Walden University

COLLEGE OF MANAGEMENT AND TECHNOLOGY

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Douglass Smith

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2008

ABSTRACT

Models of Successful Adoption and Implementation for IT Projects in the Public Sector.
by

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M.B.A., Keller Graduate School of Management, 2003
M.P.M., Keller Graduate School of Management, 2003
B.G.S., University of Michigan, 1990

Dissertation Submitted in Partial Fulfillment
of the Requirements for the Degree of
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ABSTRACT

Improper adoption and implementation of information technology (IT) can negatively affect organizational effectiveness, including the waste of resources and errant delivery of services. However, the problem of which factors affect IT projects, alignment against IT adoption models, technologies, and which knowledge management tools are utilized in the public (PU) and private (PR) sectors remains unclear. The purpose of the present study was to delineate IT differences between the public and private sectors. This was done under such theoretical frameworks as the technology acceptance model (TAM) and the theory of reasoned action (TRA). The study used the descriptive quantitative research method. This cross-sectional survey of PU and PR IT professionals was analyzed using ANOVA, Binomial, and MANOVA statistics. Senior leadership, funding, and IT methodologies were among those identified as key factors that affect IT projects. Findings suggest that the public sector is behind the private sector in IT governance, funding, and IT implementation. The data also suggests the public sector may be unnecessarily inefficient specifically because of these IT deficits. The findings show that TAM is most appropriate to align with the public sector. These findings have strong implications for social change. By building IT into public policy programs at the design stage, rather than implementing IT as an afterthought, and by focusing senior leadership on IT technologies, it is possible that public sector organizations can deliver services to the people more efficiently and more quickly with fewer errors, resulting in a healthier, safer, and more prosperous society.

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DEDICATION

This study is dedicated to the citizens of every municipality, region, state, and government. I hope that something related within this text can help and influence those in the public sector to do better and increase the value of the services provided via information technology.

ACKNOWLEDGMENTS

My mother was always a proponent of learning. At an early age, I remember her reading voraciously all types of literature. She infused in me that learning was a lifelong endeavor. Through my studies, this mantra has been a guiding light and thought. I could not have reached a level of new understanding without having her words as guidance. Without her I could not have gotten this far. Without the support and encouragement of others, I would not have been successful.

There are many people I want to thank. First, I have to thank the Almighty for helping me endure through the highs and lows of this momentous endeavor. Secondly, I have to acknowledge the sacrifice that my family and friends made to allow me to pursue this to the end and not letting me give up. To my family, know that I am because you allow me to be, and I love and thank you for that. To my children, never forget or under estimate that knowledge and education is the one thing that can never be taken from you.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1:

INTRODUCTION TO THE STUDY

Introduction

No one can deny the obvious gains introduced by Information Technology (IT) (Brynjolfsson, 2000). The impact of technology in both the private and public sectors has been documented in media outlets and by academia. According to a 2004 U.S. Department of Commerce report, 61.8% of U.S. households had computers in 2003, and 87.6% of those households used their computers to access the Internet. Based on the same survey, 54.6% of U.S. households had some form of Internet connection (Cooper & Gallagher, 2004). According to Andrews (2004), there are four categories of technology, which hold the most promise in providing progress, deep computing, smarter money, more attention to user interfaces, and better access to talent. Kelly (2005) indicated that technological advancements have revolutionized the delivery system of curriculum and educational materials to students. In 2001, the Joint Economic Committee of Congress, chaired by Saxton surmised, "at least half, and probably more, of the increase in labor productivity in the late 1990's is attributable to information technology" (p. #1)

Industry specificity aside, gains have been seen because of the introduction of information technology. Specific to the public sector, Holmes (2001) wrote that the administrative costs in the U.S. Department of Agriculture dropped from 77 dollars to 17 dollars after the introduction of an e-procurement system. Conversely, in 2006 the Internal Revenue Service (IRS) fraud detection system failed to stop an estimated 200 million dollars in fraudulent refunds (McCoy, 2006) or even earlier when the IRS spent

over eight billion dollars updating its antiquated Master File system in 2004 (Varon, 2004). The waste of resources in implementing IT projects is the basis of this research.

With the advent of new technologies comes the promise of more flexibility and more productivity (Lehr & Lichtenberg, 1998). Millions of people now enjoy the ability to access both public and private services via the Internet. Millions of new users enter the world of computers every year. Given this new demand, society has raced to meet this new frontier and our public sector is no different. As citizens, there has been a pent up demand, and sometimes frustration, to rely on the government to provide services in a manner that matches the private sector, in this case electronic services (Barrett & Greene 2001). Constituents of public services demand services that will unburden the taxpayer of the cost and delays typically associated with dealing with the public sector. In 2000, Sharrad (2000) with Forrester Research conducted interviews of 45 different agencies. During these interviews, he noted that most agencies, while providing some services electronically, had plans to across the board increase the availability traditional brick and mortar services electronically.

This research is not concerned with which information technology or electronic services are available. However, this study is concerned with the successful implementation and adoption of information technology in our public sector organizations independent of any specific software or hardware product of that IT implementation. By focusing on implementation and adoption, skirting the specific issues of what type of technology to implement, the study can hone in on fundamental flaws in technology delivery and recommend some best practices that will lead our public sector

organizations to better efficiency. People argue that this bold step should result in cost savings and efficiencies (Barrett & Greene, 2001). Further speculation says the public sector lags in some key comparisons against their private sector counterparts.

Organizational Efficiency and the Public Sector

The purpose of the public sector is to carry out public policy for the good of society by providing goods, services, education, licensure, and enforcement activities to name a few activities (Fountain, 2001). These activities are funded through a mixture of revenue gained through taxation or license fees paid by corporate entities or by individual taxpayers. As such, the efficiency, or lack thereof, in the administration of resources on the public sector level will have an effect on constituents of those organizations. As early as 1887, President Wilson advocated that the administration of the public sector should be separate from politics. In doing so, those caretakers of these agencies would have more freedom to innovate and increase governmental productivity. He stated,

> It's the object of administrative study to discover, first what government can properly and successfully do, and secondly, how it can do these proper things with the utmost possible efficiency and at the least possible cost either of money or energy. (Wilson, 1887, p. 197)

However, since that time such separation between politics and administration is almost impossible to distinguish. Moreover, the efficiency promised in Wilson's essay has been difficult to fulfill. The structure of most of these public sector organizations is one that promotes a top down approach, with many opportunities of bureaucracy based on a command-and-control philosophy.

Gulick and Urwick (1969) foretold the impact of implementing new technology to the systems that the public sector uses. The researchers and others believed that the public sector has an ongoing mandate to focus on delivering services to its constituents using new methods of operations to see productivity gains. Peterson (2005) wrote that there has been shown some mixed success using technology to provide public sector services.

Statement of the Problem

The problem addressed in this research was that there are significant differences in how technology is implemented and adopted in the public sector compared to the private sector. These differences may waste resources and cause errant delivery of services to the public. However, to date, there are no empirical studies in the published literature delineating systematic differences between public sector and private sector core IT usage, IT governance, IT budgeting, and IT adoption. By understanding this problem, potentially valuable resources can be saved and better services delivered to the public at large.

Personnel in public institutions, both IT and non-IT, have not found the right combination of strategies to produce lower costs of ownership and higher technology adoption rates (Wong & Welch, 2004). There is certainly no shortage of academic research on technology adoption. There is also body of research that explored organizational structures in decision making in the public sector as typified by Goodsell in 1994 as well as Gulick and Urick in 1969(Goodsell, 1994; Gulick & Urick, 1969). However, there is not nearly as much quantitative research on technology adoption and

acceptance in this arena. Not having direct access to tested research, which is often provided to the public sector at no or low cost, could put many organizations within the public sector at risk of wasting precious resources.

Factors have converged to bring this problem to the forefront. First, there is an underlying assumption that money spent in the public sector is fueled in large part by the needs of the public (Barrett 2001). Increases in expenses along with the mismanagement of resources, create undesired financial burdens on Mr. and Mrs. Public. No longer is there a blind trust between the public sector and its constituents (Demeritt, 2000). The second factor is that the public sector is slow to change in the face of an increasingly rapidly changing society, and is ill prepared to cope as such (Barrett & Greene, 2001). There reasons for this stagnation include the wide diversity of shareholders and decision makers to whom a public sector organization is beholding (Sminia, & van Nistelrooij, 2006). This is illustrated in Figure 1. Figure 2 illustrates the relative straight-line accountability that private sector organizations enjoy.

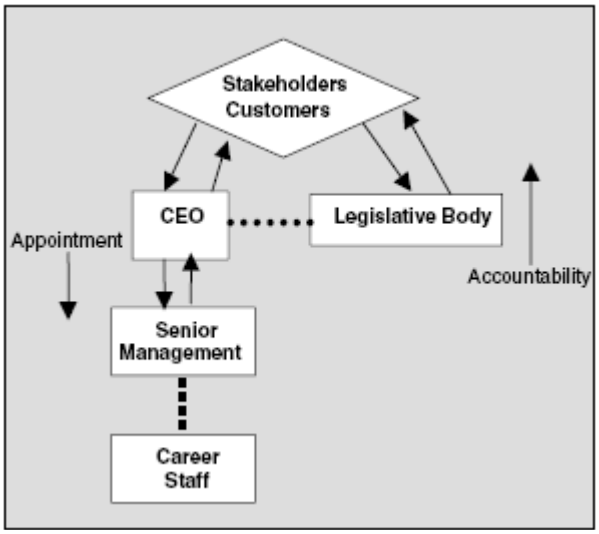

Figure 1. The public sector influences model (Sminia, & van Nistelrooij, 2006)

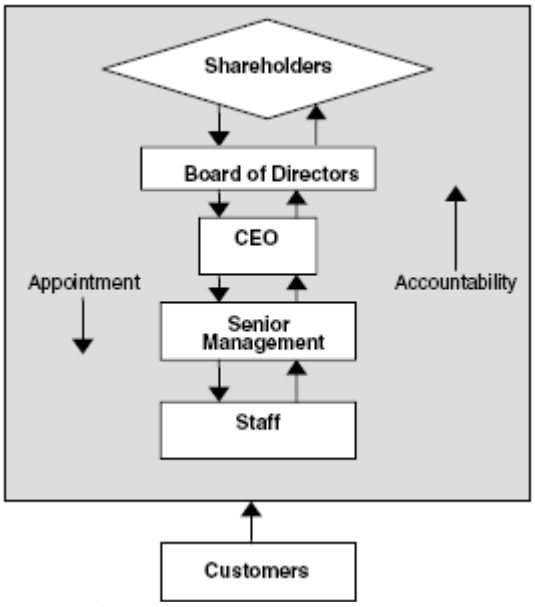

Figure 2 . The private sector influences model ***(****Sminia, & van Nistelrooij, 2006)*

With such a diverse breadth of factors to account for in the organization change, the implementation of any technology is bound to face almost insurmountable hurdles

before an organization can deal with any adoption issues. The last factor involved is Moore's Law.

In 1965, Moore stated that the number of transistors on a chip would double every 24 months and the functionality of the chip would double every 18 months. Moore was not far off the mark and, if anything, one could argue that the timeframe he spoke of is now shrinking due to the rapid introduction of new technologies. Technology is changing at a faster rate than that with which most can keep pace (Barrett & Greene, 2001). The public sector is more at risk of being victimized by these changes due to the issues involved with financing, decision making, and change management (Sminia & van Nistelrooij, 2006). Every organization faces these issues face at some point in time, but they are particularly troubling to public sector organizations.

The constituents of public sector organizations are becoming knowledgeable and technologically savvy and are demanding not only improved resources from these organizations but are holding these organizations more accountable for the management of resources (Holmes, 2001). Organizations have conducted studies and review of processes to make recommendations to promote efficiency within the public sector (Peterson, 2005). Even though such recommendations have been grounded in traditional organizational theory, they have met with mixed success (Peterson, 2005). However, there has been a consistent message throughout, public sector organizations should use technology as a change agent to enhance the delivery of the services provided by the organization in question.

The Background of the Problem

The mantra of doing more with less can heard loud and clear in the halls of public sector organizations (”Doing more,” 2003). In the early 1990s, the concept of transaction costs was developed to codify the impact of information technology on an organization’s delivery of services. It was easy to conclude that there was an on-going opportunity to change the very nature of these organizations using technology (Fountain, 2001). Overall, gains in productivity and in the economy over the last 25 years from the use of technology ranged from 48% to 72% (Taylor, 2006). This has driven a demand in technology consumption. Yet, the link between technology and increased productivity is weak. It has only been in the last two decades that there has been evidence that implementation and adoption of technology can positively affect productivity. Brynjolfsson and Yang (2002) at MIT Sloan School of Management concluded: “Overall, we found computers contribute significantly to firm-level output, even after accounting for depreciation, measurement error, and some data limitations” (Brynjolfsson & Yang, 1996:557). Lehr and Lichtenberg (1998) “found a strong positive relationship across Federal agencies between productivity growth and computer-intensity growth” (p. #277). Nevertheless, this is only part of the equation. It has been shown that there is a link between productivity and technology (Brynjolfsson, 2003), but in order to partake in the benefits of such an association the organization has to overcome the issues of implementation and adoption; issues that aren’t as prevalent in the private sector. Fountain (2001) identified one of the paradoxes of public institutions:

> Ironically, the substantial efficiency gains driving the development of e-commerce and industry change are disincentives for bureaucrats to use the

> Internet in government. Whereas dramatic efficiency gains and cost savings in the economy are rewarded through profits, promotions, stock price increases, and market share, similar gains in government are rewarded with budget cuts, staff reductions, loss of resources, and consolidation of programs. (Fountain, 2001, p. 13)

Purpose of the Study

There is not enough information about the attitudes and perceptions among those who deal with this issue in our public sector to adequately recommend reforms and actions. The purpose of the proposed study is to determine whether there are differences between public and private sectors in how they handle technology implementation and adoption. The organizational factors that promote and inhibit successful technological implementation and adoption will be explored. The results can be used to enhance existing models of information technology implementation and adoption but tailored to the issues facing the public sector. If public administrators can find improved methods of implementing and adopting technology, they will be able to fulfill the promise of the link between technology and productivity. By managing these information technology based assets, millions if not billions of dollars will be available to use in other ways.

Theoretical Framework for the Study

The framework for this study is derived from several theories: (a) the theory of reasoned action (Fishbein & Ajzen 1967); (b) the technology acceptance model (Davis, Bagozzi, & Warshaw, 1989); (c) the theory of adoption and diffusion of innovation (Rogers, 1995); (d) the task technology fit model (Goodhue & Thompson, 1995); (e) the Unified Theory of Acceptance and Use of Technology (Venkatesh, Morris, Davis, &

Davis, 2003); and (f) the stakeholder theory (Freeman, 1984). This section presents and overview of the theories that provide the structure on which this study is theoretically constructed.

In 1975, Fishbein and Ajzen developed the theory of reasoned action to explain the link between behavior and attitude to describe parts of the human condition. Attitude being defined as a person's positive or negative behavior towards a particular thing of interest; in this case, the adoption or implementation of technology. This theory became the basis of the technology adoption model (TAM).

Davis (1989) indicated that the usefulness of a technology is based heavily on the intention of the user in developing the technology acceptance model, TAM. This intention is based on a perception of ease of use and functionality. Bagozzi, Davis, and Warshaw (1992) said:

> Because new technologies such as personal computers are complex and an element of uncertainty exists in the minds of decision makers with respect to the successful adoption of them, people form attitudes and intentions toward trying to learn to use the new technology prior to initiating efforts directed at using. Attitudes towards usage and intentions to use may be ill-formed or lacking in conviction or else may occur only after preliminary strivings to learn to use the technology evolve. Thus, actual usage may not be a direct or immediate consequence of such attitudes and intentions. (Bagozzi et al., 1992, p. 667)

This message looms even larger in the face of the obstacles already enumerated here; there is clearly an obstacle to overcome in public institutions.

Rogers (1995) took another track with the diffusion of innovations theory. He saw innovations being implemented or adopted through certain circles of influence in certain groups over a span of time. Individuals or groups can be shown to have varying degrees of willingness to adopt or implement a technology. In his research, he broke groups into

five categories: innovators, early adopters, early majority, late majority, laggards. Rogers suggested that the rate of adoption is governed by five factors: relative advantage, compatibility, trialablity, observability, and complexity.

The task technology fit theory (TTF) summarized that IT is more likely to have a positive impact on an individual, and organization, if the technological capabilities of the system match those tasks that must be performed by the user, or organization (Goodhue & Thompson, 1995). The measure of TTF consists of the following eight factors: quality, locatability, authorization, compatibility, ease of use, timeliness, reliability, and relationship with users. Each factor then can be measured using a Likert scale with responses raging from strongly disagree to strongly agree. While Goodhue and Thompson focused on the individual level, their findings are similar at a group level, as shown by Zigurs and Buckland (1998).

The unified theory of acceptance and use of technology (UTAUT) is a theory, which consolidated several theories. The theories include the theory of reasoned action, technology acceptance model, motivational model, theory of planned behavior, a combined theory of planned behavior/technology acceptance model, model of PC utilization, innovation diffusion theory, and social cognitive theory, to describe user intentions to utilize information technology and the resulting behavioral patterns. Four key elements, performance, effort, social influence, and conditions, directly influence intention and behavior (Venkatesh et. al., 2003).

Assumptions of the Study

For the purpose of the research, the researcher assumed the following:

1. Respondents will provide honest responses to the questionnaires.
2. Respondents can accurately describe the conditions under which they make decisions or influence usage regarding information technology.
3. Respondents work in a public sector organizations as decision makers or influencers inside of the information technology department or outside of the information technology department.
4. All respondents have access to a computer and the Internet at home and in the office to respond to emails or questionnaires.
5. Respondents may or may not have a formalized methodology for recommending, approving, or implementing information technology.

Scope and Delimitations of the Study

The scope of this study included representatives from the public and private sectors. This study targeted organizations from the Midwest Region, as defined by the U.S. Census Bureau: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. The diversity of the region in its potential participants is why the Midwest makes a reasonable target. As with many political issues, there are those that consider the Midwest the bellwether for the rest of the United States (Everson, 1990). Participants in this study had various organization sizes. Their respective organizations shared an overall dependency on Information Technology. Traditional Public sector institutions, such as state agencies, will be selected, as well as organizations that receive grants or revenue from the taxation of citizens such as higher

education institutions. Data was gathered primarily using a web-based survey instrument. Secondary information was gathered via email or phone.

Limitations of the Study

To accurately account for the perceptions and beliefs of the respondents, the study was dependent on a qualified sample of a certain minimum size. The study sought respondents from all states in the selected region. However, the conclusions drawn may be truly representative of all public sector organizations. The success of the study was also dependent on the researcher's commitment to objectivity throughout the study. Lastly, the lack of response from targeted respondents who may not have access to the Internet and email in a timely fashion is a limitation.

Research Design and Methodology

This study used a descriptive survey research design for the quantitative method of enquiry. Using a descriptive survey sent to the target population in this study was appropriate because it allows the gathering of data that provide the answers to the research questions through a descriptive survey instrument (Wiersma, 1995).

Research Questions

To provide direction for the study, the following research questions were drawn:

1. Which non-IT factors influence and affect IT project progression in public sector organizations?
2. Which IT factors influence and affect IT project progression in public sector organizations?

3. Which IT adoption models accurately reflect and predict IT project outcomes, within the public sector IT community?
4. Which knowledge management tools can be influential in the implementation of IT in the public and privates sectors?

Hypotheses

H_0 (Null Hypothesis) There is no statistically significant difference between public and private sector organizations in terms of how IT is implemented and adopted.

H_1: (Alternate Hypothesis) Private sector organizations will score higher than public sector organizations in their use of technology as a core tool of the organization.

H_2: (Alternate Hypothesis) Private sector organizations will score higher than public sector organizations in the dimension of IT Governance.

H_3: (Alternate Hypothesis) Private sector organizations will score higher than public sector organizations in the dimension of size of budget.

H_4: (Alternate Hypothesis) Private sector organizations will score higher than public sector organizations in the dimension of adoption and usage.

Definition of Terms

Adoption: Acceptance resulting from approval and usage.

Computing: Computing includes designing and building hardware and software systems for a wide range of purposes; processing, structuring, and managing various kinds of information; doing scientific studies using computers; making computer systems behave intelligently; creating and using communications and

entertainment media; finding and gathering information relevant to any particular purpose, and so on.

Constituents: Any individual or group that receives services from a public sector organization.

Diffusion: The process by which an item is utilized and accepted within a given market or group.

e-government: The use of information technology to deliver public services in a efficient, cost effective manner.

Information Technology: Software and hardware; support or management of computer-based information systems.

Innovation: The emergence of something new that has been created.

Implementation: The realization of an application, or execution of a plan, idea, model, design, specification, standard, algorithm, or policy.

Private Sector: Organizations that are not controlled by the government, that is, a variety of entities such as private firms and companies, corporations, private banks, and non-governmental organizations.

Project Management: A system of delivering a group of related tasks to an organized conclusion.

Program Management: A system of delivering a set of projects to an organized conclusion.

Public Sector: Local, State, Federal government entities, Public Schools, Public Institutions of High Learning, or any organization that relies heavily on the use of public financing methods like taxes and fees.

Significance of the Study

The public sector by far is the largest consumer of goods and services (Milner, 2000). Citizen dollars funds these items. With ever increasing government deficits and decreasing services provided by public institutions, the reliance of enabling methods, such as technology, to do more with less rises. Technology holds the promise of allowing the public sector to do more in a shorter amount of time, utilizing far less resources than might otherwise be required.

Societal Significance of the Study

It is important that public institutions be able to utilize technology in a manner that minimizes waste and maximizes productivity to ensure the reliable and timely delivery of services to the public citizen. All stakeholders invested in making decisions surrounding the use of information technology must understand the difficult issues that operating in a non-private sector environment present in order to maximize organizational efficiency. Meister (2005) pointed at three drivers that would necessitate the need for efficient public services: (a) the increasing general age of the populace; (b) increasing expectations of service; and (c) the shrinking levels of government employees. Further Meister recommended using knowledge management tools to assist the creation of self-sustain environments in public sector institutions. Being able to successfully maneuver through these issues will surely both promise and deliver cost savings, which

can then be passed on to the taxpayer. This research is focused on the issues of that impede successful adoption and implementation by the public sector. Every economy, whether local, state, federal, or international can benefit from the smooth execution of information technology implementations and their widespread use as a means of lowering transaction costs.

Organization of the Remainder of the Study

Chapter 2 discusses the literature related to the problem statement and research questions discussed above. The literature review consists of a synthesis of the major works on the theories stated above, as well as a review of the issues of organizational development as they relate to the research questions and problem statement. Chapter 3 describes the research method employed to respond to the problem statement and the research questions. This chapter consists of, among other things, a discussion of the research design, sampling procedure, measurement and the data collection process. Chapter 4 will present and analyze the data collected using the method described in chapter 3. Finally, Chapter 5 will summarize the conclusions drawn from the data presented in chapter 4 and provide recommendations drawn from the data in this study.

CHAPTER 2:

LITERATURE REVIEW

Introduction

The majority of the research regarding IT project progression, models and knowledge management systems in the public sector is qualitative in nature. In general, the research attempts to define the specific issues associated with IT project development and implementation in the public sector and to draw some analogies to the private sector. Because of the wide variety of approaches to the issue of IT projects in the public sector, the literature is grouped into the following categories: (a) non-IT factors influencing IT project progression;(b) IT factors influencing IT project progression; (c) knowledge management systems in the public sector; (d) theoretical IT implementation and adoption models; and (e) IT models in the public sector. Framing the literature review in this context assisted in answering the problem addressed by this study, that there might be significant differences in how technology is implemented and adopted in the public sector compared to the private sector, which may waste resources and cause errant delivery of services to the public. However, to date, there are no empirical studies in the published literature delineating systematic differences between public sector and private sector core IT usage, IT governance, IT budgeting, and IT adoption. There is some overlap in the concepts and perspectives among the categories because of the qualitative approach taken by researchers in this area.

Non-IT Factors Influencing IT Project Progression

A non-IT factor influencing the progression of IT projects is the lack of funding, which results in reductions in the scope of projects in order to fit into budgetary constraints (Pawloski, Datta, & Houston, 2005). In the past, IT projects have often had a low budget priority, which reduces the amount that individual public sector organizations allocate to IT projects. In periods during which there is substantial pressure on public sector decision makers to reduce costs, upgrading IT systems are often postponed or approached in a piecemeal fashion. There is evidence suggesting that the public sector has recognized insufficient funding as an impediment to IT project development and implementation and is allocating a greater amount of resources to IT systems (Government, 2007). This trend towards increased budget allocations is intended to remedy the problems of aging infrastructure and IT systems that are unable to keep up with the demand for services in the modern environment.

Moon (2002) conducted a study of the factors that can influence the rate of IT diffusion and the success of IT implementation among municipalities in the United States. The findings of the study indicated that larger and more affluent municipalities have the financial resources to support more frequent technology adoption to improve the efficiency of operations. In addition, the size of the municipality could be directly related to the budget associated with IT implementation and development projects due to the importance of the organization, the size of the organization, or the importance of projects for which the technology supports. These findings suggested that greater level of funding available to larger public sector organizations may be a critical factor in determining

whether a technology will be adopted and the resources that can be committed to the implementation process to support successful adoption.

Elpez and Fink (2006) determined that there is a strong tendency for the public sector to develop custom IT solutions rather than using packaged software products, which tends to increase the costs associated with an IT project. They attributed the preference for customized solutions to the political process that influence IT projects in the public sector. In addition, Elpez and Fink determined that budgetary requirements and constraints could have an impact on the way in which a system is actually used after implementation, which can determine the effectiveness of the system in meeting user requirements.

There is controversy in the literature with respect to the influence of organizational structure of the public sector on the development of enterprise-wide IT systems. Phillips, Delcambre, and Weaver (2004) contended that the separation of agencies and departments in most public sector organizations tends to create strong boundaries that inhibit the development of a unified or integrated IT system for the entity as a whole. Each agency and department tends to develop separate cultures and procedures with only minimal interaction with the other operating units in the larger public sector entity. As a result, there are formidable organizational barriers in the public sector towards the development of horizontally integrated IT systems that can be shared by multiple public sector agencies even when they are part of the same governmental organization. In many cases, this has resulted in the duplication of IT systems in public sector entities that could have been consolidated if the entity had taken a more global

perspective towards IT development (Government, 2007). Lee, Xin, and Trimi (2005) suggested that the cultural differences in public sector agencies creates internal resistance to collaboration and consolidation with outside agencies that includes any type of collaborative IT project to share information or infrastructure. The implication of this perspective is that the development of effective IT systems in the public sector requires some degree of organizational change to support a greater degree of collaboration among agencies.

There is; however, substantial bureaucratic resistance to change in the public sector if the changes result in the consolidation and elimination of positions. In addition, Lee Xin and Trimi (2005) contended, based on qualitative evidence, that there cannot be effective development and deployment of integrated horizontal IT projects that cross agency or departmental boundaries in public entities without some type of substantive organizational change that enables collaborative use of IT systems. The findings of Elpez and Fink (2006) also determined that the success of an IT project is largely determined by how well the IT system interacts with the general organizational infrastructure in the public sector entity. The implications of these findings are that the IT system should be aligned with the organizational structure, which may require some adjustments to the structure when a new type of IT system is implemented.

In contrast, Wong and Welch (2004) empirically examined the premise that the development of efficient and effective IT systems in the public sector requires organizational and cultural change and concluded that the IT systems merely reflect the existing trends or tendencies within the public entity. In effect, organizational culture and

compartmentalization of agencies may not be a deterrent to the development and implementation of IT projects. The outcome of the implementation process and the way that the IT system is used to provide public services; however, is shaped by the nature of the bureaucracy in the public sector. When efficiency and service effectiveness is not considered a priority in the agency bureaucracy, the development and implementation of IT projects are more likely to be inefficient. Wong and Welch (2004) obtained the data to support their conclusions from a survey of the perspectives and attitudes towards the use of IT systems to increase transparency in governmental operations. In general, the findings showed that bureaucrats would provide support for IT projects when they increased operational efficiency or transparency without substantially altering the way in which the bureaucracy operated. If the IT project involved substantive changes to structure or procedures, the bureaucracy would tend to resist the development and deployment of the system.

Groenewegen and Wagenaar (2006) conducted a study to examine the premise that the initial stages of IT project development in the public sector is characterized by a significant amount of political maneuvering among the primary stakeholders involved in the decision-making process, which can have a significant influence on the way in which the IT project progresses. This perspective presumed that there is a top-down approach to IT project development in which the deliverables and resources committed to the project are defined by senior decision makers with representatives from various groups that have a stake in the project. According to Groenewegen and Wagenaar "The failure of information systems development is often attributed to a failure to acknowledge the

political character of its first phases" (p. 137). The political nature of the initial phase of public sector IT projects is evident from an analysis of the process by which the project is planned, which includes the allocation of resources. Elpez and Fink (2006) also determined that political factors have a significant influence on the IT implementation process using research involving a comparative case study methodology. The establishment of priorities and deadlines may have political rather than operational motives. In addition, the managers that are involved with projects often have a relatively short tenure, leading to a substantial amount of turnover in supervisory staff. Schellong (2007) considered that vendors and consultants as well as career bureaucrats such the CIO of the public sector entity can have a political influence on the decision making process during IT project implementation.

There is research; however, that suggested the users of a system, including the IT personnel, responsible for the development and maintenance of a system play a significant but unofficial role in project development in the public sector (Cibora, 2000). In this model, the users of the system develop an ad hoc community that has significant influence on the way in which the system is developed and can either support or resist the implementation of the system. The users of the system may also be responsible for some degree of drift during the development and implementation of IT projects because of their implicit influence on the process. The influence of the users is described as a source of emergent change on IT projects, which results in incremental evolution of the project between the development and implementation phase (Groenewegen & Wagenaar, 2006). The failure to take into account the influence of the users of the system can lead to

difficulties with project implementation. The effect of this failure is a tendency towards incremental expansion of IT projects during the implementation phase due to the influence of constituent users that were not taken into consideration during the planning phase. This group of constituents may be overlooked during planning because of their relatively low level of officially recognized power or status in a public organization.

Lee, Xin and Trimi (2005) conducted an international review of e-government initiatives and concluded that a critical non-IT factor to support the progression of IT projects is enabling legislation. Regardless of the level or layer of government, the rate of IT development and implementation for governmental entities increases when there is legislation providing financial support and outlining the broad objectives for the IT systems. At the federal level, the *E-Government Act of 2002* and the *Government Paperwork Elimination Act of 1998* were key statutes to foster the development and progression of IT projects in federal agencies. The enabling legislation, regardless of the level, communicates the importance of IT initiatives and projects to the members of the public organizations. In addition, it often establishes priorities that are used to determine resource allocation and reduce some of the political maneuvering among the stakeholders during the planning phase of IT projects. Enabling legislation can include funding allocations for IT projects or general IT infrastructure development, although the specific way in which the funding is applied to a specific project is usually decided at the agency or department level (Pawloski, Datta, & Houston, 2005).

IT Factors that Influence IT Project Progression

One of the IT factors identified in the literature as limiting the rate of IT adoption in the public sector is sufficient IT technical personnel to support infrastructure changes. According to Pawlowski, Datta, and Houston (2005), the public sector at both the federal and state levels have had low starting salaries and low opportunities for advancement when compared to the private sector. As a result, the public sector is characterized by a chronic shortage of qualified IT personnel despite the growing need to provide an increasing range of services. Pawloski, Datta, and Houston also conducted a survey of IT professionals in 23 state agencies and found that 53% of the employees were at least moderately dissatisfied with their positions.

DeMers (2002) surveyed the hiring practices for IT professionals in the public sector and found that the shortage of personnel was largely due to the human resources practices in the public sector. The hiring process was often lengthy and used relatively inflexible rules regarding employment classification. In addition, vacant positions were not widely publicized beyond the traditional public employment recruitment venues. As a result, many public sector organizations were faced with chronic shortages of qualified IT personnel, which had a negative impact on their ability to develop and implement IT projects. DeMers also indicated that there is a relationship between the budget allocations for IT personnel and the ability of public entities to attract qualified personnel due to the relatively low level of compensation offered in the public sector when compared to employment with private organizations.

There is evidence in the literature that interoperability of IT systems is a factor that can influence IT project progression with service delivery initiatives often requiring the cooperation of various agencies in the same public sector entity (Government, 2007). Because of the compartmentalization of many public sector entities, organizations have separately developed their IT systems based on organization-specific criteria. As a result, difficulties can often arise with projects that require the development of an interorganizational interface, which increases the complexity of the project and raises its cost. The difficulties with achieving interoperability in the public sector can result in related agencies in the same public entity having redundant capabilities that are vertically integrated within the agency but not horizontally integrated across agencies (Lee, Xin, & Trimi, 2005). In this type of environment, a project that is intended to create horizontal integration can face significant obstacles due to the need to develop interfaces with the variant legacy systems in each agency. Fountain (2001) suggested that once a technology is embedded in the infrastructure of a public sector entity, there is a great deal of inertia that inhibits changes to support the development of interoperability with the IT systems of other governmental entities. Interoperability problems can develop when there is no overarching technology framework for a public sector entity that controls the type of technology and the ways that the technology is used. Once an agency infrastructure is in place, it becomes more difficult to provide the decision-makers within the agency with a rationale for the expenditures and operational difficulties necessary to change the system infrastructure to enhance interoperability.

Knowledge Management Systems in the Public Sector

The literature regarding knowledge management systems suggested that the development of a knowledge management system should be based on the theoretical understand of the way in which organizations collect and use knowledge (Phillips, Delcambre, & Weaver, 2004). In the public sector, knowledge consists of the organized combination of concepts, ideas, procedures, and policies that are required to achieve or implement the purpose of the agency or department. This view is functionally similar to the concept of knowledge in the private sector because it allows the entity to adapt to changes in the external environment (Bhatt, 2002).

In knowledge management theory, explicit knowledge is the information or data that is written or codified and available to members of the organization (Nonaka, 1994). In a public sector entity, it can include legislation, policies, procedures, and other materials that provide specific guidance as to how the agency or department should function. Explicit knowledge involves only a small amount of the knowledge necessary to operate a public sector entity (Nonaka, 1994). Implicit knowledge consists of the information, ideas, and perceptions of the individual members of the organization, which is essential for functioning and achieving operational and strategic objectives (Nonaka, 1994). Implicit knowledge is verbalized and communicated to others in the organization. Tacit knowledge involves the experiential knowledge of the members of the organization that cannot be easily written or verbalized and involves their insights, intuitions and hunches that is used by the organization to meet its objectives (Nonaka, 1998). In this general theoretical framework, a knowledge management system allows the organization

to collect its explicit, implicit and tacit knowledge and to make it available to members of the organization to support learning, collaboration and decision-making (Phillips, Delcambre, & Weaver, 2004).

The development of public sector knowledge management systems has the potential to reduce some of the agency compartmentalization that characterizes many public sector IT systems (Phillips, Delcambre, & Weaver, 2004). The use of a knowledge management supports ad hoc projects among the individual members of the organization, and can allow some degree of collaboration among departments or agencies that is unofficial and often based on tacit knowledge. Phillips, Delcambre, and Weaver described the development of a knowledge management system at the U.S. Department of Agriculture. The primary difficulty in the creation of the system was obtaining agreement among the various agencies within the department regarding the type of implicit and tacit information that should be gathered and made available through the system. The process of developing the system forced the agencies to engage in closer collaboration and to adopt a common stakeholder view in which the individual agency objectives related to a greater organizational purpose. The implementation process; however, met substantial resistance from internal constituents in the governmental organization due to the perception that it would result in a change in the traditional organizational structure in which there were clear boundaries between the agencies in the Department. These barriers were overcome by including the internal constituents in the planning and implementation process so they could have a complete understanding of how they would benefit from the knowledge management system.

An empirical investigation into the use of a knowledge management system with an electronic knowledge repository (EKR) in the public sector found that the EKR helps to reduce the boundaries in the public entity (Kankanhalli, Tan, & Kwok-Kee, 2005). This research was approached from the perspective of social exchange theory, which contended that all social exchanges involve relinquishing resources, which is a cost, in the expectation of receiving resources, which is a benefit. The theory further argued that all individual engage in exchanges by minimizing their costs and maximizing their benefits.

In the context of knowledge management in the public sector, knowledge is a resource that represents power, which provides a benefit to the individuals that possess the knowledge. When the agencies or departments in a public entity are compartmentalized, the knowledge is one of the resources that each agency or department uses to maintain its relative position within the entity and to obtain resource allocations (Kankanhalli, Tan, and Kwok-Kee, 2005). As a result, there is substantial resistance to sharing knowledge with other agencies or departments due to concerns that it will weaken the relative positioning. By contributing knowledge to an EKR, some of this power relinquishes, which is the cost of the exchange. The anticipated benefit is the acquisition of an even greater amount of knowledge that is used to maintain or improve positioning within the public entity. Based on the findings of a survey among government employees regarding the use of an EKR, Kankanhalli, Tan, and Kwok-Kee (2005) determined that the EKR increases the level of inter-agency trust and communication. The conclusion drawn by this study was that the development of a knowledge

management system was an important antecedent for creating a greater degree of interoperability among the IT systems in a public entity.

Theoretical IT Adoption and Implementation Models

One of the prominent theoretical models regarding the factors influencing technology adoption and implementation is the Technology Adoption Model (TAM) (Davis, Bagozzi, & Warshaw, 1989). The TAM is based on the Theory of Reasoned Action (TRA) developed by Fishbein and Ajzen (1975). This theory suggested that an individual's behavioral intention is dependent on the individual's attitude towards the behavior and subjective norms of the individual and the social group around the individual. In effect, the intention to engage in a specific type of behavior is governed by the attitude toward the behavior, which is shaped by personal norms and social influences. The TAM model combined the constructs of perceived usefulness of the technology and perceived ease of use with the behavioral intention factors developed in the TRA. The TAM defined perceived usefulness as the subjective belief on the part of the user of technology that the use of the system will improve job performance. The perceived ease of use is defined as the degree that a perspective user of a technology system believes that it will be free of effort. The two constructs of usefulness and ease of use have been demonstrated to be separate psychological constructs. According to Brosnan (1998), the basic equation representing TAM is behavioral intention = attitude + usefulness + ease of use.

The TAM model has been subsequently extended to function as a predictor of technology system usage through the addition of the variables of computer experience,

computer anxiety, the level of enjoyment or fun in using the system, and the perceived level of self-efficacy among the individual users of the system (Dishaw, Strong & Bandy, 1999) (See Appendix A). The perception of enjoyment and self-efficacy moderates the anxiety level. The level of experience with technology systems, the perceived ease of use and the anxiety level in turn moderate the perception of usefulness. Usefulness influences behavioral intention, which moderates usefulness. Self-efficacy is a construct that involves the belief of individuals in their ability to perform a task. The construct is directly related to task performance because a low level of self-efficacy reduces the motivation to engage in a task due to the perception that the task is beyond the abilities of the individual. Self-efficacy is related to the degree of anxiety that an individual feels when performing a task, with a low level of self-efficacy associated with a high level of anxiety. In the expanded TAM, the construct of enjoyment is more problematic, with enjoyment considered a construct that is separate from self-efficacy although there is no evidence indicating that the two constructs are not related (Dishaw, Strong, & Bandy, 1999). The model presumes that when there is a high level of anxiety and a low level of experience in using IT systems, the system will be perceived as having a low level of usefulness regardless of the objective ease of use. As a result, the individual training and experience levels of the end users will have a significant impact on the perception of usefulness of the system.

Another type of model to explain the factor influencing the adoption and implementation of IT systems is the task technology fit (TTF) model (Goodhue & Thompson, 1995). This model postulated the existence of four constructs that influence

the use of an IT system consisting of the task characteristics, the technology characteristics, the fit between the task and the technology, the utilization of the system and the performance impact from the fit. The task construct involves an analysis of the nature of the task, such as repetitive, cognitive or complex and the type of task such as managerial or informational. The central aspect of the model is the concept that there is a need to match or fit the capabilities of the technology to the demands of the task and the ability of IT to support the task (Goodhue & Thompson). The model can be expanded to include the individual abilities of the user, which can vary depending on the experience and self-efficacy of the end users (see Appendix B). While the original TTF model did not include individual characteristics as a significant moderator in the task-technology fit, subsequent investigations have determined that factors such as previous experience of the individual with the technology and with the task can influence the perception of fit (Dishaw, Strong, & Bandy, 1999).

The TAM and TTF models have overlapping or complementary factors that can influence technology adoption or the success of project implementation (Dishaw, Strong, & Bandy, 1999). As a result, there have been attempts to integrate the two models into a single perspective. The justification for combining the models is that the TAM and the TTF each capture a different aspect of the user decision process regarding whether to utilize an IT system. The TAM presumes that the users' attitudes, beliefs regarding IT in general, and a specific IT system form the controlling set of variables in the utilization decision. As a result, it has a strong emotional or psychological component to identify the factors contributing to the utilization decision. The TTF presumed that more rational or

cognitive factors such as the effect of the IT system on job performance from the fit between the task and the technology have an influence on the decision to utilize a system (CITE). A combined TAM and TTF model functionally captures both the emotional and the cognitive factors that can contribute to the use of the IT system.

IT Models in the Public Sector

The general models developed to describe the IT adoption and implementation process have not been satisfactory to describe the way in which the process occurs in the public sector (Conklin, 2007; Elpez & Fink, 2006; Schellong, 2007). The differences between the public and private sector due to variables such as the influence of political actors, the influence of the bureaucracy, and the networking and social relationships within and between public sector agencies (Conklin, 2007). As a result, a number of models have developed that attempt to identify and account for the full range of variables found in public sector IT adoption and implementation.

Based on a global survey of e-government initiatives, Lee, Xin and Trimi (2005) proposed a general model for the way in which governments use IT systems to deliver services to constituents (See Appendix C). In this framework, constituents can include members of the public or other public sector entities. There are four components of the model that progress from simple service delivery with no integration to complex service delivery with a high level of integration. The first component involves the least complex aspect of IT implementation and involves some type of online catalogue presentation and possibly downloadable forms. The second component is more complex and allows a user to conduct transactions with the governmental agency using its IT system. These two

components focus on external users of public sector services and are intended to reduce administrative costs. The third component involves vertical integration within the governmental agency or department in which the local system is linked to higher-level systems. At this stage, each public sector entity operates a separate IT system. The final component involves horizontal integration of IT systems across agencies or departments that are controlled by a larger public sector entity. At this level, there is a high degree of system complexity and integration. The model developed by Lee, Xin and Trimi further suggested that the ways in which governments adopt the technologies necessary to support the various stages is not necessarily linear, with the public entity tending to adopt only the minimal technologies necessary to achieve their specific purpose. This model; however, is descriptive in nature and does not examine the factors that can contribute to outcomes of IT projects in the public sector.

Conklin (2007) conducted an examination of the adoption process of technology among governmental entities using the TAM framework as the model for assessing the adoption and implementation process. The approach was qualitative and sought to identify the barriers to successful implementation in the specific governmental environment, which Conklin presumed to differ significantly from the general business environment. The findings indicated that a critical factor in the development of poor perceptions of ease of use and usefulness among the end users was the lack of participation in the adoption process. In practice, an individual or a group relatively high in the bureaucracy of the public entity made the determination that a particular type of technology be adopted. The end users of the technology include the external constituents

of the public entity as well as the internal staff that will be responsible for providing services using the technology. As a result, the perception of usefulness and ease of use in the TAM model are from the perspective of the decision maker and not from the perspective of the end user. Conklin suggested that there is relatively little examination of the perceptions of usefulness and ease of use of a system from the perspective of the end user prior to the adoption of a new IT system.

Conklin (2007) developed a public sector version of the TAM to describe the additional processes influencing technology adoption that are not present in the private sector (see Appendix D). In this model, the moderating factors that exist in the public sector are the decisions of senior leadership, the desires of constituents and bureaucratic rules. Senior leaders are either political appointees or elected officials, with their tenure in their leadership positions not related to their performance. The constituents of public sector organizations are highly varied and have various objectives and degrees of political influence. As a result, some constituent groups can be more influential in the decision-making process tan other groups. Bureaucratic rules are established based on the regulations of the public sector entity and the underlying premise that government activities should be transparent. Each of these moderating factors can have a different type of influence on the attempt by the public organization to implement a technology innovation. Conklin offered the example of an e-government initiative that intended to reduce paperwork, which can find constituent support but bureaucratic resistance because it threatens to disrupt the existing power base within the organization. The conclusion arrived at from this analysis is that the implementation of a new technology in the public

sector requires a great deal of internal and external leadership and persuasion among senior leadership to increase the intention to use the system.

Elpez and Fink (2006) developed the Emerging Alignment Model (EAM) specific to the public sector to describe the variables influencing IT acceptance and implementation. The model is based on the findings of a qualitative case study that identified the usability factors that can influence the successful implementation and of projects in the public sector. The specific methodology used in the study asked IT professionals in the public sector to identify and rank the factors that contribute to or impede the success of IT project implementation. The EAM is complex and involves both IT and non-IT factors in the development and implementation process for the system (See Appendix E). The model indicated that the use of a system is dependent on a large number of variables. The IT related variables include the information quality of the system, which is the accuracy of the data, and system usability and performance, which is the ease of use. These two variables have to meet the user requirements, and suggest that the end user should be an important part of the system development process. Use is also influenced by the two collateral variables of user acceptance and IT ownership, and interaction with the IT infrastructure. The user acceptance IT ownership variable is the degree that the system is viewed as usable, and is similar to the utilization variable of the TTF model. The interaction with IT infrastructure refers to the degree of compartmentalization of the public sector agency or department from other public sector agencies or departments in the same entity. Elpez and Fink (2006) found that use increases when there is a higher degree of IT infrastructure integration among the various

agencies and departments in a public sector entity. The EAM also indicated that the use of the system impacts expenditure control and accountability, which are more important factors for IT implementation and success sin the public sector than in the private sector. The use of the IT system also influences the long-term perspective of the organization along with the interaction of the IT infrastructure.

Fountain (2001) developed the technology enactment framework (TEF). The TEF is intended to model the adoption of technology in the public sector. The basic framework is relatively simple and consists only of the four domains of institutional arrangements, organizational forms, enacted technology, and results. The first three domains; however, are subject to the influence of a large number of variables that can have an eventual impact on results. The TEF is based on the assumption that technology plays three roles in the public sector. It is a management tool that enables decision makers to obtain more information about services and to control operations. The technology also becomes part of the infrastructure of the public sector entity once it is embedded in the organization, and controls the way in which the entity interfaces with the public and with other governmental entities. The technology is also an instrument for organizational change, often requiring adjustments to internal structures when a new technology is implemented (Schellong, 2007). Schellong (2007) indicated that to a large degree, the TEF is based on the premise that technology is deterministic in nature and that the decision to adopt a particular type of technology has social, political and structural implications for a public sector entity.

In the TEF, as proposed by Fountain (2001), there are two groups of variables that can influence the organizational form domain that consist of bureaucracy and network variables. The bureaucracy variables are composed of factors such as hierarchy, level of standardization, rules, and jurisdiction of the public entity. The network variables consist of factors such as trust within the entity and with other related public entities, the level of available social capital, and the interoperability of the systems. Cognitive, cultural and legal variables influence the institutional arrangement domain. The model also contended that the enacted technology domain consists of both IT and non-IT variables such as perception, design, implementation and intention to use. The variables in the enacted technology domain are similar to the IT variables found in the private sector when implementing new technologies and are related to the TAM and TTF (Schellong, 2007). According to Schellong, since it was initially proposed, the TEF has been expanded to include the influence of different groups of actors in the public sector, which is an attempt to accommodate political and budgetary variables that can influence technology adoption.

The variables for the various domains in the TEF model are highly subjective and difficult to measure empirically. Nonetheless, there has been a recent attempt empirically to validate the basic TEF model using survey questionnaires that measure some of the under lying variables in institutional arrangement, organizational form, and enacted technology (Estrada-Marroquin, 2007). This study applied the Fountain (2001) TEF model to the e-government initiatives of the Mexican federal government. This initiative called for the adoption of a similar type of e-government initiatives in all of the entities of

the government, which created a situation in which the variables associated with institutional arrangement, organizational form and enacted technology could be tested based on the differences in the various governmental agencies in the same public entity. The findings indicated that institutional arrangements and organizational form has a substantial influence on the enacted technology. These finding indicated that the there were difficulties with standardization and use of the technology due to the organizational form and institutional arrangement variations in the agencies, which accounted for the variability in the results from the technology adoption process. The findings also indicated that there was a high degree of correlation in the relationship between enacted technology and organizational forms that had an impact on results. This suggested that these two factors are more controlling over results than institutional arrangement.

Conclusion

Based on a review of the literature, the study proposes four distinct domains be explored: IT Governance, Budgetary Considerations, and Adoption/Implementation. The first domain, IT Governance, considers the affect of leadership and philosophy on technology in an organization. The second domain, Budgetary Considerations, explores the affect of how finances are used on technological issues facing an institution. The third domain, Adoption/Implementation, investigates other issues that push and pull on the organization and affects technology in a company. The final domain considers the type of technologies used in an organization. The next chapter discusses the methodology of this study.

CHAPTER 3:

RESEARCH METHOD

This chapter details the study methodology, the description of the research design, an analysis of the target population, a description of the sampling procedure, the procedures for data collection, the instrumentation, and finally the data analysis procedures. First, the chapter introduces the chosen research method. A discussion of the target population that the study wishes to analyze follows. The sampling method and its justification are presented. Lastly, the instrumentation, the data collection, and the data collection procedures are discussed at the end of the study.

Introduction

This researcher has found no existing quantitative studies comparing the adoption and implementation strategies for IT with the organizational dynamics that exist within the public sector. There have been studies that focus the impact of technology in various parts of the public sector (CITE). However, those studies focused on the product of a specific technology as opposed to the effect that the public sector environment has on the implementation and adoption of technology. This study focuses on some of the same factors that previous studies account for such as organization size, technology planning cycles, staff size, and budget size, but also then looks at other influencing factors like responding to legislative issues, organizational funding, and administrative changes.

Research Design

This study's design utilizes survey research. Survey data was collected using Web-based electronic surveys. The survey gathered demographic variables such as age, length of time in the position, organization type, and the budgeting cycle for examination. These variables will influence the implementation and adoption cycles of technology in the public sector.

The choice of using survey research was appropriate, as it has been deemed by many scholars to provide an accurate account for the perceptions of what is happening at a given point in time. Leedy and Ormrod (2005) stated, "Survey research involves acquiring information about one or more groups of people – perhaps about their characteristics, opinions, attitudes, or previous experiences – by asking them questions and tabulating their answers" (p.183). Survey research has a goal of learning about a large population by surveying a smaller sample. This research provides data collection by using a set of pre-determined questions in a structured questionnaire so the results when tabulated will be representative of the target population.

Despite the beneficial promises of survey research, there are several potential shortcomings:

> There are at least seven potential weaknesses in survey research: a) failure to allow enough time and resources for the various steps; b) the sampling procedure can break down or there may not be enough resources to test and revise the items adequately; c) the items of the questionnaire may be poorly constructed, resulting in unusable data; d) failure to provide for follows-ups; e) inadequate procedures for assembling and tabulating the data as the questionnaires are returned are sources of inefficiency and confusion; f) failure to consider non-respondents may bias the results and lead to unwarranted generalizations; and g) reporting of the results by the researcher as separate, isolated analysis without some synthesis

> could lead to assumptions that maximum information is not being obtained from the survey. (Wiersma, 1995, pp. 157-158)

To address these issues in this study: (a) adequate time was allowed to carry out the research in this study (b) the sampling procedure was reviewed by someone very knowledge in statistics (c) the items on the survey was examined by several public and private sector employees (not included in the study) (d) repeat mailings were sent as follow-ups (e) using an electronic survey ensures that data collection is automated and all data is recorded (f) the results of the report will be utilized to summarize findings.

The strengths of the research survey far outweigh the perceived weaknesses. Singleton and Straits (2004) said that while "experiments are used almost exclusively for explanatory, hypothesis-testing research; survey research is used extensively for both descriptive and explanatory purposes" (p. 226). Using survey research allowed the most effective method of describing perceptions of those that work in the public sector.

Other research design methodologies have been considered for this study. Case studies were considered, but disregarded because it involves an examination of the subject in its natural setting. The only elements of the study that can be controlled are the scope and the length of time. Experimental research design was also considered. Singleton and Straits (2004) pointed out that experimental research design "is intended for the purpose of testing hypothesized causal relationships" (p. 183). Duncan (2001) asserted that this method cannot be used due to its condition for the hypothesized causal relationships and for the inherent problem associated with the limitation imposed on the generalization of results and findings stemming from the limited sample selection.

Target Population

The targeted populations of this study were organizations that reside within the Midwest region as defined by the U.S. Census Bureau. There are 12 states in this region being Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. The unit of analysis will be organizations in any of the 12 states in the region from the private and public sector.

Sampling Procedure

The sample frame for the study was organizations from any of the twelve selected states. The Midwest region of the United States was selected because of its geographic diversity in terms of size and complexity. Two major sub-groups will be solicited for participation, Public and Private sector organizations.

The first group will represent public sector organization, largely governmental or educational in nature. The majority of participants in this group are expected to be organizations that have a sizeable information technology reliance and infrastructure. Within this group, the study categorized respondents into one of several smaller groups: State Agencies, Local Government institutions (city municipalities), Education (both public schools and institutions of higher learning), and Not-for-Profit/Non-Profit Organizations.

The second major group represented private sector companies. These companies varied in size, but will also have an entrenched technology reliance and infrastructure. Within this group, we will categorize respondents into one of several smaller groups: Privately held corporations and publicly traded companies.

The respondents will come from a number of organizations that represent organizations and individuals in the Midwest. The respondents from this survey had similar characteristics: IT Professionals that have similar levels of influence in their respective organizations. This influence can come in the form of those that recommend or approve technology projects as well as those that manage technology projects or are in a position to influence how technology is used in an organization.

This researcher has contacted several organizations that have the characteristics of the targeted group of participants. These organizations:

Table 1

Potential Source of Public Sector Participants

Location	Organization	Public/Private Sector Affiliation
National	National Association Technology Professionals Serving State Governments	Private
National	Information Technology Association of America	Private
National	Association of Information Technology Professionals	Private

Table 2

Potential Source of Private Sector Participants

Location	Organization	Public/Private Sector Affiliation
National	National School Boards Associations	Public
National	Public Technology Institute	Public
National	National Association of State CIO's	Public
National	Blacks in Government	Public

Table 3

Potential Source of both Public and Private Sector Participants

Location	Organization	Public/Private Sector Affiliation
Illinois	Association Forum	Both
Indiana	Indiana Society of Association Executives	Both
Iowa	Iowa Society of Association Executives	Both
Kansas	Kansas Society of Association Executives	Both
Michigan	Michigan Society of Association Executives	Both
Minnesota	Midwest Society of Association Executives	Both
Missouri	Missouri Society of Association Executives	Both
Nebraska	Nebraska Society of Association Executives	Both

North Dakota	Midwest Society of Association Executives	Both
Ohio	Ohio Society of Association Executives	Both
South Dakota	Midwest Society of Association Executives	Both
Wisconsin	Wisconsin Society of Association Executives	Both
National	American Society of Association Executives	Both
National	Association of Computing Machinery	Both
National	Council of Regional Information Technology Associations	Both
National	Black Data Processing Association	Both
National	CIO.com	Both

Each of these organizations represents membership organizations, where members work in either the public or private sector as noted above. While access to most of their lists is public, this researcher solicited letters of cooperation from these organizations to increase the chance of participation. These letters could not be obtained, this researcher solicited participants from publicly available listservs.

This study uses a modification of the convenience method called the purposive or judgment sample method. Singleton and Straits (2005) defined this type of sampling as "in this form of sampling, the investigator relies on his or her expert judgment to select

units that are representative or typical of the population" (p. 243). In applying this methodology, this researcher selected the sample frame as mentioned above.

Instrumentation

The composition of the instrument is divided into four parts. The original survey instrument is in Appendix G. The revised survey instrument can be found in Appendix J. This researcher created this survey instrument for this study. The first part of the survey has closed end questions concerning demographics. Each of the remaining sections is related to each of this study's research questions. The table below displays how each of the survey questions maps to this study's research questions, along with the statistical analysis and the predictive measurement:

Table 4

Survey Indices and Analysis Map

	Survey Question	Subgroup	Research Questions	Analysis Type	Predictive Measurement
IT Governance (Leadership=A, Philosophy=B)					
Senior IT Committee	4	A	R1	Binomial	Private Higher
Senior Leadership on IT	5	A	R1,R3	ANOVA	Private Higher
Staff Involvement in technology decisions	7	A	R4	ANOVA	Private Higher
IT Strategy/Implementation	8	B	R1,R2,R3	ANOVA	Private Higher
Needs Assessment	9,10	B	R3	ANOVA, Binomial	Private Higher
Population Served by IT	6	B	R1	ANOVA	Private Higher
IT staff placement	11	B	R1,R2	Binomial	Same
Budget (Budget Considerations=A, Staffing=B)					
Formal IT Budget (relative to overall budget)	12,13	A	R1	ANOVA, ANOVA	Private Higher
% of Technology needs met by current Funding	14	A	R1,R2	ANOVA	Private Higher
External Department Influences on IT Budget	15	A	R1	ANOVA	Private Higher
FTE Technology Staff	16,17	B	R1,R2	ANOVA, ANOVA	Private Higher
Sufficient Skilled Staff	21	B	R4	ANOVA	Private Higher
Technology Utilization/Adoption (Utilization=A, Adoption=B)					
Technology capacity	19	A	R2	ANOVA	Private Higher

Maintain current level of technology	20	A	R2	ANOVA	Private Higher
New Uses of technology to meet evolving needs	20	A	R2	ANOVA	Private Higher
Hindrances to technology use	21	B	All	ANOVA	Same
Using IT processes	18,22	B	All	ANOVA, ANOVA	Private Higher

Information Technology Governance

The second part of the survey had questions pertaining to IT Governance. Within this domain, the research the study will assess two sub-factors: leadership and philosophy. The leadership dimension seeks to probe how leadership influences IT in an organization. The philosophy dimension seeks to probe how the organization views IT within the context of the organization's operating philosophy.

Budget Considerations

The third part of the survey asked questions that have financial implications to the organization. Within this domain, there are two sub-factors: budget considerations and staff. The first dimension in this domain, budget considerations, looks at the financial implications behind an organization's use of IT. The second dimension, staffing, will reveal the how appropriate staffing affects IT adoption, usage, and implementation.

Implementation, Adoption, and Use

The final part of the survey questioned the use of major technology enablers such as email, web servers, and e-commerce applications to determine the desired level of use of technologies. Within this domain, there are two sub-factors: implementation/adoption

and usage. The first dimension, implementation/adoption, sought to understand both the current and future levels of usage of technology in the participant's respective organization. The second dimension deals with technology usage; the survey assessed the factors that promote and hinder technology usage.

Expert Study

An expert study took place using the survey instrument mentioned above. A group of participants will be selected representing participants from both the public and private sector. The expert study was two-phased. The first phase consisted of the participants using the survey instrument as mentioned above. The second phase was an interview with the participants. This preliminary investigation was to secure the validity and reliability of the instrument. Based on the results of the expert study, the survey was revised and tested. The protocol for the expert study can be found in Appendix I.

Data Collection

The research proposal was reviewed Walden University Institutional Review Board, IRB. Participants were contacted only after IRB approval was received. The survey instrument was self-administered to all participants. An email containing the Internet hyperlink was sent to all participants. The website contained a cover letter, a statement of confidentiality, and introduction to the study. A copy of these items can be found in Appendix G. An email invitation to participate in the survey as sent to the participants, which can be found in Appendix H. The distribution and the data collect for the survey will be fully automated using SurveyMonkey. Participants were asked to

complete the survey within ten business days. For non-respondents, subsequent reminder emails will be sent to those participants that had not responded.

This study used the Computer Assisted Personal Interviewing (CAPI). It has become the standard for conducting survey research in the United States (Singleton & Straits, 2005). Further, web-based surveys provide inarguably faster responses and more accurate data collection than other survey methods (Schaefer & Dillman, 1998). Tracking the progression of the data collection can be automated. Using this method assumes that all participants had access to the internet and email.

Other survey methods were considered. The cost of data collection in using web-based surveys is typically a fraction of costs associated with mail or telephone surveys. Face-to-face and telephone interviewing presented an undue burden in terms of available resources.

Data Analysis

Once the survey data was collected, it was analyzed using quantitative descriptive statistical tools. Microsoft Excel (Microsoft Corporation, Redmond, Washington) and Statistical Package for Social Sciences (SPSS, Chicago, Illinois) was used for all analysis. This study used graphical and numerical models and methods to discover the trends within the collected survey data. The data was analyzed using ANOVA, Binomial, and MANOVA statistical techniques (Leedy 2005).

Hypothesis Testing

Data analysis was conducted to simply garner descriptive statistics. These hypotheses will be tested using the statistical analysis listed in Table 4 above. One of the main purposes of data analysis in this study was to answer the following hypotheses formulated to help guide the study:

H_0 (Null Hypothesis) There is no statistically significant difference between public and private sector organizations in terms of how IT is implemented and adopted.

H_1: (Alternate Hypothesis) Private sector organizations will score higher than public sector organizations in their use of technology as a core tool of the organization.

H_2: (Alternate Hypothesis) Private sector organizations will score higher than public sector organizations in the dimension of IT Governance.

H_3: (Alternate Hypothesis) Private sector organizations will score higher than public sector organizations in the dimension of size of budget.

H_4: (Alternate Hypothesis) Private sector organizations will score higher than public sector organizations in the dimension of adoption and usage.

Variables

Organization type was the independent variable, and all other variables were dependent variables.

Compliance with Ethical Guidelines

This study complied with ethical guidelines of Walden University and American Psychological Association. Participants were informed that their participation was strictly

voluntary and that there is no compensation for their involvement. Additionally, there was no penalty for terminating the survey at any time. Participants were asked for personally identifying information as part of the data collection for contact purposes only and was not be used in the statistical analysis. Participant's information was coded sequentially to ensure confidentially. However, this information and any other question on the survey were strictly voluntary.

The records of this study were kept private. If any report of this study is published, the researcher will not include any information that will make it possible to identify a participant without written permission. All research records are kept in a locked file; only the researcher will have access to the records. Records will be kept for a minimum of five years, and will then be destroyed.

Chapter Summary

This chapter discussed the sample, methodology, and design of the study. The sample came from either public or private institutions. The study targeted IT professionals in decision-making positions or those that held influence over technology adoption in their respective organizations. The study utilized survey methodology for data collection. The study was approved by the IRB and followed the guidelines set forth by Walden University and the APA. The next chapter will discuss the findings of the study.

CHAPTER 4: RESULTS

Introduction

The purpose of the study was to determine whether there were significant differences between public and private sectors in technology implementation and adoption. This study explored the organizational factors that promote and inhibit successful technological implementation and adoption. The goal was to understand if these differences may lead to better outcomes in IT adoption in the public sector.

This chapter is arranged and structured around the research questions addressed in this study. The analysis of the survey data are presented, interpreted, and explained in consistency with the research questions and the underlying theoretical or conceptual framework of the study. The findings related to each research question are reported. There are two sections of this chapter correspond to the problem domains associated with this study. In the first section, the demographics of the participants of the survey presented and analyzed. The second section reports the results of the three problem domains, IT Governance, Budget Considerations, and Technology Utilization/Adoption, along with core IT technology usage as they relate to the research questions.

The data collection instrument was appropriately used as designed. Survey data was obtained and reported clearly with established standard procedures. Electronic mail with a link to the Web site for the survey questionnaires were sent to the targeted participants. Follow up emails and listserv postings were sent as reminders to potential participants who had not responded. There were 151 respondents. Each table total might

not be exactly equal to 151 because some participants chose not to respond to all parts of each question. Several questions represent multiple measures.

The study data was analyzed and categorized using quantitative descriptive statistical tools. Descriptive statistical tools were used to summarize the collected data in a clear and understandable format. Combinations of graphical and numerical methods were used to explore possible patterns and the data characteristics. Tables and figures are presented in proper titles, captions to show clear, self-descriptive, and informative displays of the results. The data was analyzed in accordance to the survey codebook found in Appendix K.

The chapter concludes with a discussion of how the results of the study corresponds to the hypotheses presented in this study.

Demographics of Study Participants

Table 5

Study Participant Demographics

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3	1.9	1.9	1.9
PR	53	34.4	34.4	36.4
PU	98	63.6	63.6	100.0
Total	154	100.0	100.0	

There were 151 valid survey participants. Public sector organizations comprised 63.6% or 98 participants. Private sector organizations comprised 34.4% or 53 respondents.

IT Governance Domain

Within the IT Governance domain, the research collected information on senior leadership involvement with technology decisions, staff involvement in technology decisions; technology needs assessments, and the overall philosophy of the treatment of technology in organizations.

Significant findings

There were two statistically significant findings. Private sector organizations tended to utilize senior leadership collaboration on matters of technology more than public sector organizations. Senior leadership in these private sector organizations tends to give more specific in giving guidance on technology efforts than public sector organizations.

Senior IT committee

Table 6

Question 4

Group Statistics

	NEWORGTYPE	N	Mean	Std. Deviation
SRCMT	PU	95	1.27	0.45
	PR	51	1.12	0.33

This question measured whether or not the organization used a senior committee to oversee and prioritize technology on a yes (value of one) or no basis (value of two). An

independent-samples t-test was conducted to compare the Senior IT Committee scores for public and private sectors. The private sector scored significantly lower (M = 1.12, SD = .33) than the public sector (M = 1.27, SD = .45); t (144) = 2.2, p = 0.03. In this case a lower mean scores indicated a propensity to use a senior committee for technology oversight.

Senior leadership on IT

Table 7

Question 5

Group Statistics

	NEWORGTYPE	N	Mean	Std. Deviation
SRLDRATT	PU	96	1.79	0.56
	PR	49	1.53	0.82

This question was scaled to measure the attitudes that senior leadership has on technology. An independent-samples t-test was conducted to compare the senior leadership's philosophy on IT scores for the public and private sectors. The responses ranged from senior leadership providing specific guidance (rating a 1) to senior leadership generally opposing technology capabilities (rating a 4). There was a statistically significant difference in scores. In senior leadership IT, the public sector (M = 1.79, SD = .56) scored significantly higher than the private sector (M = 1.53, SD = .82), t (143) = 2.2, p = 0.03. In this case, the private sector reported a tendency for their senior leadership to provide specific guidance on technology matters.

Other resulting characteristics

While not statistically significant, there were other findings present for this problem domain:

Attitudes of the population served by your organization

Table 8

Question 6

Group Statistics

	NEWORGTYPE	N	Mean	Std. Deviation
POPSRVED	PU	94	1.97	0.74
	PR	49	1.76	0.72

This question measured the attitudes of the population served by the organization with regards to technology. The responses ranged from population served by the organization providing specific guidance (rating a one) to that population generally opposing technology capabilities (rating a four). There was no significant difference in scores. However, the public sector organizations (M = 1.97, SD =.74) scored higher than private sector organizations, M = 1.76, SD = 1.76; t (141) = 1.6, p =.06.

Staff significantly involved with managerial technology decisions

Table 9

Question 7

	PR #	PR % of total	PU #	PU % of total	*N*	*k*	*p*	*q*	*z*	binomial calculation
SETBUD	19	22%	66	78%	85	66	0.65	0.35	2.51	0.004
SETSTRAT	28	28%	71	72%	99	71	0.65	0.35	1.49	0.065

CHVND	23	25%	69	75%	92	69	0.65	0.35	2.09	0.016
AUTHPURCH	18	21%	67	79%	85	67	0.65	0.35	2.73	0.004
NOINVL	23	56%	18	44%	41	18	0.65	0.35	-2.52	0.997

This question measured how involved the respondent is in various technology decisions. This question used the Binomial calculation instead of the Chi Squared test because *p* is constant at 64%, corresponding to the ratio of public sector participants in the data. Using this ratio along with a threshold of $p < .01$ there are two statistically significant results. The ability to set budgets (SETBUD) and the ability to authorize purchases (AUTPURCH) lay outside the norm. In these measures, there was a significance prevalence of the public sector to have these characteristics.

IT philosophy implement in organization

Decisions concentrated at the top of the organization

This question measured various aspects of the organization's technology philosophy. The question was constructed using a Likert scale, with the response "not at all" representing a value of one and a response of "to a great extent" representing a value of five.

Table 10

Question 8

Group Statistics

	NEWORGTYPE	N	Mean	Std. Deviation
DCATTOP	PU	98	3.66	0.87
	PR	53	3.96	1.06
STIT	PU	98	3.36	1.11
	PR	53	3.58	1.13
CRSFUNC	PU	98	3.20	1.21
	PR	53	3.45	1.34
REDSTRUC	PU	97	2.66	1.04
	PR	53	2.83	1.22
PLANCOORD	PU	97	3.23	1.17
	PR	52	3.29	1.24
ITPLANBUS	PU	98	3.20	1.17
	PR	53	3.51	1.31

There was no significant difference in scores for public sector organizations (M = 3.66, SD = .87) and private sector organizations, M = 3.96, SD = 1.06; t (149) = -1.9, p = .06. The private sector scored higher on this measure.

Comprehensive technology strategy

There was no significant difference in scores for public sector organizations (M = 3.36, SD = 1.11) and private sector organizations, M = 3.58, SD = 1.13; t (149) = -1.2, p = .24. The private sector scored higher on this measure.

Cross-functional teams for managing day-to-day operations

There was no significant difference in scores for public sector organizations (M = 3.2, SD = 1.21) and private sector organizations, M = 3.45, SD = 1.34; t (149) = -1.2, p = .25. The private sector scored higher on this measure.

Reducing formal organizational structure

There was no significant difference in scores for public sector organizations (M = 3.36, SD = 1.11) and private sector organizations, M = 2.83, SD = 1.22; t (148) = -0.9, p = .37. The private sector scored higher on this measure.

Technology planning coordination with strategic planning

There was no significant difference in scores for public sector organizations (M = 3.23, SD = 1.17) and private sector organizations, M = 3.29, SD = 1.24; t (147) = -0.3, p = .76. The private sector scored higher on this measure.

Technology strategy incorporated into business strategy

There was no significant difference in scores for public sector organizations (M = 3.2, SD = 1.17) and private sector organizations, M = 3.51, SD = 1.31; t (149) = -1.5, p = .14. The private sector scored higher on this measure.

Conducting User/Visitor Needs Assessments

Table 11

Question 9

Group Statistics

	NEWORGTYPE	N	Mean	Std. Deviation
CONDASSESS	PU	92	2.48	0.88
	PR	39	2.44	0.91

This question was constructed having responses of "yes" (value of three), "no" (value of one), and "don't know" (value of two). There was no significant difference in scores for public sector organizations (M = 2.48, SD = .88) and private sector organizations, M = 2.44, SD = .91; t (129) = .2, p = .80. The public sector scored higher on this measure.

Using User/Visitor Needs Assessments

Table 12

Question 10

Group Statistics

	NEWORGTYPE	N	Mean	Std. Deviation
USEASSESS	PU	82	2.68	0.73
	PR	40	2.55	0.85

This question was constructed having responses of "yes" (value of three), "no" (value of one), and "don't know" (value of two). There was no significant difference in scores for public sector organizations (M = 2.68, SD = .73) and private sector organizations, M = 2.55, SD = .85; t (120) = .9, p = .37. The public sector scored higher on this measure.

Location of staff with technology responsibilities

Table 13

Question 11

Group Statistics

	NEWORGTYPE	N	Mean	Std. Deviation
STAFFLOC	PU	95	1.99	0.37
	PR	49	2.00	0.54

This question revealed where in the organization is staff with technology responsibilities predominately located. The question was constructed using a four point scale; with the responses for "management" (value of one), responses for "separate technology department" (value of two), responses for "integrated with operational departments" (value of three), and responses for "don't know/not applicable" (value of four). There was no significant difference in scores for public sector organizations (M = 1.99, SD =.37) and private sector organizations, M = 2, SD = .54; t (142) = -.1, p = .89. The private sector scored higher on this measure.

IT governance domain summary

The public sector tended to be more responsive to user/visitor needs than their private sector counterparts were. The public sector scored higher in these measures than the private sector. Senior leadership in the private sector collaborates more with IT staff in matters of technology. This collaboration can enhance the prospects of a successful implementation and adoption of an IT project. Public sector organizations usually have IT staff involved with setting budgets and authorizing purchases. This falls in line with the findings that there is more autonomy in the public sector. Additionally, private sector senior leadership gives more specific guidance in technology efforts than those in the public sector. Finally, the private sector scored higher in measures that exhibit these characteristics:

1. Decisions concentrated at the top of the organization
2. Comprehensive technology strategy
3. Integrated operations
4. Coordinated technology planning
5. Clearly stated technology strategy

Budget Domain

Within the Budget domain, the research collected information on annual budgets, overall technology budgets, technology needs met by current funding, lines of business involvement in technology budgeting, FTEs and IT FTEs within organizations.

Significant findings

There was one significant finding within the budget domain. While the public sector have more FTEs, private sector organizations have more FTEs dedicated to the IT function of the organization.

IT FTEs

Table 14

Question 17

Group Statistics

	NEWORGTYPE	N	Mean	Std. Deviation
ITFTESTAFF	PU	88	3.94	1.83
	PR	49	5.96	3.23

This measure was constructed using a 10-point scale, ranging in responses that correlated to a number of employees dedicated to technology in the organization. There was a significant difference in scores. Private sector organizations, $M = 5.96$, $SD = 3.23$, scored significantly higher than with public sector organizations ($M = 3.94$, $SD = 1.83$) ; $t(135) = -4.7$, $p = .00001$. In this case the private sector had tendencies to have more dedicated IT FTEs than public sector organizations.

Other resulting characteristics

While not statistically significant, there were other findings present for this problem domain:

Annual budget

Table 15

Question 12

Group Statistics

	NEWORGTYPE	N	Mean	Std. Deviation
ANNBUDG	PU	51	6.41	2.53
	PR	38	6.24	3.16

This measure was constructed using a nine-point scale that correlates to an annual budget size. The scale ranges from less than $250,000 to over $25,000,001. There was no significant difference in scores for public sector organizations (M = 6.41, SD = 2.53) and private sector organizations, M = 6.24, SD = 3.16; t (87) = .3, p = .77. The public sector scored higher on this measure.

Annual technology budget

Table 16

Question 13

Group Statistics

	NEWORGTYPE	N	Mean	Std. Deviation
ANNTECHBUD	PU	74	4.82	1.75
	PR	21	4.05	2.64

This measure was constructed using a nine-point scale that correlates to an annual technology budget size. The scale ranges from less than $250,000 to over $25,000,001. There was no significant difference in scores for public sector organizations (M = 4.82, SD = 1.75) and private sector organizations, M = 4.05, SD = 2.64; t (93) = 1.6, p = .12. The public sector scored higher on this measure.

IT needs met by current funding

Table 17

Question 14

Group Statistics

	NEWORGTYPE	N	Mean	Std. Deviation
ITNEEDSMET	PU	89	4.38	1.11
	PR	48	4.58	1.41

This question measured what percentage of the organization's technology needs is met by the current funding for technology. This was done on a six-point scale, ranging from 0% to 100%. There was no significant difference in scores for public sector organizations (M = 4.38, SD = 1.11) and private sector organizations, M = 4.58, SD = 1.41; t (135) = -.9, p = .36. The private sector scored higher on this measure.

Line of business involvement in IT budgeting

Table 18

Question 15

Group Statistics

	NEWORGTYPE	N	Mean	Std. Deviation
LOBINVOLVE	PU	97	2.74	0.96
	PR	51	2.98	1.09

This question revealed the degree to which the lines of business are involved in setting IT budgets and initiatives. There was no significant difference in scores for public sector organizations (M = 2.74, SD = .96) and private sector organizations, M = 2.98, SD = 1.09; t (146) = -1.4, p = .17. The private sector scored higher on this measure.

FTE Staff

Table 19

Question 16

Group Statistics

	NEWORGTYPE	N	Mean	Std. Deviation
FTESTAFF	PU	87	7.31	1.98
	PR	51	7.24	2.73

This measure was constructed using a ten-point scale, ranging in responses that correspond to the total number of employees in the organization. There was no significant

difference in scores for public sector organizations (M = 7.31, SD = 1.98) and private sector organizations, M = 7.24, SD = 2.73; t (136) =.2, p = .85. The public sector scored higher on this measure.

Budget domain summary

Public sector organizations have larger annual and technology budgets. This comes as no surprise as public sector organization is the largest consumer of goods and services (Milner, 2000). However, private sector organizations IT initiatives are better funded. This finding is complementary to the senior committee on technology, presence of senior leadership, and the organization's philosophy on IT. When the organization has buy in from the top levels of the organization, projects are more adequately funded. Public sector organizations tend to have more FTEs in their organizations, while private sector organizations tend to have more FTEs dedicated to IT. Having more staff dedicated to IT helps to meet the growing needs of the organization.

Technology utilization/adoption Domain

Within the Technology utilization/adoption/use domain, the research collected information on technology capacity, maintenance and use of technology, hindrances to technology use, and using IT processes.

Significant findings

There were nine statistically significant findings. Private sector organizations tend to use and invest more in IT methodologies and knowledge management techniques than

the public sector. Public sector organizations tend to have more concerns about the lack of staff time and lack of equipment.

Technology capacity

Table 20

Question 19

Group Statistics

	NEWORGTYPE	N	Mean	Std. Deviation
TECHCAPACITY	PU	97	1.82	0.75
	PR	52	1.54	0.83

This question was constructed using a five-point scale. The scale ranges from "currently meets our mission" a value of one to "does not meet our mission" a value of four. There was a significant difference in scores. Private sector organizations, $M = 1.54$, $SD = .83$, scored significantly higher than with public sector organizations ($M = 1.82$, $SD = .75$) ; $t\ (147) = 2.1$, $p = .03$.

Technology hindrances

This question measured various aspects of the organization's processes that may hinder technology efforts. The question was constructed using a Likert scale, with the response "I agree" representing a value of one and a response of "strongly disagree" representing a value of five.

Table 21

Question 21

Group Statistics

	NEWORGTYPE	N	Mean	Std. Deviation
LACKSTAFF	PU	98	1.95	0.98
	PR	50	2.38	1.10
LACKEQUIP	PU	98	2.81	1.17
	PR	50	3.34	1.14
NOTRAINING	PU	96	2.63	1.03
	PR	51	3.06	1.10

Lack of staff time

Public sector organizations, M = 1.95, SD = .98, scored significantly higher than with private sector organizations (M = 2.38, SD = 1.1); t (145) = -2.4, p = .02.

Lack of equipment

Public sector organizations, M = 2.81, SD = 1.17, scored significantly higher than with private sector organizations (M = 3.34, SD = 1.14); t (146) = -2.6, p = .01.

Inconsistent/lack of training for users

There was a significant difference in scores. Public sector organizations, M = 2.63, SD = 1.03, scored significantly higher than with private sector organizations (M = 3.06, SD = 1.1); t (145) = -2.4, p = .02.

Using IT processes

This question measured various aspects of the organization's technology philosophy. The question was constructed using a Likert scale, with the response "not investing" representing a value of one, a response of "top priority investment" disagree" representing a value of four, and "don't know" representing a value of five. In every sub-measure, the private sector scored significantly higher than public sector organizations.

Table 22

Question 22

Group Statistics

	NEWORGTYPE	N	Mean	Std. Deviation
CMMI	PU	97	2.35	1.81
	PR	52	3.06	1.78
ITIL	PU	97	2.52	1.66
	PR	52	3.21	1.66
COBIT	PU	97	2.34	1.78
	PR	52	3.37	1.76
PMBOK	PU	95	2.63	1.75
	PR	52	3.21	1.54
ISO9000	PU	97	2.19	1.73
	PR	52	3.12	1.78
SIXSIGMA	PU	96	2.18	1.71
	PR	52	2.98	1.58

CMMi

Private sector organizations, M = 3.06, SD = 1.78, scored significantly higher than with public sector organizations (M = 2.35, SD = 1.81); t (147) = -2.3, p = .02.

ITIL

Private sector organizations, M = 3.21, SD = 1.66, scored significantly higher than with public sector organizations (M = 2.52, SD = 1.66); t (147) = -2.4, p = .02.

COBIT

Private sector organizations, M = 3.37, SD = 1.76, scored significantly higher than with public sector organizations (M = 2.34, SD = 1.78); t (147) = -3.4, p = .001.

PMBOK

Private sector organizations, M = 3.21, SD = 1.54, scored significantly higher than with public sector organizations (M = 2.63, SD = 1.75); t (145) = -2.0, p = .05.

ISO 9000

Private sector organizations, M = 3.12, SD = 1.78, scored significantly higher than with public sector organizations (M = 2.19, SD = 1.73); t (147) = -3.1, p = .002.

Six Sigma

Private sector organizations, M = 2.98, SD = 1.58, scored significantly higher than with public sector organizations (M = 2.18, SD = 1.71); t (146) = -2.8, p = .01.

Other resulting characteristics

While not statistically significant, there were other findings present for this problem domain:

Technology Uses

This question measured various aspects of the organization's technology philosophy. The question was constructed using a Likert scale, with the response "I agree" representing a value of one and a response of "strongly disagree" representing a value of five.

Table 23

Question 20

Group Statistics

	NEWORGTYPE	N	Mean	Std. Deviation
MAINTTECH	PU	96	1.77	0.81
	PR	52	1.94	0.98
ADDSTECH	PU	95	1.84	0.82
	PR	52	2.02	0.96

Maintain current level of technology

Public sector organizations, $M = 1.77$, $SD = .81$, scored higher than with private sector organizations ($M = 1.94$, $SD = .98$); $t\ (146) = -1.1$, $p = .26$.

Adds new uses of technology to meet evolving needs

Public sector organizations, $M = 1.84$, $SD = .82$, scored higher than with private sector organizations ($M = 2.02$, $SD = .96$); $t\ (145) = -1.2$, $p = .24$.

Hindrances to technology use (Question 21)

This question revealed hindrances to e organization's technology philosophy. The question was constructed using a Likert scale, with the response "not investing" representing a value of one, a response of "top priority investment" disagree" representing a value of four, and "don't know" representing a value of five.

Table 24

Question 21

Group Statistics

	NEWORGTYPE	N	Mean	Std. Deviation
LACKSKILL	PU	98	2.62	1.17
	PR	50	2.76	1.08
LACKFUNDS	PU	98	2.32	1.20
	PR	50	2.72	1.18
LACKPLAN	PU	97	3.33	1.30
	PR	51	3.14	1.25
LACKPOLICY	PU	97	3.48	1.12
	PR	51	3.27	1.20
LACKSTANDARDS	PU	95	3.48	1.17
	PR	51	3.29	1.20
LACKMGRPOLICY	PU	97	3.30	1.15
	PR	51	3.22	1.22
HIGHPRIORITY	PU	96	2.57	1.08
	PR	51	2.59	1.10
REGPOLICIES	PU	95	3.19	1.00
	PR	50	3.34	1.00
TECHPRIORITYSHIFT	PU	96	2.93	0.92
	PR	51	2.73	1.15
IPISSUES	PU	96	3.55	0.94
	PR	49	3.55	0.96

SECURITY	PU	96	2.90	1.10
	PR	51	3.08	1.07
IGNORETECHBENEFITS	PU	96	3.54	1.23
	PR	51	3.67	1.28

Lack of staff skills and expertise

Public sector organizations, $M = 2.62$, $SD = 1.17$, scored higher than with private sector organizations ($M = 2.76$, $SD = 1.08$); $t\ (146) = -.7$, $p = .49$.

Lack of funds

Public sector organizations, $M = 2.32$, $SD = 1.2$, scored higher than with private sector organizations ($M = 2.72$, $SD = 1.18$); $t\ (145) = -1.9$, $p = .05$.

Lack of strategic technology plan

Public sector organizations, $M = 3.33$, $SD = 1.3$, scored higher than with private sector organizations ($M = 3.14$, $SD = 1.25$); $t\ (146) = .9$, $p = .39$.

Lack of established technology usage policies

Public sector organizations, $M = 3.48$, $SD = 1.12$, scored higher than with private sector organizations ($M = 3.27$, $SD = 1.2$); $t\ (146) = 1.1$, $p = .29$.

Lack of technology quality standards

Public sector organizations, $M = 3.48$, $SD = 1.17$, scored higher than with private sector organizations ($M = 3.29$, $SD = 1.2$); $t\ (144) = .9$, $p = .35$.

Lack of established policies for managing technology

Public sector organizations, M = 3.3, SD = 1.15, scored higher than with private sector organizations (M = 3.22, SD = 1.22); t (146) = 0.4, p = .68.

Higher priorities for other projects

Public sector organizations, M = 2.79, SD = 1.08, scored higher than with private sector organizations (M = 2.59, SD = 1.1); t (145) = -.1, p = .94.

Other institutional policies

Public sector organizations, M = 3.19, SD = 1, scored higher than with private sector organizations (M = 3.34, SD = 1); t (143) = -.9, p = .39.

Shifting technology priorities

Public sector organizations, M = 2.93, SD = .92, scored higher than with private sector organizations (M = 2.73, SD = 1.15); t (145) = 1.2, p = .25.

Intellectual property issues

Public sector organizations, M = 3.55, SD = .94, scored higher than with private sector organizations (M = 3.55, SD = .96); t (143) = .01, p = .99.

Security concerns

Public sector organizations, M = 2.9, SD = 1.1, scored higher than with private sector organizations (M = 3.08, SD = 1.07); t (145) = -1.0, p = .34.

Management unaware of technology benefits

Public sector organizations, M = 3.54, SD = 1.23, scored higher than with private sector organizations (M = 3.67, SD = 1.28); t (145) = -.6, p = .56.

Technology utilization/adoptions summary

Private sector organizations match their technology capacity with the mission of the organization more than public sector organizations. Ultimately, having this technology available allows the organization to focus on its mission instead of focusing on internal processes. Additionally, private sector organizations have more current and planned investments in IT methodologies. Using IT methodologies as systems of knowledge management is important because it helps to reduce the boundaries in the organization, thus improving the position of the organization.

Public sector organizations maintain and add to the existing technology of the organization more than the private sector. These organizations are also more concerned with lack of staff time, funding, equipment, and training as hindrances to adoptions of technology. These concerns are founded in the literature as main issues that impede the progress of technology in the public sector organizations.

Technology as a core tool of the organization

The survey also gathered information about technologies in use within organizations. The research looked at items such as database, desktop, intranet, website, and wireless usage.

Significant findings

There were four statistically significant findings. Public sector organizations tend to use several technologies in the organization than the private sector.

Table 25

Question 18

Group Statistics

	NEWORGTYPE	N	Mean	Std. Deviation
Meta- or federated searching in online collections and catalogs	PU	95	1.75	1.22
	PR	50	2.52	1.47
Point-of-sale software and systems	PU	94	2.19	1.44
	PR	49	2.84	1.42
Video tours	PU	93	2.05	1.32
	PR	48	2.79	1.43
Wireless network, including WiFi	PU	96	1.22	0.74
	PR	52	1.56	1.14

Technologies used in day-to-day operations

This question revealed which technologies are used or planned for use in organizations.. The question was constructed using a four-point scale, with the response ranging from "used in past 12 months" representing a value of one to a response of "do not plan to acquire or implement" representing a value of four.

Meta- or federated searching in online collections and catalogs

Public sector organizations, $M = 1.75$, $SD = 1.22$, scored significantly higher than with private sector organizations ($M = 2.52$, $SD = 1.47$); $t\ (143) = -3.4$, $p = .001$.

Point-of-sale software and systems

Public sector organizations, *M* = 2.19, *SD* = 1.44, scored significantly higher than with private sector organizations (*M* = 2.84, *SD* = 1.42); *t* (145) = -2.6, *p* = .01.

Video tours

Public sector organizations, *M* = 2.05, *SD* = 1.32, scored significantly higher than with private sector organizations (*M* = 2.79, *SD* = 1.43); *t* (139) = -3.1, *p* = .003.

Wireless network, including WiFi

Public sector organizations, *M* = 1.22, *SD* = .74, scored significantly higher than with private sector organizations (*M* = 1.56, *SD* = 1.14); *t* (146) = -2.2, *p* = .03.

Other resulting characteristics

While not statistically significant, there were other findings present for this problem domain:

Technology used in day-to-day operations

This question reveals which technologies are used or planned for use in organizations.. The question was constructed using a four-point, with the response ranging from "used in past 12 months" representing a value of one to a response of "do not plan to acquire or implement" representing a value of four.

Table 26

Question 18

Group Statistics

	NEWORGTYPE	N	Mean	Std. Deviation
Accounting/payroll software/HR	PU	96	1.20	0.67
	PR	52	1.38	0.97
Broadband Internet connection	PU	97	1.12	0.60
	PR	51	1.37	0.98
Database software or system for membership development	PU	96	1.44	1.01
	PR	51	1.37	0.98
Desktop computers	PU	97	1.06	0.43
	PR	52	1.21	0.72
E-mail	PU	97	1.07	0.44
	PR	51	1.20	0.72
GIS (geographic information systems) application	PU	95	2.35	1.44
	PR	49	2.69	1.47
Intranet	PU	96	1.38	0.93
	PR	51	1.33	0.93
LAN (local area network)	PU	97	1.18	0.69
	PR	52	1.19	0.72
Marketing and promotion software and systems	PU	94	2.02	1.33
	PR	50	1.70	1.25
Modem (dial access) Internet connection	PU	91	2.81	1.46

	PR	48	2.38	1.51
Multimedia services	PU	96	1.30	0.85
	PR	50	1.62	1.21
Notebook or tablet computers	PU	96	1.17	0.61
	PR	52	1.37	0.97
Office productivity software, including word processing, desktop publishing and spreadsheets	PU	96	1.06	0.43
	PR	51	1.20	0.72
PDA (personal digital assistant handheld devices, e.g. Palm, Smartphones	PU	96	1.46	1.07
	PR	50	1.32	0.91
Personal information management(PIM) software	PU	94	2.16	1.42
	PR	50	1.88	1.35
RFID (radio frequency identification) in services	PU	91	3.24	1.14
	PR	48	2.92	1.40
Collections	PU	70	2.63	1.48
	PR	38	2.87	1.44
Software to manage public access computers and printing	PU	95	1.69	1.21
	PR	49	2.10	1.43
Virtual reality tours	PU	91	2.82	1.32
	PR	47	2.70	1.43
Web portal or gateway for services	PU	95	1.43	0.94
	PR	50	1.34	0.89
Web site for your institution	PU	97	1.06	0.43

	PR	51	1.20	0.72
Other	PU	35	1.97	1.40
	PR	31	2.13	1.43

Accounting/payroll software/HR

Public sector organizations, *M* = 1.2, *SD* = .67, scored higher than with private sector organizations (*M* = 1.38, *SD* = .97); *t* (146) = -1.4, *p* = .17.

Broadband Internet connection

Public sector organizations, *M* = 1.12, *SD* = .6, scored higher than with private sector organizations (*M* = 1.37, *SD* = .98); *t* (146) = -1.9, *p* = .06.

Database software or system for membership development

There was no significant difference in scores for public sector organizations (*M* = 1.44, *SD* = 1.01) and private sector organizations, *M* = 1.37, *SD* = .98; *t* (145) = .4, *p* = .71. The private sector scored higher on this measure.

Desktop computers

Public sector organizations, *M* = 1.06, *SD* = .43, scored higher than with private sector organizations (*M* = 1.21, *SD* = .72); *t* (147) = -1.6, *p* = .11.

E-mail

Public sector organizations, *M* = 1.07, *SD* = .44, scored higher than with private sector organizations (*M* = 1.2, *SD* = .72); *t* (146) = -1.3, *p* = .2.

GIS (geographic information systems) application

Public sector organizations, *M* = 2.35, *SD* = 1.44, scored higher than with private sector organizations (*M* = 2.69, *SD* = 1.47); *t* (142) = -1.4, *p* = .18.

Intranet

There was no significant difference in scores for public sector organizations (*M* = 1.38, *SD* = .93) and private sector organizations, *M* = 1.33, *SD* = .93; *t* (145) = .3, *p* = .8. The private sector scored higher on this measure.

LAN (local area network)

Public sector organizations, *M* = 1.18, *SD* = .69, scored higher than with private sector organizations (*M* = 1.19, *SD* = .72); *t* (147) = -.1, *p* = .89.

Marketing and promotion software and systems

There was no significant difference in scores for public sector organizations (*M* = 2.02, *SD* = 1.33) and private sector organizations, *M* = 1.7, *SD* = 1.25; *t* (142) = 1.4, *p* = .16. The private sector scored higher on this measure.

Modem (dial access) Internet connection

There was no significant difference in scores for public sector organizations (*M* = 2.81, *SD* = 1.46) and private sector organizations, *M* = 2.38, *SD* = 1.51; *t* (137) = 1.7, *p* = .1. The private sector scored higher on this measure.

Multimedia services

Public sector organizations, *M* = 1.3, *SD* = .85, scored higher than with private sector organizations (*M* = 1.62, *SD* = 1.21); *t* (144) = -1.8, *p* = .07.

Notebook or tablet computers

Public sector organizations, *M* = 1.17, *SD* = .61, scored higher than with private sector organizations (*M* = 1.37, *SD* = 1.97); *t* (146) = -1.5, *p* = .13.

Office productivity software, including word processing, desktop publishing and spreadsheets

Public sector organizations, *M* = 1.06, *SD* = .43, scored higher than with private sector organizations (*M* = 1.2, *SD* = .72); *t* (145) = -1.4, *p* = .16.

PDA (personal digital assistant handheld devices, e.g. Palm, Smartphones

There was no significant difference in scores for public sector organizations (*M* = 1.46, *SD* = 1.07) and private sector organizations, *M* = 1.32, *SD* = .91; *t* (144) = .8, *p* = .44. The private sector scored higher on this measure.

Personal information management (PIM) software

There was no significant difference in scores for public sector organizations (*M* = 2.16, *SD* = 1.42) and private sector organizations, *M* = 1.88, *SD* = 1.35; *t* (142) = 1.1, *p* = .26. The private sector scored higher on this measure.

RFID (radio frequency identification) in services

There was no significant difference in scores for public sector organizations (*M* = 3.24, *SD* = 1.14) and private sector organizations, *M* = 2.92, *SD* = 1.4; *t* (137) = 1.5, *p* = .14. The private sector scored higher on this measure.

Collections

Public sector organizations, *M* = 2.63, *SD* = 1.48, scored higher than with private sector organizations (*M* = 2.87, *SD* = 1.44); *t* (145) = -.8, *p* = .42.

Software to manage public access computers and printing

Public sector organizations, *M* = 1.69, *SD* = 1.21, scored higher than with private sector organizations (*M* = 2.1, *SD* = 1.43); *t* (142) = -1.8, *p* = .07.

Virtual reality tours

There was no significant difference in scores for public sector organizations (*M* = 2.82, *SD* = 1.32) and private sector organizations, *M* = 2.7, *SD* = 1.43; *t* (136) = .5, *p* = .62. The private sector scored higher on this measure.

Web portal or gateway for services

There was no significant difference in scores for public sector organizations (*M* = 1.43, *SD* = .94) and private sector organizations, *M* = 1.34, *SD* = .89; *t* (143) = .6, *p* = .57. The private sector scored higher on this measure.

Web site for your institution

Public sector organizations, *M* = 1.06, *SD* = .43, scored higher than with private sector organizations (*M* = 1.2, *SD* = .72); *t* (145) = -1.4, *p* = .16.

Other

Public sector organizations, *M* = 1.97, *SD* = 1.4, scored higher than with private sector organizations (*M* = 2.13, *SD* = 1.43); *t* (64) = -2.2, *p* = .65.

Technology as a core tool summary

This domain looked at the prevalence and usage of various technologies present in each organization. The findings show that overall the public sector employs far more diverse set of technologies than the private sector. However, given the other findings in the other domains, the effectiveness and benefits of these technologies may not be as fruitful as those found in the private sector.

Problem domain comparison

The domains were analyzed as whole units as comparisons between public and private sectors. This comparison was done to see if there were any significant differences on the whole of the domain between the two groups.

IT Governance

A one-way between groups multivariate analysis of variance was performed to investigate budget differences in organizations. Twelve dependent variables were used: SRCMT (Senior Leadership Committee Presence), SRLDRATT (Senior Leadership Philosophy on IT), POPSRVED (Population Served Influence), DCATTOP (Decision making at the top of the organization), STIT (Clearly stated and comprehensive technology strategy), CRSFUNC (Cross-functional teams for managing day to day operations), REDSTRUC (Reduced formal org. structure to more fully integrate operations), PLANCOORD (Technology planning coordinated with strategic planning), ITPLANBUS (Technology plan clearly incorporated into the overall strategic business strategy), CONDASSESS (User/Visitor needs assessment conducted), USEASSESS (Results of user/visitor needs assessment used), and STAFFLOC (Location of staff with

technology responsibilities). The independent variable was NEWORGTYPE (Organization Type). Preliminary assumption testing was conducted to check for normality, linearity, univariate and multivariate outliers, homogeneity of variance-covariance matrices, and multicollinearity, with no serious violations noted. Overall there was a statistically significant difference between public and private sector organizations on the combined variables, F (12, 89) = 3.1, p = .001; Wilks' Lambda = .705; partial eta squared = .99. When the results for the dependent variables were considered separately, there were four variables exhibiting statistical significant differences: SRCMT, SRLDRATT, POPSRVED, and DCATTOP.

Table 27

IT governance

Descriptive Statistics

	NEWORGTYPE	Mean	Std. Deviation	N
SRCMT	PR	1.07	0.27	27
	PU	1.32	0.47	75
	Total	1.25	0.44	102
SRLDRATT	PR	1.48	0.75	27
	PU	1.79	0.53	75
	Total	1.71	0.61	102
POPSRVED	PR	1.56	0.64	27
	PU	1.92	0.73	75
	Total	1.82	0.72	102
DCATTOP	PR	4.15	0.82	27
	PU	3.60	0.89	75
	Total	3.75	0.90	102

Budget

A one-way between groups multivariate analysis of variance was performed to investigate budget differences in organizations. Six dependent variables were used. The independent variable was NEWORGTYPE (Organization Type). Preliminary assumption testing was conducted to check for normality, linearity, univariate and multivariate outliers, homogeneity of variance-covariance matrices, and multicollinearity, with no serious violations noted. There was a statistically significant difference between public

and private sector organizations on the combined variables, F (6, 45) = 2.7, p = .024; Wilks' Lambda = .732; partial eta squared = .268. When the results for the dependent variables were considered separately, there was one variable exhibiting statistically significant differences, FTESTAFF.

Table 28

Budget

Descriptive Statistics

	NEWORGTYPE	Mean	Std. Deviation	N
FTESTAFF	PR	4.71	3.00	17
	PU	6.49	2.38	35
	Total	5.90	2.70	52

Technology adoption/utilization/use

A one-way between groups multivariate analysis of variance was performed to investigate technology adoption differences in organizations. Twenty-four dependent variables were used: TECHCAPACITY (Technology capacity of organization), MAINTTECH (Maintains current level of technology), ADDSTECH (Adds new uses of technology), LACKSTAFF (Lack of staff time), LACKSKILL (Lack of staff skills), LACKFUNDS (Lack of funds), LACKEQUIP (Lack of equipment), LACKPLAN (Lack of strategic technology plan), LACKPOLICY (Lack of technology usage policies), LACKSTANDARDS (Lack of quality standards), LACKMGRPOLICY (Lack of technology management policies), HIGHPRIORITY (Higher priority projects),

REGPOLICIES (Institutional Policies), TECHPRIORITYSHIFT (Shifting technology priorities), IPISSUES (Concerns about IP issues), SECURITY (Security concerns), NOTRAINING (Lack of training), IGNORETECHBENEFITS (Management is unaware of the benefits of technology), CMMI, ITIL, COBIT, PMBOK, ISO9000, and SIXSIGMA. The independent variable was NEWORGTYPE (Organization Type). Preliminary assumption testing was conducted to check for normality, linearity, univariate and multivariate outliers, homogeneity of variance-covariance matrices, and multicollinearity, with no serious violations noted. There was a statistically significant difference between public and private sector organizations on the combined variables, F (24, 110) = 2.4, p = .001; Wilks' Lambda = .66; partial eta squared = .344. When the results for the dependent variables were considered separately, there were nine variables exhibiting statistical significant differences, LACKSTAFF, NOTRAINING, CMMI, ITIL, COBIT, PMBOK, ISO9000, AND SIXSIGMA.

Table 29

Technology adoption

Descriptive Statistics

	NEWORGTYPE	Mean	Std. Deviation	N
LACKSTAFF	PR	2.39	1.11	49
	PU	1.93	0.96	86
	Total	2.10	1.04	135
IGNORETECHBENEFITS	PR	3.67	1.26	49
	PU	3.53	1.22	86
	Total	3.59	1.24	135
CMMI	PR	3.10	1.76	49
	PU	2.31	1.81	86
	Total	2.60	1.83	135
ITIL	PR	3.24	1.65	49
	PU	2.48	1.64	86
	Total	2.76	1.68	135
COBIT	PR	3.39	1.77	49
	PU	2.30	1.78	86
	Total	2.70	1.84	135
PMBOK	PR	3.27	1.55	49
	PU	2.53	1.74	86
	Total	2.80	1.71	135
ISO9000	PR	3.10	1.78	49
	PU	2.14	1.71	86

	Total	2.49	1.79	135
SIXSIGMA	PR	3.00	1.57	49
	PU	2.16	1.70	86
	Total	2.47	1.70	135

Technology as a core use in the organization

A one-way between groups multivariate analysis of variance was performed to investigate budget differences in organizations. Twenty-six dependent variables were used: Accounting/payroll software/HR; Broadband Internet connection; Database software or system for membership development; Desktop computers; E-mail; GIS (geographic information systems) application; Intranet; LAN (local area network); Marketing and promotion software and systems; Meta- or federated searching in online collections and catalogs; Modem (dial access) Internet connection; Multimedia services; Notebook or tablet computers; Office productivity software; including word processing, desktop publishing and spreadsheets; PDA (personal digital assistant handheld devices, e.g. Palm, Smartphones); Personal information management(PIM) software; Point-of-sale software and systems; RFID (radio frequency identification) in services; Collections; Software to manage public access computers and printing; Video tours; Virtual reality tours; Web portal or gateway for services; Web site for your institution; Wireless network, including WiFi; and other technologies. The independent variable was NEWORGTYPE (ORGANIZATIONAL TYPE). Preliminary assumption testing checked for normality, linearity, univariate and multivariate outliers, homogeneity of variance-

covariance matrices, and multicollinearity, with no serious violations noted. There was no statistically significant difference between public and private sector organizations on the combined variables, *F* (24, 27) = 1.72, p = .087; Wilks' Lambda = .395; partial eta squared = .605. When the results for the dependent variables were considered separately, two variables exhibited statistically significant differences, point-of-sale software and systems; and software to manage public access computers and printing.

Table 30

Technology as a core tool

Descriptive Statistics

	NEWORGTYPE	Mean	Std. Deviation	N
Point-of-sale software and systems	PR	3.380952	1.116969	21
	PU	2.548387	1.479611	31
	Total	2.884615	1.395425	52
Software to manage public access computers and printing	PR	2.571429	1.468722	21
	PU	1.709677	1.216376	31
	Total	2.057692	1.377885	52

Summary

This chapter discussed the four major hypotheses concerning technology adoption that were examined using the comparative study, as outlined in chapter 3, involving public and private sector organizations.

The Null hypothesis predicted that there was no statistical difference between the public and private sector organizations in terms of how IT is implemented and adopted. There were several instances found where there were significant differences between the two types of organizations.

Hypothesis 1 predicted that private sector organizations would score higher than public sector organizations in their use of technology as a core tool of the organization. Data analysis did not confirm this finding in every measure. In fact, there were several measures indicating statistical significance, where the public sector scored higher.

Hypothesis 2 predicted that private sector organizations would score higher than public sector organizations in the dimension of IT Governance. Overall, data analysis confirmed this prediction. However, out of the twelve measures, eight indicated the private sector scored higher, with two of those eight being statistically significant. Four or the twelve measures indicated the public sector having scored higher.

Hypothesis 3 predicted that private sector organizations would score higher than public sector organizations in the dimension of size of budget. The data analysis did not confirm this prediction. The six measures were split evenly between the public in private sectors. However, the statistically significant measure was in the area of dedicated IT FTEs, where the private sector scored higher.

Hypothesis 4 predicted that private sector organizations would score higher than public sector organizations in the dimension of adoption and usage. The data analysis did not confirm this prediction. Out of the twenty-four measures, the public sector scored higher on eleven measures (three being statistically significant), while the private sector

scored higher on thirteen (seven being statistically significant). The data produced several statistically significant findings for both the public and private sectors.

The final chapter of this study will present an overview of the study, discussion of the findings in the context of the research questions and limitations of the study. Additionally, the concluding chapter will present implications of the study along with recommendations for future research. Finally, the chapter will conclude with a discussion of the findings in the context of social change.

CHAPTER 5: DISCUSSION

Introduction

This research explored the dimensions of IT governance, budgetary constraints, and implementation issues as compared between the public and private sectors. This chapter restates the problem, reviews this study, summarizes the overall research design of the study, provides the demographic characteristics of the samples used in the study, and the results of the data analysis in the context of the research questions and the hypotheses. This chapter also considers alternative interpretations of the findings, limitations of the study, and recommendations for further research. This chapter concludes with the implications for social change.

Problem Restatement

The purpose of this study was to investigate the differences in technology adoption and implementation problem domains between the public and private sectors. The differences could be categorized into three problem domains, IT governance, budget, and technology adoption/utilization along with a look at how technology is used as a core tool of the organization. Public sector organizations tend to have more reported problems implementing technology than private sector organizations which have more far reaching affects than those found in the private sector. When observed, these issues can take the form of higher transaction costs to those organizations. These transaction costs typically reveal themselves in the form of higher costs of ownership, lower, slower technology adoption, and inefficient delivery. Most likely, this results in a waste of publicly funded dollars, errors, or delays in service. Public institutions must utilize technology efficiently.

In doing so, public sector organizations can expect to see an improvement in the quality, quantity, and speed of the services provided.

Study Organization

The first chapter of this study introduced the need for such a study citing several reasons why technology can play a central role to the efficiency of public sector organizations.

Chapter 2 reviewed existing literature. The literature review discovered three salient problem domains, IT governance (Groenewegen & Wagenaar, 2006), budgetary considerations (Pawloski, Datta, & Houston, 2005), and adoption/implementation (Phillips, Decambre, & Weaver, 2004).

The third chapter detailed the methodology used to conduct the research for this study. The study used survey methodology. The survey was broken into four parts covering demographics, IT governance, budgetary considerations, and technology adoption. The survey was administered using a web-based tool, SurveyMonkey.com, comprised of twenty-three questions. The survey used a cross-sectional design, having one independent variable (organization type), and several dependent variables. The details of the survey can be found in Appendix J and the coding for the results in Appendix K. An expert panel reviewed the survey and provided feedback. The survey instrument was revised based on the feedback received from the expert panel. The finalized survey was used in data collection spanning four weeks. An electronic invitation to participate in the study was sent out to IT professionals from both the public and private sectors using publicly available listservs. Reminders were sent to potential

participants every seven days. The data was downloaded and checked for errors. A copy of the raw data was saved in several locations for safety. The data was analyzed using ANOVA, MANOVA, and Binomial statistical tests. These analyses were performed using Microsoft Excel and SPSS. The study was conducted under the ethical guidelines established with IRB, Walden University, and the American Psychological Association.

Chapter 4 presented the data analysis for the study. The chapter presented the findings in the context of each measure in each of the problem domains. There were 267 respondents to the survey. However, only 151 participants completed the survey completely representing an initial completion rate of 56%. Out of the 151 participants, there were 98 (63.3%) participants that identified themselves as public sector organizations and 53 (34.4%) private sector participants. Additional analysis was conducted on the domains as a whole. Further discussion of these findings will follow shortly.

This final chapter will discuss the findings in the context of the research questions. A discussion of the limitations and areas for further research will ensue.

Literature and data analysis comparison

The literature implied that the public sector would lag in all the domain areas that this study covered. The analysis did discover some differences, some of which were statistically significant. The analysis observed differences across all domains. However, these differences were not an across the board indictment of the public sector. In fact, the public sector was ahead of the private sector in several areas. Within the IT governance domain, 47% of the measures were higher for the public sector. Within the budget

domain, 50% of the measures were higher the public sector. Within the technology adoption domain, 45% of the measures were found to be higher for the public sector. However, just looking at these percentages does not completely reflect the narrative; a closer examination of the research questions is warranted.

Research Questions

A considerable amount of time has been taken to deal with the hypotheses that helped guide this study. However, the purpose of the study would be defeated if a thorough discussion of the relationship between the research questions and findings was not completed. What follows, then, is a discussion of the hypotheses, research questions, the findings, and the implications of those findings.

The Null Hypothesis cannot totally be rejected, as there were several significant findings across all the domains. However, there was enough evidence in the data analysis supported elements present in hypothesis 1, hypothesis 2, hypothesis 3, and hypothesis 4 to suggest that the public sector could benefit from taking more lessons learned from the private sector.

The research questions guiding this study: Which non-IT factors influence and affect IT project progression in public sector organizations? Which IT factors influence and affect IT project progression in public sector organizations? Which IT adoption models accurately reflect and predict IT project outcomes, within the public sector IT community? Which knowledge management tools can be influential in the implementation of IT in the public and privates sectors?

Research Question 1

Which non-IT factors influence and affect IT project progression in public sector organizations?

In this study questions 5 through 18, covering the domains of IT governance and budget, spoke to this question. There were three significant findings (senior committee presence, senior leadership philosophy, and the number of dedicated IT FTEs). In all three measures, the private sector scored significantly higher than the public sector.

Senior committee

The findings showed that the private sector will have a senior committee to monitor, collaborate, and manage technology issues more often than the public sector. This is important as Groenewegen and Wagenaar (2006) suggested that senior leadership is important to influencing both internal and external resources of the organization with the goal of enhancing the prospects of a positive outcome for IT projects.

Senior philosophy on IT

The philosophy of the senior leadership on technology matters is another important aspect of determining IT project progression. When the senior leadership provides specific guidance on technology issues, IT projects are aligned with the organization strategy. Conklin (2007) asserted that having organizational alignment with IT is critical component of success.

Dedicated IT personnel

The private sector significantly scored higher on this measure. Private sector organizations have more dedicated personnel dedicated to IT. Pawlowski, Datta, and Houston (2005) suggested that staffing levels are critical to the success of IT projects in the public sector. With a growing need to provide a broader range of services, the public sector has a need for more qualified and dedicated IT staff.

Research Question 2

Which IT factors influence and affect IT project progression in public sector organizations?

From the findings of the study, it is evident that there are several significant factors that influence project progression in public sector organizations. The data analysis showed that issues of technology capacity, staff time, technical training, and equipment could influence project progression.

Lack of staff time

Data analysis of the survey indicated that the public sector has more concerns over the time that staff has to perform their responsibilities than their private sector counter parts. This finding is in line with the assertions of Pawloski, Datta and Houston (2005) in suggesting a shortage of IT staff contributes to the issues found in the public sector as it relates to IT adoption and implementation. With the chronic shortage of qualified IT personnel in the public sector, the time that staff can spend on any one item or task is smaller and this can negatively affect the quality of delivery of services.

Lack of equipment

The public sector has more concerns over the lack of equipment than the private sector. Additionally, the private sector feels that their technology capacity meets their organizational mission more than the public sector. Both measures work in concert together. These measures tie together with the presence of senior leadership. If senior leadership is collaborating with IT in setting strategy and funding, the issue of having lack of equipment and having enough technology to meet the organization lessens in importance in the public sector.

Inconsistent/lack of training

The public sector has more issues with technology training than the public sector. This may be either a byproduct, cause, or effect of the issues of IT staffing in the public sector. While Demers (2002) indicates there may be a relationship between budget allocations for IT personnel and the ability of public entities to attract qualified personnel, training can certainly be considered in that relationship.

Research Question 3

Which IT adoption models accurately reflect and predict IT project outcomes, within the public sector IT community?

Out of the models reviewed in this study, the TAM model extended by Conklin to consider public sector issues in 2007, most accurately considers the factors present in the public sector. The research findings demonstrate throughout the domains that factors that strongly influence outcomes. However, this model fails to account for funding or the

intention to use methodologies to implement technology. To account for these components, this research suggests the following extension of TAM in figure 3:

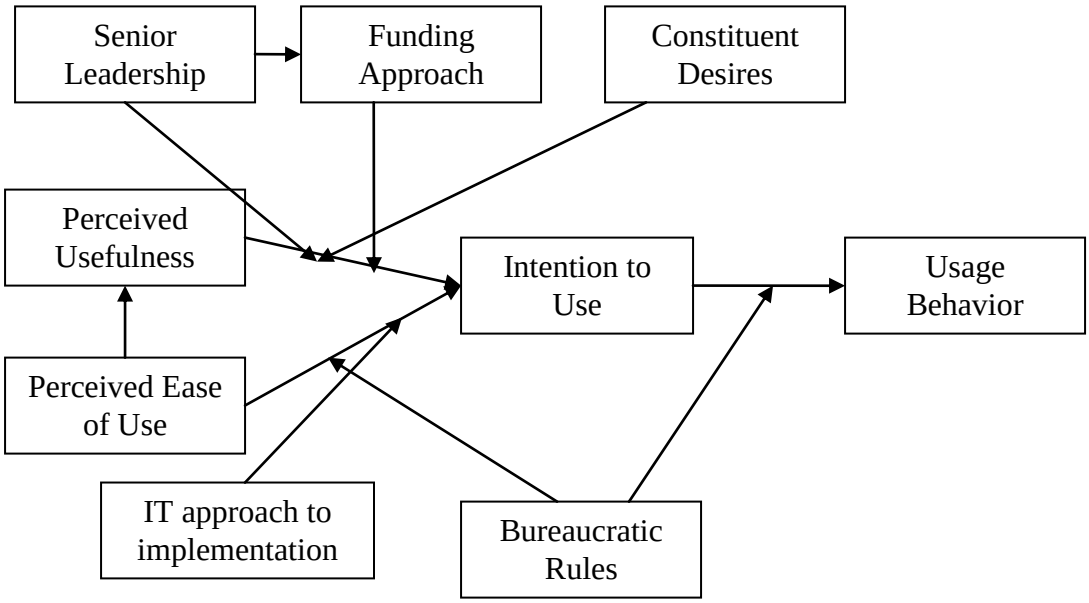

Figure 3. The Smith TAM Model in the Public Sector

As Moon (2002) suggested, the funding available may be a critical factor in determining whether technology will be adopted and resources can be committed to implementing technology. The addition of this component to the TAM model is important, as it has been left out as critical factor in technology adoption. Additionally, the IT approach used, or in this case how knowledge management is utilized, can enhance the prospects of successful IT adoption and implementation (Phillips, Delcambre, & Weaver, 2004). The addition of this component completes the TAM model for the public sector.

Research Question 4

Which knowledge management tools can be influential in the implementation of IT in the public and privates sectors?

The findings in this study show a significant difference in the usage of methodologies such as CMMi, ITIL, and PMBOK. Private sector organizations are more heavily invested in using these tools and methods than the public sector. These tools can reduce the boundaries of the public sector organization (Kankanhalli, Tan, & Kwok-Kee, 2005). Reducing these boundaries is important to delivering better quality and timeliness of services.

Other findings that support the research questions

Not all the findings of this study were statistically significant, but nonetheless noteworthy. When reviewing how organizations think, manage, and strategize about technology the private sector consistently rates higher than the public sector. This prevalence reveals shows an alignment between technology and strategy provides a foundation of success for IT adoption and implementation (Elpez & Fink, 2006). There was also a prevalence of private sector to be more concerned with issues of planning, policy, quality standards, management, and prioritization of technology than the public sector. These concerns are in line with the findings presented above and in the literature.

Alternative Interpretation of current findings

The findings suggested some significant differences between the public and private sector. However, one may argue that the findings do not suggest that these differences point to the private sector having more positive outcomes in IT adoption and

implementation as a result of its implementation and adoption of technology. An alternate opinion may be that even if there are differences, there are enough cultural, political, and organizational differences between the private and public sectors that adopting the traits shown by the public sector would not be effective by itself. Xin and Trimi (2005) indicate that the differences in the organizational culture may have to be dealt with before any governance, budget, or implementation techniques could prove to be effective in the public sector.

Limitations of the present study

There were several limitations present in this study. The number of participants could not be controlled or accounted for based on the method for which participants were gathered. This had an effect of unknown and limited the sample size. Furthermore, the limited length of time allocated to data collection may have been a factor as well as the form of the collection being solely a web-based instrument. The study did not account for the behavior of the respondents and assumed that all responses were truthful. Additionally, the study was internet based which could have a limiting effect on the sample size. The study also did not measure the number or percentage of positive outcomes in adoption and implementation of technology. These limitations present opportunities for further research.

Areas for Future Research

This study should not serve as an end for this particular field of study. Researchers should take the under pinning's of this study to advance the knowledge of the area. The investigation into this field could be greatly enhanced by future research.

Design cross-sectional v. longitudinal

This study was conducted using a cross-sectional design, used to measure a single point in time. Using a longitudinal design, research could make further inquiries into cause and effect over an extended period. Leedy (2005) suggests that a longitudinal design would allow for correlative analysis into cause and effect due to observations over an elongated period of time.

Other opportunities for inquiry

During the analysis of this research, several opportunities explorative questions arose which could spur further research:

1. What percentage of IT projects are considered failures and successes? What are the definitions of these conditions and how do these definitions vary from the public and private sector? How do these differences affect the ultimate outcome of technology in public sector organizations?
2. How does the presence of leadership and lines of business in decision making influencing technology? Which style of leadership is the most influential in the positive outcomes of IT implementation and adoption?
3. What is the relationship between the usage of IT methodologies and IT adoption and implementation in the public and private sectors? If adopted, which IT methodologies would prove most effective in implementing technology successfully within the public sector?

4. How does the relationship between funding, technical capacity, and the lack of equipment in the public and private sectors influence adoption and implementation?
5. How does organizational differences between public and private sectors affect IT adoption and implementation?

Implications of study

The findings of this study are relevant to the fields of public administration, management, leadership, and information technology. Understanding the differences in technological orientation, that is differences in strategy, philosophy, and knowledge – can help organizations and institutions make better management and leadership decisions when dealing with technology.

Several findings in the research have implications for IT managers, legislators, the public use of technology, and research. For IT Managers, this study has implied that having senior leadership involved in the IT function may enhance the alignment of technology and the organization's mission. Additionally, the study presented some evidence that a close look at IT methodologies should be taken by public sector administrators. Legislators may also look towards this research as a growing body of evidence that there needs to be more thoughtful examination of projects involving IT as a strategic tool and how best to provide resources that will strengthen the opportunities IT to be successful. For researchers, this study provides some empirical evidence that regarding the differences between the public and private sectors. Researchers can build

off the inquiries made within this study to further examine issues that concern technology in the public sector.

Implications for social change

There are several implications for social change. First, the simple fact that this study has been successfully completed adds an empirical public sector study for future researchers to consider. Before this study was completed there were few studies of this kind. Academic research has been enriched by the addition of this study to the academic roll because another voice has been added to the discourse about technology adoption in organizations.

The results of the study have shown that marked differences in IT governance, budget, adoption/utilization exist between the public and private sectors. For this reason, this study has added new data and academic thought that point to the significance of technology adoption and implementation in the public sector. Irrespective of the organization's emphasis, being local, regional, national, or global, technology may be able to bring tremendous assistance to organizational efficiency.

Finally, there seems to be a great hesitancy to reveal issues in both the public and private sector organizations, especially as it relates to failures in technology adoption. Using research such as this can assist in the efficiency in the delivery of resources to the public. Public sector organizations have much to gain from revealing these issues and using it as an opportunity for growth and improvement. The private sector has a role to play in this transformation, in as much as these organizations are also consumers of public resources; the private sector is also in a position to share their knowledge with the

public sector. By building IT into public policy programs at the design stage, rather than implementing IT as an afterthought, and by focusing senior leadership on IT technologies, it is possible that these organizations can deliver services to the people more efficiently and more quickly with fewer errors, resulting in a healthier, safer, and more prosperous society.

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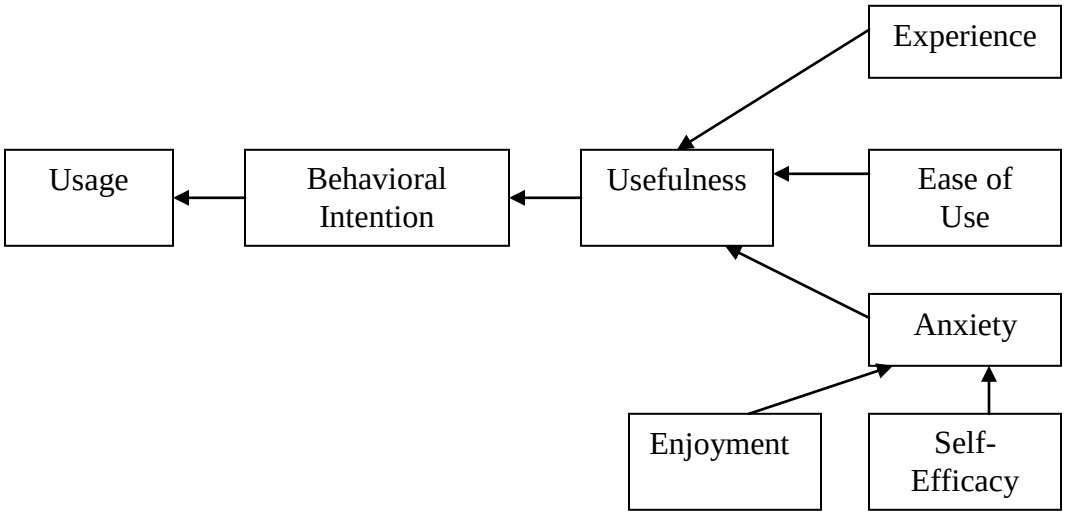
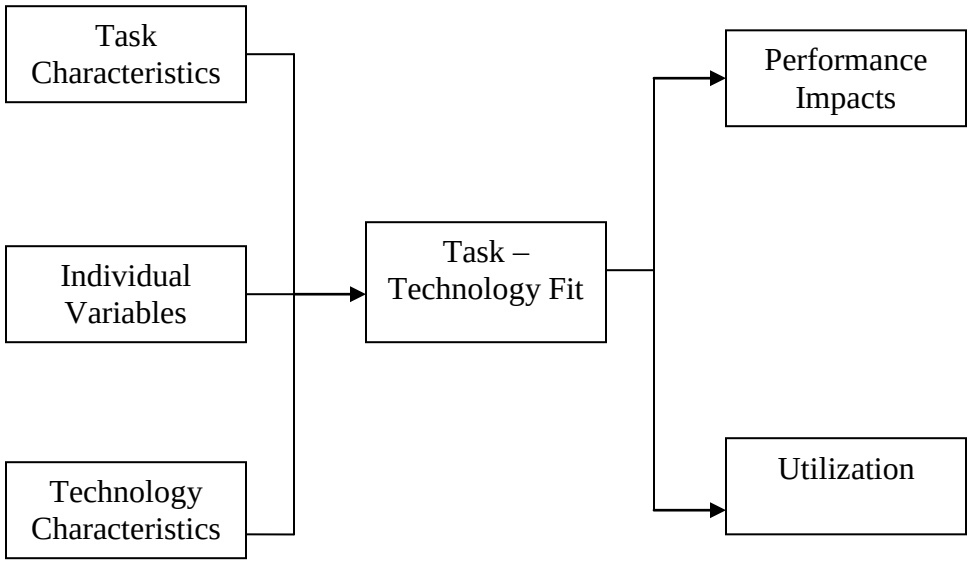
APPENDIX A: EXPANDED TAM MODEL

(Dishaw, Strong & Bandy, 1999)



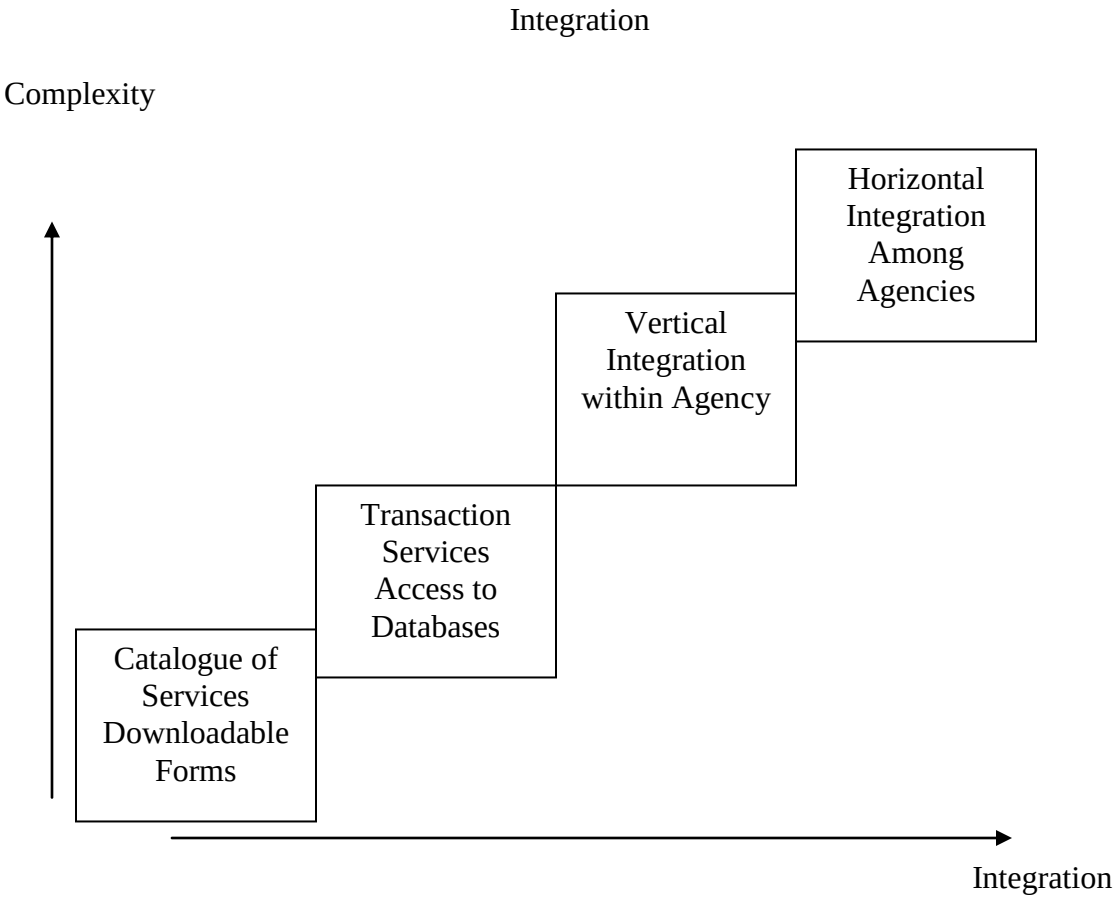
APPENDIX B: TASK TECHNOLOGY FIT MODEL

(Goodhue & Thompson, 1995; Dishaw, Strong, & Bandy 1999)



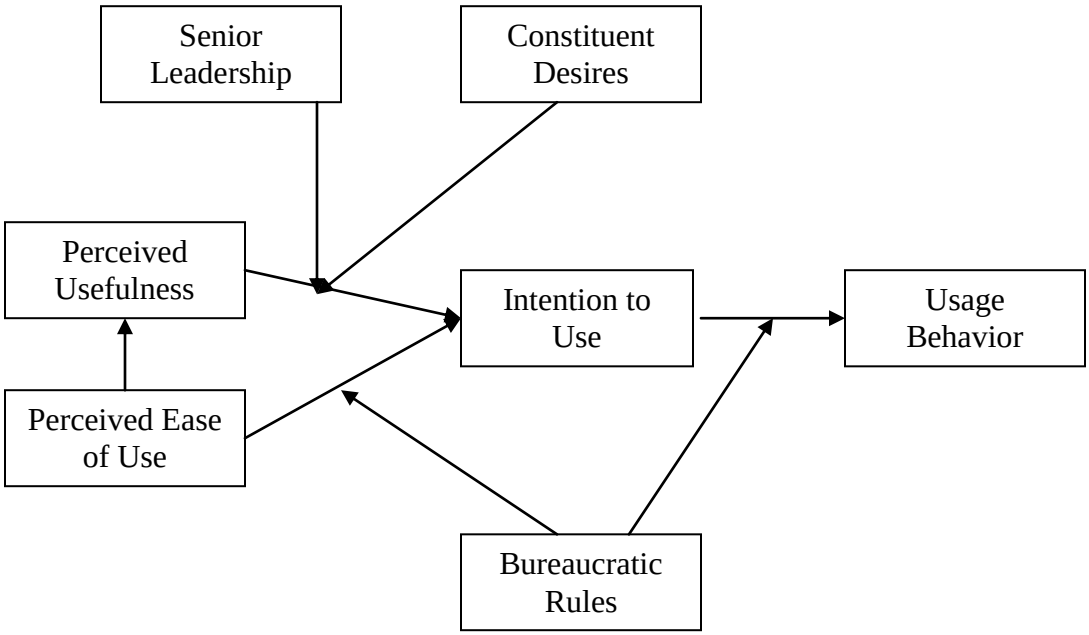
APPENDIX C: DIMENSIONS OF E-GOVERNMENT DEVELOPMENT

(Lee, Xin & Trimi, 2005)



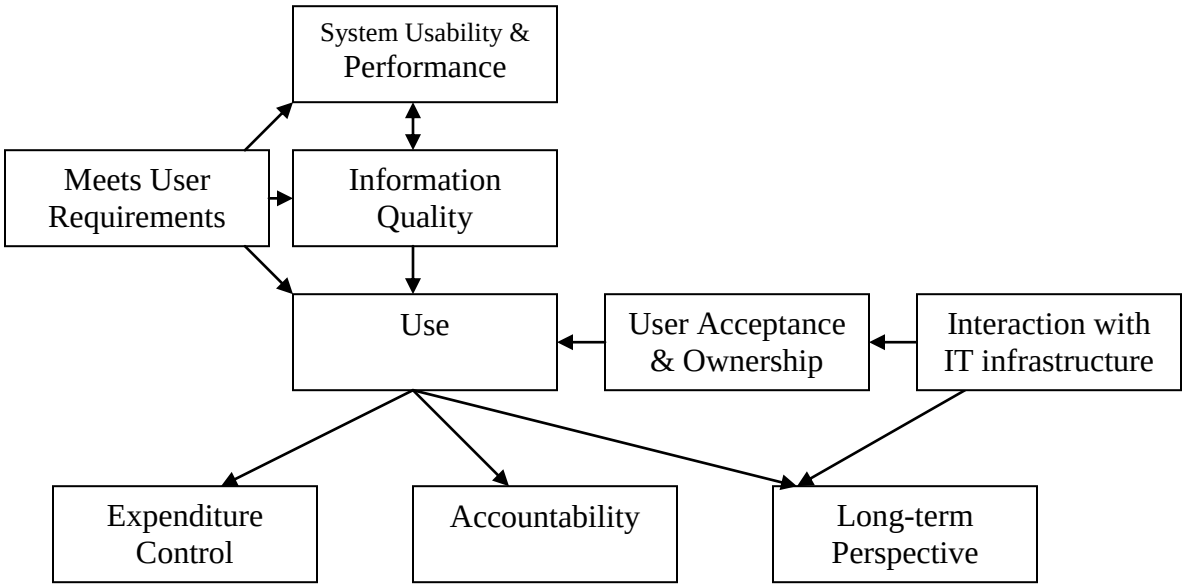
APPENDIX D: TAM IN THE PUBLIC SECTOR

(Conklin, 2007)



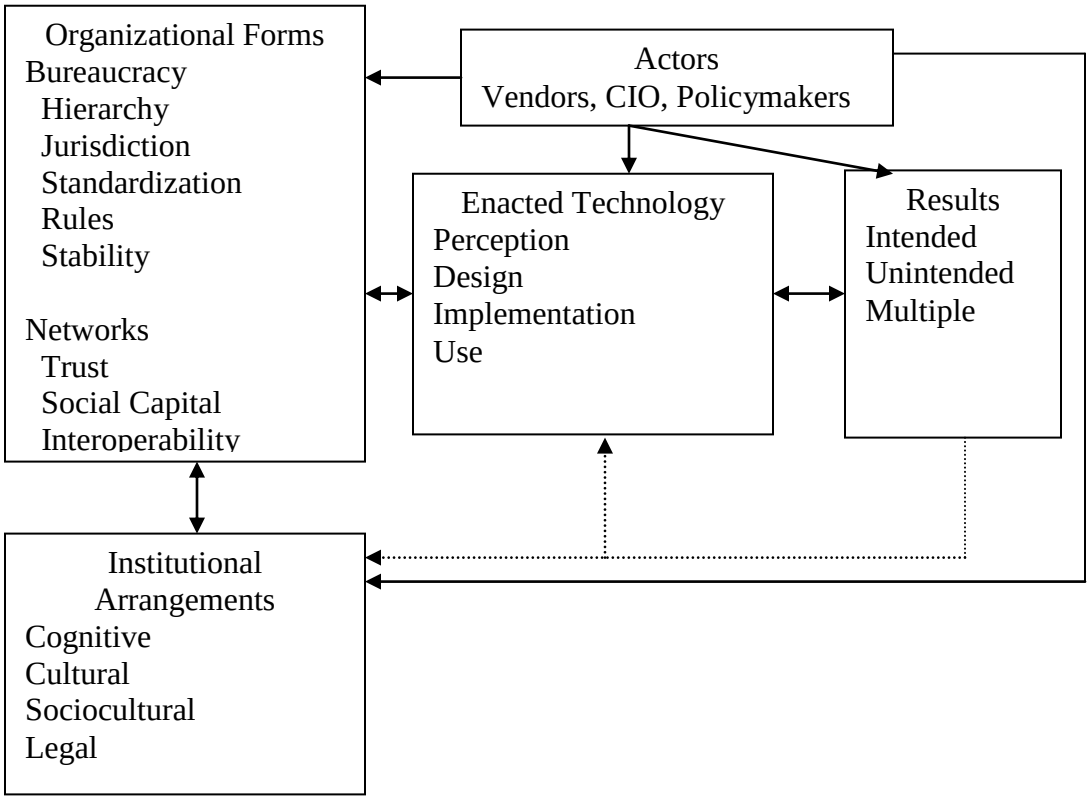
APPENDIX E: EMERGING ALIGNMENT MODEL

(Elpez & Fink, 2006)



APPENDIX F: EXPANDED TECHNOLOGY ENACTMENT MODEL

(Schellong, 2007)



APPENDIX G: ORIGINAL SMITH SURVEY

Public Sector Implementation and Adoption

1. Introduction to the survey

1. Douglass Paul Smith, a doctoral candidate at Walden University, is conducting a research study whose purpose is to investigate the role that technology plays in both the public and private sector. Please read this form and ask any questions you may have before acting on this invitation to be in the study.

If you agree to be in this study, you will be asked to complete a survey/questionnaire that will take approximately 25 minutes.

In the event that you experience any stress or anxiety during your participation in the study, you may terminate your participation at any time. You may also refuse to answer any questions you consider to be invasive or stressful. As participation is voluntary, no compensation, monetary or otherwise, will be provided to participants.
The records of this study will be kept private. If any report of this study might be published, the researcher will not include any information that will make it possible to identify a participant without written permission. All research records will be kept in a locked file; only the researcher will have access to the records. Records will be kept for a minimum of five years, and will then be destroyed.

The researcher conducting this study is Douglass Smith. The researcher's adviser is Dr. Charles Nichols and can be contacted at rnichols@waldenu.edu. You may contact the researcher with any questions at dsmit001@waldenu.edu or 785-554-2077. The Research Participant Advocate at Walden University is Dr. Dale Good. You may contact him at 1-800-925-3368, x 1210 if you have questions about your participation in this study.

I have read the above information. This study has been clearly explained to me, and any questions that I have had have been answered. By selecting yes below, I consent to participate in this study.

- ◯ Yes
- ◯ No

Public Sector Implementation and Adoption

2. Tell me about yourself

2. Please enter the following information.

Name:

Company:

Address:

Address 2:

City/Town:

State/Province: -- select state --

ZIP/Postal Code:

Country:

3. What is your email address?

4. Which of the following best describes your type of institution?

- ◯ State Government
- ◯ Local Government
- ◯ Public School
- ◯ Higher Education
- ◯ Non-Profit/Not-for-Profit/Association
- ◯ Publicly traded Company
- ◯ Privately held Company

Public Sector Implementation and Adoption

3. IT Governance

This next section deals with how your organization manages its technology.

5. Does your company have a committee of senior business/management/administrators to oversee and prioritize technology investments?

- ◯ Yes
- ◯ No
- ◯ Don't know

6. Complete the following statement by using the phrase that best describes the attitudes of your institutions's senior leadership towards technology acquisition and use:

The senior leadership of my institution...

- ◯ generally promote the expansion of my institution's technology capabilities and they provide specific guidance of these efforts
- ◯ generally promote the expansion of my institution's technology capabilities but they provide little specific guidance of these efforts
- ◯ are generally neutral on the subject of expanding my institution's technology capabilities
- ◯ generally oppose the expansion of my institution's technology capabilities
- ◯ Don't know/Not applicable

7. Complete the following statement by using the phrase that best describes the attitudes of POPULATION SERVED BY YOUR INSTITUTION towards technology acquisition and use:

The population served by of my institution...

- ◯ generally promote the expansion of my institution's technology capabilities and they provide specific guidance of these efforts
- ◯ generally promote the expansion of my institution's technology capabilities but they provide little specific guidance of these efforts
- ◯ are generally neutral on the subject of expanding my institution's technology capabilities
- ◯ generally oppose the expansion of my institution's technology capabilities
- ◯ Don't know/Not applicable

8. Are you significantly involved with the following technology decisions

- ☐ Set budgets

- [ ] Set strategy
- [ ] Choose vendors
- [ ] Authorize purchases
- [ ] None/Don't know

4. IT Governance, continued

9. Please indicate the extent to which you agree with the survey statements by checking your responses:

	Not at all	Very Little	Somewhat	A Significant Amount	To a Great Extent
Company decision-making is highly concentrated at top management levels	◯	◯	◯	◯	◯
My institution has a clearly stated and comprehensive technology strategy	◯	◯	◯	◯	◯
My organization extensively utilitizes cross-functional teams for managing day-to-day operations	◯	◯	◯	◯	◯
My organization has reduce formal organizational structure to more fully integrate operations	◯	◯	◯	◯	◯
In my company technology planning is well coordinated with the overall strategic planning process	◯	◯	◯	◯	◯
My company's technology strategy is clearly incorporated into the organization's overall business strategy	◯	◯	◯	◯	◯

10. Do you conduct needs assessments of user or visitor needs for technology support services or experiences at your company?

- ◯ No
- ◯ Don't know/Not applicable
- ◯ Yes

11. Does your company act on the result of any needs assessments of user or visitor needs for technology support services or experiences that are conducted at your company?

- ◯ No
- ◯ Don't know/Not applicable
- ◯ Yes

12. Where in your institution's organization are the staff with technology

responsibilities (e.g. procurement, installation, resource allocation, operations, and maintenance) PREDOMINATELY placed?

- ◯ Management
- ◯ Seperate Information Systems/Technology Department
- ◯ Integrated with operational departments
- ◯ Don't know/Not applicable

5. Budget

Next, we'll ask you questions that deal with budgetary issues.

13. What is the size of your OVERALL ANNUAL budget?

- ◯ Less than $250,000
- ◯ $250,001 - $500,000
- ◯ $500,001 - $750,000
- ◯ $750,001 - $1,000,000
- ◯ $1,000,001 - $5,000,000
- ◯ $5,000,001 - $10,000,000
- ◯ $10,000,001 - $25,000,000
- ◯ I don't know

14. What is the size of your OVERALL TECHNOLOGY ANNUAL budget?

- ◯ $1 - $250,000
- ◯ $250,001 - $500,000
- ◯ $500,001 - $750,000
- ◯ $750,001 - $1,000,000
- ◯ $1,000,001 - $5,000,000
- ◯ $5,000,001 - $10,000,000
- ◯ $10,000,001 - $25,000,000
- ◯ I don't know
- ◯ There is no technology budget

15. What percentage of your institution's technology needs are met by current funding?

- ◯ 0%
- ◯ 1% - 25%
- ◯ 26% - 50%
- ◯ 51% - 75%
- ◯ 76% - 99%
- ◯ 100%

16. How involved are the lines of business (outside of IT) in setting your institution's IT budget and deciding which IT initiatives to fund?

- ◯ Not at all involved
- ◯ Slightly involved
- ◯ Somewhat involved
- ◯ Very involved

17. What is the current size of your institution's paid, full-time equivalent(FTE) Staff?

- ◯ Less than 5
- ◯ 5 - 10
- ◯ 11 - 25
- ◯ 26 - 75
- ◯ 76 - 150
- ◯ 151 - 250
- ◯ 251 - 500
- ◯ 501 - 1000
- ◯ 1,001 or more
- ◯ I don't know

18. What is the current size of your institution's paid, full-time equivalent(FTE) TECHNOLOGY Staff?

- ◯ Less than 5
- ◯ 5 - 10
- ◯ 11 - 25
- ◯ 26 - 75
- ◯ 76 - 150
- ◯ 151 - 250
- ◯ 251 - 500
- ◯ 501 - 1000
- ◯ 1,001 or more
- ◯ I don't know

Public Sector Implementation and Adoption

6. Technology Utilization/Adoption/Use

This section asks about the major technology enablers in your organization such as email, video, etc.

19. What technologies has your institution used in its day-to-day operations within the past 12 months, or plan to acquire or implement in the future? (Select ONE in each row

	Used in past 12 months	Plan to acquire or implement in next 12 months	Plan to acquire or implement more than 12 months from now	Do not plan to acquire or implement/Don't know
Accounting/payroll software/HR	◯	◯	◯	◯
Broadband Internet connection	◯	◯	◯	◯
Database software or system for membership development	◯	◯	◯	◯
Desktop computers	◯	◯	◯	◯
E-mail	◯	◯	◯	◯
GIS (geographic information systems) application	◯	◯	◯	◯
Intranet	◯	◯	◯	◯
LAN (local area network)	◯	◯	◯	◯
Marketing and promotion software and systems	◯	◯	◯	◯
Meta- or federated searching in online collections and catalogs	◯	◯	◯	◯
Modem (dial access) Internet connection	◯	◯	◯	◯
Multimedia services	◯	◯	◯	◯
Notebook or tablet computers	◯	◯	◯	◯
Office productivity software, including word processing, desktop publishing and spreadsheets	◯	◯	◯	◯
PDA (personal digital assistant handheld devices, e.g. Palm, Smartphones	◯	◯	◯	◯
Personal information management(PIM) software	◯	◯	◯	◯
Point-of-sale software and systems	◯	◯	◯	◯
RFID (radio frequency identification) in services or	◯	◯	◯	◯
collections	◯	◯	◯	◯
Software to manage public access computers and printing	◯	◯	◯	◯
Video tours	◯	◯	◯	◯
Virtual reality tours	◯	◯	◯	◯
Web portal or gateway for services	◯	◯	◯	◯
Web site for your institution	◯	◯	◯	◯
Wireless network, including WiFi	◯	◯	◯	◯
Other	◯	◯	◯	◯

Public Sector Implementation and Adoption

20. To what extent does your institution have the technology capacity (e.g. equipment, software, connectivity, skills and expertise, staffing) necessary to meet its mission?

- ◯ Currently meets our mission
- ◯ Almost meets our mission
- ◯ Is short of meeting our mission
- ◯ Does not meet our mission
- ◯ Don't know/Not applicable

21. Indicate the degree to which you agree with the following statements: My institution...

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Maintains its current level of technology (e.g. keeps current with software versions, hardware, or maintains equipment by using utilities like disk defragmenters)	◯	◯	◯	◯	◯
Adds new uses of technology to meet evolving needs	◯	◯	◯	◯	◯

22. Indicate the degree to which you agree with the following statements. Technology activites in your institution are hindered by:

	Strongly Agree	Agree	Neutral	Disagree	Stronly Agree
Lack of staff time	◯	◯	◯	◯	◯
Lack of staff skills and expertise	◯	◯	◯	◯	◯
Lack of funds	◯	◯	◯	◯	◯
Lack of necessary equipment and/or software	◯	◯	◯	◯	◯
Lack of an established strategic technology plan	◯	◯	◯	◯	◯
Lack of established technology usage policies	◯	◯	◯	◯	◯
Lack of established technology quality standards	◯	◯	◯	◯	◯
Lack of established policies and procedures for managing technology	◯	◯	◯	◯	◯
Other projects that have higher priorities	◯	◯	◯	◯	◯
Regulatory/Legislative/Other institutional policies	◯	◯	◯	◯	◯
Technology priorities shift	◯	◯	◯	◯	◯
Concerns about intellectual property issues	◯	◯	◯	◯	◯
Security concerns	◯	◯	◯	◯	◯
Inconsistent/Lack of training for users	◯	◯	◯	◯	◯
Management is unaware of the benefits of technology	◯	◯	◯	◯	◯

Public Sector Implementation and Adoption

23. Please describe your organization's level of investment in the following IT methodologies/processes to help improve the operation and credibility of IT in your organization.

	Not investing	Minor investment	Major investment	Top Priority investment	Don't know.
CMMi to improve software development	◯	◯	◯	◯	◯
ITIL to improve infrastructure management	◯	◯	◯	◯	◯
COBIT to improve IT overall	◯	◯	◯	◯	◯
PMBOK to improve IT Project/Program Management	◯	◯	◯	◯	◯
ISO 9000 for continous improvement	◯	◯	◯	◯	◯
Six Sigma for continuous improvement	◯	◯	◯	◯	◯

7. Thank you!

Thank you for your participation, your responses will be kept confidential for five years, after which time the information will be destroyed.

APPENDIX H: EMAIL SURVEY INVITATION

My name is Douglass Smith. I'm a doctoral student at Walden University. I'm researching the differences in technology adoption, implementation, and usage between public and private sectors. This research will help us find ways of helping those not in the private sector more effectively implement, adopt, and manage their technological assets.

I'm writing today to see if it's permissible for me to extend an invitation to your membership to participate in this survey. I'm most interested in contacting the members in your group that represent various companies and institutions. The survey, once released, will only take about 15 – 25 minutes to complete, and the results will be made available once the dissertation has been published. No information received will be used in anything other than aggregate form.

If interested, I can supply a copy of the dissertation proposal for your review. Thanks for your time.

Regards,
Doug Smith

APPENDIX I: PART A OF EXPERT PANEL REVIEW

The "interview/walkthrough" process is divided into two parts: the first consists of general questions about the survey and the second is a question-by-question interview where the participant is asked what the participants thought the item was asking him/her and also checks to see the specific difficulty and clarity of the wording of the item.

PART A

1. How long did the survey take you to complete?

2. Please give me a general overview of the clarity of the survey. Rate the clarity using a scale of 1-10, with 10 being VERY CLEAR.

3. Please give me a general overview of the difficulty of the survey. Rate the difficulty using a scale of 1-10, with 10 being VERY DIFFICULT.

4. Did any part of the survey seem to ask information that was too personal?

5. Was it hard for you to understand any portion of the instructions?

PART B

"We are now going to look at the items in the survey one at a time and I would like you to let me know the following:"

-the difficulty of the item
-the clarity of the item
-what you think the item was asking of you

APPENDIX J: REVISED SMITH SURVEY

1. Introduction to the survey

1. Douglass Smith, a Ph.D candidate at Walden University, is researching the role technology plays in the public and private sectors. After numerous years working in both the public and private sectors, the problem of successful adoption and implementation in the public sector became very important to the researcher. The results of this study could lead to maxmizing our public organization's resources, thereby improving services to the public at large.

This is an invitation to participate in said research by completing a brief 23 question online survey. This survey should only take 10 minutes to complete.

Participating in this survey should not expose participants to any reasonably foreseeable risks or discomforts. However, participants may refuse to answer questions they consider invasive or stressful. Participants may also withdraw from the study (e.g. leave the survey incomplete) at any time should they experience any anxiety. Participation is voluntary. No compensation, monetary or otherwise, will be provided to participants.

The record of this study shall remain private. Your confidentiality of information is maintained by using a secure database. The information you enter will not be seen by anyone other than the researcher. Information gathered by this study will only be reported in the aggregate.

Should the opportunity to publish present itself, the researcher will not include any information that will make it possible to identify a participant without written permission. All research records will be kept in a locked file; only the researcher will have access to the records. Records will be kept for a minimum of five years before being destroyed.

Again, the researcher conducting this study is Douglass Smith, douglass.smith@waldenu.edu or 785-554-2077. The researcher's adviser is Dr. Charles Nichols, charles.nichols@waldenu.edu. Dr. Nichols can be reached at 502-456-6504. If you want to talk privately about your rights as a participant, you can call Dr. Leilani Endicott. She is the Director of the Research Center at Walden University. Her phone number is 1-800-925-3368, extension 1210. Please contact these officials should you require more information.

Please print this web page for your records.

I have read the above statement and (if necessary) posed questions to Walden

officials involved with this research. I understand the requirements of participating in this study. My consent to participate will be determined by selecting the "Yes" button in the field below.

Do you agree to participate in this study?

- ○ Yes
- ○ No

2. Tell me about yourself

2. Please enter the following information.

Name:	
Company:	
Address:	
Address 2:	
City/Town:	
State/Province:	
ZIP/Postal Code:	
Country:	

3. Which of the following best describes your organization's type of institution?

- ○ State Government
- ○ Local Government
- ○ Public School
- ○ Higher Education
- ○ Non-Profit/Not-for-Profit/Association
- ○ Publicly traded Company
- ○ Privately held Company
- ○ Other/I don't know

Comments (Optional)

3. IT Governance

This next section deals with how your organization manages its technology. If you are not the top level executive for your organization, please report for the level that you most direct responsibility and control over.

4. Does your organization have a committee of senior business/management/administrators to oversee and prioritize technology investments?

- ○ Yes
- ○ No
- ○ Don't know

Comments (Optional)

5. Complete the following statement by using the phrase that best describes the attitudes of your organization's senior leadership towards technology acquisition and use:

The senior leadership of my organization...

- ○ generally promotes the expansion of my organization's technology capabilities and they provide specific guidance of these efforts
- ○ generally promotes the expansion of my organization's technology capabilities but they provide little specific guidance of these efforts
- ○ are generally neutral on the subject of expanding my organization's technology capabilities
- ○ generally opposes the expansion of my organization's technology capabilities
- ○ Don't know/Not applicable

Comments (optional)

6. Complete the following statement by using the phrase that best describes the attitudes of POPULATION SERVED BY YOUR ORGANIZATION towards technology acquisition and use:

The population served by my organization...

- ○ generally promotes the expansion of my institution's technology capabilities and they provide specific guidance of these efforts
- ○ generally promotes the expansion of my institution's technology capabilities but they provide little specific guidance of these efforts
- ○ are generally neutral on the subject of expanding my institution's technology capabilities
- ○ generally opposes the expansion of my institution's technology capabilities

Don't know/Not applicable

Comments (Optional)

7. Are you significantly involved with the following technology decisions

- Setting budgets
- Setting strategy
- Choosing vendors
- Authorizing purchases
- None/Don't know

Comments (Optional)

4. IT Governance, continued

Reminder: If you are not the top level executive for your organization, please report for the level that you most direct responsibility and control over.

8. Please indicate the extent to which you agree with the survey statements by checking your responses:

	Not at all	Very Little	Somewhat	A Significant Amount	To a Great Extent
Decision-making is highly concentrated at top management levels					
My organization has a clearly stated and comprehensive technology strategy					
My organization extensively utilitizes cross-functional teams for managing day-to-day operations					
My organization has reduced the formal organizational structure to more fully integrate operations					
In my organization, technology planning is well coordinated with the overall strategic planning process					
My organization's technology strategy is clearly incorporated into the organization's overall business strategy					

Comments (Optional)

9. Does your organization conduct needs assessments of user or visitor needs

for technology support services or experiences?

- ○ No
- ○ Don't know/Not applicable
- ○ Yes

Comments (Optional)

10. Does your organization act on the result of any needs assessments of user or visitor needs for technology support services or experiences that are conducted at your organization?

- ○ No
- ○ Don't know/Not applicable
- ○ Yes

Comments (Optional)

11. Where in your organization are the staff with technology responsibilities (e.g. procurement, installation, resource allocation, operations, and maintenance) PREDOMINATELY placed?

- ○ Management
- ○ Seperate Information Systems/Technology Department
- ○ Integrated with operational departments
- ○ Don't know/Not applicable

Comments (Optional)

5. Budget

Next, we'll ask you questions that deal with budgetary issues. If you are not the top level executive for your organization, please report for the level that you most direct responsibility and control over.

12. What is the size of your OVERALL ANNUAL budget?

- Less than $250,000
- $250,001 - $500,000
- $500,001 - $750,000
- $750,001 - $1,000,000
- $1,000,001 - $5,000,000
- $5,000,001 - $10,000,000
- $10,000,001 - $25,000,000
- $25,000,001 or more
- I don't know

Comments (Optional)

13. What is the size of your OVERALL TECHNOLOGY ANNUAL budget?

- $1 - $250,000
- $250,001 - $500,000
- $500,001 - $750,000
- $750,001 - $1,000,000
- $1,000,001 - $5,000,000
- $5,000,001 - $10,000,000
- $10,000,001 - $25,000,000
- $25,000,001 or more
- I don't know
- There is no technology budget

Comments (Optional)

14. What percentage of your organization's technology needs are met by current funding?

- 0%
- 1% - 25%
- 26% - 50%
- 51% - 75%
- 76% - 99%
- 100%

Comments (Optional)

15. How involved are the lines of business/other departments (outside of IT) in setting your organization's IT budget and deciding which IT initiatives to fund?

- Not at all involved
- Slightly involved
- Somewhat involved

- Very involved

Comments (Optional)

16. What is the current size of your organization's paid, full-time equivalent (FTE) staff?

- Less than 5
- 5 - 10
- 11 - 25
- 26 - 75
- 76 - 150
- 151 - 250
- 251 - 500
- 501 - 1000
- 1,001 or more
- I don't know

Comments (Optional)

17. What is the current size of your organization's paid, full-time equivalent (FTE) TECHNOLOGY staff?

- Less than 5
- 5 - 10
- 11 - 25
- 26 - 75
- 76 - 150
- 151 - 250
- 251 - 500
- 501 - 1000
- 1,001 or more
- I don't know

Comments (Optional)

6. Technology Utilization/Adoption/Use

This section asks about the major technology enablers in your organization such as email, video, etc. If you are not the top level executive for your organization, please report for the level that you most direct responsibility and control over.

18. What technologies has your institution used in its day-to-day operations within the past 12 months, or plan to acquire or implement in the future? (Select ONE in each row)

	Used in past 12 months	Plan to acquire or implement in next 12 months	Plan to acquire or implement more than 12 months from now	Do not plan to acquire or implement/Don't know
Accounting/payroll software/HR	○	○	○	○
Broadband Internet connection	○	○	○	○
Database software or system for membership development	○	○	○	○
Desktop computers	○	○	○	○
E-mail	○	○	○	○
GIS (geographic information systems) application	○	○	○	○
Intranet	○	○	○	○
LAN (local area network)	○	○	○	○
Marketing and promotion software and systems	○	○	○	○
Meta- or federated searching in online collections and catalogs	○	○	○	○
Modem (dial access) Internet connection	○	○	○	○
Multimedia services	○	○	○	○
Notebook or tablet computers	○	○	○	○
Office productivity software, including word processing, desktop publishing and spreadsheets	○	○	○	○
PDA (personal digital assistant handheld devices, e.g. Palm, Smartphones	○	○	○	○
Personal information management(PIM) software	○	○	○	○
Point-of-sale software and systems	○	○	○	○
RFID (radio frequency identification) in services or	○	○	○	○
collections	○	○	○	○
Software to manage public access computers and printing	○	○	○	○
Video tours	○	○	○	○
Virtual reality tours	○	○	○	○
Web portal or gateway for services	○	○	○	○
Web site for your institution	○	○	○	○
Wireless network, including WiFi	○	○	○	○
Other	○	○	○	○

19. To what extent does your organization have the technology capacity (e.g. equipment, software, connectivity, skills and expertise, staffing) necessary to meet its mission?

- ○ Currently meets our mission
- ○ Almost meets our mission
- ○ Is short of meeting our mission
- ○ Does not meet our mission
- ○ Don't know/Not applicable

Comments (Optional)

20. Indicate the degree to which you agree with the following statements: My organization...

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Maintains its current level of technology (e.g. keeps current with software versions, hardware, or maintains equipment by using utilities like disk defragmenters)	○	○	○	○	○
Adds new uses of technology to meet evolving needs	○	○	○	○	○

Comments (Optional)

21. Indicate the degree to which you agree with the following statements. Technology activites in your organization are hindered by:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Lack of staff time	○	○	○	○	○
Lack of staff skills and expertise	○	○	○	○	○
Lack of funds	○	○	○	○	○
Lack of necessary equipment and/or software	○	○	○	○	○
Lack of an established strategic technology plan	○	○	○	○	○
Lack of established technology usage policies	○	○	○	○	○
Lack of established technology quality standards	○	○	○	○	○
Lack of established policies and procedures for managing technology	○	○	○	○	○
Other projects that have higher priorities	○	○	○	○	○
Regulatory/Legislative/Other institutional policies	○	○	○	○	○

Technology priorities shift	○	○	○	○	○
Concerns about intellectual property issues	○	○	○	○	○
Security concerns	○	○	○	○	○
Inconsistent/Lack of training for users	○	○	○	○	○
Management is unaware of the benefits of technology	○	○	○	○	○

Comments (Optional)

22. Please describe your organization's level of investment in the following IT methodologies/processes to help improve the operation and credibility of IT in your organization.

	Not investing	Minor investment	Major investment	Top Priority investment	Don't know.
CMMi to improve software development	○	○	○	○	○
ITIL to improve infrastructure management	○	○	○	○	○
COBIT to improve IT overall	○	○	○	○	○
PMBOK to improve IT Project/Program Management	○	○	○	○	○
ISO 9000 for continous improvement	○	○	○	○	○
Six Sigma for continuous improvement	○	○	○	○	○

Comments (Optional)

7. Thank you!

Thank you for your participation, your responses will be kept confidential for five years, after which time the information will be destroyed.

23. If you are interested in the results of this survey please answer this question, what is your email address?

APPENDIX K: CODEBOOK

Item Number	Question	Variable	SPSS Variable Name	Coding Instructions
1	3	Organization Type	NEWORGTYPE	PU = Public Sector, PR = Private Sector
2	3	Organization Type	ORGTYPE	1 = State Government 2 = Local Government 3 = Public School 4 = Higher Education 5 = Non-Profit/Not-for-profit 6 = Publicly traded company 7 = Privately held Company 8 = Other
3	4	Senior Leadership Committee Presence	SRCMT	1 = Yes 2 = No 3 = Don't Know
4	5	Senior Leadership Philosophy on IT	SRLDRATT	1 = General promotes and provides specific guidance 2 = General promotes but provides little guidance 3 = Generally neutral 4 = Generally opposes 5 = Don't know
5	6	Population Served Influence	POPSRVED	1 = General promotes and provides specific guidance 2 = General promotes but provides little guidance 3 = Generally neutral

				4 = Generally opposes 5 = Don't know
6	7	Involvement in setting budgets	SETBUD	Checked = 1 = Yes Unchecked = No
7	7	Involvement in setting strategy	SETSTRAT	Checked = 1 = Yes Unchecked = No
8	7	Ability to choose vendors	CHVND	Checked = 1 = Yes Unchecked = No
9	7	Ability to authorize purchases	AUTPURCH	Checked = 1 = Yes Unchecked = No
10	7	No involvement	NOINVL	Checked = 1 = Yes Unchecked = No
11	8	Decision making at the top of the organization	DCATTOP	1 = Not at all 2 = Very little 3 = Somewhat 4 = A significant amount 5 = To a great extent
12	8	Clearly stated and comprehensive technology strategy	STIT	1 = Not at all 2 = Very little 3 = Somewhat 4 = A significant amount 5 = To a great extent
13	8	Cross-functional teams for managing day to day operations	CRSFUNC	1 = Not at all 2 = Very little

				3 = Somewhat 4 = A significant amount 5 = To a great extent
14	8	Reduced formal org. structure to more fully integrate operations	REDSTRUC	1 = Not at all 2 = Very little 3 = Somewhat 4 = A significant amount 5 = To a great extent
15	8	Technology planning coordinated with strategic planning	PLANCOORD	1 = Not at all 2 = Very little 3 = Somewhat 4 = A significant amount 5 = To a great extent
16	8	Technology plan clearly incorporated into the overall strategic business strategy	ITPLANBUS	1 = Not at all 2 = Very little 3 = Somewhat 4 = A significant amount 5 = To a great extent
17	9	User/Visitor needs assessment conducted	CONDASSESS	1 = No 2 = Don't know 3 = Yes
18	10	Results of user/visitor needs assessment used	USEASSESS	1 = No 2 = Don't know

				3 = Yes
19	11	Location of staff with technology responsibilities	STAFFLOC	1 = Management 2 = Separate technology department 3 = Integrated with operational departments 4 = Don't know
20	12	Annual organization budget	ANNBUDG	1 = < 250,000 2 = 250,001 - 500,000 3 = 500,001 - 750,000 4 = 750,001 - 1,000,000 5 = 1,000,001 - 5,000,000 6 = 5,000,001 - 10,000,000 7 = 10,000,001 - 25,000,000 8 = > 25,000,000 9 = I don't know
21	13	Annual technology budget	ANNTECHBUD	1 = 1 - 250,000 2 = 250,001 - 500,000 3 = 500,001 - 750,000 4 = 750,001 - 1,000,000 5 = 1,000,001 - 5,000,000 6 = 5,000,001 - 10,000,000

				7 = 10,000,001 - 25,000,000 8 = > 25,000,000 9 = I don't know 10 = There is no technology budget
22	14	Percent of organization's technology needs are met by current funding	ITNEEDSMET	1 = 0% 2 = 1% - 25% 3 = 26% - 50% 4 = 51% - 75% 5 = 76% - 99% 8 = 100%
23	15	Lines of business (outside) of IT involved with IT planning	LOBINVOLVE	1 = Not involved 2 = Slightly involved 3 = Somewhat involved 4 = Very involved
24	16	Number of organizational FTEs	FTESTAFF	1 = Less than 5 2 = 5 -10 3 = 11 – 25 4 = 26 – 75 5 = 76 – 150 6 = 151 – 250 7 = 251 – 500 8 = 501 - 1,000 9 = 1,001 or more 10 = I don't know

25	17	Number of organizational FTEs dedicated to IT	ITFTESTAFF	1 = Less than 5 2 = 5 -10 3 = 11 – 25 4 = 26 – 75 5 = 76 – 150 6 = 151 – 250 7 = 251 – 500 8 = 501 - 1,000 9 = 1,001 or more 10 = I don't know
26	18	Accounting/payroll software/HR	ACCOUNTING	1 = Used in past 12 months 2 = Plan to acquire or implement in next 12 months 3 = Plan to acquire or implement more than 12 months from now 4 = Do not plan to acquire or implement/don't know
27	18	Broadband Internet connection	BROADBAND	1 = Used in past 12 months 2 = Plan to acquire or implement in next 12 months 3 = Plan to acquire or implement more than 12 months from now 4 = Do not plan to acquire or implement/don't know

28	18	Database software or system for membership development	DATABASE	1 = Used in past 12 months 2 = Plan to acquire or implement in next 12 months 3 = Plan to acquire or implement more than 12 months from now 4 = Do not plan to acquire or implement/don't know
29	18	Desktop computers	DESKTOPS	1 = Used in past 12 months 2 = Plan to acquire or implement in next 12 months 3 = Plan to acquire or implement more than 12 months from now 4 = Do not plan to acquire or implement/don't know
30	18	Email	EMAIL	1 = Used in past 12 months 2 = Plan to acquire or implement in next 12 months 3 = Plan to acquire or implement more than 12 months from now 4 = Do not plan to acquire or implement/don't know
31	18	GIS (geographic information systems) application	GIS	1 = Used in past 12 months 2 = Plan to acquire or implement in next 12 months

				3 = Plan to acquire or implement more than 12 months from now 4 = Do not plan to acquire or implement/don't know
32	18	Intranet	INTRANET	1 = Used in past 12 months 2 = Plan to acquire or implement in next 12 months 3 = Plan to acquire or implement more than 12 months from now 4 = Do not plan to acquire or implement/don't know
33	18	LAN (local area network)	LAN	1 = Used in past 12 months 2 = Plan to acquire or implement in next 12 months 3 = Plan to acquire or implement more than 12 months from now 4 = Do not plan to acquire or implement/don't know
34	18	Marketing and promotion software and systems	MARKETING	1 = Used in past 12 months 2 = Plan to acquire or implement in next 12 months 3 = Plan to acquire or implement more than 12 months from now 4 = Do not plan to acquire or

				implement/don't know
35	18	Meta or federated searching in online collections and catalogs	METASEARCHING	1 = Used in past 12 months 2 = Plan to acquire or implement in next 12 months 3 = Plan to acquire or implement more than 12 months from now 4 = Do not plan to acquire or implement/don't know
36	18	Modem dial access Internet connection	DIALUP	1 = Used in past 12 months 2 = Plan to acquire or implement in next 12 months 3 = Plan to acquire or implement more than 12 months from now 4 = Do not plan to acquire or implement/don't know
37	18	Multimedia services	MULTIMEDIA	1 = Used in past 12 months, 2 = Plan to acquire or implement in next 12 months, 3 = Plan to acquire or implement more than 12 months from now, 4 = Do not plan to acquire or implement/don't know
38	18	Notebook or tablet computers	NOTEBOOKS	1 = Used in past 12 months 2 = Plan to acquire or implement in next 12 months 3 = Plan to acquire or

				implement more than 12 months from now 4 = Do not plan to acquire or implement/don't know
39	18	Office productivity software including word processing desktop	SOFTWARESUITES	1 = Used in past 12 months 2 = Plan to acquire or implement in next 12 months 3 = Plan to acquire or implement more than 12 months from now 4 = Do not plan to acquire or implement/don't know implement/don't know
40	18	PDA (personal digital assistant handheld devices, e.g. Palm, Smartphones)	PDAS	1 = Used in past 12 months 2 = Plan to acquire or implement in next 12 months 3 = Plan to acquire or implement more than 12 months from now 4 = Do not plan to acquire or implement/don't know
41	18	Personal information management (PIM) software	PIMS	1 = Used in past 12 months 2 = Plan to acquire or implement in next 12 months 3 = Plan to acquire or implement more than 12 months from now 4 = Do not plan to acquire or implement/don't know

42	18	Point-of-sale software and systems	POS	1 = Used in past 12 months 2 = Plan to acquire or implement in next 12 months 3 = Plan to acquire or implement more than 12 months from now 4 = Do not plan to acquire or implement/don't know
43	18	RFID (radio frequency identification) in services	RFID	1 = Used in past 12 months 2 = Plan to acquire or implement in next 12 months 3 = Plan to acquire or implement more than 12 months from now 4 = Do not plan to acquire or implement/don't know
44	18	Collections	COLLECTIONS	1 = Used in past 12 months 2 = Plan to acquire or implement in next 12 months 3 = Plan to acquire or implement more than 12 months from now 4 = Do not plan to acquire or implement/don't know
45	18	Software to manage public access computers and printing	PUBLICACCESSSOFTWARE	1 = Used in past 12 months 2 = Plan to acquire or implement in next 12 months

				3 = Plan to acquire or implement more than 12 months from now 4 = Do not plan to acquire or implement/don't know
46	18	Video tours	VIDEOTOURS	1 = Used in past 12 months 2 = Plan to acquire or implement in next 12 months 3 = Plan to acquire or implement more than 12 months from now 4 = Do not plan to acquire or implement/don't know
47	18	Virtual reality tours	VIRTUALREALITYTOUR	1 = Used in past 12 months 2 = Plan to acquire or implement in next 12 months 3 = Plan to acquire or implement more than 12 months from now 4 = Do not plan to acquire or implement/don't know
48	18	Web portal or gateway for services	WEBPORTAL	1 = Used in past 12 months 2 = Plan to acquire or implement in next 12 months 3 = Plan to acquire or implement more than 12 months from now 4 = Do not plan to acquire or

				implement/don't know
49	18	Website for your institution	WEBSITE	1 = Used in past 12 months 2 = Plan to acquire or implement in next 12 months 3 = Plan to acquire or implement more than 12 months from now 4 = Do not plan to acquire or implement/don't know
50	18	Wireless network including WiFi	WIRELESS	1 = Used in past 12 months 2 = Plan to acquire or implement in next 12 months 3 = Plan to acquire or implement more than 12 months from now 4 = Do not plan to acquire or implement/don't know
51	18	Other	OTHER	1 = Used in past 12 months 2 = Plan to acquire or implement in next 12 months 3 = Plan to acquire or implement more than 12 months from now 4 = Do not plan to acquire or implement/don't know
52	19	Technology capacity of organization	TECHCAPACITY	1 = Currently meets our mission 2 = Almost meets our

				mission 3 = Is short of meeting our mission 4 = Does not meet our mission 5 = Don't know/Not applicable
53	20	Maintains current level of technology	MAINTTECH	1 = Strongly Agree 2 = Agree 3 = Neutral 4 = Disagree 5 = Strongly Disagree
54	20	Adds new uses of technology	ADDSTECH	1 = Strongly Agree 2 = Agree 3 = Neutral 4 = Disagree 5 = Strongly Disagree
55	21	Lack of staff time	LACKSTAFF	1 = Strongly Agree 2 = Agree 3 = Neutral 4 = Disagree 5 = Strongly Disagree
56	21	Lack of staff skills	LACKSKILL	1 = Strongly Agree 2 = Agree 3 = Neutral 4 = Disagree 5 = Strongly Disagree

57	21	Lack of funds	LACKFUNDS	1 = Strongly Agree 2 = Agree 3 = Neutral 4 = Disagree 5 = Strongly Disagree
58	21	Lack of equipment	LACKEQUIP	1 = Strongly Agree 2 = Agree 3 = Neutral 4 = Disagree 5 = Strongly Disagree
59	21	Lack of strategic technology plan	LACKPLAN	1 = Strongly Agree 2 = Agree 3 = Neutral 4 = Disagree 5 = Strongly Disagree
60	21	Lack of technology usage policies	LACKPOLICY	1 = Strongly Agree 2 = Agree 3 = Neutral 4 = Disagree 5 = Strongly Disagree
61	21	Lack of quality standards	LACKSTANDARDS	1 = Strongly Agree 2 = Agree 3 = Neutral 4 = Disagree 5 = Strongly Disagree

62	21	Lack of technology management policies	LACKMGRPOLICY	1 = Strongly Agree 2 = Agree 3 = Neutral 4 = Disagree 5 = Strongly Disagree
63	21	Higher priority projects	HIGHPRIORITY	1 = Strongly Agree 2 = Agree 3 = Neutral 4 = Disagree 5 = Strongly Disagree
64	21	Institutional Policies	REGPOLICIES	1 = Strongly Agree 2 = Agree 3 = Neutral 4 = Disagree 5 = Strongly Disagree
65	21	Shifting technology priorities	TECHPRIORITYSHIFT	1 = Strongly Agree 2 = Agree 3 = Neutral 4 = Disagree 5 = Strongly Disagree
66	21	Concerns about IP issues	IPISSUES	1 = Strongly Agree 2 = Agree 3 = Neutral 4 = Disagree 5 = Strongly Disagree

67	21	Security concerns	SECURITY	1 = Strongly Agree 2 = Agree 3 = Neutral 4 = Disagree 5 = Strongly Disagree
68	21	Lack of training	NOTRAINING	1 = Strongly Agree 2 = Agree 3 = Neutral 4 = Disagree 5 = Strongly Disagree
69	21	Management is unaware of the benefits of technology	IGNORETECHBENEFITS	1 = Strongly Agree 2 = Agree 3 = Neutral 4 = Disagree 5 = Strongly Disagree
70	22	CMMi to improve software development	CMMI	1 = Not Investing 2 = Minor Investment 3 = Major Investment 4 = Top Priority Investment 5 = Don't know
71	22	ITIL to improve infrastructure management	ITIL	1 = Not Investing 2 = Minor Investment 3 = Major Investment 4 = Top Priority Investment

				5 = Don't know
72	22	COBIT to improve IT overall	COBIT	1 = Not Investing 2 = Minor Investment 3 = Major Investment 4 = Top Priority Investment 5 = Don't know
73	22	PMBOK to improve IT/Program management	PMBOK	1 = Not Investing 2 = Minor Investment 3 = Major Investment 4 = Top Priority Investment 5 = Don't know
74	22	ISO 9000 for continuous improvement	ISO9000	1 = Not Investing 2 = Minor Investment 3 = Major Investment 4 = Top Priority Investment 5 = Don't know
75	22	Six Sigma for continuous improvement	SIXSIGMA	1 = Not Investing 2 = Minor Investment 3 = Major Investment 4 = Top Priority Investment 5 = Don't know

CURRICULUM VITAE

EDUCATION AND PROFESSIONAL TRAINING

WALDEN UNVERISTY – *Minneapolis, Minnesota,* **2003-2007**
Ph.D. in Applied Management and Decision Sciences, concentration in Information Systems and Knowledge Management

KELLER GRADUATE SCHOOL OF MANAGEMENT – *Deerfield, Illinois,* **1994-2003**
Masters of Business Administration, concentration in Management Information Systems
Masters of Project Management

UNIVERSITY OF MICHIGAN – *Ann Arbor, Michigan,* **1990**
Bachelor of General Studies in Business Administration, Computer Science and Liberal Arts

ACADEMIC TEACHING EXPERIENCE

CCI, INC. – *Santa Anna, California*

CGS 2110-2R – Computer Applications	2005
CGS 2167 – Computer Applications	2005-2006

FRIENDS UNIVERSITY – *Topeka, Kansas*

Mgmt 310 – Principles of Information Systems	2006-2007

OTTAWA UNIVERSITY – *Ottawa, Kansas*

ITS 12100 – Intro to Computer Science	2005-2006
ITS 12063 – Web Design	2005-2006
ITS 13063 – Foundations of Information Technology	2006-2007
EDU 20000 – Educators & Technology	2005-2006
ITS 43000 – IT Project Management	2006-2007
ITS 48163 – System Analysis and Design	2006
OU College Faculty Rules & Benefits Committee	2006-2007
OU College Technology Committee	2005-2007

UNIVERSITY OF PHOENIX – *Kansas City, Kansas*

BSA 375 – Business Systems Analysis	2005
EBUS 400 – E-business Technologies	2006

WALDEN UNIVERSITY – *Minneapolis, Minnesota*

MMBA 6000 – Success Strategies in the Online Environment (MBA)	*2004-2005*
AMDS 8000 – Success Strategies in the Online Environment (PhD)	*2004-2005*
MGMT 3001 – Management in the 21st Century (BBA)	2005-2007
MGMT 3005 – Information Technology in te Enterprise (BBA)	2005-2006
MGMT 1000 – Success Strategies in the Online Environment (BBA)	2005

PROFESSIONAL EXPERIENCE

OTTAWA UNIVERSITY - *Ottawa, Kansas* – **2005-Present**
Assistant Professor of Information Technology

(See Academic Teaching Experience)

KANSAS DEPARTMENT OF AGRICULTURE – *Topeka, Kansas* – **2003 – 2005**
Chief Information Officer
Invited to provide vision, guidance and daily direction for IT department within state agency. Duties included setting technical directives for proprietary software development efforts, coordinating with strategic technology objectives with overall agency and state-wide principles.

- Demonstrated ability to think strategically by crafting Agency's first strategic technology plan.
- Implemented Service Level Agreements between IT and end-user community.
- Revised software development projects to save Agency money by re-working programming paradigms.
- Initiated RFID project for the Kansas participation in the National Animal ID system
- Instituted Mobile technology within the Agency to produce "Point of Inspection" data entry
- Completed 1 Million dollar Oracle project to improve the data collection/reporting services for the Agency
- Re-architected Agency's web-services to deliver timely information and services via the Internet
- Managed 1.2 – 1.7M technology budget

HILL'S PET NUTRITION – *Topeka, Kansas* – **2001 – 2003**
Supervisor, Integrated Data Systems
Recruited by subsidiary of Colgate Palmolive, serving as IT Manager responsible for integrating, supporting and managing all R&D systems at corporate Science and Technology Center (STC). Responsible for integrating custom systems with various laboratory software systems, Lotus Notes and SAP.

- Instituted comprehensive organizational structure for STC IT staff, enabling department to provide 40% faster response time for feedback and IT services.
- Initiated and integrated Crystal Enterprise within STC procedures, radically reducing time to create and distribute critical business reports throughout operation; implementation used as model for entire Hill's/Colgate enterprise.
- Initiated and implemented two intranet sites using ASP and Lotus Notes technologies for project tracking.

SAVANT TECHNOLOGY PARTNERS, INCORPORATED – *Westchester, Illinois* – **2000 – 2001**
President
Invited to provide vision, guidance and daily direction for technology firm offering strategic planning and technology services. Duties included prospecting for clients, setting technical directives for proprietary software development efforts, coordinating with strategic partners and conducting high level public relations campaigns. Served as Engagement Manager, coordinating efforts clients and vendors, defining engagement goals, assisting in vendor selection and contract negotiations and monitoring milestones, personnel performance and deliverables.

- Demonstrated keen ability to "close the deal" by doubling closure rate on business prospects, tripling sales over first three quarters.
- Developed strategic partner program that enabled company to diversify offerings without taking unnecessary risks, rapidly fielding three highly successful knowledge management software products.
- Implemented client e-commerce sites utilizing ASP, Cold Fusion, Flash, and Java technologies.

FERS BUSINESS SERVICES, INCORPORATED – *Chicago, Illinois* – **1997 – 2000**
Manager
Hand picked by mid-sized accounting and management consulting firm to serve as liaison between client and consulting team, defining project scope and goals, with responsibility for overall project implementation. Duties included project management, budgeting, staff management, strategic planning, sales, market development, mentoring, defining client business requirements and defining technical requirements for internal and external use.

- Overcame tight schedule constraints to install critical e-commerce site by assembling and managing a highly cohesive technical team that included the client, internal consultants and external vendors, delivering project on time and on budget.
- Strengthened mentoring skills by coaching team members through troubleshooting technical issues, rather than directly solving problems, resulting in increased growth and confidence among team members.
- Was responsible for several internet sites for clients as well as an extranet site for client project tracking.
- Created and performed extensive benchmarking test using AIX and NT platforms for clients.

AMERICAN MASSAGE THERAPY ASSOCIATION – *Evanston, Illinois* – **1996 – 1997**
Director of Operations
Recruited back to association created for promotion of massage therapy, having more than 30,000 members globally. Managed systems and back office personnel in directing operational activities of the association through facilities, production and systems management.

- Instituted extensive automation into back office procedures, including duplicating and printing services that created extensive cost savings throughout the organization.
- Rapidly implemented new membership database system in two months, saving the organization thousands of dollars annually in processing and maintenance costs.
- Initiated and managed the implementation of the association's first website; initiated integration of "high speed" internet services into the organization using ISDN.

FORTIS, INCORPORATED – *Milwaukee, Wisconsin* – **1994 – 1996**
Information Technology Project Manager
Selected by multinational insurance company to manage the development and installation of business critical software systems. Responsible for supervising elite development teams for local and multi-site IT projects.

- Installed Lawson Human Resources system that spanned three sites in Milwaukee, Kansas City and Minneapolis, included converting Fortis legacy system and training HR employees on new system.
- Led configuration management efforts of the US based sites (over 1000 desktops) in dealing with the OS/2 environment.
- Dramatically improved competency of Milwaukee IT support staff by providing comprehensive training on effective OS/2 support and defining support procedures and policies that reduced incident closure time.
- Major player in Netware 3 to Netware 4 conversion projects and its administration.