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

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Abstract

The purpose of this study is to investigate the factors that influence local government participation in electronic information sharing with state agencies. Information technologies can help government agencies to increase productivity and performance, improve policy-making and provide better public services to the citizens. Although extensive amount of information sharing among agencies is important for effective IT management in government, there is still little information available about the factors that antecede electronic information sharing between local and state agencies.

Synthesizing well-established theories such as diffusion of innovations, critical mass theory and social exchange theory, I propose that local government participation in electronic information sharing with state agencies will be determined by system characteristics, agency characteristics, collaboration factors and external factors. The proposed study will include both qualitative and quantitative techniques. In the first phase of my study, I will conduct multiple case studies of local agencies that are participating/not participating in an electronic information sharing initiative with state agencies in a southeastern state of the United States. I will also interview key decision makers from the state agencies. In the second phase of my study, I will administer a survey to randomly selected local government agencies from across the United States. Based on my findings, I will identify a preliminary set of strategies that could be used to increase electronic information sharing between local and state agencies.

Keywords: Electronic information sharing, government information systems, intergovernmental information sharing, local government, state government, state-local information systems

Introduction

Effective management of IT as a tool to increased efficiencies in government operations relies on information sharing among government agencies. However, currently the extent of information sharing in government agencies is limited and does not go beyond the transfer of mandated documents (Dawes et al., 2001). Although government managers recognize the benefits that electronic information sharing provides to policy-makers, agencies, and to public in general, agencies face several technological, organizational, political and economic barriers to electronic information sharing (Dawes, 1996; Landsbergen and Wolken, 2001; Rocheleau, 1997).

A review of past literature indicates that research on electronic information sharing between local and state agencies is very limited. Dawes mentions that although they have done an extensive literature search, they were "unable to uncover any significant research regarding this issue" (Dawes et al., 1997). Specifically, this research effort will investigate the following question: *What factors influence local government participation in electronic information sharing with state agencies and what is the relative*

importance of these factors? Based on the findings of my main research question, I will also identify a preliminary set of strategies that could be used to increase electronic information sharing between local and state agencies.

Review and Theoretical Background

Dawes (1996) proposed a theoretical model of interagency information sharing 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. Dawes' study didn't differentiate between electronic or paper based information sharing and didn't capture the issues related to recently developed information technologies that can enable and facilitate information sharing between state and local agencies. Landsbergen and Wolken (2001) specifically focused on electronic interagency information sharing (interoperable information systems) and expanded the theoretical model developed by Dawes. They emphasized the need for an infrastructure and legal, managerial & policy approaches to maintain interagency information sharing. Dawes' (1996) study investigated interagency information sharing issues at the state level. Similarly, Landsbergen and Wolken (2001) focused on federal-to-federal and federal-to-state interoperability. Even though many similar issues exist in electronic information sharing between state and local governments, there is a need for further investigation. I was not able to find any academic research that focuses on electronic information sharing between state and local government agencies. However, several government and professional organizations were found to have carried out projects to promote electronic sharing of information between state and local agencies.

Research in diffusion of innovations theory, critical mass theory and social exchange theory can provide important insights into the factors that affect electronic information sharing between local and state agencies.

Rogers (1995) identified five innovation attributes (relative advantage, compatibility, complexity, observability, and triability) that determine the adoption of innovations. In addition to innovation characteristics research has also determined several factors such as individual factors, decision maker characteristics, user community characteristics, task characteristics, organizational factors, and environmental factors as determinants for studying organizational adoption (Bingham 1976; Damanpour 1991; Kwon and Zmud 1987; Perry and Kramer 1979).

Critical mass theory suggests that an organization's decision to be engaged in a collective action depends on its perceptions of what the group is doing and not on the characteristics of the innovation (Bouchard, 1993). Moreover, critical mass creates positive network externalities or network benefits which arise as a direct function of the number of the current adopters (Fichman and Kemerer, 1993).

Social exchange theory lays a suitable base for studying non-profit making interorganizational transactions. The main emphasis of this perspective is that the relationship between organizations does not necessarily need to be directly related to any economic outcomes. 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 of the formation of relationships such as power, trust, interdependency, and the like (Prekumar and Ramamurthy, 1995).

Research Framework and Hypothesis

Synthesizing the theoretical foundations described above, I developed the research framework in Figure 1. I propose that the level of local agency participation in electronic information sharing with state agencies will be determined by perceived system characteristics, agency characteristics, external factors and collaboration factors.

Level of participation in electronic information sharing refers to the extent to which a local agency shares information electronically with state agencies. 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. Information sharing includes the formal as well as informal sharing of information between local and state agencies.

Perceived System Characteristics: Perceived system characteristics refer to the perceived attributes of electronic information sharing and the information system that is used to share information between state and local agencies.

Relative advantage: Relative advantage encompasses several different types of benefits such as economic gains and social prestige as well as the different types of costs or risks associated with the adoption of an innovation (Kwon and Zmud, 1987; Rogers, 1995).

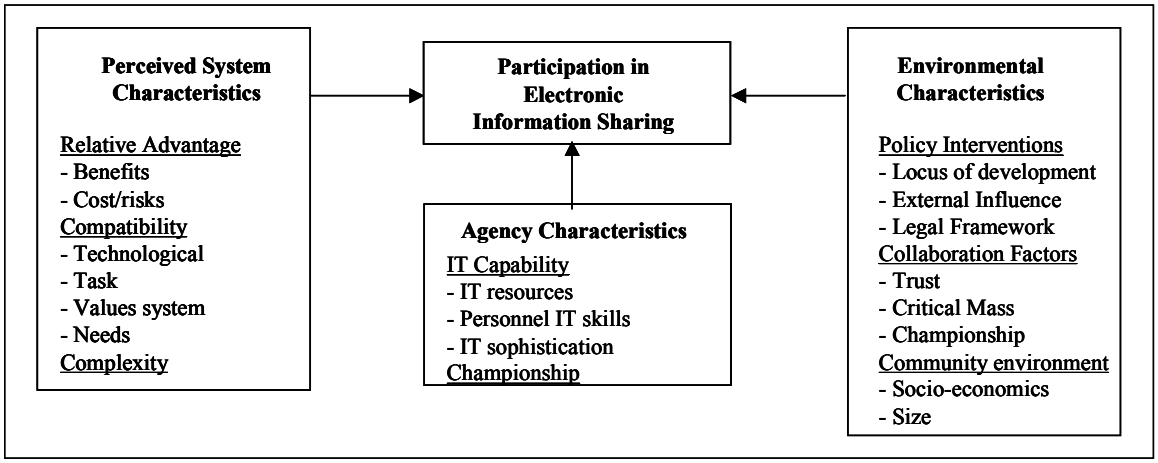

Figure 1. Research Framework

Timely and accurate information for better decision making and problem solving, reduced costs and increased productivity, centralized source and support for current information, 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). However, Landsbergen and Wolken (2001) state that agencies usually lack the resources for electronic information sharing and it is difficult to encourage their participation in a system where the benefits and costs are ill defined and uncertain. Risks associated with electronic information sharing are primarily due to making the information collected by an agency available to outsiders. Agencies want to have full control over the data collected and sharing might result in openness to public scrutiny and invite external evaluation and criticism. Political interference can threaten the policy making power of the agencies (Dawes, 1996; Landsbergen and Wolken, 2001; Rocheleau, 1997).

H1: Higher levels of perceived benefits will positively affect local agency participation in electronic information sharing with state agencies.

H2: Higher levels of perceived costs/risks will negatively affect local agency participation in electronic information sharing with state agencies.

Compatibility: Technical compatibility refers to the perceived compatibility of the systems required for electronic information sharing with state agencies with existing technologies of the local agency. 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) found out that the integration of technologies was the most important issue of concern among public sector managers. Research shows that the incompatibility of the hardware, software as well as telecommunication networks negatively affects interagency information sharing (Dawes, 1996; 1997; Landsbergen and Wolken 2001).

H3: Higher levels of perceived technological compatibility will positively affect local agency participation in electronic information sharing with state agencies.

Organizational compatibility can be thought as the organizational fit of the system required for electronic information sharing. Electronic sharing of information might require changes in the *existing operating practices and tasks* and might introduce new ways of doing things. 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 is also another important issue. Landsbergen and Wolken (2001) state that lack of an experience base and institutional memory and awareness of sharing opportunities is an important organizational barrier in the way to interoperable systems. Research shows that a history of innovativeness leads to a positive organizational climate and facilitates adoption of technologies by local governments (Damanpour, 1991; Newcomer and Caudle, 1991; Norris, 1999). Another important aspect of compatibility is the compatibility of the systems with the *existing needs* of the agency. It was found out that unless there was a real internal need, an organization would be unlikely to adopt a new innovation (Premkumar and Ramamurthy, 1995). As, electronic information sharing between

state and local agencies might require the participation of different stakeholders that have different needs and priorities, the compatibility of the system with the self-interests of the stakeholders is an important factor in the success of these systems.

H4: Higher levels of perceived organizational compatibility will positively affect local agency participation in electronic information sharing with state agencies.

H4a: Higher levels of perceived compatibility with existing operating practices will positively affect local agency participation in electronic information sharing with state agencies.

H4b: Higher levels of perceived compatibility with existing beliefs, values, and past experiences will positively affect local agency participation in electronic information sharing with state agencies.

H4c: Higher levels of perceived compatibility with existing needs will positively affect local agency participation in electronic information sharing with state agencies.

Complexity: Complexity refers to the degree to which the systems required for electronic information sharing are perceived as being difficult to understand and use by the local agency. 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.

H5: Higher levels of perceived complexity will negatively affect local agency participation in electronic information sharing with state agencies.

Agency Characteristics: Agency characteristics refer to the characteristics of the local agency that might impact participation in electronic information sharing with state agencies.

Financial Capability: Financial resources express an agency's capital available for participation in electronic information sharing. Damanpour (1991) state that organizations that have slack resources can afford costly innovations, can absorb failure, and can explore new ideas in advance of the actual need.

H6: Higher levels of financial capabilities will positively affect local agency participation in electronic information sharing with state agencies.

IT capability: IT capabilities refer to the level of IT resources, personnel IT knowledge and IT sophistication of an agency. Newcomer and Caudle (1991) stated that the existence of adequate equipment in the organization is a major determinant of adoption of new technologies. The available skill set of the available personnel is an important factor that constraints the introduction of new technologies. Perry and Danziger (1980) showed that one of the most important factors in the adoption of computer applications by local government was staff competence. Norris (1999) posited that local governments had 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 underutilization of computers. Another important factor which might affect participation in electronic information sharing is the *IT sophistication* which assesses the level of management understanding of and support for using IT to achieve organizational objectives (Chwelos et al. 2001).

H7: Higher levels of IT capabilities will positively affect local agency participation in electronic information sharing with state agencies.

H7a: Higher levels of IT resources will positively affect local agency participation in electronic information sharing with state agencies.

H7b: Higher levels of personnel IT skills will positively affect local agency participation in electronic information sharing with state agencies.

H7c: Higher levels of IT sophistication will positively affect local agency participation in electronic information sharing with state agencies.

Championship: 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. In interorganizational information systems the presence of an internal sponsor in each participating organization is very important in providing the necessary leadership as the existence of a system-wide sponsor is not always sufficient (Garfield, 2000). Norris (1999) posits that the existence of a champion was one of the most important facilitators in the adoption of technologies by local governments.

H8: The existence of a championship at the agency level will positively affect local agency participation in electronic information sharing with state agencies.

External factors: External factors refer to the factors that are external to or outside any single agency that might impact its participation in electronic information sharing with state agencies.

External Influence: External influence refers to the influences that external entities exercise on the agency and can vary from no encouragement/pressure to recommendation, request or providing incentives or exposing to penalties. Intergovernmental influence including grants, transfers, and technical assistance has been found to be a significant factor in the adoption of innovations by local governments (Bingham, 1976). Heeks (1999) suggests that in order to alter stakeholder motivations to support the introduction of a new system, one way is to use a reward or punishment system.

H9: Higher levels of external influence will positively affect local agency participation in electronic information sharing with state agencies.

Policy/Legal Framework: Research revealed that although there were some ad hoc information sharing agreements among agencies, uniform contracts and federal law and policy as well as economic and budgetary mechanisms were found to be necessary to achieve interoperability (Landsbergen and Wolken, 2001)

H10: The existence of a government wide policy and legal framework will positively affect local agency participation in electronic information sharing with state agencies.

Socio-Economic Status: Bingham (1976) proposed that community socio economic factors of cities are related to the adoption of technological innovations. He stated that the cities with low socio-economic status are more likely to adopt innovations that are necessity based (such as innovations designed to correct some specific deficiency) rather than amenity based, whereas cities with higher socio-economic status are more prone to emphasize amenity value than others.

H11: Higher socio-economic status of the local agency environment will positively affect local agency participation in electronic information sharing with state agencies.

Size: As an environmental factor size can be measured in terms of the size of the community served and the number of the services provided. In state and city governments size was found to positively affect adoption of innovations in general and computers in particular (Bingham, 1976; Brudney and Selden, 1995). Norris (1999) showed that larger cities would adopt more sophisticated and advanced information technologies compared to smaller cities because larger cities (1) have greater financial resources (2) are in more need of these technologies (3) have superior institutional ability such as IT departments to support these technologies.

H12: Higher size will positively affect local agency participation in electronic information sharing with state agencies.

Collaboration Factors: Collaboration factors refer to the interagency factors that might impact local agency participation in electronic information sharing with state agencies.

Participation in System Development: The extent and effectiveness of the participation of the stakeholders' in the development process affect the success of the information system. Moreover, one way to align stakeholder self-interests with other stakeholders' interests is to include the key stakeholders in the system development process (Heeks, 1999).

H13: Higher levels of agency participation in the planning and development process will positively affect local agency participation in electronic information sharing with state agencies.

Interagency trust: Research identifies mutual interagency trust as a precondition to sharing information (Dawes, 1996; Landsbergen and Wolken, 2001). Landsbergen and Wolken (2001) points out that because of the lack of mutual trust among agencies, each agency ends up collecting its own information about the same subject.

H14: Higher levels of interagency trust will positively affect local agency participation in electronic information sharing with state agencies.

Critical Mass: 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. Bingham (1976) found out that the cities adopting innovations were located in close proximity to other innovation-adopting cities. I have observed that local agencies were affected by the actions of other agencies that were similar to them in terms of size, budgetary constraints, etc.

> *H15: Higher number of participants (and their identities) will positively affect local agency participation in electronic information sharing with state agencies.*

Championship/System-wide: Especially early in the implementation process of an interorganizational information system, a system-wide champion is necessary to gather interest in the program and to coordinate its implementation (Garfield, 2000). Landsbergen and Wolken (2001) state that interoperability projects are more easily implemented when there is common executive leadership.

> *H16: The existence of a system-wide championship will positively affect local agency participation in electronic information sharing with state agencies.*

Research Approach

The theoretical paradigm for this research study is positivist. The study will employ both quantitative and qualitative techniques. At the beginning of my study I administrated a short questionnaire to a small group of state and local agencies that are engaged in an electronic information sharing initiative in a southeastern state of the United States. In the first phase of my study, I will conduct multiple case studies of local agencies that are participating/not participating in this initiative. My primary method for data collection will be to conduct semi-structured interviews with key informants in local agencies. Key informants from state agencies will also be interviewed. All interviews will be taped and transcribed where the participants grant permission. In the second phase of my study, I will administer a survey to 1000 randomly selected local government agencies from across the United States. Special emphasis is being given to preparation of the instruments. I have borrowed from previously tested and validated instruments to form the basis for the interview and survey questionnaires. I pre-tested and pilot tested the interview instrument. At the time being I am developing the survey instrument, which will be finalized basis on the data collected from the case studies.

I plan to utilize the techniques for data reduction, data display and conclusion drawing/verification offered by Miles and Huberman (1994) to guide the qualitative data analysis part of my study. The data collected through the surveys will be analyzed using Structural Equation Modeling.

Conclusion

My research develops and empirically tests a theoretical model to better understand local agency participation in electronic information sharing with state agencies. Moreover I seek to provide support for the factors that have been studied in the technology adoption literature in a new context that is state-local electronic information sharing initiatives. My research will also have practical contributions. The reluctance of local agencies in electronically sharing information with state agencies results in serious inefficiencies in government operations and a loss of millions of dollars. I expect that the insights provided by my study will specifically be useful for the state agencies that are in search for strategies to encourage local agency participation in electronic information sharing. Local agencies will also benefit from the study, as it will help them to spell out their concerns, expectations, and will try to offer strategies by focusing on their needs.

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