencies are particularly concerned about making the information collected by their agencies available to outsiders. One concern is that agencies want to have full control over the information collected and perceive that sharing might reduce control over the information, resulting in openness to public scrutiny and, in turn, inviting external evaluation or criticism. Moreover, the accuracy or validity of the information shared can be challenged by other agencies. Another concern is related to the misinterpretation or misuse of the shared information. Agencies are also concerned about the security of information shared online and apprehensive about unauthorized access and privacy rights.

One possible explanation of this discrepancy between the findings of the quantitative and qualitative studies might be that crash data, which was the focus of the case study, was not perceived as being sensitive compared to some other types of information that is shared between local agencies and state agencies such as information on criminals, wanted person, etc. Another possible explanation might be that other factors were more important for local agencies and, hence, the risk of participation in electronic information sharing was relatively a less important factor compared to the others. Therefore, risk may not have been frequently cited.

Based on these findings, it can be argued that risks influence local agency participation in electronic information sharing with state agencies. In order to increase local agency participation in such initiatives, it might prove helpful to minimize the risks. This could be done by using interagency information sharing agreements, which clearly detail the uses of information shared, and by employing security standards and restricted access to information.

7.1.1.4 Compatibility

Hypothesis H_4 examined the effect of compatibility on local agency participation in electronic information sharing with state agencies. Specifically, the hypothesis suggested that compatibility would have a positive effect on local agency participation in electronic information sharing. The effect of compatibility on local agency participation was not tested in the quantitative study. However, in the qualitative study compatibility emerged as a frequently cited factor. Moreover, the themes that emerged from the open-ended survey questions also provided support for this hypothesis.

The case study showed that agencies that perceived electronic information sharing as being compatible with their existing information systems, functions and tasks, as well as aligned with their current needs and objectives were more likely to participate in electronic information sharing. In terms of technological compatibility, it was found that the majority of local agencies were using different systems, procured from different vendors, which made connectivity and, hence, electronic information sharing very problematic. In terms of organizational compatibility, it was found that electronic crash data sharing was not compatible with the current needs and objectives of some local agencies. Therefore, these agencies did not really perceive an internal need for

participating in this initiative. Moreover, in most cases, non-participant agencies were satisfied with the existing way of crash report submission to the state and they felt that participation in the electronic information sharing initiative system would require unnecessary changes in the existing operating practices and tasks.

Based on these findings, it can be argued that compatibility might influence local agency participation in electronic information sharing initiatives with state agencies. In order to increase local agency participation in such initiatives, it might prove helpful to promote both technological and organizational compatibility.

In terms of technological compatibility, interagency information sharing systems could be designed after a careful investigation of the existing information technologies that are used by agencies. If possible, agencies could work together to develop systems that are fully integrated. State and federal agencies could facilitate integration by providing technological and financial assistance. For this purpose, a local government technology resource center can be established. This center can provide guidelines on technology purchases, assist local agencies to procure compatible solutions, and offer other forms of technological assistance. In terms of organizational compatibility, it might prove helpful to address the needs of all the participants when designing electronic information sharing initiatives. This can be accomplished by identification of common goals and needs, as well as through increasing involvement of the local agencies during the design and development phases. Generating input from the local agencies might also be useful in ensuring that the changes introduced by participation in these initiatives will require minimal transformations in the current functioning of the agencies.

7.1.1.5 Complexity

Hypothesis H_5 examined the effect of complexity on local agency participation in electronic information sharing with state agencies. Specifically, the hypothesis suggested that complexity of electronic information sharing would have a negative effect on local agency participation in electronic information sharing initiatives. Both quantitative (β= -.157, p = 014) and qualitative study results supported this hypothesis. Moreover, the themes that emerged from the open-ended survey questions also provided support. Complexity of electronic information sharing was found to be a factor in local agencies' participation decisions. More specifically, the study findings showed that agencies perceiving electronic information sharing as a complex idea involving a complex development process had lower participation levels. Moreover, complexity of electronic information sharing technologies reduced the likelihood of participation because it required additional skills and effort from local agencies in order to participate in electronic information sharing initiatives. In the case study, it was found that some local agencies tried the web-based data entry system initially, but they found it difficult to use and discontinued using it. On the other hand, the agencies that had higher levels of participation viewed electronic information sharing as a relatively simple concept to implement and electronic information sharing technologies as easier to use and user-friendly.

Based on these findings, it can be argued that complexity influences local agency participation in electronic information sharing initiatives with state agencies. In order to increase local agency participation in such initiatives, it might prove helpful to design the electronic information sharing systems in an easy to use and user-friendly fashion. This

requires gaining an understanding of the capabilities and the organizational and staffing limitations of the local agencies.

Table 7-2: Characteristics of Electronic Information Sharing-Recommendations

Benefits
- Design information sharing projects in a way to benefit all participants.
- Promote common goals and tangible results.
- Establish promotional programs (seminars, presentations, on-site visits) to increase awareness about the benefits.

Costs
- Provide financial assistance.
- Provide technological assistance (i.e. technology grants, equipment, training and support services) at low costs, services from an ASP by costs being borne by state agencies.

Risks
- Promote interagency information sharing arrangements.
- Establish security standards.

Compatibility
- Identify and address the needs of all participants.
- Design systems after a careful investigation of existing information systems.
- Encourage local agency input in system design and development.
- Establish a local government technology resource center.
- Provide guidelines on technology purchases and assist local agencies to procure compatible solutions.

Complexity
- Gain an understanding of the capabilities and organizational and staffing limitations of the agencies.
- Design systems that are easy to use and user-friendly.
- Use prototypes during system design and development.
- Provide training to local agency employees.

Since there is a wide disparity among the IT capabilities of local agencies, a system that is perceived as easy to use by a certain agency can be perceived as a complex system by another one. In this case, using prototypes during the system design and development processes can provide a very cost-effective way in designing easy to use and user-friendly systems. Moreover, special training programs can be offered to local agency employees to increase their familiarity with electronic information sharing

technologies. As employees begin to master these technologies through training, they are less likely to be intimidated by them (Johnson and Marakas 2000).

Table 7-2 above provides a summary of the recommendations concerning characteristics of electronic information sharing that could be used to increase local agency participation in electronic information sharing initiatives.

7.1.2 Agency Characteristics

7.1.2.1 IT Capability

Hypothesis H_6 examined the effect of IT capability on local agency participation in electronic information sharing with state agencies. Specifically, the hypothesis suggested that IT capability would have a positive effect on local agency participation in electronic information sharing. Both quantitative (β= .327, p = .000) and qualitative study results supported this hypothesis. Moreover, the themes that emerged from the open-ended survey questions also provided strong support for this hypothesis. IT capability was found to be a factor in local agencies' participation decisions.

The findings showed that participating agencies, or the agencies that had higher levels of participation, perceived themselves to have the necessary technological resources to participate in electronic information sharing initiatives. These agencies seemed to have already acquired a certain level of IT infrastructure and their employees were better trained in using information technologies. On the other hand, it was observed that IT capabilities of agencies throughout the state showed great variation. Even though there are some advanced agencies, in general, most of the local agencies lack the required computer resources and their employees have limited IS skills. In these agencies, employee fears and concerns about new technology were often observed. Moreover,

since agencies had limited personnel that possesed IT skills, the high turnover rate in local agencies was found to be leaving holes in IT-savvy staff, which contributed to the dissipation of the electronic information sharing initiatives.

Based on these findings, it can be argued that IT capability influences local agency participation in electronic information sharing initiatives with state agencies. As most electronic information sharing technologies are build upon the existing information technologies and skills, agencies might tend to postpone participation in electronic information sharing until developing the necessary skills and acquiring the necessary infrastructure. In this respect, in order to increase local agency participation in electronic information sharing initiatives, technological assistance might be very helpful. Again a local government technology resource center can be very useful in helping local agencies acquire compatible technologies at low costs. Such a center can also provide help in training local agency employees and providing on-site assistance.

7.1.2.2 Top Management Support

Hypothesis H_7 examined the effect of top management support on local agency participation in electronic information sharing with state agencies. Specifically, the hypothesis suggested that top management support would have a positive effect on local agency participation in electronic information sharing. In the quantitative study, the effect of top management support on local agency participation was found to be insignificant. Therefore, the quantitative study results did not support this hypothesis. However, in the qualitative study, top management support emerged as a frequently cited factor. It was found that the lack of top management support was a barrier to local agency participation in electronic information sharing initiatives. In participating

agencies, top management was supportive of adoption of technologies in general and this electronic information sharing initiative in particular. On the other hand, in non-participating agencies, top management was not often aware of the potential uses of crash information, was not overly familiar with technology or lacked the interest to participate in electronic information sharing. The study showed that, at times, willingness to share information occurred at the line level, but these employees were not comfortable communicating this to their agency heads or they received little or no support from them.

Based on these findings, it can be argued that top management support might influence local agency participation in electronic information sharing initiatives with state agencies. In order to increase local agency participation in such initiatives, support from top management might be necessary. However, strategies that could be used to increase top management support might be limited. One possible solution can be to actively communicate the benefits of electronic information sharing to the agency heads through promotional seminars, presentations, and on-site visits. Another strategy might be to offer direct or indirect incentives to local agencies so that participation in electronic information sharing initiatives might become more appealing to the agency heads.

7.1.2.3 Agency Championship

Hypothesis H_8 examined the effects of agency championship on local agency participation in electronic information sharing with state agencies. Specifically, the hypothesis suggested that agency championship would have a positive effect on local agency participation in electronic information sharing. The effect of agency championship on participation was not tested in the quantitative study. However, in the qualitative study agency championship emerged as a frequently cited factor.

The case study showed that the presence of a champion within the agency was a supporting factor. In participating agencies, there tended to be an individual who supported and promoted the electronic information sharing initiative. Moreover, these individuals usually possessed either strong IT skills and/or leadership skills needed to overcome resistance within the agency.

Based on these findings, it can be argued that agency championship might influence local agency participation in electronic information sharing initiatives with state agencies. Therefore, in order to increase local agency participation in such initiatives, it might be useful to locate and nurture a champion who can promote electronic information sharing within the local agency. It might be helpful to take advantage of formal or informal agency contacts and staff relationships to identify individuals who can act as champions. Once such individuals are identified, promotional efforts could focus on these individuals. Champions are more likely to exert a greater persuasive influence over their peers by disseminating the information directly.

7.1.2.4 Size

Hypothesis H_9 examined the effect of size on local agency participation in electronic information sharing with state agencies. Specifically, the hypothesis suggested that size would have a positive effect on local agency participation in electronic information sharing. In the quantitative study, the effect of size on local agency participation was found to be insignificant. Therefore, the quantitative study results did not support this hypothesis. This suggests that size does not have an effect on participation. The results of the qualitative study in relation to the effect of size on participation can be viewed as ambiguous. On one hand, the results of the case study

showed that larger agencies had superior institutional capabilities such as data entry clerks and IT staff to support electronic information sharing, whereas small agencies usually lacked the financial, technological and human resources to participate in these initiatives. Compared to small agencies, larger agencies were more likely to participate in electronic information sharing initiatives.

On the other hand, some large agencies had very heavy workloads because of their other law enforcement duties as well as the high amount of crashes that happened in their area, as they served larger communities. Hence, it was difficult for them to divert their resources to the crash data sharing initiative.

Table 7-3: Agency Characteristics-Recommendations

IT Capability
- Establish a local agency technology resource center.
- Provide equipment and technological assistance including training, on-site assistance, and customer support.

Top Management Support
- Communicate the benefits of electronic information sharing through promotional seminars, presentations, and on-site visits.
- Offer direct or indirect incentives (i.e. financial incentives, awards, certification of appreciation).

Agency Championship
- Take advantage of formal or informal agency contacts and staff relationships to identify individuals who can act as champions.
- Nurture champions and channel promotional efforts through them.

Contrary to large agencies, small agencies had lesser amounts of crash data and were more willing to participate in the electronic information sharing initiative. Based on the findings of the quantitative and qualitative studies, it can be argued that that agency size does not have an effect on local agency participation in electronic information sharing with state agencies.

Table 7-3 above provides a summary of the recommendations concerning agency characteristics that could be used to increase local agency participation in electronic information sharing initiatives.

7.1.3 Environmental Characteristics

7.1.3.1 External Influence

Hypothesis H_{10} examined the effect of external influence on local agency participation in electronic information sharing with state agencies. Specifically, the hypothesis suggested that external influence would have a positive effect on local agency participation in electronic information sharing. Both quantitative ($\beta = .286$, $p = .000$) and qualitative study results supported this hypothesis. External influence was found to be a factor in local agencies' participation decisions. Agencies that perceived more influence from the state agencies were more likely to participate in electronic information sharing initiatives. For example, the case study results showed that participant agencies were encouraged by the state agency. Those agencies were in constant contact with the state agency, receiving information from the state agencies regarding the initiative, as well as technological and financial assistance. The state agency provided them with computer equipment and training necessary to enter crash data over the Internet and informed them about the available grants. On the other hand, case study results showed that non-participant agencies did not receive the same amount of influence from the state agencies. This was primarily because of two reasons. First, as the state agency had limited resources it concentrated its efforts on specific local agencies. A number of agencies were not actually approached by the state agency to participate in this initiative. Second, in some cases, in spite of the state agency's efforts to get some local agencies on board,

agencies preferred not to respond to these efforts, as they perceived other pressing barriers to participation.

Based on these findings, it can be argued that external influence influences local agency participation in electronic information sharing initiatives with state agencies. In order to increase local agency participation in such initiatives, non-coercive or coercive influence strategies could be implemented. Non-coercive efforts may include the promotional efforts and financial and technical assistance that are discussed earlier, whereas coercive efforts may include penalties for non-participant agencies or enforcing participation though legislature. However, it should be noted that coercive strategies should be kept at a minimum for the success of electronic information sharing initiatives in the long-term.

7.1.3.2 Policy/Legal Framework

Hypothesis H_{11} examined the effect of policy/legal framework on local agency participation in electronic information sharing with state agencies. Specifically, the hypothesis suggested that policy/legal framework would have a positive effect on local agency participation in electronic information sharing. In the quantitative study, the effect of policy/legal framework was found to be insignificant. Therefore, the quantitative study results did not support this hypothesis. However, in the qualitative study, particularly, the lack of policy/legal framework to organize electronic information sharing initiatives emerged as a frequently cited factor. Moreover, the themes that emerged from the open-ended survey questions also provided support for this hypothesis. Agencies mentioned the need for clear technical standards to organize interagency information sharing as well as effective legal mandates and binding contracts.

Based on these findings, it can be argued that the existence of a policy/legal framework to organize electronic information sharing initiatives might influence local agency participation in electronic information sharing initiatives with state agencies. In order to increase local agency participation, state and federal legislation or formal policies could be put into place to organize electronic information sharing initiatives between state and local agencies.

State and federal government may be able to develop ways to support interagency information sharing initiatives through legislation providing technical, financial, and political support. The role of legislation could be to encourage and facilitate the design and implementation of electronic information sharing initiatives. This framework could offer planning support, provide guidance from a national perspective, facilitate the necessary infrastructure enhancements and implement a broad, yet defined, set of principles, standards, and policies for electronic information sharing. Clear data and technical standards could be identified to reduce the inconsistencies in data definitions and simplify the sharing process. Guidelines could be established to protect the privacy rights of the individuals. Formal policies could be prepared to provide financial assistance in forms of nationwide or statewide grants for participation in electronic information sharing initiatives. Moreover, it might prove helpful if the existing legislation is carefully analyzed and modified to support and encourage electronic information sharing initiatives.

In some cases, it might be necessary to mandate participation in electronic information sharing initiatives. However, it should be noted that unless the local agencies possess the necessary financial, technological, and human resources, as well as

the awareness about the benefits of electronic information sharing, such mandates might still have limited enforcement or might result in unmotivated participants that might hinder the success of electronic information sharing initiatives in the long-term.

7.1.3.3 Interagency Trust

Hypothesis H_{11} examined the effect of interagency trust on local agency participation in electronic information sharing with state agencies. Specifically, the hypothesis suggested that interagency trust would have a positive effect on local agency participation in electronic information sharing. The quantitative study results did not support this hypothesis, whereas the themes that emerged from the open-ended survey questions and the case study findings provided moderate support. It was observed that the relationships between the local and state agencies have been problematic to some degree, and agencies had concerns in terms of trusting each other.

One possible explanation of the discrepancy between the findings of the quantitative and qualitative studies can be the existence of respondent bias. It is possible that in the quantitative study respondents might have felt apprehensive about revealing distrust among their agency and state agencies.

Based on these findings, it can be argued that interagency trust might influence local agency participation in electronic information sharing with state agencies. For the success of electronic information sharing initiatives in the long-term, promoting interagency trust might prove beneficial. This could be done through formal written interagency information sharing agreements, as well as ongoing communication between agencies. Once mutual trust among agencies is achieved, cooperation and hence interagency information sharing could be more easily accomplished.

7.1.3.4 Critical Mass

Hypothesis H_{13} examined the effect of critical mass on local agency participation in electronic information sharing with state agencies. Specifically, the hypothesis suggested that critical mass would have a positive effect on local agency participation in electronic information sharing. In the quantitative study, the effect of critical mass on local agency participation was found to be insignificant. Therefore, the quantitative study results did not support this hypothesis. However, in the qualitative study, critical mass emerged as a moderately cited factor. The case study showed that local agencies were affected by the actions of similar agencies when they were making their decisions to share information electronically. Since the abilities and resources of the state agency were limited, the state agency targeted other individuals/agencies that could serve as successful benchmarks and utilized their help to promote the system. In many cases, non-participant agencies were not aware that other agencies were successfully participating in this initiative. Study informants from both local and state agencies agreed that using agencies that are successfully participating in electronic information sharing was a helpful strategy to motivate non-participating agencies.

Based on these findings, it can be argued that critical mass might influence local agency participation in electronic information sharing initiatives with state agencies. In order to increase local agency participation in such initiatives, agencies successfully participating in electronic information sharing with state agencies could be identified and these agencies could be used to promote the system to non-participating agencies. Representatives from those agencies could give presentations to other agencies about their experiences and encourage the non-participating agencies to participate in electronic

information sharing initiatives. Moreover, state agencies could also focus on disseminating information via additional means, such as newsletters and conferences, to keep local agencies abreast of success stories involving peer agencies.

7.1.3.5 System-Wide Championship

Hypothesis H_{14} examined the effect of system-wide championship on local agency participation in electronic information sharing with state agencies. Specifically, the hypothesis suggested that system-wide championship would have a positive effect on local agency participation in electronic information sharing. The effect of system-wide championship on local agency participation was not tested in the quantitative study. However, in the qualitative study particularly, the lack of system-wide championship emerged as a frequently cited factor. The case study findings showed that the existence of a system-wide champion, who would actively support and promote the electronic information sharing initiative, as well as provide information, resources and political support, could potentially facilitate the success of such initiatives. In this respect, the state agency promoting this initiative had limited financial and human resources and was having difficulties in exerting a systematic and organized effort to gather interest in the initiative and to coordinate its implementation. Another factor that emerged during the case study, which might be linked to lack of system-wide championship, was lack of marketing. Due to the limited abilities of the state agency in championing the initiative, a number of local agencies were not even aware of the initiative.

Based on these findings, it can be argued that system-wide championship might influence local agency participation in electronic information sharing. In order to increase local agency participation in such initiatives, a committee or an organization

with the necessary resources and authorization to oversee the implementation of the electronic information sharing initiative could be established. This committee could be composed of people with the necessary project management skills and have a leader who has a good understanding of the local and state agency operations.

Table 7-4: Environmental Characteristics-Recommendations

External Influence
- Apply non-coercive and coercive influence strategies.

Policy/Legal Framework
- Promote legislation that facilitates electronic information sharing.
- Establish clear data and technical standards.
- Utilize formalized guidelines for use and dissemination of information and emphasize security measures.
- Provide formal policies for financial assistance.

Interagency Trust
- Utilize formal written interagency information sharing agreements.
- Encourage open and honest communication between agencies.

Critical Mass
- Utilize successful agencies to promote the systems.
- Keep local agencies abreast of success stories involving peer agencies via state-wide presentations, newsletters, conferences.

System-Wide Championship
- Form a committee with the requisite resources, authorization, and project management knowledge.
- Promote equal and adequate presentation of local and state agencies on initiative committees.

Moreover, in order to balance the interests of the agencies involved in the initiative, it might prove helpful if both state and local agencies have equal and adequate representation in the committee. This committee can coordinate all the activities related to the electronic information sharing initiative, be in ongoing contact with the agencies involved in the initiative, and act as a liaison if conflict arises. Table 7-4 above provides a summary of the recommendations concerning environmental characteristics that could be used to increase local agency participation in electronic information sharing initiatives.

7.1.4 Other Factors

During the qualitative study, additional factors that were previously unconsidered emerged. The case study revealed that resistance to change and political considerations were also among the factors that influenced local agency participation in electronic information sharing initiatives. Given the lack of IT knowledge in the local agencies, vendors were found to be influencing local agencies' IT decisions. Since vendors had a vested-interest in maintaining continued development of solutions for the local agencies, they were against local agencies' participation in the electronic information sharing initiative by using the Web-based data entry system. In addition to vendors' objections, resistance from the agency heads and/or employees was also observed. Moreover, political considerations of agency heads also restricted local agency participation in such initiatives.

Based on the above discussions, it can be argued that in order to increase local agency participation in electronic information sharing initiatives, it might prove helpful if potential sources of conflict and resistance are identified in advance. Individuals may resist change, as they are concerned about the impacts on their personal status, authority, power and job security.

Similarly, vendors can also object to change, as they are concerned about the possibility of losing their customers and profits. Once the potential sources of conflict and resistance are clearly understood, then specific strategies can be developed to minimize these problems before they arise. These strategies can include clearly communicating the objectives of electronic information sharing initiatives to the agencies so that the employees and agency heads would understand the needs for such initiatives and would

not feel threatened. Including these individuals in the planning process could facilitate the identification of potential impacts concerning participation in electronic information sharing initiatives, as well as their effects on existing tasks and employee roles. Defining strategies to minimize disruption might also prove helpful.

Moreover, technological assistance could be provided to local agencies to improve their methods for procuring information technologies and to overcome the current vendor-driven status of these agencies. It might also prove useful to promote better communications and cooperation between agencies and vendors. The importance of interagency information sharing and compatible information technologies could be emphasized to vendors.

Table 7-5: Other Factors-Recommendations

Resistance to Change

- Identify potential sources of conflict in advance.
- Develop specific strategies to address concerns.
- Clearly communicate initiative objectives to management and employees.
- Ensure job security.

Vendor Influence

- Provide assistance to local agencies to improve their procurement methods and overcome vendor-driven decision-making.
- Promote better communication and cooperation between agencies and vendors.
- Emphasize importance of information sharing and compatibility.
- Provide formal guidelines and standards for local agencies to follow in procurement of information technologies.

As an alternative form of governance, federal or state government can determine a clear set of guidelines and standards for the local agencies to follow in the procurement of information technologies. Yet, local agencies can make their own decisions among different alternatives as long as they meet the federal or state guidelines. Table 7-5

provides a summary of the recommendations concerning other factors that could be used to increase local agency participation in electronic information sharing initiatives.

7.2 Limitations

Like every research endeavor, this study is limited in certain respects. These limitations must be taken into account while interpreting the research results. In this section, the limitations surrounding the quantitative and qualitative studies are discussed.

One limitation of the quantitative part of the study was the inability to test all of the hypotheses. Three hypotheses (H_4, H_8 and H_{14}) were not statistically tested. Specifically H_{14}, which was designed to examine the effects of system-wide championship on local agency participation in electronic information sharing with state agencies, was not tested due to missing data. Hypotheses H_4 and H_8, which investigated the effects of compatibility and agency championship respectively, were not tested, as it was found that the items used to measure these factors did not demonstrate sound psychometric properties during the final stage of the instrument validation process. Even though the items used to measure these two variables had high factor loadings when evaluated individually, they cross-loaded on other factors when all the measurements were factor analyzed together. One possible way to include these two variables was to use single-item measures. However, use of single-item measures is not advisable as reliability and validity becomes difficult if not impossible to ascertain (Dennis and Valacich 2001). Since it could not be guaranteed whether the item measured the construct that it was intended to measure, these factors were no longer considered for subsequent statistical analysis. A qualitative study was also conducted and, hence, this limitation was overcome to some extent. However, future work should be conducted to

measure the effects of these factors on local agency participation in electronic information sharing initiatives with state agencies.

Another limitation of the quantitative study was that the single informant method was used for data collection. As mentioned earlier, the quantitative study targeted sheriffs and police chiefs as the key informants in the agencies. Therefore, the surveys were directly sent to them. In most cases, these individuals themselves completed the surveys that were used to solicit data for the quantitative study. In other cases, they passed the surveys to a knowledgeable individual in the agency. In both cases, it is possible that the respondents might have selected the responses that they believed were socially desirable. Hence, since multiple respondent sources were not used in this study, the extent to which the responses accurately reflected the actual situation is difficult to interpret. Future studies might utilize multiple respondents to overcome this limitation.

The major limitation of the qualitative study was the limited number of interviews. The local agencies that participated in the case study were selected based on their proximity and willingness to participate rather than being selected by a random process. Therefore, there is no assurance that these agencies are representative of the other local agencies. As a part of the future research efforts, more local agencies will be interviewed to overcome this limitation.

Another related issue involved the success of this electronic information sharing initiative. This project is an important concern to the state agency. Therefore, the informants in the state agency were more willing to spend time during the interviews, which might have resulted in collecting more data from the state agency. On the other hand, local agency interviews, especially the ones that were conducted over the phone,

were shorter in duration. This might have resulted in accumulation of less data from local agencies. Longer interviews could have resulted in richer responses and, therefore, future work will attempt to capture greater depth by longer face-to-face interviews. In order to overcome any biases that might have been caused by this situation, evidence of the findings were presented via the inclusion of supporting quotes from the interviews along with the type of the agency that made the comment.

Another limitation that applies to the both qualitative and quantitative studies is related to the generalizability of the study findings. The sample was restricted to the law enforcement community in the state of Louisiana, which means the findings may not be generalized to other local-state government electronic information sharing initiatives in other states. Future work should be conducted in different contexts using complementary samples to address the issue of generalizability.

7.3 Theoretical and Practical Contributions

7.3.1 Theoretical Contributions

This study has a number of theoretical implications and contributes to the state of the knowledge in the information systems, public administration and management communities. Specifically, it adds to the literature on IT adoption, interorganizational and interagency information sharing, digital government in general and governmental information systems and state-local information systems in particular.

An extensive review of pertinent literature revealed that research on electronic information sharing among government agencies was very limited in general. In particular no academic research addressing local agency participation in electronic information sharing initiatives with state agencies had been conducted. Only two

academic studies related to interagency information sharing were discovered, which were conducted in the public administration domain. These two studies focused on information sharing initiatives among federal and/or state government agencies and did not address the phenomena in the context of state and local agencies. This research addressed this existing research lacuna, by developing and empirically validating a rigorous theoretical framework to better understand local agency participation in electronic information sharing with state agencies.

This study extended two previous theoretical models of interagency information sharing (Dawes 1996, Landsbergen and Wolken 2001) by synthesizing well-established theories such as diffusion of innovations, critical mass theory and social exchange theory. In addition to the two factors investigated in these studies -benefits and costs (including risks) of electronic information sharing- several new factors were incorporated into electronic information sharing research framework.

This study also provided support for the factors that have been studied in the technology adoption literature in a new context – state-local electronic information sharing initiatives. Additional factors such as resistance to change, political factors and vendor influences were identified during this study. These factors can be incorporated into the future studies. Moreover, as direct use of previous instruments was not always possible, most of the constructs used in the study were operationalized by modifying these instruments. Particularly, the instrument used to measure policy/legal framework was created and validated for this study based on literature concepts. This psychometrically sound instrument can be easily leveraged in further research in this area.

One of the key strengths of this study was its methodological approach. The study employed both quantitative and qualitative techniques to investigate the research question. While the quantitative study provided useful information, the qualitative study helped surface additional factors that would have remained undiscovered via quantitative techniques. Therefore, utilizing both techniques led to a richer understanding of the phenomena under investigation. In this respect, this study can serve as an exemplar piece concerning how quantitative and qualitative studies can be used together.

7.3.2 Practical Contributions

The findings of this study are important and relevant to federal, state and local government agencies and the directors and IT managers of these agencies. This study also makes a significant contribution to our society at large.

Information sharing among government agencies has the potential to provide increased efficiencies in government operations and improved services to the citizens. Although government administrators recognize the importance of electronic information sharing among government agencies and the significant benefits it can provide to policy-makers, agencies, and to the public in general, government agencies face several technological, organizational, political and economic barriers to electronic information sharing (Dawes 1996, Landsbergen and Wolken 2001, Rocheleau 1997). The success of interagency electronic information sharing initiatives requires a detailed examination of these barriers combined with an application of solutions that are specifically tailored to address these barriers. Therefore, this research constitutes an initial step toward achieving this goal.

Moreover, this study also has important implications for the law enforcement community in general and local law enforcement agencies and state agencies in the state of Louisiana in particular. An urgent need was detected for improved interagency information sharing among law enforcement agencies, as these agencies play a critical role as sources of information needed to fight crime and terrorism, as well as protect the safety of citizens. Based on the factors identified in this study, statewide or nationwide programs can be designed to increase interagency information sharing among law enforcement agencies. Moreover, this research endeavor addressed a particularly salient issue in the state of Louisiana. The findings of the quantitative and qualitative studies will be used to develop a set of intervention strategies to enhance electronic information sharing initiatives in the state.

7.4 Future Research Directions

This research constitutes an initial step toward understanding the factors that influence local government participation in electronic information sharing with state agencies. A systematic program of research is required to gain a more comprehensive understanding of the factors that effect electronic information sharing among government agencies.

In this study, the sampling frame was restricted to the law enforcement agencies in the state of Louisiana. In order to increase the generalizability of the results, the study will be replicated in different contexts using complementary samples to identify the boundary conditions of the theoretical model. For example, future work will focus on the experiences of different states and/or different types of government agencies other than law enforcement agencies. First, the applicability of the framework will be tested in

other states by limiting the sample to law enforcement offices. Then, the experiences of other types of local government agencies in Louisiana will be examined. Synthesizing the findings of these studies, other future work will focus on other types of local government agencies in other states. The findings will then be used to create a knowledge repository for best practices.

Electronic information sharing between local and state agencies is just a small part of the nationwide information sharing. Information sharing involves the transfer of information from a holder entity to a receiver entity (NASCIO 2000). An information holder entity can also be an information receiver entity with the same relation depending on the reciprocity of the information transfer. The entities involved in nationwide information sharing can vary. Table 7-6 (modified from NASCIO 2000, p. 9) provides examples of the entities that can be involved in interagency information sharing, as well as the examples of information that can be shared between those entities.

An important avenue for future work involves investigating the factors that influence electronic information sharing among the entities identified in the table above. Different factors may come into play when information is shared among peers (such as local-to-local or state-to-state information sharing) or when it is shared among government agencies in different levels of the hierarchy (such as local-to-state or local-to-federal information sharing). The factors that influence participation might change based on the type of the agencies involved in the information sharing relationship, presenting another important issue for examination. For example, law enforcement agencies might be more willing to (or reluctant to) share information with other law enforcement agencies versus the courts or district attorneys.

Table 7-6: Examples of Interagency Information Sharing

Information Holder	Information Receiver	Example
Local Government	Local Government	Police to Prosecutor
Local Government	State Government	Police to Criminal History
Local Government	Federal Government	Police to FBI
State Government	Local Government	Criminal History to Prosecutor
State Government	State Government	Public Safety to Transportation & Dev.
State Government	Federal Government	Prison to Bureau of Prisons
Federal Government	Local Government	Response to Warrant Check
Federal Government	State Government	FBI to Sate Police
Federal Government	Federal Government	INS to FBI
All	All	Criminal Investigation

All these issues must be carefully examined and incorporated into the research framework for a more comprehensive understanding of the factors that influence electronic information sharing among government agencies. Moreover, even though information sharing between government agencies and private organizations and citizens is not included in Table 7-6, it is also an important area of research for future efforts.

Another important extension of this study involves the development and application of intervention strategies that can be used to increase participation in electronic information sharing initiatives. Based on the knowledge accumulated in the quantitative and qualitative studies, an action plan that includes a set of recommendations will be developed and implemented. As a first step, this effort will only target the agencies involved in the electronic information sharing initiative that was the focus of the qualitative part of this dissertation.

Future work will also utilize other theory bases to shed light into the factors that influence electronic information sharing among government agencies. The first step will be to combine the insights of Stakeholder Theory (Freeman 1984) and Technological Frameworks Approach (Leon 1995, Orlikowski and Gash 1994). Information sharing among government agencies requires the participation of different stakeholders that have different self-interests and priorities, as well as different perceptions and expectations about the interagency information sharing initiative. Many times, these self-interests, perceptions and expectations may not match or may even conflict. However, for successful interagency information sharing initiatives, it is necessary to balance these interests and expectations to make all the agencies involved equal parties in the information sharing arrangements. Therefore, stakeholder theory, which is "about managing potential conflict stemming from divergent interests" (Frooman 1999, p. 193) as well as technological frameworks approach, which focuses on the incongruencies of technological frameworks among the stakeholders -differences in expectations, assumptions or knowledge about key aspects of technology- can provide important insights in investigating interagency information sharing initiatives.

7.5 Conclusion

This study investigated the factors that influence local government participation in electronic information sharing with state agencies. Synthesizing the pertinent literature on interagency information sharing and well-established theories such as diffusion of innovations theory, critical mass theory and social exchange theory, a research framework was developed and specific hypotheses were derived to test the proposed research framework. Two separate, but interrelated studies were conducted to address the

research question under investigation. The first study involved the collection and analysis of survey data from local agencies to statistically test the proposed research framework and hypotheses. The second study involved the collection and analysis of qualitative data related to a major state-local electronic information sharing initiative to seek additional support for the findings of the quantitative data analysis and to identify additional factors that were not discovered in the quantitative part.

The results indicate that a number of technological, organizational and environmental factors affect local agency participation in electronic information sharing initiatives. Therefore, the study has a number of theoretical and practical implications. This study contributes to the state of the knowledge in the information systems, public administration and management domains. Specifically, it adds to the literature on IT adoption, interorganizational and interagency information sharing, digital governments in general and governmental information systems and state-local information systems in particular. The findings of this study are important and relevant to federal, state and local government agencies and the directors and IT managers of these agencies. This study also makes a significant contribution to our society at large. Once the factors that facilitate or hinder participation in electronic information sharing initiatives are identified, specific strategies can be developed to increase electronic information sharing among government agencies. An important extension of this research will be to develop and implement intervention strategies to facilitate participation in these important initiatives. Based on these strategies, statewide or nationwide programs can be implemented and legislation can be enforced to increase electronic information sharing among government agencies.

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APPENDIX A
CONSTRUCTS, ITEMS AND QUESTIONNAIRE CROSS-REFERENCE

TABLE A-1: Constructs, Items and Questionnaire Cross-Reference

Constructs	Items	References
Benefits	Question 7, Items 1-16	Dawes (1996), Dawes et al. (1997a,b) Landsbergen and Wolken (2001)
Costs	Question 6, Items 1-4	Premkumar et al. (1994) Chau and Jim (2002)
Risks	Question 6, Items 8-12	Dawes (1996), Dawes et al. (1997a,b) Landsbergen and Wolken (2001)
Compatibility	Question 8, Items 14-18	Grover (1993) Premkumar and Ramamurthy (1995)
Complexity	Question 8, Items 4-5	Grover (1993)
IT Capability	Question 8, Items 7-13	Thong (1999), Grewal et al. (2001) Premkumar and Ramamurthy (1995)
Top Management Support	Question 8, Items 1-3	Grover (1993)
Agency Championship	Question 8, Item 41 Question 9, Item b	Grover (1993) Premkumar and Ramamurthy (1995)
Size	Question 14, Items c,d	Grover (1993) Brudney and Selden (1995)
External Influence	Question 8, Items 34-38	Chwelos et al. (2001)
Policy/Legal Framework	Question 8, Items 39-40	Dawes (1996), Dawes et al. (1997a,b) Landsbergen and Wolken (2001)
Interagency Trust	Question 8, Items 31-33	Zaheer et al. (1998)
Critical Mass	Question 8, Items 20-22	Bouchard (1993)
System-Wide Championship	Question 8, Item 42 Question 10, Item b	Grover (1993) Premkumar and Ramamurthy (1995)
Participation	Question 2, Item 3-10 Questions 3-5	Massetti and Zmud (1996)

APPENDIX B
LETTER PROVIDED TO LOUISIANA ASSOCIATION OF CHIEFS OF POLICE

LOUISIANA STATE UNIVERSITY
AND AGRICULTURAL AND MECHANICAL COLLEGE
Department of Information Systems and Decision Sciences

Norman C. Ferachi
Executive Director
Louisiana Association of Chiefs of Police
603 Europe Street
Baton Rouge, LA 70802

Subject: Interagency Information Sharing Research Study

Dear Mr. Ferachi:

I am writing to request your help about a research study being conducted by Louisiana State University.

The purpose of this study is to identify the barriers to electronic information sharing by local law enforcement offices and to develop strategies that can be used to reduce these barriers. While inter-agency information sharing to support intelligence functions is not a new goal, the September 11, 2001 terrorist-related events increased awareness of the importance of information sharing and analysis capabilities. In this respect, the study is an important one that will help law enforcement offices to enhance their abilities to fight crime and terrorism and to protect the safety of citizens.

The data collection part of this study includes a survey that is being sent to all of the local law enforcement offices in Louisiana. The survey is completely voluntary. All individual responses will remain strictly confidential; only summary statistics will be reported.

I would like to request your help locating an updated list of Louisiana's Chiefs of Police, particularly the names, and addresses of the Chiefs of Police in Louisiana. Please be assured that this information is sought for research purposes only and will not be released.

Ms. Asli Akbulut, a doctoral student in Information and Decision Sciences Department at Louisiana State University, is conducting this research under my supervision. She will be in touch with you regarding this study.

Thank you very much for helping with this important study. Please feel free to contact me at 225-578-2516 or hschnei@lsu.edu if any additional information is needed.

Sincerely,

Dr. Helmut Schneider
Ourso Family Distinguished Professor of Information Systems
and Chairman of Information Systems and Decision Sciences at LSU

APPENDIX C
PRE-NOTICE LETTER

LOUISIANA STATE UNIVERSITY
AND AGRICULTURAL AND MECHANICAL COLLEGE
Department of Information Systems and Decision Sciences

«DATE»

«PREFIX» «FULL_NAME»
«AGENCY»
«ADDRESS»
«CITY»,«STATE» «ZIP»

SUBJECT: 2003 Electronic Information Sharing Survey

Dear «PREFIX» «LAST NAME»:

A few days from now you will receive in the mail a request to fill out a brief questionnaire for an important research project being conducted by Louisiana State University.

The purpose of this survey is to identify the barriers to electronic information sharing perceived by local law enforcement offices and to develop strategies that can be used to overcome these barriers. While inter-agency information sharing is not a new goal, the September 11, 2001 terrorist-related events increased awareness of the importance of information sharing and analysis capabilities. In this respect, the study is an important one that will help law enforcement offices to enhance their abilities to fight crime and terrorism and to protect the safety of citizens.

I am writing in advance because we have found many people would like to know ahead of time that they will be contacted. The survey is being sent to all of the local law enforcement offices in Louisiana and your input is very important to us. Once you receive the survey you can either fill it out yourself or give it to the person who is most involved in your agency's information sharing initiatives. You will be provided with a self-addressed, postage-paid envelope to return the survey, or you can access the survey on the Internet and complete it online.

Thank you for your time and cooperation.

Sincerely,

Dr. Helmut Schneider
Ourso Family Distinguished Professor of Information Systems
and Chairman of Information Systems and Decision Sciences at LSU

APPENDIX D
COVER LETTER

LOUISIANA STATE UNIVERSITY
AND AGRICULTURAL AND MECHANICAL COLLEGE
Department of Information Systems and Decision Sciences

«DATE»

«PREFIX» «FULL_NAME»
«AGENCY»
«ADDRESS»
«CITY»,«STATE» «ZIP»

SUBJECT: 2003 Electronic Information Sharing Survey

Dear «PREFIX» «LAST NAME»:

Recently you received a letter informing you about a survey for an important research project being conducted by Louisiana State University.

The purpose of this survey is to identify the barriers to electronic information sharing perceived by local law enforcement offices and to develop strategies that can be used to overcome these barriers. While inter-agency information sharing is not a new goal, the September 11, 2001 terrorist-related events increased awareness of the importance of information sharing and analysis capabilities. In this respect, the study is an important one that will help law enforcement offices to enhance their abilities to fight crime and terrorism and to protect the safety of citizens.

The survey is being sent to all of the local law enforcement offices in Louisiana and your input is very important to us. The survey should take approximately 15-20 minutes to complete. You can either fill out the survey yourself or give it to the person who is most involved in your agency's information sharing initiatives. We encourage you to participate, but your participation is completely voluntary. You can either complete the enclosed paper survey and send it back to us in the enclosed self-addressed, postage-paid envelope, or you can access the survey at **http://cvoc.bus.lsu.edu/SS/wsb.dll/aakbul1/survey.htm?ID=1111** and complete it online. The online survey may be completed any time at any computer that has Internet access.

Please be assured that this information is sought for research purposes only and your responses will be strictly confidential. Only summary statistics will be reported. No individual's responses will be identified as such and the identity of persons responding will not be published or released to anyone. Thank you very much for helping with this important study. We know that you are very busy and appreciate you taking the time to complete the survey. To learn more about this study or receive a summary of the study findings/recommendations, please send the enclosed self-addressed, postage-paid postcard to us. If you have any questions or would like to share any additional feedback, please feel free to contact us at any time.

Sincerely;

Dr. Helmut Schneider
Ourso Family Distinguished Professor of Information Systems
and Chairman of Information Systems and Decision Sciences at LSU

APPENDIX E
PAPER-BASED VERSION OF THE SURVEY

LOUISIANA STATE UNIVERSITY
AND AGRICULTURAL AND MECHANICAL COLLEGE
E. J. Ourso College of Business Administration
Department of Information Systems and Decision Sciences

2003 Electronic Information Sharing Survey

The purpose of this survey is to identify the barriers to electronic information sharing perceived by local law enforcement offices and to develop strategies that can be used to overcome these barriers. This survey will help local law enforcement offices voice their concerns, issues, and expectations about participating in electronic information sharing initiatives.

We estimate that this survey will take approximately 15-20 minutes to complete. All individual responses will remain strictly confidential; only summary statistics will be reported. If you have any questions about this survey, please do not hesitate to contact Dr. Helmut Schneider.

Please remember to return the completed survey no later than «Date» in the enclosed envelope or fax to the address below. If you prefer, you can complete the survey online at:

http://cvoc.bus.lsu.edu/SS/wsb.dll/aakbul1/survey.htm?ID=1111

ACKNOWLEDGEMENTS: We would like to extend special thanks to **ICJIS Program Manager Stephen Craft** and **Louisiana State-level ARMMS Coordinator Charles Borchers, IV** for their contributions of time and effort throughout the development of this survey.

Dr. Helmut Schneider
Professor and Chairman
Department of Information Systems & Decision Sciences
Louisiana State University
Baton Rouge, LA 70803-6316
Ph: 225-578-2516, Fax: 225-578-2511
Email: hschnei@lsu.edu

2003 Electronic Information Sharing Survey

This survey can be completed online at **http://cvoc.bus.lsu.edu/SS/wsb.dll/aakbul1/survey.htm?ID=1111**

1. What electronic information management and/or sharing system(s) does your agency currently use? Please mark all that apply.

- ❑ ADSi "Force" Suite (Data Force, CAD Force, etc.)
- ❑ Automated Records Management and Mapping System (ARMMS)
- ❑ Law Enforcement Management Information System (LEMIS)
- ❑ New World Systems (AEGIS)
- ❑ PTS Solutions WinJustice Suite
- ❑ Other (Please specify): _____

_____

_____

- ❑ N/A – My agency does not currently record information electronically.

2. To what extent are the following communication types used by your agency to share information with state agencies? For each type below, please place a checkmark in the box that best describes your view.

	No Usage ⬇	Low Usage ⬇	Moderate Usage ⬇	High Usage ⬇	Very High Usage ⬇
Paper					
Telephone/Fax					
E-mail					
Internet					
Extranet					
Other Network (Please specify): _____					
Disk/CD/DVD					
Magnetic Tape					
Shared Databases					
Other (Please specify):_____					

3. Approximately what percent of all information shared between your agency and state agencies is shared electronically?

0% 1-20% 21-40% 41-60% 61-80% 81-100%

4. Approximately how long has your agency been sharing information electronically with state agencies?

0 Years < 1 Year 1--3 Years 4-6 Years 7-9 Years 10+ Years

5. Please describe the types of information (e.g. arrest information, criminal history information, warrant information, etc.) that your agency shares with state agencies.

a. In the "Type of Information" column, please list the types of information that your agency shares with state agencies. Please list *all* types of information shared, regardless of whether the information is shared electronically.

b. In the "Percentage Shared Electronically" column, please indicate the approximate percentage of the corresponding type of information that is shared electronically. If this information is NOT shared electronically, simply check 0 %.

For example, consider the following type of information:

	Percentage Shared Electronically					
Type of Information ⬇	0 ⬇	1-20 ⬇	21-40 ⬇	41-60 ⬇	61-80 ⬇	81-100 ⬇
Arrest Information				✓		

The sample above indicates that arrest information is shared between your agency and state agencies, and that 41-60% of this information is shared electronically.

	Percentage Shared Electronically					
Type of Information ⬇	0 ⬇	1-20 ⬇	21-40 ⬇	41-60 ⬇	61-80 ⬇	81-100 ⬇

6. Please rate the importance of each of the following factors in terms of your agency's decisions whether or not to participate in electronic information sharing with state agencies. In other words, to what extent would each of these factors inhibit your agency's participation in electronic information sharing with state agencies? For each item below, please place a checkmark in the box that best describes your view.

	Unimportant ⬇	**Of Little Importance** ⬇	**Moderately Important** ⬇	**Important** ⬇	**Very Important** ⬇
Set-up Costs					
Training Costs					
Maintenance Costs					
Integration Costs with Existing Information Systems					
Lack of Legislative Support/Formal Policy					
Lack of Clear Technical Standards					
Laws/Regulations Prohibiting Electronic Information Sharing					
Misinterpretation or Misuse of Shared Information					
Challenges to the Accuracy/Validity of Shared Information					
External Evaluation/Criticism of Shared Information					
Electronic information sharing threatens agency policy-making power.					
Electronic information sharing reduces full control over information.					

7. Please rate the importance of achieving each of the following benefits of electronic information sharing in terms of your agency's decisions whether or not to participate in electronic information sharing with state agencies. For each item below, please place a checkmark in the box that best describes your view.

	Unimportant ⬇	Of Little Importance ⬇	Moderately Important ⬇	Important ⬇	Very Important ⬇
Reduces paperwork.					
Reduces overall costs of agency operations.					
Reduces intra- and inter-agency paper flow.					
Reduces duplicate data collection, processing, and storage.					
Improves productivity.					
Improves information accuracy.					
Improves information comprehensiveness.					
Improves information accessibility.					
Improves information timeliness.					
Improves decision- and policy-making.					
Improves intra- and inter-agency information integration.					
Improves intra- and inter-agency integration of computer systems.					
Improves relationships with state agencies.					
Improves public services.					
Improves accountability.					
Improves public image/reputation.					

8. Please indicate your level of agreement or disagreement with each of the following statements. For each statement below, please place a checkmark in the box that best describes your view.

	Strongly Disagree ⬇	Disagree ⬇	Neutral ⬇	Agree ⬇	Strongly Agree ⬇
Our top management has communicated its support for electronic information sharing with state agencies.					
Our top management is interested in our agency's participation in electronic information sharing with state agencies.					
Our top management considers electronic information sharing with state agencies important to our agency.					
In general, information technologies required for electronic information sharing are difficult to understand and use.					
In general, electronic information sharing is a complex process.					
Our employees are computer-literate.					
There is at least one employee within our agency who is a computer expert.					
Our agency has strong technical support.					
Our employees' fears and concerns about new technology have been observed.					

	Strongly Disagree ⬇	Disagree ⬇	Neutral ⬇	Agree ⬇	Strongly Agree ⬇
Our agency has a good telecommunications infrastructure.					
Our agency has integrated information systems applications encompassing different functional areas.					
Our agency uses database-oriented applications regularly in daily operations.					
Overall, our agency has adequate information technology capability to support electronic information sharing.					
Electronic information sharing with state agencies is consistent with our agency's needs.					
Electronic information sharing with state agencies is consistent with our agency's existing standard operating procedures (SOPs).					
Electronic information sharing with state agencies is consistent with our agency's beliefs, values, and experience with similar systems.					
Electronic information sharing with state agencies is compatible with our agency's telecommunication infrastructure.					
Electronic information sharing with state agencies is compatible with our agency's existing information systems and/or other electronic applications.					
Assuming our agency had access to a system that allowed us to share information electronically with state agencies, our agency would use it.					
Most other criminal justice agencies share/will soon be sharing information electronically with state agencies.					
Most of the information shared between local criminal justice agencies and state agencies is shared/will soon be shared electronically.					
The implementation of electronic information sharing systems by criminal justice agencies is inevitable and essential.					
Our agency plans on participating or continue participating in electronic information sharing with state agencies.					
In the context of our agency's overall budget, the financial costs of participating in electronic information sharing would be significant.					
Our agency has adequate financial resources to participate in electronic information sharing with state agencies.					
Given that our agency had access to a system that allowed us to share information electronically with state agencies, there is a high likelihood that our agency would use it.					
Our agency's sharing information electronically with state agencies can provide important benefits to state agencies.					
It doesn't make any difference to state agencies whether our agency shares information electronically.					
If significant barriers didn't exist, our agency would participate in electronic information sharing with state agencies.					
In the future, our agency intends to participate or continue to participate in electronic information sharing with state agencies.					
State agencies and our agency have a high level of mutual trust.					
State agencies keep our best interests in mind.					
State agencies perform actions that result in positive outcomes for our agency.					

	Strongly Disagree ⬇	Disagree ⬇	Neutral ⬇	Agree ⬇	Strongly Agree ⬇
State agencies influenced our decision to participate/not participate in electronic information sharing with them.					
State agencies recommended that our agency share information electronically.					
State agencies requested that our agency share information electronically.					
State agencies provided information regarding the advantages of sharing information electronically.					
State agencies provided information regarding the disadvantages of NOT sharing information electronically.					
Adequate state/federal legislation or formal policies exist to organize electronic information sharing between local and state agencies.					
State/federal legislation or formal policies exist that require electronic information sharing between local and state agencies.					
For electronic information sharing initiatives with state agencies, there is usually at least one influential individual within *our* agency who supports and promotes the initiative.					
For electronic information sharing initiatives with state agencies, there is usually at least one influential individual within the *state* agency who supports and promotes the initiative.					

9. In cases where there is at least one influential individual within *your* agency who supports and promotes electronic information sharing initiatives with a state agency:

a) At what level, typically, are these people within your agency? _____
b) How would you rate the information technology (IT) knowledge of these people?

None Very Low Moderate High Very High

10. In cases where there is at least one influential individual within the *state* agency who supports and promotes electronic information sharing initiatives with your agency:

a) At what level, typically, are these people in the state agency? _____
b) How would you rate the information technology (IT) knowledge of these people?

None Very Low Moderate High Very High

11. In your opinion, what are the major barriers to successful electronic information sharing initiatives between local and state agencies?

12. In your opinion, what are the most important factors for successful electronic information sharing initiatives between local and state agencies?

13. In your opinion, what incentives are necessary for local agencies to participate in electronic information sharing with state agencies?

14. Please provide the following background information:

a. Agency name (Optional): _____

b. Agency type: Sheriff's Office Police Department Other: _____

c. Number employed by your agency: Full-time: _____ Part-time: _____

d. Population served by your agency: _____

e. Approximate total operating budget of your agency: $ _____

f. Your title: _____

g. Number of years/months employed by your agency: Years: _____ Months: _____

h. Number of years/months employed in your current position: Years: _____ Months: _____

i. Your gender: Male Female

j. Your age group: 20-30 31-40 41-50 51-60 61+

k. Highest level of education you have attained:

High School Bachelor's Master's Doctorate Other: _____

Thank you for your cooperation in completing this survey. If you feel that there are any points of particular interest to your agency concerning electronic information sharing that this survey has failed to address, please feel free to elaborate below.

APPENDIX F
RESULTS/FINDINGS REQUEST POSTCARD

2003 Electronic Information Sharing Survey

If your agency would like to receive a summary of the results from this study, please complete the following information. To preserve your anonymity, please send this postcard to us separately from the survey. You can also request a copy of the study findings by e-mailing Dr. Helmut Schneider at hschnei@lsu.edu

Agency Name: _____

Agency Address: _____

_____

Your Name (optional): _____

(Back of postcard)

(Business Reply)
Dr. Helmut Schneider
Professor and Chairman
Department of Information Systems & Decision Sciences
Louisiana State University
Baton Rouge, LA 70803

(Front of postcard)

APPENDIX G
THANK YOU/REMINDER POSTCARD

LOUISIANA STATE UNIVERSITY
Department of Information Systems & Decision Sciences
Baton Rouge, LA 70803-6316

«PREFIX» «FULL_NAME»
«AGENCY»
«ADDRESS»
«CITY»,«STATE» «ZIP»

«DATE»

A few days ago you should have received a request from us to participate in the 2003 Electronic Information Sharing Survey. It was sent to you as part of our effort to help local law enforcement offices enhance their abilities to fight crime and terrorism and to protect the safety of citizens.

If you have already completed and returned the survey to us, please accept our sincere thanks. If not, please do so as soon as possible. You can either complete the paper survey and send it back to us or you can complete the survey online at:

http://cvoc.bus.lsu.edu/SS/wsb.dll/aakbul1/survey.htm?ID=1111

If you did not receive a survey, or it was misplaced, please contact us and we will send you another one today. Thank you very much for helping with this important study.

Dr. Helmut Schneider, Professor and Chairman
Department of Information Systems & Decision Sciences
Louisiana State University, Baton Rouge, LA 70803-6316
Ph: (225) 578-2516, Fax: (225) 578-2511, E-mail: hschnei@lsu.edu

APPENDIX H
FOLLOW-UP LETTER

LOUISIANA STATE UNIVERSITY
AND AGRICULTURAL AND MECHANICAL COLLEGE
Department of Information Systems and Decision Sciences

«DATE»

«PREFIX» «FULL_NAME»
«AGENCY»
«ADDRESS»
«CITY»,«STATE» «ZIP»

SUBJECT: 2003 Electronic Information Sharing Survey

Dear «PREFIX» «LAST NAME»:

About three weeks ago we sent a questionnaire to you that asked about your agency's experiences of the barriers to electronic information sharing with state agencies. To best of our knowledge, it's not yet been returned.

The comments of the agencies that have already responded include a wide variety of barriers to electronic information sharing. Many have described the problems they face in terms of financial assistance, technical support, training, etc. We think the results are going to be very useful in developing strategies that can be used to overcome these barriers in order to enhance the abilities of local law enforcement offices to fight crime and terrorism and to protect the safety of citizens.

We are writing again because of the importance of your questionnaire has for helping to get accurate results. It is only by hearing from all the local law enforcement offices in Louisiana that we can be sure that the results are truly representative.

We are enclosing a replacement questionnaire in case you didn't receive one, or it was misplaced. You can either fill out the survey yourself or give it to the person who is most involved in your agency's information sharing initiatives. You can complete the enclosed paper survey and send it back to us in the enclosed self-addressed, postage-paid envelope, or you can access the survey at **http://cvoc.bus.lsu.edu/SS/wsb.dll/aakbul1/survey.htm?ID=1111** and complete it online. The online survey may be completed any time at any computer that has Internet access.

Please be assured that this information is sought for research purposes only and your responses will be strictly confidential. No individual's responses will be identified as such and the identity of agencies/individuals responding will not be published or released to anyone. Protecting the confidentiality of your answers is very important to us, as well as the University.

We hope that you will be able to participate in the survey soon. We know that you are very busy and appreciate you taking the time to help with this important study. To learn more about this

study or receive a summary of the study findings/recommendations, please send the enclosed self-addressed, postage-paid postcard to us. If you have any questions or would like to share any additional feedback, please feel free to contact us at any time.

Sincerely;

Dr. Helmut Schneider
Ourso Family Distinguished Professor of Information Systems
and Chairman of Information Systems and Decision Sciences at LSU

APPENDIX I
PRELIMINARY SURVEY AND FINDINGS

1-Please list the most important benefits that IT-supported crash report data sharing would provide to the state of Louisiana.

- Manpower savings-data entry validation
- Low/minimum cost
- Accurate data, accuracy (as long as edits are in place)
- Completeness
- Reduced time between accident and entry information, timeliness
- Central source for current information
- Central support for current information
- Eliminates repetition of entry and storage
- Problem solving etc. critical to problem
- Identification for all communities in the state
- Uniform edit process uniform information /data
- Gather data for allocation of resources
- Fixing the roadway
- Information of driver behavior
- Type of accident regarding road condition, surface condition
- Type of data helping the other safety criteria
- Upgrade of state highways, roads, US highways
- Highlight areas of danger requiring corrections
- Police inventory

2- Please list the most important benefits that IT-supported crash report data sharing would provide to the local agencies.

- Timely information and better decision-making
- They could use the data to better position their officers in the field
- Use the information to develop safety programs/information programs for public with high crash rates
- Gather data for allocation of resources,
- Problem solving etc. critical to problem
- Identification for all communities in the state
- Upgrade of state highways, roads, US highways
- Highlight areas of danger requiring corrections
- Police inventory
- Provide DOTD information needed to evaluate roads for improvements by the state in a timely manner. Most current information is 2 years old.
- The problem with the enforcements regarding driver behavior on particular roadway
- Locations

- Intersection problem with state route
- Cost (benefit to local agency if given free by the state)
- Timeliness and accuracy
- Eliminate expense of local storage and retrieval
- Central source for current information
- Central support for current information
- Low/minimum cost

3- Please list the most important barriers to IT-supported crash report data sharing for local agencies.

- Not having access to state level data because local agencies would not provide the basic data needed for IT-support
- Not wanting to share with other state/local entities
- Lack of computer equipment at local levels
- Local agencies want to have full (total access) control of data
- Integration with their existing system
- No return on investment costs (equipment, training, manpower)
- Cost (if cost to be borne by locals)
- Cost of creating "workarounds"
- Having the IT solution interface with current solution
- Cost of interface
- Updating system (unless this cost is borne by state)
- Lack of interest of the state to consider the needs of the local communities
- The communities that provide the crash data in the first place
- Local agencies are not interested in same information as state
- Lack of cooperation and inflexibility of state agencies

4-Please rank the following factors according to their importance in a local agency's decision to participate in IT-supported crash report data sharing with the state government (with 1 being the most important).

- Perceived benefits to the local agency: 1, 3, 2, 2, 1, 1, 1
- Perceived costs/risks to the local agency: 2, 2, 1, 2, 3, 2, 2
- Financial, technological, and personnel resources of the local agency: 5, 1, 4, 3, 2, 3, 4
- Characteristics of the information technology such as complexity, compatibility with the existing systems of the local agency: 3, 6, 3, 4,4, 5, 5
- The presence/absence of legal requirements, government-wide IT policies: 6, 4, 5, 5, 5, 4, 3
- Perceived benefits to the State of Louisiana: 4, 5, 6, 6, 6, 6, 6

APPENDIX J
INTERVIEW GUIDE

Interview Guide for Participating Agencies

General Questions

- What are some of the factors that affected your agency's decision to participate in this initiative?
- How long have you been participating in this initiative? What is the importance of collecting crash data in your overall mission?
- How did you learn about and decide to participate in this initiative?
- How were you transferring crash report data to the state before? Were you satisfied with that system? Why or why not?

Benefits

- What are the benefits for your agency to participate in this initiative?

Costs

- In the context of your agency's overall budget, how significant is it to participate in this initiative? Have you incurred any costs? What kind of costs?

Risks

- What are the risks for your agency to participate in this initiative?

Technological Compatibility

- Was it easy to integrate this system with your existing computer systems? Were they compatible?

Complexity

- Do you think that sharing crash data electronically is an easy/difficult concept/process?
- Do you think that the system is difficult to use in general, or is it user-friendly?

Organizational Compatibility

- Did participation in this initiative require few/moderate or many changes in the way the work was done?
- Was this initiative compatible with your agency's needs?

IT Capability

- How much of your agency operations are computerized?
- How many it people do you have? Does your agency have a professional it manager?
- Are your employees computer literate? Are they knowledgeable about and comfortable with computers?

Top Management Support

- What is the attitude of your sheriff/chief toward the deployment of such information technologies? What about the attitudes of the employees?

Agency Size

- Approximate number of employees in your agency ……
- Population served by your agency……

Agency Championship/System-Wide Championship

- Who was responsible for overseeing the implementation of this electronic information sharing initiative in your agency?
- Who was responsible for overseeing the implementation of this electronic information sharing initiative at the state agency?

External Influence

- How would you characterize the level of encouragement or pressure put on your agency by the state agency? (no encouragement or pressure /recommendation/ information exchange/ request/ incentives/ penalties, etc.)
- Have you received any kind of aid from the state?

Critical Mass

- Were you knowledgeable about other agencies participating in this initiative?
- Did the number/identity of other agencies participating in this initiative affect your participation decision?

Policy/Legal Framework

- Do you think adequate state/federal legislation or formal policies to organize electronic information sharing initiatives are in place?
- What is the role of legislation? Do you think participation in this initiative should be mandated by law?

Interagency Trust

- In general, how are the relationships between local and state agencies?
- Are there any issues of trust between your agency and the state agency receiving the crash data?

Participation in Development

- Did your agency provide any input during the system design and development phases?

Benefits to Others

- Do you think that your participation in this initiative provides benefits to other agencies at the local, state and federal level? Was it a factor in your participation decision?

General Questions

- Can you summarize the factors that motivated your agency to participate in this initiative?
- If you compare your agency to those that are not participating in this initiative, what are the major differences?
- Is your agency participating in any other electronic information sharing initiatives with state agencies? If you compare those initiatives with the crash data sharing initiative, what are the major differences?
- In your opinion, what incentives are necessary to increase the level of local agency participation in this initiative? What would motivate local agencies to participate in this initiative?
- In your opinion, what are the barriers for local law enforcement agencies to participate in electronic information sharing initiatives with state agencies in general?
- In your opinion, what are the most important factors for successful electronic information sharing initiatives between state and local agencies in general?
- Is there anything that you would like to add? Is there anything that I should have asked you about this issue, but I didn't ask?
- If you know some other people who might be knowledgeable about these issues in other agencies, could you please provide me their contact information?

Background Information

- Number of years you have been working for this agency…… years, in this position …… years.
- Your title:……

Interview Guide for Non-Participating Agencies

General Questions

- How do you transfer crash report data to the state? Are you satisfied with that system? Why or why not?
- What is the importance of collecting crash data in your overall mission?
- What are the most important barriers for agency to participate in this initiative?

Benefits

- What would the benefits for your agency be in participating in this initiative?

Costs

- In the context of your agency's overall budget, how significant would it be to participate in this initiative? Would you incur any costs? What kind of costs?

Risks

- What would the risks for your agency be in participating in this initiative?

Technological Compatibility

- Do you think that it would be easy to integrate this system with your existing computer systems? Would they be compatible?

Complexity

- Do you think that sharing crash data electronically is an easy/difficult concept/process?
- Do you think that the system would be difficult to use in general?

Organizational Compatibility

- Do you think that participation in this initiative would require few, moderate or many changes in the way work is done?
- Would this initiative be compatible with your agency's needs?

IT Capability

- How much of your agency operations are computerized?
- How many it people do you have? Does your agency have a professional it manager?
- Are your employees computer literate? Are they knowledgeable about and comfortable with computers?

Top Management Support

- What is the attitude of your sheriff/chief toward the deployment of such information technologies? What about the attitudes of the employees?

Agency Size

- Approximate number of employees in your agency ……
- Population served by your agency……

Agency Championship

- Is there an individual in your agency who oversees the implementation of electronic information sharing initiatives in general?

External Influence

- How would you characterize the level of encouragement or pressure put on your agency by the state? (no encouragement or pressure /recommendation/ information exchange/ request/ incentives/ penalties, etc.)
- Has the state agency offered you any kind of aid?

Critical Mass

- Are you knowledgeable about other agencies that are participating in this initiative?

- Do you think that your agency would consider participating in this initiative if the majority of the local agencies were doing so?

Policy/Legal Framework

- Do you think adequate state/federal legislation or formal policies to organize electronic information sharing initiatives are in place?
- What is the role of legislation? Do you think participation in this initiative should be mandated by law?

Interagency Trust

- In general, how are the relationships between local and state agencies?
- Are there any issues of trust between your agency and the state agency receiving the crash data?

Benefits to Others

- Do you think that your participation in this initiative would provide benefits to other agencies at the local, state and federal level?

General Questions

- Can you summarize the factors that inhibit your agency's participation in this initiative?
- If you compare your agency to those that are participating in this initiative, what are the major differences?
- Is your agency participating in any other electronic information sharing initiatives with state agencies? If you compare those initiatives with the crash data sharing initiative what are the major differences? Why did you decide to take part in those projects and not in the crash data-sharing project?
- In your opinion, what incentives are necessary for your agency to participate in this initiative? What would motive your agency to participate in this initiative?
- In your opinion, what are the barriers for local law enforcement agencies to participate in electronic information sharing initiatives with state agencies in general?
- In your opinion, what are the most important factors for successful electronic information sharing initiatives between state and local agencies in general?
- Is there anything that you would like to add? Is there anything that I should have asked you about this issue, but I didn't ask?
- If you know some other people who might be knowledgeable about these issues in other agencies, could you please provide me their contact information?

Background Information

- Number of years you have been working for this agency…… years, in this position …… years.
- Your title:……

Interview Guide for State Agencies

General Questions

- Can you please give me some background information about this initiative?
- In your opinion, what are the major factors that affect local agencies' decisions to participate/not participate in this initiative?

Benefits

- What are the benefits for the local agencies to participate in this initiative?

Costs

- What are the costs for the local agencies to participate in this initiative?

Risks

- What are the risks for the local agencies to participate in this initiative?

Technological Compatibility

- Do you think that this system is compatible with the local agencies existing computer systems, networks, and software? Or does it require some integration efforts?

Complexity

- Do you think that sharing crash data electronically is an easy/difficult concept/process for the local agencies?
- Do you think that the system is easy to understand and use by local agencies?

Organizational Compatibility

- Do you think that participation in this initiative requires few, moderate or many changes in the way work is done in local agencies?
- Is it compatible with local agencies' needs?

Top Management Support

- What are the attitudes of the sheriffs/chiefs toward the deployment of such information technologies?

IT Capability

- How much of the local agencies' operations are computerized?
- Do they have it people, professional it managers?
- Are the employees of local agencies computer literate? Are they knowledgeable about and comfortable with computers?

Agency Championship/System-Wide Championship

- In the participating agencies, is there a single individual responsible for overseeing the implementation of the project?

- Who is the individual/institution responsible for overseeing the implementation of the project at the state level?

External Influence

- How would you categorize the strength of encouragement or pressure put on local agencies by your agency? (No encouragement or pressure /recommendation/ information exchange/ request/ incentives/ penalties, etc.)
- Have you offered any kind of help to the local agencies?
- What type of strategies are you using to increase the participation rate?
- What are some of the problems you have been facing in motivating law enforcement agency participation?

Policy/Legal Framework

- Do you think adequate state/federal legislation or formal policies to organize electronic information sharing initiatives are in place?
- What is the role of legislation? Do you think participation in this initiative should be mandated by law?

Interagency Trust

- In general, how are the relationships between local and state agencies?
- Are there any issues of trust between local agencies and the state agencies?

Critical Mass

- Do you know whether the number/identity of other agencies participating or soon to be participating in this initiative is an important consideration for local agency participation?
- Do you think that a local agency would consider participating in this initiative if the majority of the local agencies were doing so?

Benefits to Others

- Do you think that the local agencies consider the benefits to other agencies when they are making their participation decisions?

Participation in Development

- Did any local agency provide input during the system design and development phases?

General Questions

- If you compare the participating and not participating agencies in this initiative, what are the major differences?
- Are the local agencies involved in other information sharing projects with state agencies? If you compare those initiatives and the crash data sharing initiative what are the major differences?
- In your opinion, what are the barriers for local law enforcement agencies to participate in this initiative?

- In your opinion, what incentives are necessary for local agencies to participate in this initiative? What would motive your agency to participate in this initiative?
- In your opinion, what are the barriers for local law enforcement agencies to participate in electronic information sharing initiatives with state agencies in general?
- In your opinion, what are the most important factors for successful electronic information sharing initiatives between state and local agencies in general?
- Is there anything that you would like to add? Is there anything that I should have asked you about this issue, but I didn't ask?
- If you know some other people who might be knowledgeable about these issues in other agencies, could you please provide me their contact information?

Background Information

- Number of years you have been working for this agency…… years, in this position …… years.
- Your title:……

Interview Guide for Law Enforcement Associations

General Questions

- What types of information is shared between law enforcement agencies and state agencies? What percent of this information is shared electronically?
- How long have these projects (ARMMS, ICJIS and other similar projects) been going on? Are these projects carried out at the state level or national level? How many agencies are participating?

Benefits

- What are the benefits for the local agencies to participate in these initiatives?

Costs

- Who pays for these initiatives? What are the costs for the local agencies to participate in these initiatives?

Risks

- What are the risks for the local agencies to participate in these initiatives?

Technological Compatibility

- Do you think that these systems are easily integrated with the local agencies existing computer systems? Are they compatible?

Complexity

- Do you think that sharing crash data electronically is an easy/difficult concept/process for local agencies?
- Do you think that these systems are easy to understand and use by local agencies?

Organizational Compatibility

- Do you think that participation in these initiatives requires few, moderate or many changes in the way work is done in local agencies?
- Are they compatible with local agencies' needs?

Top Management Support

- In your opinion, what are the attitudes of police chiefs and sheriffs toward these systems? What about the employees' attitudes?

IT Capability

- How much of the local agencies' operations are computerized?
- Do they have it people, professional it managers?
- Are the employees of local agencies computer literate? Are they knowledgeable about and comfortable with computers?

Agency Championship/System-Wide Championship

- Are there specific individuals in the participating agencies that are responsible for overseeing these efforts?
- Is there an agency that is responsible for overseeing these efforts at the state level or federal level?

External Influence

- How would you classify the level of encouragement or pressure put on local agencies by your agency/state agencies? (No encouragement or pressure /recommendation/ information exchange/ request/ incentives/ penalties, etc.)
- Have you offered any kind of aids to the local agencies?
- What type of strategies are you using to increase the participation rate?
- What are some of the problems you have been facing in motivating the local agencies?

Policy/Legal Framework

- Do you think adequate state/federal legislation or formal policies to organize electronic information sharing initiatives are in place?
- What is the role of legislation? Are law enforcement offices mandated to participate in these systems? Is there any enforcement or penalty involved? Do you think participation in this initiative should be mandated by law?

Interagency Trust

- In general, how are the relationships between local and state agencies?
- Are there any issues of trust between local agencies and the state agencies?

Critical Mass

- Do you know whether the number/identity of other agencies participating or soon to be participating in this initiative is an important factor for local agency participation?

- Do you think that a local agency would consider sharing crash data electronically if the majority of the local agencies were doing so?

Benefits to Others

- Do you think that the local agencies consider the benefits to other agencies when they are making their participation decisions?

General Questions

- Can you compare/contrast the projects that you have been working on with the crash data-sharing project?
- In your opinion, what are the major barriers for local law enforcement agencies to participate in electronic information sharing initiatives with state agencies?
- In your opinion, what are the most important factors for successful electronic information sharing initiatives between local and state agencies?
- In your opinion, what are the incentives for local agencies to participate in electronic information sharing with state agencies?
- Is there anything that you would like to add? Is there anything that I should have asked you about this issue, but I didn't ask?
- If you know some other people who might be knowledgeable about these issues in other agencies, could you please provide me their contact information?

Background Information

- Number of years you have been working for this agency…… years, in this position …… years.
- Your title:……

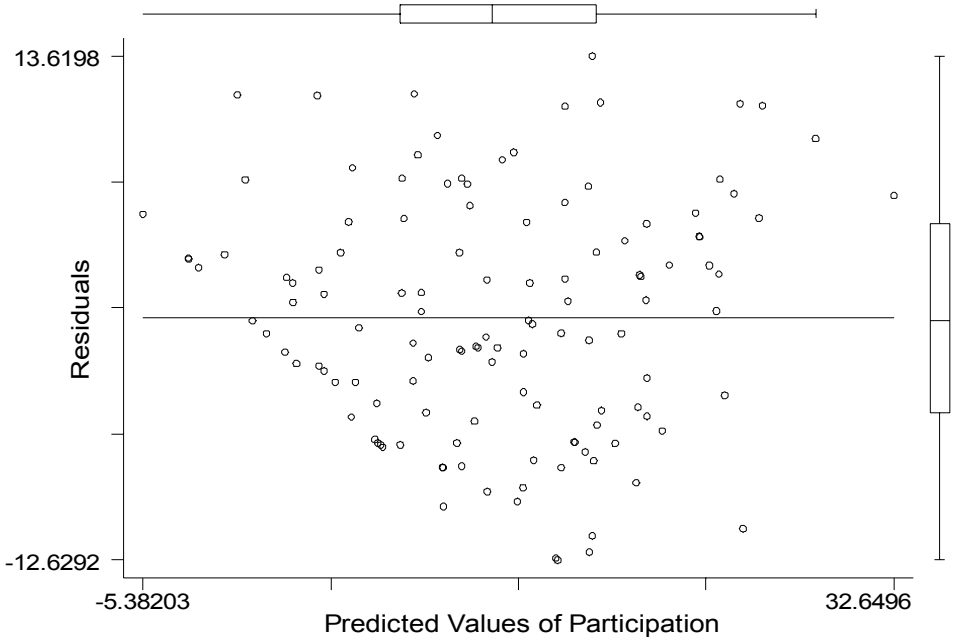
APPENDIX K
MULTIPLE REGRESSION

TABLE K-1: Multiple Regression

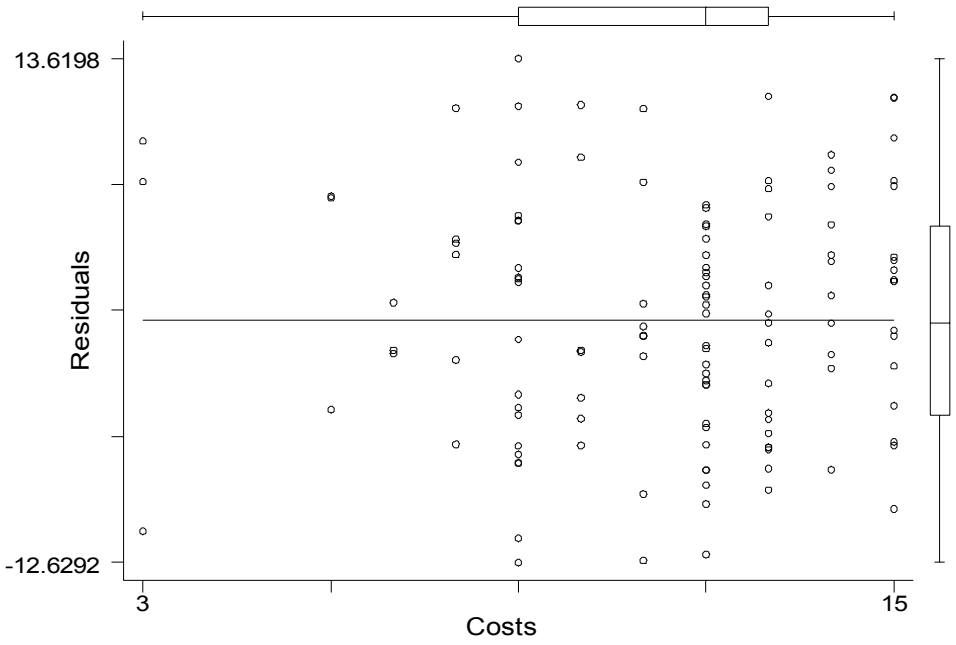
Benefits	**Costs**	**Risks**
H_0 : $ß_1 = 0$ **H_1 :** $ß_1 \neq 0$ $\lvert t \rvert = .590 < t_{.025, 119} \approx 1.980$ $p = .557 > .05$ Conclude H_0	**H_0 :** $ß_2 = 0$ **H_1 :** $ß_2 \neq 0$ $\lvert t \rvert = 2.315 > t_{.025, 119} \approx 1.980$ $p = .022 < .05$ Conclude H_1	**H_0 :** $ß_3 = 0$ **H_1 :** $ß_3 \neq 0$ $\lvert t \rvert = 2.975 > t_{.025, 119} \approx 1.980$ $p = .004 < .05$ Conclude H_1
Complexity	**IT Capability**	**Top Management Support**
H_0 : $ß_4 = 0$ **H_1 :** $ß_4 \neq 0$ $\lvert t \rvert = 2.486 > t_{.025, 119} \approx 1.980$ $p = .014 < .05$ Conclude H_1	**H_0 :** $ß_5 = 0$ **H_1 :** $ß_5 \neq 0$ $\lvert t \rvert = 4.501 > t_{.025, 119} \approx 1.980$ $p = .000 < .05$ Conclude H_1	**H_0 :** $ß_6 = 0$ **H_1 :** $ß_6 \neq 0$ $\lvert t \rvert = 1.722 < t_{.025, 119} \approx 1.980$ $p = .088 > .05$ Conclude H_0
Size	**External Influence**	**Policy/Legal Framework**
H_0 : $ß_7 = 0$ **H_1 :** $ß_7 \neq 0$ $\lvert t \rvert = 1.871 < t_{.025, 119} \approx 1.980$ $p = .064 > .05$ Conclude H_0	**H_0 :** $ß_8 = 0$ **H_1 :** $ß_8 \neq 0$ $\lvert t \rvert = 4.346 > t_{.025, 119} \approx 1.980$ $p = .000 < .05$ Conclude H_1	**H_0 :** $ß_9 = 0$ **H_1 :** $ß_9 \neq 0$ $\lvert t \rvert = .515 < t_{.025, 119} \approx 1.980$ $p = .607 > .05$ Conclude H_0
Interagency Trust	**Critical Mass**	**Overall F test**
H_0 : $ß_{10} = 0$ **H_1 :** $ß_{10} \neq 0$ $\lvert t \rvert = .558 < t_{.025, 119} \approx 1.980$ $p = .578 > .05$ Conclude H_0	**H_0 :** $ß_{11} = 0$ **H_1 :** $ß_{11} \neq 0$ $\lvert t \rvert = .582 < t_{.025, 119} \approx 1.980$ $p = .562 > p = 0.05$ Conclude H_0	**H_0 :** $ß_1 = ß_2 = ß_3 = ß_4 = ß_5 = 0$ **H_1 :** Not all $ß_k = 0$ **$F = 36.15 > F_{.05, 5, 119} \approx 2.29$** $p = .000 < .05$ Conclude H_1

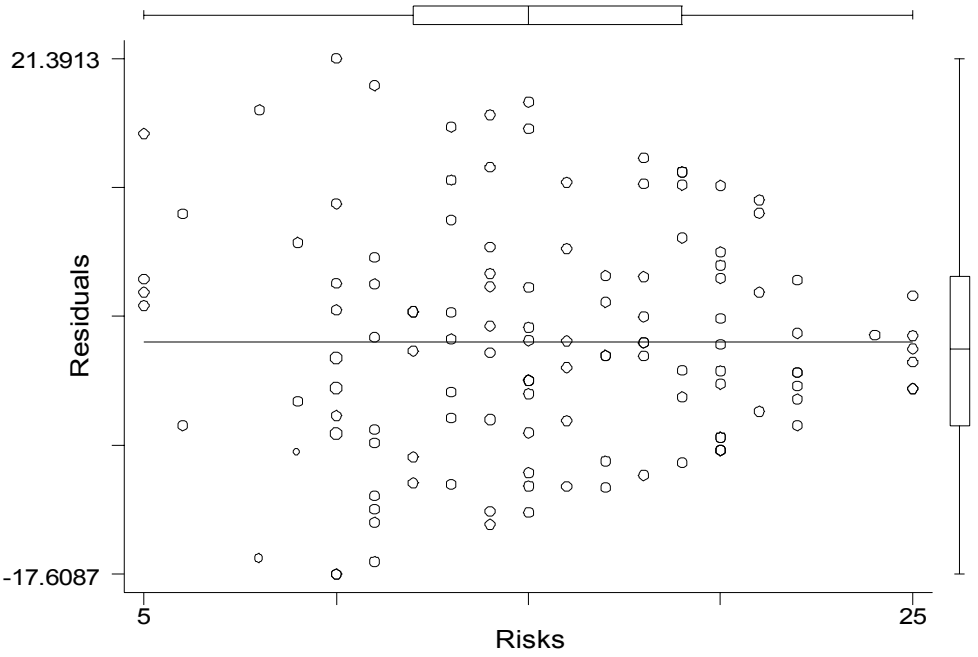
APPENDIX L
TESTS OF UNDERLYING ASSUMPTIONS OF REGRESSION

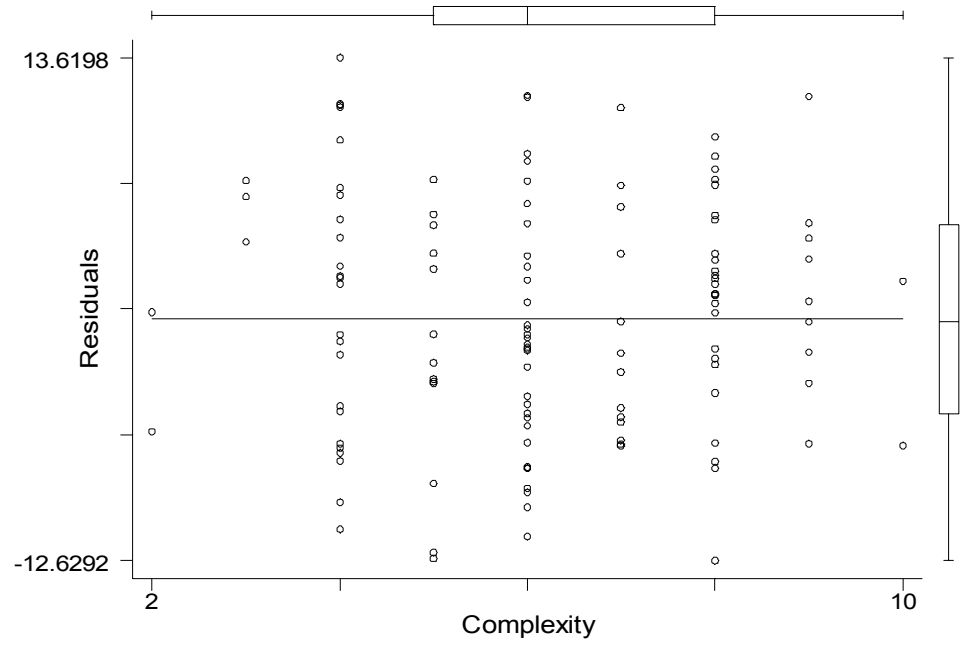
Scatter-Plot of the Residuals and the Predicted Values

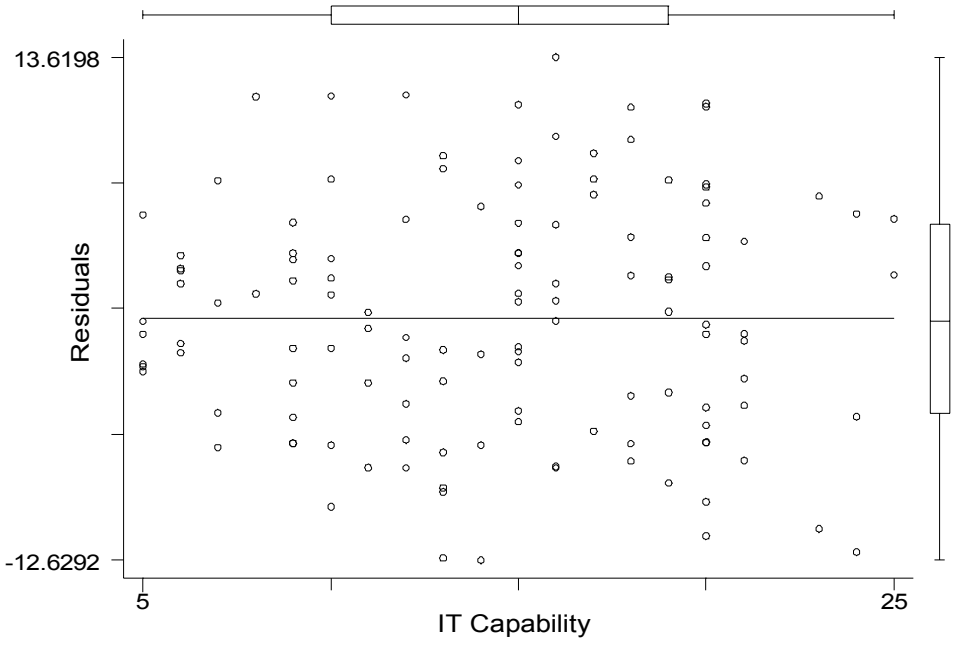


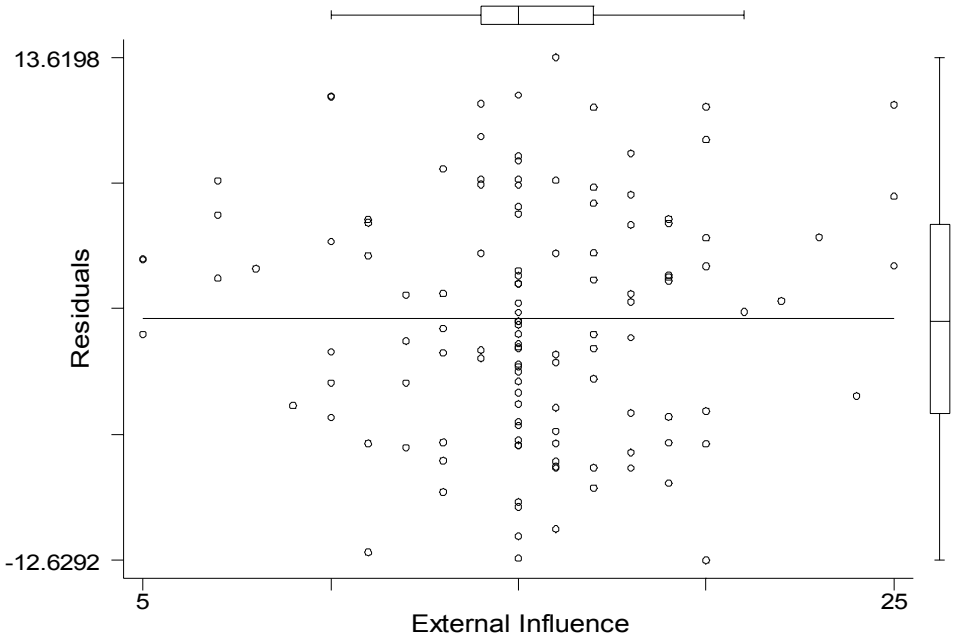
Partial Plots



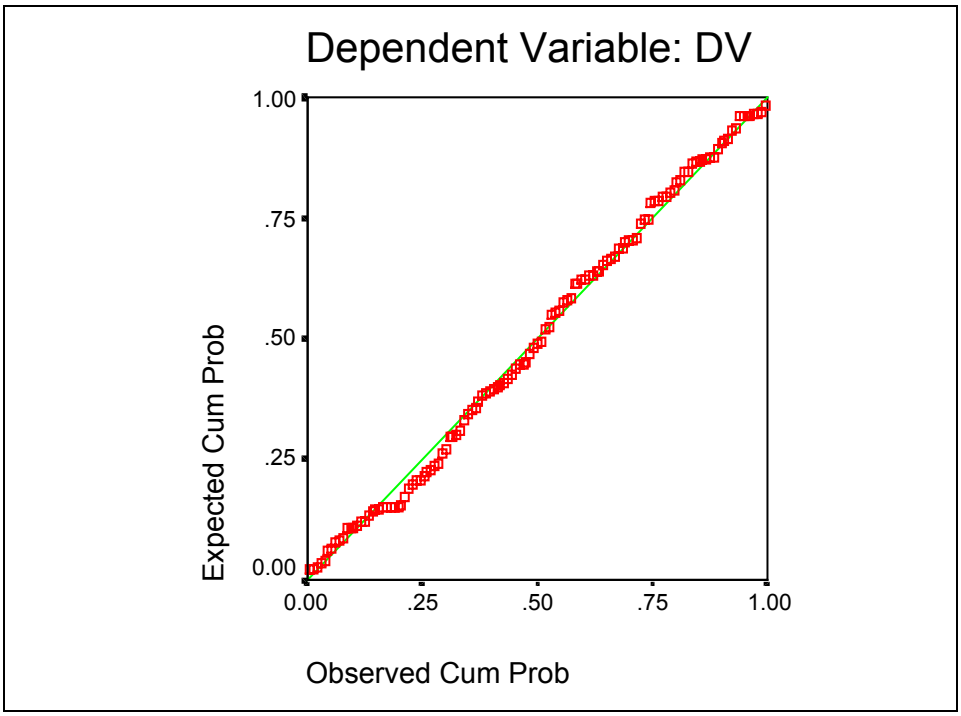

21.3913
-17.6087
Residuals
5
25
Risks


13.6198
-12.6292
Residuals
2
10
Complexity


13.6198
Residuals
-12.6292
5
25
IT Capability


13.6198
Residuals
-12.6292
5
25
External Influence

Normal P-P Plot of Regression Standardized Residual



VITA

Asli Yagmur Akbulut received her Bachelor of Science degree from Ankara University, Turkey in 1995. She graduated first in her class out of more than 150 students in the Department of Business Administration. Asli also obtained her Master of Science degree in Business Administration at the same university in 1997.

During completion of the requirements for the doctorate, Asli also fulfilled the requirements for the degree of Master of Information Systems and Decision Sciences at Louisiana State University in 2002. She will receive her degree of Doctor of Philosophy in Business Administration, majoring in Information Systems and Decision Sciences, in August 2003.