ABSTRACT

SCHELIN, SHANNON HOWLE. Managing the human side of information technology: A public-private comparison of chief information officers. (Under the direction of G. David Garson.)

Information technology has permeated the public and private sectors. However, successful adoption and implementation of technology has not been easy as predicted. Successful adoption and implementation of information technology can easily be defined as projects developed on time, on budget, and to the satisfaction of the end users. Along with the myriad benefits and promises of technology, there are several challenges to its successful adoption and implementation, including poor requirements definition, lack of communication, and limited management support.

This research study examines a variety of identifiable and controllable factors that can contribute to the successful adoption and implementation of information technology, called “critical success factors” (CSFs). Critical success factors are those factors that consistently contribute to the overall success of a technology project, regardless of project scope, organizational size, or other exogenous variables. Using a review of public and private sector literature, a list of fourteen critical success factors was developed. Each of the factors was assessed by public and private sector chief information officers to determine if sectoral differences related to influence of or performance on the critical success factors exist.

The findings suggest that several sectoral differences do exist. In particular, the public sector often rates their performance on the critical success factors lower than their private sector counterparts. Furthermore, the public sector has greater levels of dissonance

between their ideal rating of a given critical success factor and their organizational performance on the factor.

Based on the research findings, several policy implications were identified:

- Policymakers must recognize the critical importance of top management support in both public and private sectors to technology project success, and therefore, encourage and nurture it.
- Policymakers must recognize the need to close the gap between the public sector's performance on critical success factors and their ideal ratings of these factors by reducing the burden of external requirements and legislative mandates that hinder successful technology project implementation.
- Specific areas, such as use of highly skilled staff and strategic technology planning, need more attention in the public sector, in order to increase the likelihood of technology project success.

Managing the Human Side of Information Technology:

A Public-Private Comparison of Chief Information Officers

by
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BIOGRAPHY

Shannon Howle Schelin was born in Darlington, South Carolina. She attended the University of North Carolina at Chapel Hill and earned a Bachelor of Arts degree, majoring in International Studies. While working in the nonprofit sector, she enrolled at the University of North Carolina at Charlotte and completed a Master's of Public Administration degree. Shannon joined the University of North Carolina at Chapel Hill's School of Government in 2001 and continues to work with local governments on technology issues. In order to further enhance her responsibilities of teaching, research, and service to North Carolina governments, she continued her education at North Carolina State University, completing the Doctor of Philosophy in Public Administration. Shannon currently resides in the Raleigh area with her husband Jay.

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CHAPTER 1: INTRODUCTION

The role of information technology (IT) has becoming increasingly important in both private and public sectors over recent years. The advent of personal computers, information networks, and the Internet has engendered an information revolution, which has created new means of production, new communication patterns, and new work processes. The ability to buy and sell goods and services via the Internet has led to new private sector industries and new business and government models. Furthermore, there is an emerging realization that implementation of information technology is more than just a shift in communication patterns or mediums. At least potentially, it involves a transformation of an organization's culture.

At the heart of the information revolution is the belief that technology can significantly improve existing standards, procedures, and processes thereby increasing efficiency and effectiveness while reducing resource expenditures. Essentially, technology should enable us to work smarter not harder. Consider the following statement by Herbert A. Simon, a leading futurist and technologist from the beginning of the computing revolution: "[By 1985], machines will be capable of doing any work Man can do." The promise of information technology has been widely acclaimed in the public and private sectors but the reality of the success of such technologies is not so clear.

While information technology has permeated the both public and private sectors, successful adoption and implementation of technology has not been as easy as those futurists projected. Successful adoption and implementation of information technology can be defined as projects developed on time, on budget, and to the satisfaction of the end users. However, along with the myriad benefits and promises of technology, there are several challenges to its successful adoption and implementation, including poor requirements definition, lack of communication, and limited management support. A variety of identifiable and controllable factors can contribute to the successful adoption and implementation of information technology. These factors are often called "critical success factors" (CSFs) and they are the focus of this book. Critical success factors are those factors that consistently contribute to the overall success of a technology project, regardless of project scope, organizational size, or other exogenous variables.

Using a review of public and private sector literature, a list of fourteen critical success factors was developed. The critical success factors included in this study are:

- communication
- highly qualified technology staff;
- use of reward systems;
- strategic planning;
- end user involvement;
- stakeholder involvement;
- project milestones;
- top management support;
- political support;
- use of prototyping and/or piloting;
- use of cross-functional teams;
- end user training;
- location of CIO in organization; and,
- sufficient financial resources.

Through the identification and measurement of these factors, it is plausible that organizations can further increase the likelihood of successful technology project design and implementation.

In addition to examining critical success factors in general, this research also looks at differences in the public and private sectors with regard to success factors. Although significant research has been conducted in the areas of public and private information technology design and implementation, little attention has been paid to the sectoral differences that fundamentally alter the nature of IT projects and therefore influence the success factors needed in each sector. As described by Bozeman and Bretschneider's (1986) seminal article on public information technology, there is a substantial difference between management information systems (MIS), traditionally a private sector term, and public management information systems (PMIS). Some of the major differences noted include lack of market principles as primary decision criteria in the public sector; the role of economic and political authority; and the importance of transparency in the public sector (Bozeman and Bretschneider, 1986). Bretschneider's (1990) later research also found levels of organizational interdependence, "red tape," and the position of the MIS director within organizations differ greatly between the public and private sectors.

Significant homage has been paid to the Bozeman and Bretschneider article in scholarly literature. However, the reality of the situation is that practice has not followed theory. The public sector has repeatedly copied the practices of the private sector, evidenced by the current rise in popularity of enterprise-resource planning (ERP) and customer relationship management (CRM) software implementations in the public sector, which mirror the path adopted by the private sector in the past five years. Evidenced by the large-scale failures of many public sector technology projects, it is clear that strict adoption from the private sector does not work. Critical success factors, initially identified in the private sector and adopted by the public sector, must be reviewed in light of the public sector landscape and adjusted accordingly in order to facilitate successful public sector projects. Accordingly, this book offers theoretical explanations for both public and private sector adoption of specific critical success factors, as well as exploratory empirical evidence about the nature of critical success factors within each sector.

Theoretical Justification for Critical Success Factor Selection

The ability to more rigorously predict successful projects is critical in the wake of massive technology failures in both private and public settings. These failures, and the trepidation they cause, must be balanced with the new mandate, fostered in both public and private sectors, that organizations operate within new transparent and accessible structures, which are precipitated by information technology. These new structures require crosscutting services, which require improved communication and interaction across traditional organizational lines. These new requirements, which fundamentally alter the nature of the organization, are made possible through the strategic use of information technology. Fundamental changes in organizations are not easily achieved due to conflicting values, preferences, and objectives. Therefore, the identification and enactment of critical success factors associated with IT implementation becomes essential in order to mitigate the high failure rates commonly found in public and private sector IT initiatives (see Standish Group, 1995).

Each of the critical success factors will be discussed in detail in Chapter Two. However, a cursory overview of the premise for the inclusion of each item in the list of critical success factors is offered as background information.

Communication is often cited as a critical success factor in information technology initiatives. For the purposes of this paper, this critical success factor is defined as open, shared information exchange across functional areas (horizontal communication) and hierarchical levels (vertical communication). Communication is the linkage between disparate groups and departments within public and private entities. Based on review of the literature, communication is one of the most fundamental aspects of an information technology project. Communication provides the framework for many of the other critical success factors, such as strategic planning and top management support. In fact, Hartman and Ashrafi (2002) note that presence of a good communication plan is essential for technology project success.

Highly qualified technology staff is another critical success factor. Often this factor is assumed in the private sector literature. However, the public sector literature repeatedly notes the problems associated with untrained and poorly skilled technology staff. In fact, a survey of local government information technology managers reveals that many technology staff, particularly Web masters, are administrative staff who have been promoted (Schelin, 2003). Furthermore, the 2002 ICMA E-Government survey indicates that lack of technology/Web staff and expertise are two of the leading challenges to successful e-government implementation.

The use of reward systems is another critical success factor. The majority of the literature pertaining to reward systems is found in the private sector. Milis and Mercken (2002) note that appropriate implementation of reward systems can enhance technology project viability by creating defined goals, as well as by fostering teamwork in order to reap the benefits. In the public sector, the use of rewards emerged as an issue during the "reinventing government" movement, in an attempt to replicate successful private sector practices. Llittle has been done to encourage rewards in the public sector due to historical and culture contexts as well as budgetary constraints. Nonetheless, rewards have repeatedly been cited as a mechanism for improving the likelihood of technology project success and therefore reward systems are considered to be a critical success factor.

Strategic planning for technology is another critical component to successful technology project design and implementation. The holistic, long-range thinking that accompanies strategic planning allows the technology staff to connect to the broader organizational mission, as well as to establish a commitment from upper management. In fact, Al-Mashari, et al (2003) places visioning and planning at the forefront of critical success factors for the private sector. In the public sector, the Paperwork Reduction Act of 1995 mandated strategic planning for public sector information technology projects. It is evident that strategic planning is important on both the private and public sector fronts.

End user involvement is another critical success factor in information technology implementation. In order to increase the support for and use of new technology applications, the end users must be involved from the onset of the project, in order to determine requirements and establish realistic but aggressive time frames. Both public and private sector literature highlights the importance of end user involvement because it establishes a sense of ownership in the project and engenders future support and usage. Furthermore, without user involvement, technology projects can fail due to misaligned goals, incorrect requirements, and employee resistance to change.

Stakeholder involvement is one of the most frequently cited critical success factors. It is essential for garnering organization-wide project support beyond the role of end user involvement (Ang, et al., 2002). Furthermore, stakeholder involvement, coupled with end user involvement, ensures the needs of internal and external recipients are being met through adequate representation during the planning and testing phases. By involving stakeholders in technology projects, a new level of complexity is introduced. This complexity is essential because it forces the technology project team to assess various individual and group interests, as well as competing alternatives, in order to identify the solution that best addresses the requirements and desires of the stakeholders. By including stakeholder involvement as a critical success factor, CIOs can foster external and internal project support, as well as ensure that projects will be designed with attention to alternatives.

Realistic goals and expectations, articulated as *project milestones*, are critical to the successful adoption of information technology. By realizing that technology is not a panacea, project teams can develop realistic, workable goals. It is critical to have small, realistic goals and expectations in order to foster confidence in the new technology and to provide for morale-boosting achievements associated with the new application. Without project milestones, technology applications can become overwhelming and burdensome to employees. Additionally, milestones provide the opportunity to assess the work to date, make corrections if needed, and also provide small victories for successes achieved by the project staff.

Top management support is one of the most crucial factors to successful adoption of technology. Almost without exception, the literature on critical success factors places top management support at the apogee of project success. Top management support is essential for fostering end user adoption of new technologies. Without executive level support, there is little incentive for the employees to change their current operating procedures and learn new technologies. Those already working in a comfort zone rarely enjoy the paradigm shift and learning curve that accompanies new IT applications. Top management support is the preeminent critical success factor, according to the extant literature review.

Political support (by elected officials or boards of directors) is critical to the success of information technology projects. Poon and Wagner (2001) note that political resistance might fundamentally undermine the technology project, based on perceived power shifts. Based on the literature review, there is little mention of political support within the private sector. Perhaps this is a function of the importance of management support, and relative power, compared to the board of directors. However, the public sector literature repeatedly highlights the importance of political support to technology projects. Again, this difference may stem from power distributions within the public sector. Regardless, political support is essential for technology projects, primarily because political resistance can quickly disable such projects.

Prototyping and/or piloting are main tenets of project management methodologies. The use of these techniques can significantly reduce change orders and user dissatisfaction once full implementation has occurred. In the private sector literature, these methods are often categorized under the heading of project management. The use of prototyping creates a sense of ownership among end users, and also requires their involvement. The prototyping phase is also critical for refining functionality and user requirements. The piloting process should be used to demonstrate the success of a given project initially and then its scalability and applicability to varying constraints. The piloting approach also allows for rapid expansion of the project. The use of prototyping and/or piloting can significantly reduce organizational resistance to new technologies as well as identify and correct system problems prior to full implementation (Hong and Kim, 2002).

The use of cross-functional teams is one of the emerging trends in the technology world. The selection of the proper project team is critical to the overall success of a technology project. These teams incorporate individuals from various departments within an organization for a variety of reasons. According to Powers and Dickson (1973), the employment of people who understand the various facets of a given organization is essential to appropriate project definition, which sets the framework for the rest of the project success. Furthermore, Milis and Mercken (2002) note the need for team members with complementary skill sets, in order to foster "a sum that is greater than its parts." Finally, Teo and Ang (1999) further solidify the importance of cross-functional teams in their discussion of business and technology goal alignment. In essence, the technology staff and the business staff must collaborate on technology projects in order to create value-added outcomes for the organization.

End user training is central to the adoption of the technology in the workplace. Rocheleau and Wu (2002) note a fairly high rating of training importance in both the public and private sectors. However, other studies cite that lack of attention to training (Northrop, 2002). Regardless of statistical findings, the majority of critical success factor literature indicates that end user training is essential for project success (see Dickson and DeSanctis, 2001; Harvard Policy Group, 2001). By incorporating training, end users will be more likely to adopt new technologies because the learning curve has been reduced. In addition, the implementation of a training program signifies top management support for a project through the designation of funds for training purposes.

The location of the CIO in the organization is another critical success factor. As early as 1981, the title Chief Information Officer (CIO) emerged in the private sector literature as the defined leadership role for information technology. Additionally, Rocheleau and Wu (2002) note the public sector has adopted the stance of the private sector by codifying the position of Chief Information Officer. Extensive research has been conducted on the attributes and characteristics of successful CIOs in the private sector (see Dickson and DeSanctis; Harvard Policy Group; General Accounting Office). One of the most commonly cited aspects includes having significant power and authority in the organization. By locating the CIO within the upper echelon of management, the organization signifies a commitment to new technology, which is critical for end user adoption and support. The location of the CIO within the management team is a critical success factor, as noted by private and public sector literature.

The lack of *financial resources*, evidenced by the serious budgetary issues facing both the public and private sectors, is a major concern for successful IT implementation. However, compared to the public sector literature, the majority of private sector literature seldom mentions budgetary constraints. Instead, the literature highlights the importance of providing adequate financial support for a given project (Milis and Mercken, 2002), without attention to the reality of the budget situation for both the private and public sectors. Regardless, adequate financial resources are essential for the design and implementation of new technologies. Accordingly, this study seeks to examine the impact of financial resources in public and private technology settings.

Theoretical Justification for Selection of Chief Information Officers as Survey Population

Information technology has fundamentally altered many aspects of daily life, including interactions with public and private sectors. The role of the Internet continues to increase as more citizens use it to find pertinent information, purchase goods and services, and to participate in virtual communities. By capitalizing on the Internet revolution, governments can create new channels of communication and new methods for participation via e-government. The changing environment, coupled with citizen and business demands, encourages government involvement in e-government initiatives and related uses of information technologies.

Chief information officers emerged as a mechanism to connect the business units in an organization with the information technology staff. In essence, CIOs are the linchpin between these two seemingly disparate, and often contentious, components of an organization. In the past few decades, CIOs have been revered as supreme organizational aligners and lamented as over-titled technocrats. Regardless of the hype and hyperbole surrounding the role of chief information officer, one thing is certain: the job of CIO is always demanding, and often difficult. The CIO is responsible for disseminating the critical technology plans to senior executives in order to engender their support, while maintaining one foot firmly entrenched in the realm of new and emerging technologies. The CIO must possess the vision for the future while maintaining an eye on the historical legacies of the organization. Too often, chief information officers are forced to take sides between the business units and the information technology department, when, in fact, their role is to build the bridges between these organizational silos. The role of the CIO is critical and the job requires skillful navigation of the various minefields and bear traps that can ensnare and destroy technology projects.

As established as the role of CIO is within the private sector, it is only just emerging in the public sector. The role of the CIO has been adopted from the private sector as one way to navigate the emerging reality of public sector information technology and e-government. As early as 1981, the title Chief Information Officer (CIO) emerged in the private sector literature as the defined leadership role for information technology. Extensive research has been conducted on the attributes and characteristics of successful CIOs in the private sector (see Dickson and DeSanctis; Harvard Policy Group; General Accounting Office). Some of the most commonly cited traits include being a generalist, having significant power and authority in the organization, and providing a common vision for the implementation of strategic information technology. Based on the success of the CIO in providing leadership and status to information technology projects in the private sector, the federal public sector followed suit by institutionalizing the position with the passage of the 1996 Clinger-Cohen Act.

The 1996 Clinger-Cohen Act heightened the status of information technology in government (Schelin and Garson, 2004). It established a chief information officer (CIO) in every federal agency, making agencies responsible for developing an IT plan. Later, when e-government becomes a priority, the existence of the CIO strategic planning structure becomes critical to facilitating e-government implementation at the federal level. The importance of successful IT projects and their requisite investments is critical in both public and private sectors, as evidenced by the Clinger-Cohen Act and solidified by the rapid proliferation of CIOs at all levels of public and private organizations.

This paper offers a theoretical framework for understanding the characteristics of successful public and private sector CIOs; empirically tests several hypotheses about sectoral differences in public and private sector CIOs' perceptions of critical success factors for IT project success; and, offers implications and questions for future research. The focus of research on the perceived critical success factors surrounding IT project implementation is not a new concept. In fact, critical success factors have been identified and studied from the inception of modern IT systems. However, this research is the first attempt to quantify the unique aspects of the public compared to the private sector in order to determine the differences in chief information officers' perspectives on critical success factors.

Critical Success Factors Not Included in The Study

Given the breadth of research on critical success factors relating to IT project design and implementation, the list of potential success factors is quite extensive. This research has narrowed the field using two methods to warrant exclusion of specific factors. First, factors that are not repeatedly offered in the literature review as critical success factors are excluded from this study. Much of the research surrounding critical success factors uses case study analysis to determine factors that are specific to a given organization. Accordingly, many of these factors are not generalizable to IT projects in a variety of organizations in both the public and the private sectors. For example, Holland and Light (1999) focus on enterprise resource planning (ERP) system implementation and highlight the existence of legacy systems as a critical success factor. While the majority of the critical success factors outlined in their research do align with other critical success factor literature, the legacy system issue is unique to ERP implementation because of the integration and interoperability problems faced in such a technology project. Other factors excluded due to lack of ubiquity include technology staff morale (see Zahedi, 1987), design requirements and definition (see Shenhar, et al., 2002), and institutionalization of post-mortem analysis (see Reel, 1999). Other factors, such as project champions and feedback mechanisms have been bundled under broader headings of 'top management support' and 'prototyping and piloting.'

The second method chosen for critical success factor exclusion deals with the nature of the factor. Given that the majority of large-scale technology project failures do not occur because of hardware or software failures, but rather human failures (i.e., lack of top management support, lack of training, or lack of resources), this study seeks to examine those factors which contribute to IT project success but are external to the actual IT systems.

Therefore, certain critical success factors, pertaining to internal system requirements, such as use of cutting-edge technology, migration from legacy systems, and integration efforts, have been excluded from this study.

Despite the exclusion of these two classes of critical success factors, the research study does allow for the survey participants to describe other critical success factors that each individual chief information officer deems important to overall IT project success. The use of open-ended questions about the importance of other factors, as determined by the CIOs, allows for exploration of other factors that may not be included in the initial listing of the fourteen critical success factors. Furthermore, this method of questioning allows the researcher to employ qualitative measures to add to the body of knowledge about critical success factors.

Research Problem

Although significant research has been conducted in the areas of public and private information technology design and implementation, little attention has been paid to the sectoral differences that fundamentally alter the nature of IT projects and therefore influence the success factors needed in each sector. As described by Bozeman and Bretschneider's (1986) seminal article on public information technology, there is a substantial difference between management information systems (MIS), traditionally a private sector term, and public management information systems (PMIS). Some of the major differences noted include lack of market principles as primary decision criteria in the public sector; the role of economic and political authority; and the importance of transparency in the public sector (Bozeman and Bretschneider, 1986). Bretschneider's (1990) later research also found levels of organizational interdependence, "red tape," and the position of the MIS director within organizations differ greatly between the public and private sectors.

Significant homage has been paid to the Bozeman and Bretschneider article in scholarly literature. However, the reality of the situation is that practice has not followed theory. The public sector has repeatedly copied the practices of the private sector, evidenced by the current rise in popularity of enterprise-resource planning (ERP) and customer relationship management (CRM) software implementations in the public sector, which mirror the path adopted by the private sector in the past five years. Evidenced by the large-scale failures of many public sector technology projects, it is clear that strict adoption from the private sector does not work. Critical success factors, initially identified in the private sector and adopted by the public sector, must be reviewed in light of the public sector landscape and adjusted accordingly in order to facilitate successful public sector projects.

A review of the literature was conducted using various search methods, including the use of electronic bibliographic databases; review of relevant peer-reviewed journals, with public and private sector foci; review of federal government documents, particularly General Accounting Office and Office of Management and Budget documents; and, searches of relevant websites, including the National Electronic Commerce Coordinating Council, the National Association of State Chief Information Officers, and the National Governors' Association.

The search of electronic bibliographic databases included JSTOR, Academic Search fullTEXT Elite, Ingenta, Expanded Academic ASAP, ACM Digital Library, IEEE Xplore, ScienceDirect, and PAIS International. Both private and public sector articles were obtained by using the search terms "chief information officer," "critical success factors," and "information technology." In addition, another literature review was performed for each of the fourteen critical success factors selected for this study. The majority of the scholarly research focuses on the private sector, so this work formed the baseline for identifying critical success factors. In particular, information from the Standish Group, articles by Dr. Gary Dickson, and publications of the ACM and IEEE were used to create the list of critical success factors. Following the initial list compilation, public sector sources were reviewed to determine continuity of factors across both sectors. The public sector sources include the work of the Harvard Policy Group on Network-Enabled Services and Government, the Center for Technology in Government, and the General Accounting Office. The cross-referencing of the critical success factors between public and private sector literature produced fourteen testable factors, which are outlined in Chapter Two.

In summary, the purpose of this research is to assess the perceived differences in public and privates sector CIOs with regard to the critical success factors associated with information technology. The importance of the study is to add empirical research on the differences between the public and private sectors that contribute to project failures (i.e. cost overruns, budget overruns, and quality issues). Traditionally the public sector has adopted its technology project definitions, management techniques, and expectations from private sector literature. This research will offer empirical baseline data on the unique nature of the public sector as well as insight into how the two sectors differ in both context and content. It is important to note that this research contains original baseline data that is needed in the field of public sector information technology.

Organization of Chapters

Chapter One served as a primer on the various critical success factors, the role of chief information officers, and the paucity of research about success factors based on sectoral differences. First, an overview of the importance of information technology was offered, in order to justify the study purpose. Second, the fourteen critical success factors are briefly described. Next, the chapter offers a brief narrative on the role and function of the chief information officer, the target survey population for this study. Finally, the research agenda of this study is outlined, with particular attention to the contribution of the study to the fields of information management and public administration.

Chapter Two theoretically grounds the research study. First, the chapter offers an overview of the twenty-eight hypotheses associated with the study. Then the chapter offers a comprehensive review of the literature associated with each of the fourteen critical success factors and postulates expectations about the strength and direction of association within the public and the private sectors. Finally, the chapter is concluded with two tabular representations of hypotheses and expectations.

Chapter Three highlights the research design and methodology utilized in this research study. This chapter includes discussion of survey instrumentation, data collection, and sampling procedures. It also includes a section on internal and external validity and reliability associated with the study. Finally, the chapter concludes with a section on data analysis methodology.

Chapter Four presents the descriptive statistical findings of this research study. This chapter highlights the univariate statistics associated with each of the fourteen critical success factors, including frequency, distribution, and variance. Chapter Four also provides descriptive statistics on the demographic variables collected in the survey research, including age, educational attainment, employment sector, and organizational size.

Chapter Five presents the bivariate statistical analysis of the survey data. The first method employed to analyze the data is one-way analysis of variance. This method demonstrates the relationship between the ranking of critical success factors and the sector of a given CIO's employment. In addition, analysis of covariance is used to assess the difference in critical success factor rankings based on current sector of employment while controlling for previous employment. Chapter Six highlights the use of factor analysis to determine the presence of underlying constructs that may link specific critical success factors into groups.

Chapter Seven provides a summary of the findings and offers prescriptive recommendations for policy makers and future researchers. This research study attempts to examine the various critical success factors associated with technology project success, as well as ascertain differences in success factors between the public and private sectors. In addition, the review of the literature is offered as a primer for the reader to provide a foundation for understanding the research associated with critical success factors. Finally, this research effort seeks to improve the body of research surrounding critical success factors associated with information technology and offers insight into the unexplored area of sectoral differences in determining factor salience.

CHAPTER 2: REVIEW OF THE LITERATURE

The ability to more rigorously predict successful projects is critical in the wake of massive technology failures in both private and public settings. These failures, and the trepidation they cause, must be balanced with the new mandate, fostered in both public and private sectors, that organizations operate within new transparent and accessible structures, which are precipitated by information technology. These new structures require crosscutting services, which require improved communication and interaction across traditional organizational lines. These new requirements, which fundamentally alter the nature of the organization, are made possible through the strategic use of information technology. Fundamental changes in organizations are not easily achieved due to conflicting values, preferences, and objectives. Therefore, the identification and enactment of critical success factors associated with IT implementation becomes essential in order to mitigate the high failure rates commonly found in public and private sector IT initiatives (see Standish Group, 1995).

The fourteen hypotheses tested in this study are grounded in reviews of public and private sector literature. Due to the large volume of information concerning critical success factors in the private sector, the private sector CIO group is used as the baseline for testing variations in public sector CIO perceptions. The literature supporting the hypotheses is grounded in public administration, in order to most accurately predict the public sector's responses. It should also be noted that two sets of hypotheses have been postulated: one to assess critical success factors as they should be enacted according to the chief information officers (ideal ranking) and one to assess the critical success factors based on the current organizational atmosphere (actual organizational performance). Following the listing of all hypotheses, each individual hypothesis will be examined based on relevant literature and predictions of strength, direction, and effect of relationships will be offered.

The hypotheses are as follows:

H1a: Public sector CIOs will rate the importance of communication **should be** more important compared to private sector counterparts.

H1b: Public sector CIOs will rate the importance of communication **to be** less important in current organizations compared to private sector counterparts.

H2a: Both public and private sector CIOs will rate the importance of highly qualified technology staff **should be** high in organizations.

H2b: Public sector CIOs will rate the importance of highly qualified technology staff **to be** less important in current organizations compared to private sector counterparts.

H3a: Public sector CIOs will rate the importance of rewards systems **should be** lower in organizations compared to private sector counterparts.

H3b: Public sector CIOs will rate the importance of rewards systems **to be** lower in current organizations compared to private sector counterparts.

H4a: Both public and private sector CIOs will rate the importance of strategic planning for information technology **should be** high in organizations.

H4b: Public sector CIOs will rate the importance of strategic planning for information technology **to be** lower in current organizations compared to private sector counterparts.

H5a: Both public and private sector CIOs will rate the importance of end user involvement **should be** lower in organizations.

H5b: Public sector CIOs will rate the importance of end user involvement **to be** lower in current organizations compared to private sector counterparts.

H6a: Public sector CIOs will rate the importance of stakeholder involvement **should be** lower in current organizations compared to private sector counterparts.

H6b: Public sector CIOs will rate the importance of stakeholder involvement **to be** lower in current organizations compared to private sector counterparts.

H7a: Both public and private sector CIOs will rate the importance of project milestones **should be** higher in organizations.

H7b: Public sector CIOs will rate the importance of project milestones **to be** lower in current organizations compared to private sector counterparts.

H8a: Both public and private sector CIOs will rate the importance of top management support **should be** high in organizations.

H8b: Public sector CIOs will rate the importance of top management support **to be** lower in current organizations compared to private sector counterparts.

H9a: Public sector CIOs will rate the importance of political support **should be** higher in organizations compared to private sector counterparts.

H9b: Public sector CIOs will rate the importance of political support **to be** higher in current organizations compared to private sector counterparts.

H10a: Both public and private sector CIOs will rate the importance of prototyping and/or piloting support **should be** high in organizations.

H10b: Public sector CIOs will rate the importance of prototyping and/or piloting **to be** higher in current organizations compared to private sector counterparts.

H11a: Both public and private sector CIOs will rate the importance of the use of cross-functional (inter-agency) teams in the development of information technology projects **should be** higher in organizations.

H11b: Public sector CIOs will rate the importance of the use of cross-functional (inter-agency) teams in the development of information technology projects **to be** lower in current organizations compared to private sector counterparts.

H12a: Both public and private sector CIOs will rate the importance of training **should be** high in organizations.

H12b: Both public and private sector CIOs will rate the importance of training **to be** low in current organizations.

H13a: Both public and private sector CIOs will rate the importance of the CIO position in the organization **should be** high in organizations.

H13b: Public sector CIOs will rate the importance of the CIO position in the organization **to be** lower in current organizations than private sector counterparts.

H14a: Both public and private sector CIOs will rate the importance of financial resources **should be** high in organizations.

H14b: Public sector CIOs will rate the importance of financial resources **to be** lower in current organizations compared to private sector counterparts.

Each of the critical success factors will now be discussed in detail in order to theoretically justify the placement of the factor within the range of CSFs. The order of the discussion is based on the author's arrangement of the literature, and is not reflective of the perceived importance of the specific critical success factor.

Critical Success Factor 1: Communication

H1a: Public sector CIOs will rate the importance of communication **should be** more important compared to private sector counterparts.

H1b: Public sector CIOs will rate the importance of communication **to be** less important in current organizations compared to private sector counterparts.

Communication is often cited as a critical success factor in information technology initiatives. For the purposes of this book, this critical success factor is defined as open, shared information exchange across functional areas (horizontal communication) and hierarchical levels (vertical communication). Communication is the linkage between disparate groups and departments within public and private entities. Based on review of extant literature, communication is one of the most fundamental aspects of an information technology project. Communication provides the framework for many of the other critical success factors, such as strategic planning and top management support. In fact, Hartman and Ashrafi (2002) note that presence of a good communication plan is essential for technology project success.

Private sector organizations often invest significant resources in the development of communication plans to guide and encourage the open exchange of information (Al-Mashari, et al., 2003). The private sector embrace of knowledge management techniques further highlights the importance of communication as a critical success factor for technology projects. As noted by Davenport and Prusak (1998), the water cooler conversations and coffee room exchanges are critical for the exchange of information and ideas. This realization has led private sector organizations to offer employees more time to converse in order to facilitate the communication patterns that are essential to technology project success.

Even the largest corporations, with various functional areas, recognize the importance of communication between the departments. If sales and production do not communicate, then serious issues with meeting customer demand may arise. The culture of the private sector, with its focus on bottom-line profit, is favorable to communication in order to ensure that the greatest profit can be attained. Clearly, the use of communication plans and organization-sponsored space for exchanges, among other mechanisms, indicates the private sector's recognition of communication as a critical success factor.

Conversely, the requisite shared communication is less pronounced in the public sector due to its historical "stovepipe" structure. The structure of the public sector is grounded in the ideal of Weberian bureaucracy, which established the ideal type of both public and private organizations. This traditional bureaucratic model of public service delivery focuses on specialization, departmentalization, and standardization (Ho, 2002). The Weberian model has created departmental "silos" that resist functioning across agency boundaries, in the name of equitable and efficient governmental interactions. In the 1990s, however, the "reinventing government" movement sought to shift the core focus of government, moving from departmentalization and centralization to citizen-centric decentralization (Osborne and Gaebler, 1992). This movement was grounded in the belief that the market economy would make government more efficient and effective. Some of the components of the reinventing movement are still being implemented at the federal level, particularly the increased reliance on information technology to provide a new venue for access and service. However, the issues of turf, hierarchy, and specialization have not evaporated and must be addressed in the design of public information technology systems.

The main concerns of public sector information technology focus not only on the electronic dissemination of public information arising from traditional agency functions, but also on reinventing agency processes to fully exploit the potential of information technology. As Fountain (2001) has noted, the reinvention process requires overcoming the rigidities and limits of traditional bureaucratic forms. Specific objectives may include the centralization of public data and the improvement of internal processes and communications (Alexander and Grubbs, 1998). Furthermore, in order to increase the reach of electronic delivery of governmental services and information, new technologies also require the integration of government networks and databases to allow for cross-agency communication and interaction (Moon, 2002). Again, the turf issues and the lack of communication associated with the cultural context of government may preclude some of these efforts from reaching maturation. Finally, the issue of "client" versus "customer" emerges, as often noted in public and private sector comparisons. In the private sector, communication with "customers," who are a specified, readily identifiable group, is more easily achieved due to ease of access and increased incentives to foster communication. Conversely, the public sector must communicate with "clients," who are widespread and in some instances include all citizens in the jurisdiction. This communication is more tenuous due to the lack of ease in implementation, as well as the lack of incentive to engage in such time-consuming behavior. Communication is a critical success factor in the deployment of strategic information technologies.

Expectations:

1. Public sector CIOs will rate the importance of communication should be more important compared to ratings by private sector counterparts.
2. Public sector CIOs will rate the importance of communication to be less important in current organizations compared to ratings by private sector counterparts.

Critical Success Factor 2: Highly qualified technology staff

H2a: Both public and private sector CIOs will rate the importance of highly qualified technology staff **should be** high in organizations.

H2b: Public sector CIOs will rate the importance of highly qualified technology staff **to be** less important in current organizations compared to private sector counterparts.

Highly qualified technology staff is another critical success factor. Often this factor is assumed in the private sector literature. However, the public sector literature repeatedly notes the problems associated with untrained and poorly skilled technology staff. In fact, a survey of local government information technology managers reveals that many technology staff, particularly Web masters, are administrative staff who have been promoted (Schelin, 2003). Furthermore, the 2002 ICMA E-Government survey indicates that lack of technology/Web staff and expertise are two of the leading challenges to successful e-government implementation. The importance of high quality technology staff cannot be overlooked when assessing those factors that contribute to the success or failure of technology projects. Various public and private sector scholars have noted the importance of highly qualified technology staff on project success.

According to Norris (2003), the importance of "well-trained, capable technical personnel" cannot be understated when assessing critical success factors. By having technical personnel to provide assistance with planning and implementation, as well as to assist in end user support, information technology projects will face lower hurdles from the onset. Throughout the literature, the staff is continuously mentioned, and its skill set duly noted (see Hartman and Ashrafi, 2002). However, much of the literature assumes the proficiency of the staff to be of highest caliber. In one instance, Kakati (2003) notes the importance of staff competence in the success of venture teams. Furthermore, Poon and Wagner (2001) rate appropriate technology staff as one of the ten most critical success factors for technology projects. These findings confirm the role of highly qualified technology staff as a critical success factor; however, the widespread acceptance of the superiority of technology staff among the private sector literature indicates that staff competency will be rated higher by the private sector CIOs because of its ubiquitous nature.

On the other hand, as noted by Relyea (2001), the public sector often faces funding issues that limit the ability to recruit and retain skilled information technology professionals. Although skilled personnel are critical, the public sector often promotes individuals to technology positions from within the organization because of the funding constraints. For example, the International City and County Management Association (ICMA) conducted an e-government survey in 2002, which assessed the changes associated with the implementation of new technologies. Many jurisdictions noted that changed role of staff was one of the most common changes emanating from technology adoption (ICMA, 2002). In a follow-up survey, conducted by the author, with selected local governments who identified the changed role of staff as a change, the most common types of changed roles for staff include task expansion and task reorientation. Specific examples offered by local governments of task expansion include answering emails at a higher rate than previous channels of communication, such as face-to-face contact or telephone contact. Examples of task reorientation include changing employee positions from education and training to web masters. By promoting internal staff to the new positions mandated by technology, the public sector does not obtain the same caliber of technology-savvy employees as might be found in the private sector. Clearly, if internal promotion is the most common method of gaining technology staff, it is imperative for public administrators to gain training in fundamental technology.

Basic technology literacy is critical to information technology success, particularly in the public sector, which often lacks the resources for well-trained technical staff. The importance of technology training for public administrators is highlighted by the studies and publications dealing with the topic; however, the primary focus of available literature is on the integration of technology training into collegiate public administration programs. The focus on information technology in schools of public administration began in 1988, when the National Association of Schools of Public Affairs and Administration (NASPAA) added computing as a skill set for accredited Masters of Public Administration (MPA) programs (Northrop, 2002). In 1993, Perry and Kraemer advocated new educational practices to educate public sector employees on understanding and implementing information technology. In 1998, Brown and Brudney completed a comprehensive examination of 106 MPA programs to determine program efficacy in meeting the NASPAA requirements related to information technology education. They found that only about thirty percent of the schools included in the sample offered instruction on technology planning, policy development, and evaluation, despite the NASPAA recommendation to include these in the curriculum (Brown and Brudney, 1998). The literature, particularly Brown and Brudney, indicates that the critical success factor, highly qualified technology staff, may be less common in public sector organizations. However, the recent economic downturn has afforded the public sector with the ability to hire highly skilled technology staff at lower salaries than was previously possible during the dot-com boom. Therefore, the importance of highly qualified staff may be gaining importance in the public sector as it becomes more plausible to afford such a staff.

Expectations:

1. Both public and private sector CIOs will rate the importance of highly qualified technology staff should be high in organizations.
2. Public sector CIOs will rate the importance of highly qualified technology staff to be less important in current organizations compared to ratings by private sector counterparts.

Critical Success Factor 3: Use of reward system

H3a: Public sector CIOs will rate the importance of rewards systems **should be** lower in organizations compared to private sector counterparts.

H3b: Public sector CIOs will rate the importance of rewards systems **to be** lower in current organizations compared to private sector counterparts.

The use of reward systems is another critical success factor. The majority of the literature pertaining to reward systems is found in the private sector. Milis and Mercken (2002) note that appropriate implementation of reward systems can enhance technology project viability by creating defined goals, as well as by fostering teamwork in order to reap the benefits. In the public sector, the use of rewards emerged as an issue during the "reinventing government" movement, in an attempt to replicate successful private sector practices. The reality of the situation is that little has been done to encourage rewards in the public sector due to historical and culture contexts as well as budgetary constraints. Nonetheless, rewards have repeatedly been cited as a mechanism for improving the likelihood of technology project success and therefore reward systems are considered to be a critical success factor.

The importance of performance measures, and requisite rewards, has been the focus of much public and private sector research in the past decade. As projects move through their lifecycles, it is critical to celebrate the accomplishment of milestones in tangible ways. In the private sector, these rewards are often monetary in nature. According to Milis and Mercken (2002), the issue of rewards is two-fold for successful organizations. First, the organization must establish clear criteria for judging success, i.e. performance measures. These measures must be commonly defined and understood. Second, the evaluation of the project successes/milestones must involve a reward mechanism that is established at the onset of the project. By combining the performance measures and rewards, the organization can encourage successful technology project implementation.

Similar themes concerning performance measurement and rewards are found throughout private sector critical success factor literature. Often, these issues are rolled under the heading of project management but they actually require external commitment to reward provision. For example, Umble et al. (2003) note the failure of performance measures as incentives if they are not tied to compensation or rewards. If the project team will receive a two percent raise regardless of their effort, then the performance measures are meaningless. However, in the private sector, the compensation system is often closely linked to performance; therefore, the private sector will have stronger commitment to the use of rewards as a critical success factor for technology projects.

The public sector offers a vastly different approach to rewards, primarily because of its history and culture. Historically, the use of a reward system in the public sector has been seen as corrupt and inappropriate. According to Leonard White (1929),

> "the spoils system has prevailed where the party essentially controls the original appointment, but it also may equally control the whole official life of the public employee (42). Unfortunately, the appointee may not have any competence for the position and this may be disastrous for they have little interest in their official duties, have no incentive to perfect themselves, are difficult to control, and the discipline of the whole office suffers. Public confidence is destroyed. In short, sound administration, efficiency of even a rudimentary sort, falls before the ungoverned greed of the party for positions (43)."

The patronage and spoils system that characterized the US political system during the mid-1800s led to the enactment of the 1883 Pendleton Act. The Pendleton Act established a merit system in which federal employees are hired based on qualifications and competitive exam scores. The overarching goals of the Pendleton Act, to maintain neutral competence among administrators and to reduce corruption within the bureaucracy, have certainly been attained. However, the connotation associated with bureaucratic rewards hearkens back to the spoils system and rarely finds public or administrative support. Beyond the use of the merit system and the negative connotation of rewards in the public sector, there is also the issue of limited financial resources. The public sector has faced serious fiscal crisis in recent years and cannot afford increased monetary compensation in order to encourage innovation in government.

Another facet of the lack of a reward structure is due to the structure of the organization. Fountain (2001) argues that the bureaucratic structure of government, with its focus on specialization and hierarchy, contributes to stovepipe agencies. This stovepipe design, a formal institutional structure, is a disincentive to collaboration and sharing of information, resources, and staff, which is mandated by technology usage (Fountain, 2001). Similarly, the appropriate rewards structure cannot be enacted because the institution of government does not support the behaviors associated with technological advancement. Furthermore, Fountain (2001) argues that information technology adoption can actually be a detriment to governments. As efficiency gains are realized with the implementation of new technologies, governments may see a reduction in legislative appropriations. This possibility often leads to a lack of technology adoption because the rewards system may actually punish innovation in the public sector.

Clearly, the current public sector structure does not reinforce technology adoption through the use of a formalized reward structure. However, various intergovernmental advisory councils, including the Industry Advisory Council E-Government Shared Interest Group and the Harvard Policy Group, promote the use of rewards as a means of furthering the adoption and innovation of public information technology.

Expectations:

1. Public sector CIOs will rate the importance of rewards systems should be lower in organizations compared to ratings by private sector counterparts.
2. Public sector CIOs will rate the importance of rewards systems to be lower in current organizations compared to ratings by private sector counterparts.

Critical Success Factor 4: Strategic technology planning

H4a: Both public and private sector CIOs will rate the importance of strategic planning for information technology **should be** high in organizations.

H4b: Public sector CIOs will rate the importance of strategic planning for information technology **to be** lower in current organizations compared to private sector counterparts.

Strategic planning for technology is another critical component to successful technology project design and implementation. The holistic, long-range thinking that accompanies strategic planning allows the technology staff to connect to the broader organizational mission, as well as to establish a commitment from upper management. In fact, Al-Mashari, et al (2003) place visioning and planning at the forefront of critical success factors for the private sector. In the public sector, the Paperwork Reduction Act of 1995 mandated strategic planning for public sector information technology projects. It is evident that strategic planning is important on both the private and public sector fronts. Accordingly, it is included as a critical success factor in this study.

Strategic planning for technology requires enterprise-based, holistic thinking. Hartman and Ashrafi (2002) note that the holistic approach to technology is critical for project success. The strategic planning process allows for organizations to identify areas where technology can provide strategic advantage, as well as highlight areas where process improvements and efficiency gains can occur. It also allows for organizations to engage in enterprise-wide technology deployment in order to capitalize on economies of scale and other benefits of interoperability. Another facet of strategic planning is goal alignment between the overall organizational strategy and the technology strategy. This area is repeatedly noted as critical to technology project success and longevity (see Al-Mashari, et al., 2003; Ang, et al., 2002; and, Hartman and Ashrafi, 2002). Strategic planning, and all of its facets, has long been a part of the private sector repertoire and, therefore, will be considered essential to project success.

The public sector has adopted various techniques and practices from the private sector, including strategic planning. However, due to the brevity of elected officials' tenure and the focus on immediate action stemming from political demands, strategic planning has often been undertaken but not implemented. As such, public sector employees have a negative view of this time-consuming process that rarely results in change.

According to the 1995 Paperwork Reduction Act, strategic planning for information technology is federally mandated. However, Fletcher (2003) notes that the mandate is largely in name only. She highlights several points of failure including a lack of unity in government, the requirement of multi-tiered planning, which requires cross-functional communication and collaboration, a lack of financial support, and limited performance measures as reasons for the lack of authentic strategic technology planning in the public sector (Fletcher, 2003).

Beaumaster (1999), in her assessment of small and medium size local governments, found that strategic IT planning was virtually nonexistent. Among 58 jurisdictions, only five local governments had formalized strategic planning (Beaumaster, 1999). Accordingly, she recommends that formal technology planning become institutionalized in local governments in order to improve overall technology project success. The findings of Fletcher and Beaumaster support the hypothesis that public sector CIOs will rate strategic planning lower than their private sector counterparts.

However, recent efforts by the Office of Management and Budget and the General Accounting Office indicate that strategic planning is becoming more central to public sector technology planning and funding. In fact, recent initiatives, such as the Business Reference Model and Performance Reference Model, offered by the Federal Enterprise Architecture Project Management Office at the Office of Management and Budget, essentially require strategic planning that involves cross-agency coordination and cooperation and results in integrated and interoperable systems. As the push toward citizen-centric e-government moves forward, strategic planning for technology will become more important to the public sector. It will be fundamental in order to facilitate the large-scale integration and interoperability envisioned by e-government champions.

Expectations:

1. Both public and private sector CIOs will rate the importance of strategic planning for information technology should be high in organizations.
2. Public sector CIOs will rate the importance of strategic planning for information technology to be lower in current organizations compared to ratings by private sector counterparts.

Critical Success Factor 5: End user involvement

H5a: Both public and private sector CIOs will rate the importance of end user involvement **should be** lower in organizations.

H5b: Public sector CIOs will rate the importance of end user involvement **to be** lower in current organizations compared to private sector counterparts.

End user involvement is another critical success factor in information technology implementation. In order to increase the support for and use of new technology applications, the end users must be involved from the onset of the project, in order to determine requirements and establish realistic but aggressive time frames. Both public and private sector literature highlights the importance of end user involvement because it establishes a sense of ownership in the project and engenders future support and usage. Furthermore, without user involvement, technology projects can fail due to misaligned goals, incorrect requirements, and employee resistance to change.

End user involvement from the onset of the project is critical because such involvement increases support for and use of new technology applications. Research has demonstrated that by involving the users at the beginning, they are more likely to feel a sense of ownership for the project and are more likely to implement it. End users are also critical in helping to determine the requirements, scope, and time frame for the application.

One of the most basic measures for project success is the actual use of the new technology. Engaging end users in the requirements, design, and testing phases of the project, can increase end user support for and commitment to the technology. As noted by King (1995), poorly specified requirements are one of the most common reasons for technology project failure. This issue may be easily remedied by the involvement of the end users. Based on the heightened importance of collaboration and communication in the private sector, in order to achieve the goal of largest profit, the role of the end user is also elevated. Milis and Mercken (2002) offer a private sector model that encourages end user involvement as a mechanism for managing change, both within the project and as a result of the project. Finally, Poon and Wagner (2001) feature end user involvement as a method to managing organizational resistance to new technology implementation. Clearly, end user involvement is critical to the overall success of a technology project. It is also evident, based on the literature review, that the private sector has made a more concentrated effort to engage end users in order to facilitate change and acceptance, as well as to properly specify projects. The end user view from the public sector is quite different.

Laudon and Laudon (1996) note that end users in the public sector are often excluded from the definition of information technology system requirements, which leads to significant problems downstream in the technology implementation process. There are several reasons why the end users are less engaged in the public sector, including political, cultural, and convenience issues.

There are two major political reasons users are less involved in the public sector. First, the lack of defined customers/clients in the public sector creates competing streams of interest, which translates into conflict among users. According to Bozeman and Bretschneider (1986), the market failures of the public sector, i.e. lack of defined customer, make the implementation and management of public information technology even more difficult. Due to the lack of a common goal, such as the profit in the private sector, the end users in the public sector often seek technologies that will further the specific interests of their department or agency in lieu of a technology that will enhance the enterprise. Due to this competition and "agency" perspective, involvement of end users in the public sector is often viewed as onerous and difficult to navigate. Therefore, the public sector technology staff often choose not to involve end users. In fact, Fountain (2002) argues that the end users with the greatest political clout, i.e. powerful departments, will have new technology applications deployed in their best interests prior to the deployment of applications for other user groups. She follows the argument of Olson (1965) on the role of interest groups in the policy process by arguing that the organized are serviced to the exclusion of other groups.

Other research indicates that user involvement is critical to public information technology systems, even though it is often overlooked. Specifically, case studies from the Center for Technology in Government (2000) focus on the use of participatory design in technology projects in order to ensure end user buy-in and support. The Harvard Policy Group also notes the importance of involving end users in operationalizing the objectives of the technology project (2001). Finally, Rocheleau (1993) notes that the resistance to technology adoption can be mitigate by end user involvement in all stages of the technology project. It is evident that end user involvement is vitally important to public sector information technology projects; however, the myriad conflicts and competing actors create an environment that is inhospitable to end user involvement. As such, the literature, while touting the importance of participatory design, appears to indicate that it is not as widespread in the public sector technology arena.

Expectations:

1. Both public and private sector CIOs will rate the importance of end user involvement should be lower in organizations.
2. Public sector CIOs will rate the importance of end user involvement to be lower in current organizations compared to ratings by private sector counterparts.

Critical Success Factor 6: Stakeholder involvement

H6a: Public sector CIOs will rate the importance of stakeholder involvement **should be** lower in current organizations compared to private sector counterparts.

H6b: Public sector CIOs will rate the importance of stakeholder involvement **to be** lower in current organizations compared to private sector counterparts.

Stakeholder involvement is one of the most frequently cited critical success factors. It is essential for garnering organization-wide project support beyond the role of end user involvement (Ang, et al., 2002). Furthermore, stakeholder involvement, coupled with end user involvement, ensures the needs of internal and external recipients are being met through adequate representation during the planning and testing phases. By involving stakeholders in technology projects, a new level of complexity is introduced. This complexity is essential because it forces the technology project team to assess various individual and group interests, as well as competing alternatives, in order to identify the solution that best addresses the requirements and desires of the stakeholders. By including stakeholder involvement as a critical success factor, CIOs can foster external and internal project support, as well as ensure that projects will be designed with attention to alternatives.

Hartman and Ashrafi (2002) also highlight the critical necessity of involving stakeholders in technology projects. In order to incorporate stakeholders in technology projects, one must first identify the group, and then solicit participation. Due to the relatively narrow scope of most private sector organizations, the definition of a stakeholder is rather straightforward—anyone who contributes to or benefits from a given product. The group of stakeholders for the private sector is easier to access, and their willingness to participate is greater, given direct benefits. It is important to note that, for the purposes of this hypothesis, stakeholders do not include end users. Rather, they are composed of external interests that benefit from the introduction of a new technology. Furthermore, the history and culture of the private sector is grounded in stakeholder/customer satisfaction, which further enhance the private sector's ability to engage the stakeholders. Accordingly, the private sector will rate stakeholder involvement as more critical to project success than their public sector counterparts.

Although stakeholder involvement is critical to the success of information technology initiatives, the various opposing stakeholders in the public sector will create a negative perception among the public sector CIOs with respect to this factor. In fact, the role of the various stakeholders in the public sector is not a new concept, with significant research by Kingdon (1984) and others dedicated to understanding the rise of specific issues in the world of competing, complex interests. However, other public administration and political science theorists have used the role of stakeholders to ascertain the most salient matters and alternatives. Essentially, the stakeholders provide checks and balances to organizational ideas by offering competing alternatives and specifying the issues that are most critical. In the realm of information technology, the goal is similar but it also must facilitate stakeholder buy-in as a means of facilitating adoption and usage.

According to Reed (2001), the variety of stakeholder groups in the public sector makes it difficult to include an appropriate subsection and still maintain order and focus on the task at hand, namely the information technology project. Similarly, Brown (2003) has noted the relative paucity of research concerning stakeholder involvement in public sector information technology projects. In her work, Brown has found that although stakeholders are critical to the success of projects according to state CIOs, they are not actively engaged in the decision making processes surrounding the IT projects (Brown, 2003). Furthermore, the conflict and complexity of stakeholder engagement lead to reduced engagement on the part of the public sector CIOs. The works of Brown and Reed support the hypothesis that stakeholder involvement will be less important according to public sector CIOs. The idea that defining stakeholders is too complex for the public sector does not mean that governments should disregard this critical success factor. In fact, many e-government award winners have successfully managed to define the specific stakeholders within the framework of a given project, and therefore reduce the complexity of stakeholder definition and incorporation.

Expectations:

1. Public sector CIOs will rate the importance of stakeholder involvement should be lower in current organizations compared to ratings by private sector counterparts.
2. Public sector CIOs will rate the importance of stakeholder involvement to be lower in current organizations compared to ratings by private sector counterparts.

Critical Success Factor 7: Defined, achievable project milestones

H7a: Both public and private sector CIOs will rate the importance of project milestones **should be** higher in organizations.

H7b: Public sector CIOs will rate the importance of project milestones **to be** lower in current organizations compared to private sector counterparts.

Realistic goals and expectations, articulated as ***project milestones***, are critical to the successful adoption of information technology. By realizing that technology is not a panacea, project teams can develop realistic, workable goals. It is critical to have small, realistic goals and expectations in order to foster confidence in the new technology and to provide for morale-boosting achievements associated with the new application. Without project milestones, technology applications can become overwhelming and burdensome to employees. Additionally, milestones provide the opportunity to assess the work to date, make corrections if needed, and also provide small victories for successes achieved by the project staff.

Clarke (1999) highlights the importance of milestone usage with his recommendation to divide large projects into small, attainable pieces. By using milestones, a large project becomes a series of small project with built-in rewards and recovery periods. The private sector has long subscribed to using milestones to divide projects, most notably through project management methodologies. Project milestones also are critical checkpoints to indicate system problems and to ensure appropriate communication (Al-Mashari, et al., 2003). The private sector literature pays significant attention to the use of milestones because of their critical importance in identifying potential points of failure; therefore the private sector will rate project milestones as more important to project success than will the public sector.

Regardless of the importance of milestones, they are rarely used in the public sector for a variety of reasons. First, the lack of profit as the final measurable outcome, combined with externally mandated goals, leads to less defined, achievable project milestones in the public sector (Bozeman and Bretschneider, 1986). Although public information technology projects are designed to meet all of the promises of technology adoption, including efficiency and effectiveness gains, cost savings, and increased satisfaction rates, the lack of the bottom line typically leads to unmeasured outcomes (Fletcher, 2003). Furthermore, the measuring of outcomes, such as efficiency gains, may translate into reduced appropriations in future budget cycles, which is a detriment to measuring and quantifying milestones.

Another reason for the lack of specified milestones is the short planning timeframe of the public sector, primarily due to the tenure of elected officials. This short timeframe reduced the focus on performance measures and modular advances, such as those advocated by the Harvard Policy Group (2001). In addition, the historical focus on the public sector has centered on qualitative measures, such as client satisfaction, which has lead to less use of project milestones. However, through the recent adoption of performance measurement, previously qualitative measures can be quantified and measured, which enables future milestones to be developed (Swiss, 2003). Accordingly, although project milestones may become mainstream based on new methods of accountability, currently the use of milestones may be less prominent in the public sector with regard to its information technology projects.

Expectations:

1. Both public and private sector CIOs will rate the importance of project milestones should be higher in organizations.
2. Public sector CIOs will rate the importance of project milestones to be lower in current organizations compared to ratings by private sector counterparts.

Critical Success Factor 8: Top management support

H8a: Both public and private sector CIOs will rate the importance of top management support **should be** high in organizations.

H8b: Public sector CIOs will rate the importance of top management support **to be** lower in current organizations compared to private sector counterparts.

Top management support is one of the most crucial factors to successful adoption of technology. Almost without exception, the literature on critical success factors places top management support at the pinnacle of project success. Top management support is essential for fostering end user adoption of new technologies. This form of support is critical because it forces employees to engage in innovation and change, instead of simply maintaining status quo. Top management support is the preeminent critical success factor, according to the extant literature review. Accordingly, it is included in this study for assessment.

In order to encourage end user adoption of new technologies, there must be demonstrated commitment to the technology in the upper echelons of the organization. Although the support does not have to germinate from the offices of the CEO, it is imperative that the employees perceive managerial backing for the technology. Without executive level support, there is little incentive for the employees to change their current operating procedures and learn new technologies. Those already working in a comfort zone rarely enjoy the paradigm shift and learning curve that accompanies new IT applications. One of the easiest ways to engender support and use of new technology is to provide management support, and its associated incentives, to the project. Without executive level support, the new technology is less likely to be adopted because of the lack of incentive and enforcement.

The private sector literature overflows with top management support recommendations. Al-Mashari, et al., (2003) note the importance and centrality of top management support to successful ERP implementation. The role of top management extends into all other critical success factors, particularly setting the strategic plan, goal alignment, and adequate resource provision. Ang, et al. (2002) also note the importance of top management support, observing that it provides the framework and structure for project adoption and success. Finally, Milis and Mercken (2002) have synthesized the private sector literature on top management support and find that, not only is it essential, but varying degrees of adoption can have significantly different impacts. For example, top management should have sufficient knowledge in order to make high-level decisions. However, too much knowledge can lead to excessive involvement, which can hinder the project team in its decision-making and implementation.

The private sector has significantly invested in this factor, through the placement of CIOs in the management team, as well as commitment of the leadership to technology innovation. Accordingly, it is expected that the private sector will rate top management support as more important than will the public sector.

Top management support is problematic in the public sector due to the removed nature of the chief administrative officer and the elected officials in most government structures, as well as the reinforced autonomy of bureaucrats. According to Caudle, Gorr, and Newcomer (1991), the real influence and thrust for technological adoption in the public sector comes from middle management, compared to the private sector support generated from top management. Fletcher (2003) notes that the CIO is rather removed in the agency or department hierarchy, with several layers separating cabinet heads from the chief proponent of technology. This lack of senior executive authority is also noted as a hindrance to top management support in GAO reports on how to maximize the success of public sector CIOs (GAO, 2001). Regardless of the critical need for top management support of IT projects in the public sector, due to the need to manage trade-offs, it is still limited at best (Swiss, 2003). As noted by Norris (2003), one of the main facilitating factors in technology adoption and innovation is the support of top officials. Top management support is critical to the success of public technology projects. However, the structure of government is not conducive to fostering this necessary support.

Expectations:

1. Both public and private sector CIOs will rate the importance of top management support should be higher in organizations.
2. Public sector CIOs will rate the importance of top management support to be lower in current organizations compared to ratings by private sector counterparts.

Critical Success Factor 9: Political support

H9a: Public sector CIOs will rate the importance of political support **should be** higher in organizations compared to private sector counterparts.

H9b: Public sector CIOs will rate the importance of political support **to be** higher in current organizations compared to private sector counterparts.

Political support (by elected officials or boards of directors) is critical to the success of information technology projects. Based on the literature review, there is little mention of political support within the private sector. Perhaps this is a function of the importance of management support, and relative power, compared to the board. However, the public sector literature repeatedly highlights the importance of political support to technology projects. Again, this difference may be stem from power distributions within the public sector. Regardless, political support is essential for technology projects, primarily because political resistance can quickly disable such projects.

Although board of director support is important in the private sector, there is little supporting literature to place it among the major critical success factors for technology projects. Conversely, the public sector literature frequently mentions political support.

Perhaps the very core of the sectoral differences, in terms of authentic power and authority, imposes this difference. In the private sector, top management support is critical to the success of a technology project, due to the power and financial responsibility of the CEO. However, in the public sector, the elected officials maintain the fiduciary responsibility for the government unit. Accordingly, the importance of political support for technology projects is more salient in the public sector. However, the lone mention of political support in the review of the private sector literature noted that political resistance might fundamentally undermine the technology project, based on perceived power shifts (Poon and Wagner, 2001). This concern is quite common and is often cited as a reason for avoiding new technologies. Regardless, the public sector has more involvement with political actors and, accordingly, will rank this critical success factor as more important than their private sector counterparts.

The unique political constraints imposed by elected officials, the majority seeking re-election and therefore needing demonstrated action and successes for their campaigns, increases their importance in the public sector. In a case study of the Boston Police Department, Dale Nesbary (2001) has identified the importance of political support for new information technology systems. His work demonstrates how the political acumen of police commissioners can translate into real dollar support for technology initiatives (Nesbary, 2001). The Boston Police Department computer-aided dispatch system was acquired based on a combination of political support and administrative awareness that is less important in the private sector.

Furthermore, according to the 2002 Pew Internet and American Life Project, Americans continue to use the Internet to access government information, research policy issues, contact elected officials, and participate in e-democracy in increasing numbers (Larson and Rainie, 2002). The number of Americans who have accessed government information online was 68 million in January 2002, compared with 40 million in March 2000. This marked increase further supports the idea that citizen demand for and use of public technology will continue to expand in the future. Accordingly, political support continues to increase along with public perception. Evidence of this increasing interest is found in the 2000 Presidential election, in which both the Republican and Democratic candidates ran on e-government platforms.

Further evidence of the elected officials' commitment to public information technology is found in the legislative mandates of the past decade. According to Holmes (2001), political support is a requirement for e-government to succeed. The proliferation of legislation concerning technology in the past ten years is evidence of political commitment.

One of the first comprehensive visions of e-government is found in the 1993 National Performance Review report, *Creating a Government that Works Better and Costs Less: Reengineering Through Information Technology* (Gore, 1993; Kim and Wolff, 1994). This report laid the groundwork for new customer- and client-oriented ways for agencies to engage citizens via technology, involving both improved agency processes and improved methods of delivery.

The 1995 amendment of the 1980 Paperwork Reduction Act (PRA) was another important milestone in the history of e-government. This amendment offered specific policies on issues associated with managing electronic information, including the establishment of standards, mandates for cross-agency information technology initiatives, and technology investment guidelines (Relyea, 2001). By outlining guidelines for information technology, the amended PRA solidified the government's commitment to improving citizen services via new channels based on technology. In essence, the PRA established baseline critical success factors for public sector information technology projects. Several other national acts focusing on information technology and e-government followed the PRA, including the Electronic Freedom of Information Act Amendment of 1996.

The 1996 Clinger-Cohen Act further heightened the role of information technology in government. It established a chief information officer (CIO) in every agency, making agencies responsible for developing an IT plan. Later, when e-government became a priority, the existence of the CIO strategic planning structure was an important element facilitating e-government implementation at the federal level.

Also in 1996, Congress passed the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA). This act, also known as welfare reform, represented one of the first national pushes to incorporate the rhetoric of e-government with the routine services of agencies, specifically the administration of Temporary Aid to Needy Families (TANF). The act required interagency, interstate, and intergovernmental coordination of information technology systems to ensure that no individual exceeded the allotted five-year lifetime cap on assistance (Scavo and Shi, 2000). The failures associated with the PRWORA in terms of technology have been duly noted and offer a warning to technology proponents about the harsh realities of creating interoperable, cross-platform systems.

In July 1996, President Clinton issued Executive Order 13011, which sought to improve management of information technology at the federal level. It also provided broad support for coordinated approaches to technology application in the Executive Office (Relyea, 2001). Although this executive order mandated implementation of and adherence to the PRA Act and the Clinger-Cohen Act, it also focused on the alignment of technology goals with strategic organizational goals. The support for interagency coordination of technology is codified in Executive Order 13011. Mandated goal alignment and technology investment reviews are included in the directive as a method for reducing the failure rates and cost over-runs associated with federal technology initiatives.

The Electronic Government Act of 2002 was passed by Congress November 15, 2002, and signed by the President on December 16, 2002. The Act promotes e-government in all federal agencies and establishes an Office of Electronic Government within the Office of Management and Budget. Beyond the establishment of the E-Government Office, the Electronic Government Act requires regulatory agencies to publish all proposed rules on the Internet and to accept public comments via e-mail, among numerous other provisions. To further solidify the importance of e-government at the federal level, the Act provides $45 million for e-government projects in the 2003 and $345 million over the next five years.

Political support for public technology initiatives is critical to their success. Similarly, as the public perception of public technology improves and demand for Web-based services and information increases, the elected officials are increasingly engaged in the technology projects. The literature demonstrates support for the importance of political support in public sector information technology.

Expectations:

1. Public sector CIOs will rate the importance of political support should be higher in organizations compared to ratings by private sector counterparts.
2. Public sector CIOs will rate the importance of political support to be higher in current organizations compared to ratings by private sector counterparts.

Critical Success Factor 10: Prototyping and/or piloting

H10a: Both public and private sector CIOs will rate the importance of prototyping and/or piloting support **should be** high in organizations.

H10b: Public sector CIOs will rate the importance of prototyping and/or piloting **to be** higher in current organizations compared to private sector counterparts.

Prototyping and/or piloting are main tenets of project management methodologies. The use of these techniques can significantly reduce change orders and user dissatisfaction once full implementation has occurred. In the private sector literature, these methods are often categorized under the heading of project management. The use of prototyping creates a sense of ownership among end users, and also requires their involvement. The prototyping phase is also critical for refining functionality and user requirements. The piloting process should be used to demonstrate the success of a given project initially and then its scalability and applicability to varying constraints. The piloting approach also allows for rapid expansion of the project. The use of prototyping and/or piloting can significantly reduce organizational resistance to new technologies as well as identify and correct system problems prior to full implementation (Hong and Kim, 2002). Therefore, prototyping and/or piloting techniques are included as critical success factors for technology projects.

Although prototyping and piloting are critical, mention of these concepts is often omitted from existing literature on critical success factors (see Al-Mashari, et al., 2003; Ang, et al., 2002). However, proper implementation methods such as prototyping and piloting can have significant impact of the success of a project. The use of prototyping creates a sense of ownership among end users, and also requires their involvement. The piloting approach also allows for rapid expansion of the project. These pieces are critical to the overall likelihood of project success but are often overlooked in the competitive private sector. Expanding the issue of competition, the role of "first to market" has significant financial benefits when a project deployment is successful. However, the multitude of project failures is sufficient evidence for the necessity of prototyping and/or piloting.

According to Rocheleau (2000), the use of piloting and/or prototyping can significantly reduce implementation and adoption problems for public sector technology projects. In addition, Bozeman and Bretschneider (1986) noted that public sector information systems require a long period of testing and prototyping due to the very public nature of large IT failures. Recent large-scale failures, including such public events as the space shuttle disasters and the failures of various Child Support Enforcement Act technologies has renewed interest in prototyping and piloting.

Northrop (2002), in her development of best practices from the field, notes that applications should only be introduced after good testing periods in order to reduce chances of system failure. The repeated theme in the public sector literature is that the nature of public technology failures is newsworthy and as such, prototyping and/or piloting should be used in order to reduce the likelihood of failure. Finally, as noted by Kraemer and Dedrick (1997), the competitive environment of the private sector makes protracted periods of testing and piloting undesirable, which is less of an issue in the public sector.

Expectations:

1. Both public and private sector CIOs will rate the importance of prototyping and/or piloting support should be higher in organizations.
2. Public sector CIOs will rate the importance of prototyping and/or piloting to be higher in current organizations compared to ratings by private sector counterparts.

Critical Success Factor 11: Cross-functional teams

H11a: Both public and private sector CIOs will rate the importance of the use of cross-functional (inter-agency) teams in the development of information technology projects **should be** higher in organizations.

H11b: Public sector CIOs will rate the importance of the use of cross-functional (inter-agency) teams in the development of information technology projects **to be** lower in current organizations compared to private sector counterparts.

The use of cross-functional teams is one of the emerging trends in the technology world. The selection of the proper project team is critical to the overall success of a technology project. These teams incorporate individuals from various departments within an organization for a variety of reasons. According to Powers and Dickson (1973), the employment of people who understand the various facets of a given organization is essential to appropriate project definition, which sets the framework for the rest of the project success. Furthermore, Milis and Mercken (2002) note the need for team members with complementary skill sets, in order to foster "a sum that is greater than its parts." Finally, Teo and Ang (1999) further solidify the importance of cross-functional teams in their discussion of business and technology goal alignment. In essence, the technology staff and the business staff must collaborate on technology projects in order to create value-added outcomes for the organization.

The selection of the proper project team is critical to the overall success of a technology project. One of the emerging trends in the technology world is the use of cross-functional teams. These teams incorporate individuals from various departments within an organization for a variety of reasons. According to Powers and Dickson (1973), the employment of people who understand the various facets of a given organization is essential to appropriate project definition, which sets the framework for the rest of the project success.

Furthermore, Milis and Mercken (2002) note the need for team members with complementary skill sets, in order to foster "a sum that is greater than its parts." Finally, Teo and Ang (1999) further solidify the importance of cross-functional teams in their discussion of business and technology goal alignment. In essence, the technology staff and the business staff must collaborate on technology projects in order to create outcomes that have value-add for the organization. This focus on an enterprise approach is more readily achieved in the private sector due to its bottom-line profit motive. Conversely, the public sector often has difficulty with enterprise approaches and is rarely encouraged to collaborate with peers from other departments.

The historically "stovepipe" format of government creates difficulties when attempting to develop cross-functional teams. Coordination and involvement across agencies is not rewarded in the public sector because of the competition for legislative appropriations. Fountain (2002) highlights the lack of interagency support and coordination, which reduces the likelihood of enterprise approaches to technology deployment, due to the institutional structures of government.

Other researchers, including Relyea (2001), note that the lack of funding from legislative bodies for cross-agency development and technology deployment reduces the impetus for collaborative teamwork. The lack of cross-agency, cross-functional teams is a cultural factor, deeply entrenched in the bureaucratic traditions of the public sector. Even government personnel systems reinforce characteristics such as individual effort, specialization, formalization, and maintenance of the status quo, which are antithetical to this success factor.

Although the literature suggests that technology must be developed in an enterprise approach with various end users and stakeholders at the table, this form of development is a cultural mismatch for the public sector. As such, public sector CIOs may be less inclined to engage in activities that create organizational discomfort (i.e., use of cross-functional teams).

Expectations:

1. Both public and private sector CIOs will rate the importance of the use of cross-functional (inter-agency) teams in the development of information technology projects should be higher in organizations.

2. Public sector CIOs will rate the importance of the use of cross-functional (inter-agency) teams in the development of information technology projects to be lower in current organizations compared to ratings of private sector counterparts.

Critical Success Factor 12: End user training

H12a: Both public and private sector CIOs will rate the importance of training **should be** high in organizations.

H12b: Both public and private sector CIOs will rate the importance of training **to be** low in current organizations.

End user training is central to the adoption of the technology in the workplace. Rocheleau and Wu (2002) note a fairly high rating of training importance in both the public and private sectors. However, other studies cite that lack of attention to training (Northrop, 2002). Regardless of statistical findings, the majority of critical success factor literature indicates that end user training is essential for project success (see Dickson and DeSanctis, 2001; Harvard Policy Group, 2001). By incorporating training, end users will be more likely to adopt new technologies because the learning curve has been reduced. In addition, the implementation of a training program signifies top management support for a project through the designation of funds for training purposes. It is evident that training is critical to technology project success and, accordingly, is included in this study.

High-quality end user training is central to the adoption of the technology in the workplace. However, many studies have indicated that little attention is given to this success factor in the public or private sectors. Although the public sector places strong emphasis on employee credentials, this focus is limited to the developers and specialists in information technology. Similarly, the private sector has larger expenditures for training; however, this spending typically does not include specific end user training for information technology projects.

According to Elliot and Tevavichulada (1999), the public sector offers slightly more training but the private sector offers more "regular" systematic training. Similarly, Rocheleau and Wu (2002) found conflicting results in their assessment of IT training among public and private sectors. The perceived importance of training was slightly higher in the public sector but actual training expenditures were greater in the private sector (Rocheleau and Wu, 2002).

Although the aforementioned study notes a fairly high rating of training importance, other studies have underlined the relative lack of attention to end user training. Northrop (2002) conducted a study of public and private sector employees that found that lack of training is one of the top two failures of technology projects. She notes that training is critical to the ongoing success of a project and it should be budgeted for and included as mechanism for continual feedback and support (Northrop, 2002). The study conducted by Northrop supports the idea that training will viewed as important in theory but less realistic in practice by both public and private sector CIOs.

Expectations:

1. Both public and private sector CIOs will rate the importance of training should be high in organizations.
2. Both public and private sector CIOs will rate the importance of training to be low in current organizations.

Critical Success Factor 13: Location of CIO

H13a: Both public and private sector CIOs will rate the importance of the CIO position in the organization **should be** high in organizations.

H13b: Public sector CIOs will rate the importance of the CIO position in the organization **to be** lower in current organizations than private sector counterparts.

The location of the CIO in the organization is another critical success factor. As early as 1981, the title Chief Information Officer (CIO) emerged in the private sector literature as the defined leadership role for information technology. Additionally, Rocheleau and Wu (2002) note the public sector has adopted the stance of the private sector by codifying the position of Chief Information Officer.

Extensive research has been conducted on the attributes and characteristics of successful CIOs in the private sector (see Dickson and DeSanctis; Harvard Policy Group; General Accounting Office). One of the most commonly cited aspects includes having significant power and authority in the organization. By locating the CIO within the upper echelon of management, the organization signifies a commitment to new technology, which is critical for end user adoption and support. In the private sector, the CIO is often found within the executive management team, a direct report to the Chief Executive Officer. Through the placement of the CIO in this strategically significant organizational position, the private sector has solidified its commitment to use and investment in information technology.

The literature suggests that public sector CIOs have not received the same level of decision-making authority or compensation as their private sector counterparts. In fact, Bozeman and Bretschneider (1986) argued for lower organizational placement of public sector MIS directors in order to insulate these individuals from political whims. However, as noted by Rocheleau and Wu (2002), the public sector has adopted the stance of the private sector by codifying the position of Chief Information Officer.

According to Bretschneider (1990), the placement of the director of information technology in the public sector is lower than that of private sector counterparts. Similarly, the recent publications of the General Accounting Office (2001) indicate that in order to maximize the success of chief information officers, they must be included as full participants in the management team. Additionally, the report indicates that the CIO must be given legitimacy and authority in order to successfully lead the information technology goals of the organization (GAO, 2001). The nature of the report suggests that the role of the CIO in the public sector is nebulous and maintains less power and credibility than its private sector counterpart. As such, the report suggests that public sector CIOs are placed lower in the organizational hierarchy than their private sector counterparts.

Expectation:

1. Both public and private sector CIOs will rate the importance of the CIO position in the organization should be high in organizations.

2. Public sector CIOs will rate the importance of the CIO position in the organization to be lower in current organizations than ratings by private sector counterparts.

Critical Success Factor 14: Financial resources

H14a: Both public and private sector CIOs will rate the importance of financial resources **should be** high in organizations.

H14b: Public sector CIOs will rate the importance of financial resources **to be** lower in current organizations compared to private sector counterparts.

The lack of ***financial resources***, evidenced by the serious budgetary issues facing both the public and private sectors, is a major concern for successful IT implementation. However, compared to the public sector literature, the majority of private sector literature seldom mentions budgetary constraints. Instead, the literature highlights the importance of providing adequate financial support for a given project (Milis and Mercken, 2002), without attention to the reality of the budget situation for both the private and public sectors. Regardless, adequate financial resources are essential for the design and implementation of new technologies. Accordingly, this study seeks to examine the impact of financial resources in public and private technology settings. It is evident that financial resources are critical to technology project success and should be included in any study of critical success factors.

In this time of recession and major corporate failures, the budget issues facing all organizations, public and private, are significant. However, in the review of the private sector literature, budgetary constraints are seldom mentioned. Often, the literature highlights the importance of providing adequate financial support for a given project (Milis and Mercken, 2002). However, there is cursory attention paid to the reality of the budget situation for the private sector. This lack of attention to budgetary constraints may be a function of the role of technology in obtaining strategic advantage in the private sector (Dickson and DeSanctis, 2000). It may also be an issue similar to the role of high quality technology staff; the private sector literature may assume that a baseline level of funding is available for specific technology projects. Perhaps the lack of attention to budgetary constraints in the private sector reflects a more fundamental shift in perspective from the public sector. The private sector may very well view information technology as a critical, integral component of the business process, while the public sector often sees technology as an experiment outside the scope of normal government business. Regardless of the reason, it is clear that the private sector does not view budgetary constraints as serious challenges to project success.

The budgetary constraints facing the public sector are creating significant problems in terms of innovation and service delivery. The process of adopting new technologies requires an influx of resources, which currently are being diverted to other mission-critical applications. According to the Progressive Policy Institute, one of the biggest problems facing the rise of digital government is the lack of funding and flexibility (Atkinson and Ulevich, 2000). The Electronic Government Act of 2002 demonstrates further evidence of the lack of funding. This act was passed with the authorization of $45 million in funding for the first year. However, upon appropriation, the e-government initiatives received only five million dollars for support.

Additionally, Relyea (2001) highlights the monetary requirements of continued maintenance of public sector IT systems. He notes that replacement costs and system upgrades, particularly those related to security, will require significant investments from legislative bodies (Relyea, 2001). Finally, other groups, such as the Harvard Policy Group (2001), advocate significant investment in technology in the public sector in order to continually improve service delivery and information dissemination. The various calls to arms for funding of public sector technology indicate that current efforts are piecemeal and nascent at best. In order to capitalize on the technology revolution, the public sector must make funds available for hardware, software, training, and personnel. This critical success factor underlies the other factors and provides the foundation for project success or failure.

Expectations:

1. Both public and private sector CIOs will rate the importance of financial resources should be high in organizations.
2. Public sector CIOs will rate the importance of financial resources to be lower in current organizations compared to ratings of private sector counterparts.

Table 2.1 Expectations of Importance of Success Factors as They Should Be in Organization, Public Sector compared to Private Sector

Research Variable	Hypothesized Relationship versus Private Sector	Hypothesized Strength
a. Top management support	Not significant (both high)	Strong
b. End user involvement	Not significant (both low)	Moderate
c. Stakeholder involvement	Lower	Weak
d. Cross-functional teams	Not significant (both high)	Weak
e. Communication	Higher	Weak
f. Strategic planning	Not significant (both high)	Moderate
g. High quality technology staff	Not significant (both high)	Moderate
h. Defined, achievable project milestones	Not significant (both high)	Weak
i. Rewards systems	Lower	Moderate
j. Use of prototyping and/or piloting	Not significant (both high)	Weak
k. End user training	Not significant (both high)	Strong
l. Political support (i.e. Board of Directors, Elected or Appointed Officials)	Higher	Moderate
m. Location of CIO in organization	Not significant (both high)	Strong
n. Financial resources	Not significant (both high)	Strong

Table 2.2 Expectations of Importance of Success Factors in Current Organization, Public Sector compared to Private Sector

Research Variable	Hypothesized Relationship versus Private Sector	Hypothesized Strength versus Private Sector
a. Top management support	Lower	Strong
b. User involvement	Lower	Moderate
c. Stakeholder involvement	Lower	Weak
d. Cross-functional teams	Lower	Strong
e. Communication	Lower	Weak
f. Strategic planning	Lower	Moderate
g. High quality technology staff	Lower	Weak
h. Defined, achievable project milestones	Lower	Weak
i. Rewards systems	Lower	Moderate
j. Use of prototyping and/or piloting	Higher	Strong
k. End user training	Not significant (low)	Not significant (weak)
l. Political support (i.e. Board of Directors, Elected or Appointed Officials)	Higher	Strong
m. Location of CIO in organization	Lower	Moderate
n. Financial resources	Higher	Strong

CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY

Chapter Three offers a description of the research design, data collection methods, sampling frame, and survey instrument. The chapter also contains information on data screening, reliability, internal and external validity, and variable operationalization. The chapter concludes with a brief overview of the statistical techniques used to analyze the survey data.

Research Design

The research design selected for this study is quasi-experimental. It uses statistical controls in lieu of physical control, randomization, and manipulation. A pretest of the survey instrument was conducted in order to ascertain the validity and reliability of the instrument. In addition, the pretest was used to determine the median critical success factor, generated from the initial list of fourteen factors. This median factor, use of reward systems, was instituted as a comparison factor, in order to elicit variance between the remaining thirteen factors. The pretest involved 40 individuals from the public and private sectors. Twenty-five of the pretest participants were North Carolina local government IT directors and CIOs, who participated in the pretest during the annual Fall meeting of the North Carolina Local Government Information Systems Association (NCLGISA) in September, 2003. The remaining fifteen pretest participants were randomly selected private sector CIOs who were participating in another research study affiliated with the author.

Data Source

The author as part of her dissertation research collected data for this research study. Data collection took place during from December 4, 2003 until January 13, 2004. The survey instrument was designed by the author and was based on the literature review previous described. Respondents were contacted by electronic mail, US postal mail, and telephone. Occupying the senior management position associated with information technology in a given organization was the qualifying factor for participation. For example, many local governments have Directors of Information Technology, whereas state and federal government, as well as the private sector, typically have Chief Information Officers, both of whom have similar roles and responsibilities within the organization.

Sampling

The public sector groups surveyed include the National Association of State Chief Information Officers (NASCIO), as well as a random sample of International City/County Management Association (ICMA) members whom had previously participated in the 2002 ICMA E-Government Survey. There are 50 state CIOs, from which a random sample of 10 CIOs was selected. In addition, a random sample of 200 CIOs or IT directors was selected from approximately 1000 ICMA members. Of the 200 CIOs, eleven individuals were no longer employed with the government unit, so this group was removed from the survey sample. Finally, an additional 10 federal CIOs were randomly selected from the US CIO Council, which is composed of the 52 CIOs and deputy CIOs from the various federal agencies. A total of 83 public sector Chief Information Officers completed the survey, providing a response rate of 41.71 percent for the public sector.

In order to select a random sample of private sector Chief Information Officers, the Leadership Library database, which includes the Yellow Books for corporate officials, was used. The Leadership Library offers a variety of organizations, with differing sizes, functional areas, and organizational designs. The Leadership Library contains approximately 856 CIO listings, from which 200 CIOs were sampled. Fifteen of the 200 CIOs sampled are no longer employed with their organizations, so this group was removed from the survey sample. A total of 95 private sector Chief Information Officers completed the survey, creating a response rate of 51.35 percent for the private sector.

In sum, the response rate for the survey is 46.35 percent. Both the public and private sector samples offer a wide range of size, technological sophistication, and expertise, which mirrors the population of both sectors.

Instrumentation

Data was collected by World Wide Web-based surveys, facilitated by electronic mail, US postal mail and telephone contacts, from December 4, 2003 until January 13, 2004. The first questions on the survey asked the respondents to assess the relative influence of thirteen critical success factors, compared to a median factor determined during pretesting. Then the survey asked the respondents to assess their organizational performance on each of the success factors. The survey also included questions to elicit further insight into the actual organizational performance on specific factors, in order to correct any overstatements by the respondents. Finally, the survey concluded with open-ended questions related to other critical success factors and relaying of experiences with successful and failed IT project implementation. The survey instrument can be found in Appendix A.

Data Screening

Data screening methods were utilized to determine the accuracy of the data file, examine missing values, examine outliers, and test for multicollinearity. The first step in the data screening was to check the accuracy of the data file. By examining the frequency analysis of each variable, all values were determined to be within the prescribed range. Furthermore, assessment of means and standard deviations indicated that the values for each variable were conceivable.

The second step in the data screening process was to examine missing values. Using SPSS 11.0 Missing Value Analysis, the distribution of missing values was assessed. Based on examination of the missing value patterns, the distribution was determined to be random. In addition, less than five percent of the cases had missing values. After completing the missing values analysis, the EM algorithm in the SPSS Missing Values option was used to apply maximum likelihood estimation for imputing missing data values. Maximum likelihood estimation makes fewer demands of the data in terms of statistical assumptions and is generally considered superior to imputation by multiple regression (Garson 2003).

The next step in the data screening process was an examination of the outliers. Initially, boxplots were examined to assess outliers. In addition, cases falling outside the range (Q1-1.5*IQR, Q3-1.5*IQR) were identified as outliers. No variables in the data set were determined to be outliers. Finally, for the dichotomous independent variable, the split of the categories was 53.4 percent to 46.6 percent, which falls within the acceptable boundaries.

The final technique used to screen the data was a test for multicollinearity. Bivariate correlations for each of the independent variables were conducted. None of the variables were too highly correlated, using the standard cutoff of .90 (Tabachnick and Fidell, 2001: 83). Accordingly, all of the variables are included in the bivariate and multivariate statistical analysis.

Validity Issues

Internal validity

Validity generally refers to a descriptive term used of a measure that accurately reflects the concept that it is intended to measure. Internal validity involves assessing how well the research was done by determining whether there were flaws in the research design. In true experiments, internal validity is the extent to which the researcher has controlled exogenous variables so that any observations can be attributed to the treatment. An informal procedure for determining the validity of a test is by looking over each item and assessing the degree to which it is fulfilling its intended role in the test. Internal validity primarily deals with control and how the researcher has controlled the experiment in order to create an appropriate, repeatable experiment.

There are four types of internal validity including face validity, content validity, concurrent validity, and criterion validity. Face validity asks how the measure appears on its face as a measure of the concept. This is the least formal of the types and was assessed during the pretest by Chief Information Officers not included in the final survey sample.

Content validity concerns the comprehensiveness of the measure. When measuring a particular concept, there generally are variables that experts agree should be included in order to accurately assess that concept. The pretest population also assessed content validity. A measure that has content validity will include all, or at least the majority, of the individual elements that make up the entire content of the concept.

Concurrent validity also called construct validity asks whether the measure covaries with other known measures. Specifically, the researcher, when using construct variables, checks to be sure that the variable in question relates to the variables that make up the construct. In order to assess construct validity, the researcher uses factor analysis during the data analysis stage (see Chapter 5).

The final type of internal validity, criterion or predictive validity, is based on some external criteria. In other words, criterion validity is evaluated based on the measure's ability to predict something in the real world. Criterion validity is more difficult to measure and will be tested by future researchers at the culmination of the research study.

Threats to internal validity

There are several threats to internal validity.

- History is when historical events may occur during the course of the experiment that might confound the results. This threat is mitigated by the use of a single point in time survey during data collection.
- Maturation, changes in the subjects between pre- and post-tests, is also eliminated by the use of only one test at a single point in time.
- Regression towards the mean, the tendency of extremes to move toward the center, is easily counteracted by the use of anonymous surveys as well as the design of the survey instrument, particularly the use of Likert scales centered on a median factor determined by the pretest.

- The learning effect on a group taking the posttest from taking the pretest is eliminated because there is only one point in time survey administered.
- Instrumentation, ensuring the testing instrument measures the same things on pre- and post-tests, is also addressed by only offering one test at a single point in time.
- Selection bias is a serious issue in a quasi-experiment. This study seeks to address the issue of selection bias by randomly selecting its survey participants. In addition, analysis of variance (ANOVA) is used to determine if any significant, confounding differences emerge between the survey participants. It should be noted that the researcher does expect differences between the public and private sector respondents based on the review of the literature. As such, it is not the intent of this study to create homogenous groups, but rather to create groups that are comparable once the sectoral difference is held constant.
- Mortality is not an issue for this research because it is a single point in time survey.

In addition, there are other threats to internal validity, such as demoralization of control group subjects and required equalization of treatments. However, these issues do not apply to this quasi-experimental research design. As previously noted, the internal validity issues in this study are minimal.

External validity

External validity is with how much accuracy "we can infer that the presumed causal relationship can be generalized to and across alternate measures of the cause and effect and across different types of persons, settings, and times" (Cook and Campbell, 1979: 37).

Specific threats to external validity include interaction of selection and treatment, interaction of history and treatment, and interaction of setting and treatment.

- The first threat, interaction of selection and treatment, is minimized in this study through the use of random sampling. The study uses a large stratified random sample of public and private sector Chief Information Officers from the United States. However, because the study is limited to CIOs in the United States, the research findings are only generalizable within the United States.
- The interaction of history and treatment threat is minimized in this study because the survey was administered at one point in time, with no successive data collection.
- The final threat, interaction of setting and treatment, is also minimized by administering a mail survey, which is completed by the respondents in a location of their choice.

This research study features a cross-section of public and private CIOs from across the United States, which makes the survey findings generalizable to a larger population of Chief Information Officers. Based on the large sample size and the geographic distribution of the target sample, this research study should have high external validity, as well as high internal validity.

Survey Design and Implementation

There are several steps to the survey design and implementation for this research study. The first step involved the creation of the survey instrument, which was based on other surveys assessing critical success factors for technology projects. The second step was to pretest the instrument on a group of IT professionals. This pretest was used to establish the validity of the instrument, to ferret out any problems with the instrument, and most importantly, to create the median critical success factor for use in the final survey implementation.

By analyzing the pretest results, the median critical success factor, use of rewards, was established. The final survey instrument used this factor as the baseline, or reference point, for approximating influence. For example, the factor "top management support" is compared to the median factor "use of rewards" on a scale of 1 to 5, with 1 indicating significantly less important than "use of rewards" and 5 indicating significantly more important than "use of rewards". The use of a median factor for comparison is offered as a means for ensuring variance among the survey respondents. Other methods, such as using a scale to rank all critical success factors individually, would likely result in the majority of factors being given the same high importance scores. Again, the survey instrument is offered in Appendix A for review.

Variable Operationalization

"Critical success factors" has been a widely used concept since it was popularized by Rockart (1979). Essentially, critical success factors are those few items that must been handled correctly in order for a project to succeed. The concept has been extended to a variety of project types and arenas; however, critical success factors are most commonly associated with the field of information technology and project management.

Independent variable

The independent variable for this study was selected to ascertain differences in rating of critical success factors based on sector (public versus private). The respondents are asked to identify their organization as with public or private with respect to sector. Nonprofits were excluded from this study by virtue of the stratified random sample. Approximately 53.4 percent of the survey sample identified their organization as residing in the private sector, while the remaining 46.6 percent are in the public sector.

Dependent variables

Based on the review of the literature, fourteen critical success factors have been selected and included in a survey of Chief Information Officers. The CIOs have been asked to rate the relative influence of the critical success factors on technology project success. Due to variety of definitions of success with respect to technology projects, this study defines it as: projects developed on time, on budget, and to the satisfaction of the end users (see Park and McLean, 1991). In addition, they have been asked to assess their organization's performance on the various success factors. Table 3.1 highlights the twenty-eight hypotheses and the variables that address them.

Table 3.1. Hypotheses/Survey Instrument Matrix

Hypotheses	Survey Questions
H1a: Public sector CIOs will rate the importance of communication **should be** more important compared to private sector counterparts. H1b: Public sector CIOs will rate the importance of communication **to be** less important in current organizations compared to private sector counterparts.	Q1e. Ranking of influence of critical success factors Q2e. Ranking of performance on critical success factors Q6. Information sharing horizontally Q7. Information sharing vertically

Table 3.1, Continued

H2a: Both public and private sector CIOs will rate the importance of highly qualified technology staff **should be** high in organizations. H2b: Public sector CIOs will rate the importance of highly qualified technology staff **to be** less important in current organizations compared to private sector counterparts.	Q1g. Ranking of influence of critical success factors Q2g. Ranking of performance on critical success factors
H3a: Public sector CIOs will rate the importance of rewards systems **should be** lower in organizations compared to private sector counterparts. H3b: Public sector CIOs will rate the importance of rewards systems **to be** lower in current organizations compared to private sector counterparts.	Q1. Median factor in ranking of influence of critical success factors Q2i. Ranking of performance on critical success factors Q15. Reward teamwork
H4a: Both public and private sector CIOs will rate the importance of strategic planning for information technology **should be** high in organizations. H4b: Public sector CIOs will rate the importance of strategic planning for information technology **to be** lower in current organizations compared to private sector counterparts.	Q1f. Ranking of influence of critical success factors Q2f. Ranking of performance on critical success factors Q8. Accountability of CIO Q9. Formal rules, procedures, etc.
H5a: Both public and private sector CIOs will rate the importance of end user involvement **should be** lower in organizations. H5b: Public sector CIOs will rate the importance of end user involvement **to be** lower in current organizations compared to private sector counterparts.	Q1b. Ranking of influence of critical success factors Q2b. Ranking of performance on critical success factors

Table 3.1, Continued

H6a: Public sector CIOs will rate the importance of stakeholder involvement **should be** lower in current organizations compared to private sector counterparts. H6b: Public sector CIOs will rate the importance of stakeholder involvement **to be** lower in current organizations compared to private sector counterparts.	Q1c. Ranking of influence of critical success factors Q2c. Ranking of performance on critical success factors Q10. Stakeholder inclusion Q11. Stakeholder involvement Q13. Stakeholder impact
H7a: Both public and private sector CIOs will rate the importance of project milestones **should be** higher in organizations. H7b: Public sector CIOs will rate the importance of project milestones **to be** lower in current organizations compared to private sector counterparts.	Q1h. Ranking of influence of critical success factors Q2h. Ranking of performance on critical success factors Q16. Measures of success
H8a: Both public and private sector CIOs will rate the importance of top management support **should be** high in organizations. H8b: Public sector CIOs will rate the importance of top management support **to be** lower in current organizations compared to private sector counterparts.	Q1a. Ranking of influence of critical success factors Q2a. Ranking of performance on critical success factors Q14. IT idea germination
H9a: Public sector CIOs will rate the importance of political support **should be** higher in organizations compared to private sector counterparts. H9b: Public sector CIOs will rate the importance of political support **to be** higher in current organizations compared to private sector counterparts.	Q1k. Ranking of influence of critical success factors Q2l. Ranking of performance on critical success factors Q14. IT idea germination

Table 3.1, Continued

H10a: Both public and private sector CIOs will rate the importance of prototyping and/or piloting support **should be** high in organizations. H10b: Public sector CIOs will rate the importance of prototyping and/or piloting **to be** higher in current organizations compared to private sector counterparts.	Q1i. Ranking of influence of critical success factors Q2j. Ranking of performance on critical success factors
H11a: Both public and private sector CIOs will rate the importance of the use of cross-functional (inter-agency) teams in the development of information technology projects **should be** higher in organizations. H11b: Public sector CIOs will rate the importance of the use of cross-functional (inter-agency) teams in the development of information technology projects **to be** lower in current organizations compared to private sector counterparts.	Q1d. Ranking of influence of critical success factors Q2d. Ranking of performance on critical success factors Q15. Reward teamwork
H12a: Both public and private sector CIOs will rate the importance of training **should be** high in organizations. H12b: Both public and private sector CIOs will rate the importance of training **to be** low in current organizations.	Q1j. Ranking of influence of critical success factors Q2k. Ranking of performance on critical success factors
H13a: Both public and private sector CIOs will rate the importance of the CIO position in the organization **should be** high in organizations. H13b: Public sector CIOs will rate the importance of the CIO position in the organization **to be** lower in current organizations than private sector counterparts.	Q1l. Ranking of influence of critical success factors Q2m. Ranking of performance on critical success factors Q4. Location of CIO

Table 3.1, Continued

H14a: Both public and private sector CIOs will rate the importance of financial resources **should be** high in organizations. H14b: Public sector CIOs will rate the importance of financial resources **to be** lower in current organizations compared to private sector counterparts.	Q1m. Ranking of influence of critical success factors Q2n. Ranking of performance on critical success factors Q17. Financial strain Q18. Financial impact
Other Questions: Measures exogenous factors	Q3. List other critical success factors Q19. Project success factors Q20. Project failure factors
Moderating Variable	Q5. Previous work background
Measuring all hypotheses	Q19. Success factors Q20. Failure factors Q21. Tips for projects
Demographic Variables	Q22. Sector Q23/24. Organization Q25. Number of employees Q26. Number of IT employees Q27. Position Q28. Education level Q29. Age

Based on the previously described variables, the hypotheses about sectoral differences and their impact on critical success factor ratings, in terms of perceived influence as well as organizational performance, will be tested.

Statistical Methods

A variety of statistical methods will be employed to ascertain the effect of organizational sector on the critical success factor ratings.

Univariate analysis

First, univariate analysis will be performed for each of the variables in the survey. SPSS 11.0 for Windows is used to conduct a frequency analysis for each variable. Chapter 4 offers the descriptive information derived from the frequency analyses.

Bivariate analysis

The second type of analysis will be bivariate in nature. Two-way contingency analysis will be used to assess the presence of statistically significant relationships use the statistical significance test, chi-square. Then correlational analysis will be used primarily to identify interesting patterns in the data. Analysis of variance (ANOVA) will also be conducted to determine if organizational sector affects critical success factor ranking, as well as organizational performance on the factors. In addition, ANOVA will be used to determine if the difference between the relative influence rating of a given factor and the organizational performance on the factor differ significantly by sector. Finally, analysis of covariance (ANCOVA) will be used to determine the influence of the moderating variable, previous employment, on the sectoral differences concerning the critical success factors. In all instances of ANOVA and ANCOVA, each of the hypotheses will be tested individually, which eliminates the concerns of multicollinearity between the critical success factors.

Multivariate analysis

Multivariate analysis is the final statistical technique employed. Factor analysis will be the final method used in this study. Factor analysis is a procedure to discover the underlying structure of a set of variables. When conducted as a stand-alone procedure, principal components analysis (PCA) is the most common type of factor analysis used. PCA seeks a linear combination of variables in order to extract the maximum variance from the variables. The goal of this factor analysis is to collapse variables that are indicators of the same underlying concept in order to reduce the level of multicollinearity in the data and make the data eligible for use in modeling. Due to the nature of this baseline research, it is not the intent of the researcher to create a model for predicting successful technology adoption based on critical success factors.

CHAPTER 4: UNIVARIATE STATISTICAL ANALYSIS

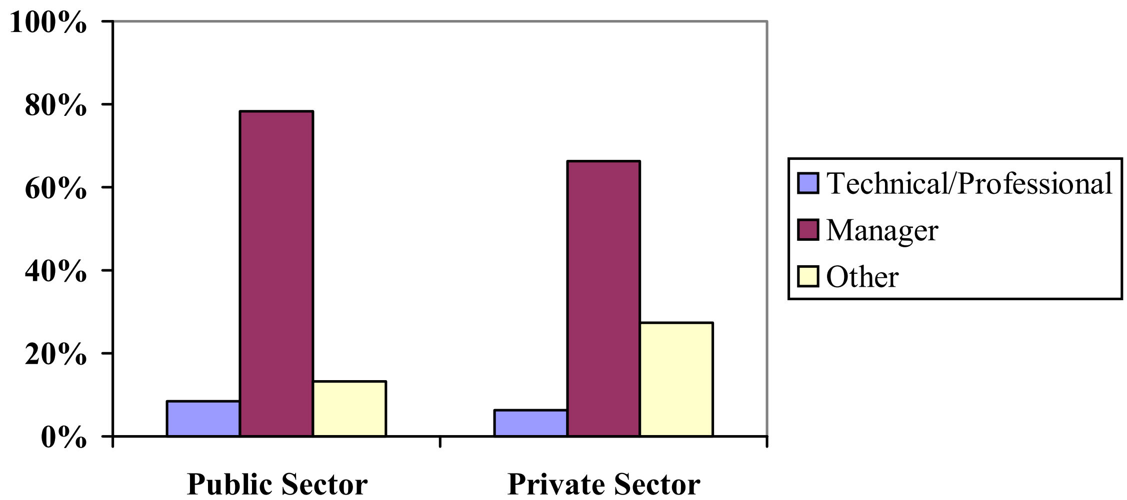
In an attempt to underline the importance of critical success factors in public and private sector organizations, a survey of randomly selected Chief Information Officers was conducted. The survey population was generated from the Leadership Library database, local government members of the International City and County Management Association with information technology departments, the US Chief Information Officers Council, and the National Association of State Chief Information Officers. Approximately 384 Chief Information Officers were selected by random number generation to be included in the data set. Of the 384 individuals, 178 Chief Information Officers responded (a response rate of 46.35 percent). The resulting data set was analyzed with respect to the perceived influence and actual organizational performance on the fourteen critical success factors. In addition, descriptive statistics on demographic information about the CIO sample is offered. The survey instrument is offered in Appendix A for review.

Demographic Variables

In terms of the demographics of the survey respondents, 83 of the respondents are from the public sector (46.6 percent) while 95 are from the private sector (53.4 percent). The median organizational size is 2600 employees, with seventy employees in the information technology (IT) department. In terms of the public sector respondents, the median organizational size is 1300 employees, with thirty technology employees. Conversely, the median private sector organizational size is 4500 employees, with one hundred and forty-five IT employees.

In terms of the Chief Information Officers themselves, both the public and private sector respondents are quite similar. The majority of both groups identify themselves as managers within the organization. Chart 4.1 demonstrates the breakdown of CIO positions within the organization.

Chart 4.1. CIO Positions by Sector



As demonstrated in Chart 4.1, approximately 78 percent of the public sector CIOs and 66 percent of the private sector CIOs view their position as managerial or administrative in nature. Over eight percent of the public sector CIOs view their position as technical or professional, compared to six percent of the private sector respondents. Finally, 13.3 percent of the public sector respondents and 27.4 percent of the private sector CIOs view their position as other. For those Chief Information Officers identifying their position as “Other,” the most common description of the position is senior executive officer in both the public and private sectors.

In terms of educational attainment, a bachelor's degree is the median response for survey participants. Approximately 42.2 percent of the public sector respondents and 40.0 percent of the private sector respondents indicate that a bachelor's degree is their highest level of educational attainment. Furthermore, 45.8 percent of the public sector respondents and 51.6 percent of the private sector respondents indicate that they have attained a graduate or professional degree. Finally, the median age group for the survey respondents is 41-50 years of age. Chart 4.2 demonstrates the breakdown of CIO age groups by sector.

Chart 4.2. Age groupings of CIO respondents by sector

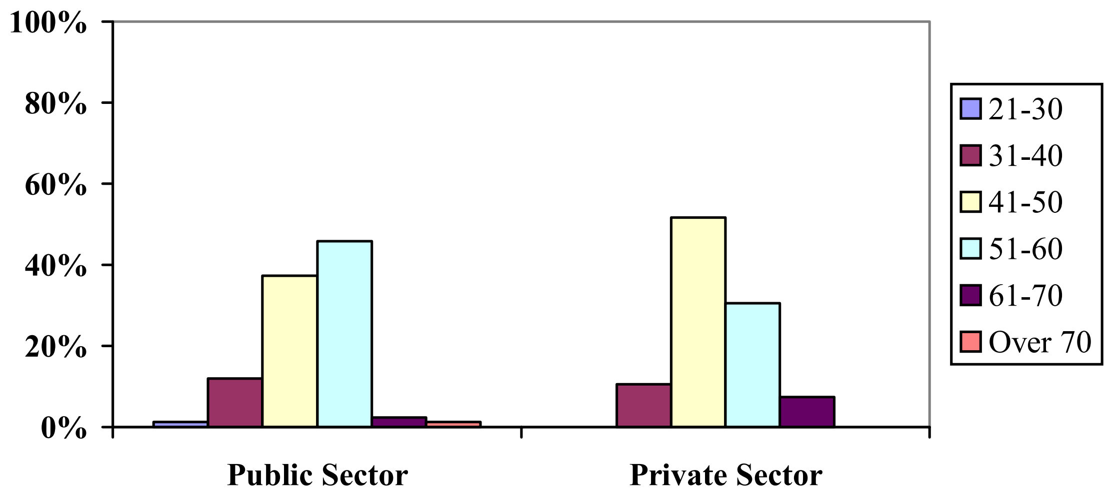


Chart 4.2 highlights the age of CIOs in the public and private sectors. Only one public sector respondent and no private sector respondents are between the ages of 21 and 30. Twelve percent of the public sector CIOs and ten percent of the private sector CIOs are between the ages of 31 and 40. In the public sector, 37.3 percent of the respondents fall within the 41 to 50 age group, compared to 51.6 percent of the private sector. Over 45 percent of the public sector CIOs are ages 51 to 60, while 30.5 percent of the private sector

CIOs fall within this age group. Slightly over two percent of the public sector respondents are between 61 and 70 years of age, compared to approximately seven percent of the private sector respondents. Again, only one public sector respondent and no private sector respondents are over the age of 70.

Critical Success Factor: Communication

Communication is often cited as a critical success factor in information technology initiatives. For the purposes of this book, this critical success factor is defined as open, shared information exchange across functional areas (horizontal communication) and hierarchical levels (vertical communication). Communication is the linkage between disparate groups and departments within public and private entities. Based on review of extant literature, communication is one of the most fundamental aspects of an information technology project. Communication provides the framework for many of the other critical success factors, such as strategic planning and top management support.

Over 55 percent of the survey respondents indicate that communication is significantly more influential than use of rewards (median comparison factor) in affecting technology project success. An additional 30.9 percent of the survey respondents indicate that communication is slightly more influential than use of rewards. Ten percent of respondents feel that communication is equal in influence to use of rewards, while only 3.4 percent feel that it is slightly or significantly less influential. Chart 4.3 demonstrates the breakdown of responses on communication by sector.

Chart 4.3. Influence of communication, by sector

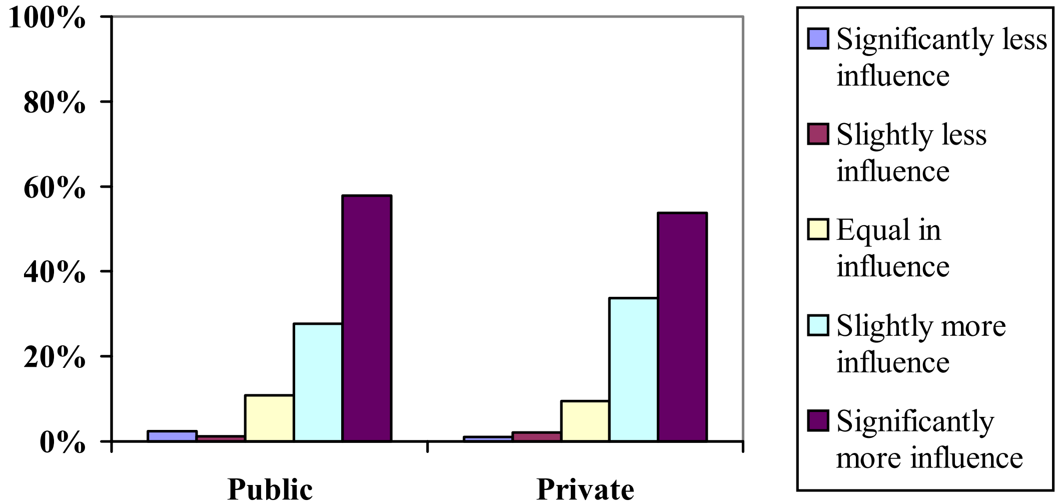


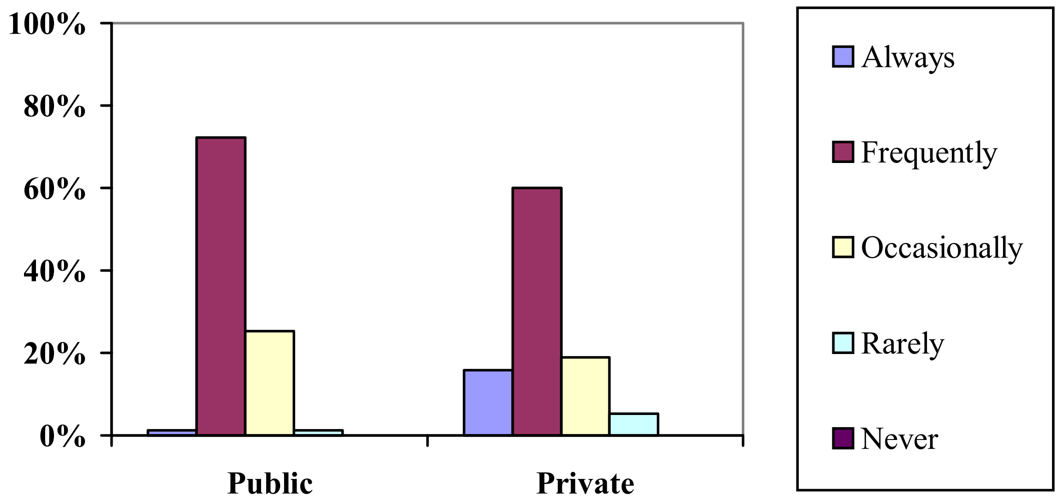
Chart 4.3 illustrates the relative influence of communication based on organizational sector. Only two percent of the public sector CIOs and one percent of private sector CIOs view communication as significantly less influential than use of rewards (the median factor). Furthermore, one percent of the public sector respondents and two percent of private sector respondents view the success factor as slightly less influential than the median factor. In the public sector, 10.8 percent of the CIO respondents feel that communication is equal in influence to use of rewards, compared to 9.5 percent of the private sector respondents. Over 27 percent of the public sector CIOs and 34 percent of the private sector CIOs rate communication as slightly more influential than use of rewards. Finally, approximately fifty-eight percent of respondents from the public sector view communication as significantly more influential than use of rewards, compared to approximately fifty-four percent of private sector respondents.

In addition to the relative influence of communication, compared to use of rewards, the survey respondents also evaluated their organizational performance on the critical success factor. In the public sector, 16.9 percent of the respondents rated their organizational performance on communication as poor or very poor, compared to 14.7 percent of the private sector. Approximately 28 percent of the public sector respondents and 47 percent of the private sector rated their performance on communication as adequate. Finally, 55.4 percent of the public sector respondents and 52.6 percent of the private sector respondents rated their organizational performance on communication as good or very good.

Information Sharing (Horizontal and Vertical)

Another critical measure of communication is the amount of information sharing that occurs between horizontal layers (peers in different departments) of an organization, as well as the vertical layers (hierarchical authority structure). In terms of horizontal information sharing, nine percent of the survey respondents indicate that their peer departments always share information. An additional 65.7 percent state that horizontal information sharing frequently occurs. Almost 22 percent of the CIOs view horizontal information sharing as occurring occasionally, compared to 3.4 percent who state that it occurs rarely. Chart 4.4 illustrates the findings of horizontal data sharing based on sectoral differences.

Chart 4.4. Frequency of horizontal information sharing, by sector.



As demonstrated in Chart 4.4, only 1.2 percent of public sector respondents indicate that horizontal information sharing always occurs in their organizations, compared to 15.8 percent of private sector CIOs. Seventy-two percent of public sector CIOs and sixty percent of private sector CIOs state that horizontal information sharing occurs frequently in their organizations. Over 25 percent of respondents from the public sector and 19 percent from the private sector indicate that horizontal information sharing occurs occasionally, while 1.2 percent of public sector CIOs and 5.3 percent of private sector CIOs feel that it occurs rarely. None of the public or private sector CIOs indicate that horizontal information sharing never occurs.

Findings similar to those about horizontal communication exist for vertical information sharing. Almost six percent of the survey respondents indicate that vertical information sharing (between hierarchical levels) always occurs. Furthermore, 62.4 percent feel that such sharing frequently occurs within their organizations. Over 26 percent of the

CIOs surveyed indicate that vertical information sharing occasionally occurs. Only five percent feel that vertical communication rarely occurs and less than one percent indicate that it never occurs. Chart 4.5 illustrates the findings of vertical data sharing based on sectoral differences.

Chart 4.5. Frequency of vertical information sharing, by sector.

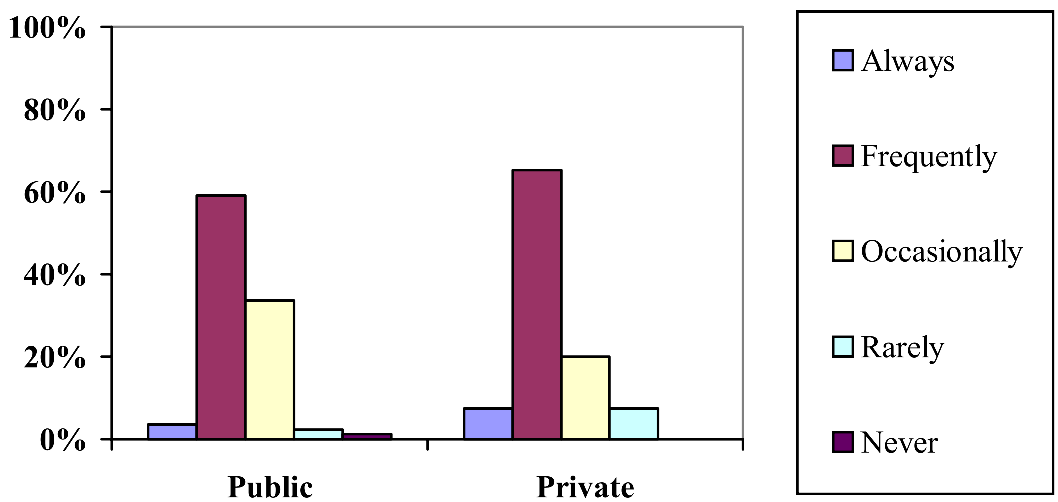


Chart 4.5 depicts the relative frequency of vertical information sharing by sector. Approximately four percent of public sector CIOs and seven percent of private sector CIOs feel that their organizations always share information in a vertical manner. In the public sector, 59 percent of respondents indicate that vertical information sharing occurs frequently, compared to 65.3 percent in the private sector. Almost 34 percent of public sector and 20 percent of private sector respondents state that vertical information sharing occurs occasionally. Only two percent of the public sector CIOs and seven percent of private sector CIOs feel that vertical information sharing rarely occurs in their organizations. Finally, one

percent of the public sector respondents indicate that vertical information sharing never occurs.

Critical Success Factor: Highly qualified technology staff

Highly qualified technology staff is another critical success factor. The importance of high quality technology staff cannot be overlooked when assessing those factors that contribute to the success or failure of technology projects. Approximately 30 percent of the survey respondents indicate that highly qualifies technology staff is significantly more influential than use of rewards (median comparison factor) in affecting technology project success. An additional 43.8 percent of the survey respondents indicate that highly qualified technology staff is slightly more influential than use of rewards. Over twenty percent of respondents feel that it is equal in influence to use of rewards, while 5.6 percent feel that highly qualified technology staff is slightly less influential. Only one respondent (0.06 percent) indicates that highly qualified staff is significantly less influential compared to use of rewards. Chart 4.6 demonstrates the breakdown of responses on highly qualified technology staff by sector.

Chart 4.6. Influence of highly qualified technology staff, by sector

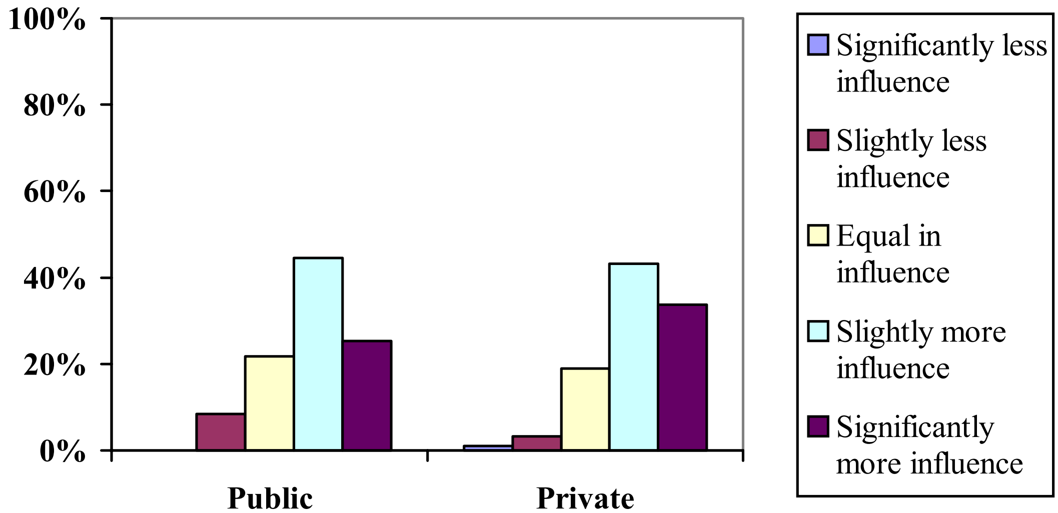


Chart 4.6 depicts the relative influence of highly qualified technology staff on IT project success. Neither the public nor private sector respondents rate highly qualified technology staff as significantly less influential than use of rewards. Only eight percent of the public sector respondents and five percent of the private sector ones view highly qualified technology staff as slightly less influential than the median factor. Approximately 21 percent of respondents in the public sector and 19 percent in the private sector rate highly qualified technology staff as equal in influence, compared to the median factor. Over 44 percent of the public sector CIOs view highly qualified staff as slightly more influential as use of rewards, compared to over 43 percent of the private sector CIOs. Finally, 25.3 percent of public sector respondents and 33.7 percent of private sector respondents rate highly qualified technology staff as significantly more influential than the median success factor—use of rewards.

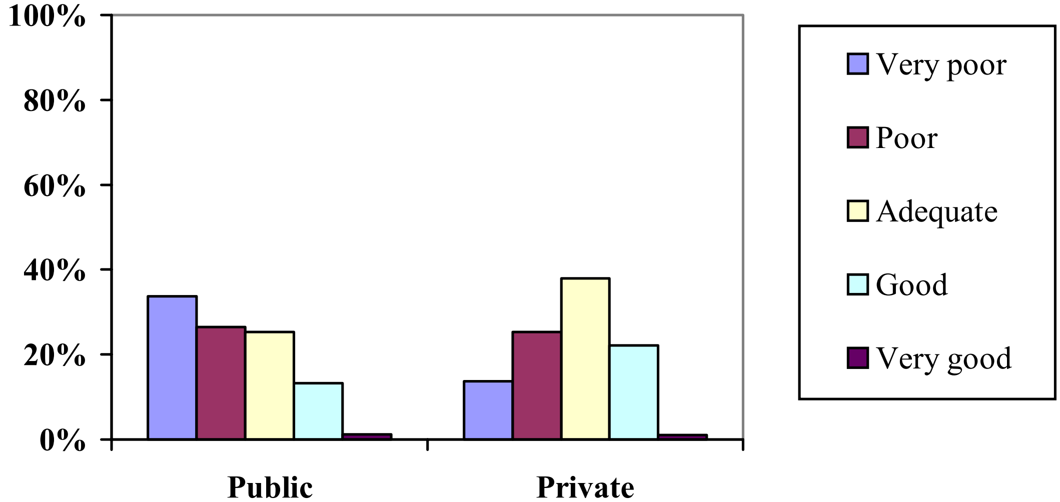
The survey respondents also evaluated their organizational performance on the critical success factor, highly qualified technology staff. In the public sector, twelve percent of the respondents rated their organizational performance on highly qualified technology staff as poor or very poor, compared to just **two** percent of the private sector. Approximately 20 percent of the public sector respondents and 21.1 percent of the private sector rated their performance on highly qualified technology staff as adequate. Finally, 67.5 percent of the public sector respondents and 76.8 percent of the private sector respondents rated their organizational performance on highly qualified technology staff as good or very good.

Critical Success Factor: Use of reward system

The use of reward systems is another critical success factor. The majority of the literature pertaining to reward systems is found in the private sector, highlighting its roles in fostering teamwork and assisting with goal establishment. In the public sector, the use of rewards emerged as an issue during the "reinventing government" movement, in an attempt to replicate successful private sector practices. Use of rewards has repeatedly been cited as a mechanism for improving the likelihood of technology project success.

In the pretest, use of reward system was established as the median critical success factor. Accordingly, it was used as the comparison factor for the remaining thirteen critical success factors. However, the survey respondents did rate their organizational performance on use of rewards. Chart 4.7 demonstrates the breakdown of responses on use of rewards by sector.

Chart 4.7. Organizational performance on use of rewards, by sector



As illustrated in Chart 4.7, over 32 percent of public sector CIOs and 16 percent of private sector CIOs rate their organizational performance on use of rewards as very poor. In addition, 28.6 of public sector respondents and 24.5 percent of private sector ones view their performance on the critical success factor to be poor. Slightly over twenty percent of the public sector CIOs view their performance on use of rewards as adequate, compared to over thirty-six percent of the private sector CIOs. Sixteen percent of public sector CIOs and twenty-two percent of private sector CIOs rate their performance on use of rewards as good, while two percent and six percent, respectively, view their performance as very good.

Critical Success Factor: Strategic planning for technology

Strategic planning for technology is another critical component to successful technology project design and implementation. The holistic, long-range thinking that accompanies strategic planning allows the technology staff to connect to the broader organizational mission, as well as to establish a commitment from upper management.

Over sixteen percent of the survey respondents indicate that strategic planning for technology is significantly more influential than use of rewards (median comparison factor). An additional 29.8 percent of the survey respondents indicate that it is slightly more influential than use of rewards. Thirty-two percent of respondents feel that strategic planning is equal in influence to use of rewards, while eighteen percent feel that it is slightly less influential. Finally, 3.4 percent of the survey respondents feel that strategic planning for technology is significantly less influential in technology project success than use of rewards. Chart 4.8 demonstrates the breakdown of responses on strategic planning for technology by sector.

Chart 4.8. Influence of strategic planning, by sector

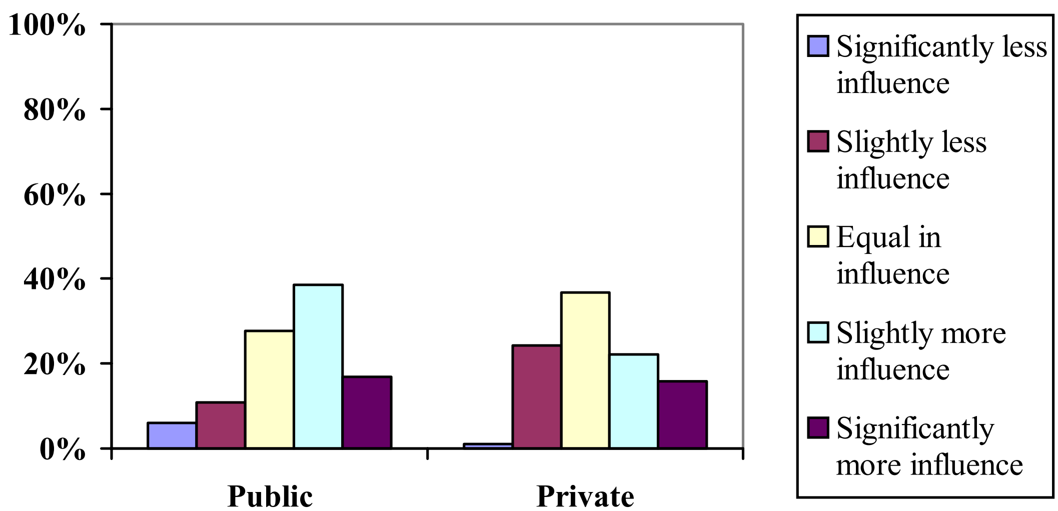


Chart 4.8 demonstrates the relative influence of strategic technology planning according to organizational sector. Six percent of public sector CIOs and one percent of private sector CIOs rate strategic technology planning as significantly less influential than the median critical success factor—use of rewards. Furthermore, 10.8 percent of respondents

from the public sector and 24.2 percent in the private sector view the success factor as slightly less influential. In the public sector, 27.7 percent of the CIO respondents feel that strategic technology planning is equal in influence to use of rewards, compared to 36.8 percent of the private sector respondents. Almost 39 percent of the public sector CIOs and 22 percent of the private sector CIOs rate strategic technology planning as slightly more influential than use of rewards. Finally, seventeen percent of respondents from the public sector view strategic technology planning as significantly more influential than use of rewards, compared to approximately sixteen percent of private sector respondents.

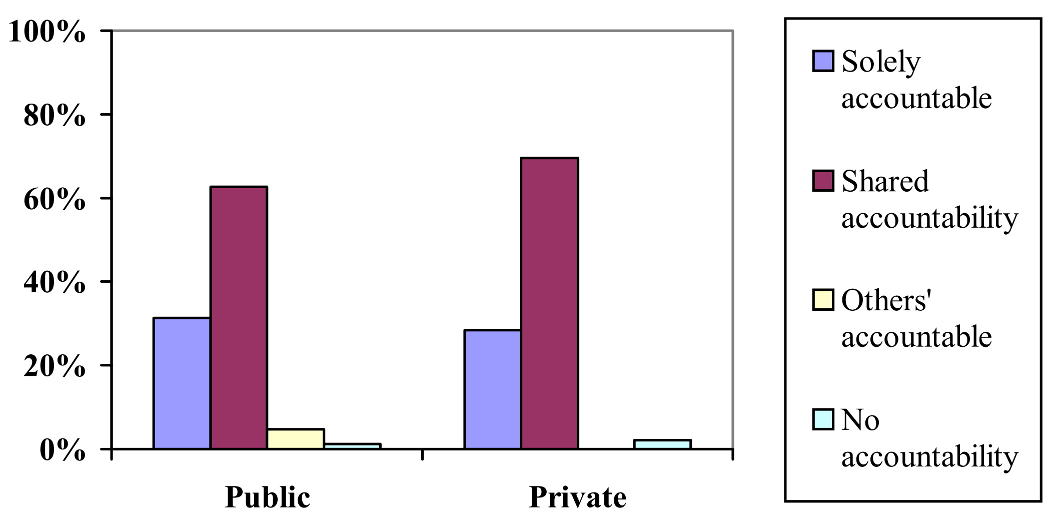
In addition to the relative influence of strategic planning for technology, the survey respondents also evaluated their organizational performance on the critical success factor. In the public sector, 26.5 percent of the respondents rated their organizational performance on strategic planning for technology as poor or very poor, compared to 10.5 percent of the private sector. Approximately 25 percent of the public sector respondents and 37 percent of the private sector rated their performance on strategic planning as adequate. Finally, 48.1 percent of the public sector respondents and 52.6 percent of the private sector respondents rated their organizational performance on strategic planning for technology as good or very good.

Accountability of CIO

In addition to ranking the influence and organizational performance on strategic technology planning, the survey respondents also rated their accountability as Chief Information Officer. This concept is critical to understanding strategic technology planning because CIOs with higher levels of accountability are more powerful in the organization and their use of strategic planning is more important to overall technology project success. By engaging in strategic planning, a highly accountable CIO can build his constituency, while addressing issues of goal alignment and engaging top management support. Furthermore, CIOs who share accountability with other technology staff should use strategic planning to create a shared vision and establish common goals for the organization.

Approximately 30 percent of the CIOs included in the survey indicate that they are solely accountable for IT project success. An additional 66.3 percent indicate that the CIO is accountable, but that she shares accountability with others. Only two percent indicate that the accountability for IT project success resides with others in the organization, while 1.7 percent indicate that there is no organizational accountability for IT project success. Chart 4.9 demonstrates the sectoral differences associated with CIO accountability.

Chart 4.9. CIO accountability, by sector.



As illustrated in Chart 4.9, over 30 percent of public sector CIOs and 28 percent of private sector CIOs are solely accountable for IT project success. In addition, 62.7 percent of public sector respondents feel that the CIO shares accountability with others in the organization, compared to 69.5 percent of the private sector. Almost five percent of the public sector CIOs state that accountability for IT project success resides with others in the organization, while one percent of public and two percent of private sector CIOs indicate that there is no organizational accountability for success.

Formal rules and procedures

Another important component of strategic technology planning is the use of formal rules and procedures to guide organizational operations. When developing a strategic technology plan, it is important to codify specific procedures and rules in order to maintain consistency and standardization across technology projects. In other words, the use of formal rules and procedures allows project success to be assessed despite differences in project design, scope, or function. It also allows specific, standard milestones to be established for all projects, which can significantly increase the likelihood of project success, by acting as triggers for specific actions.

According to survey respondents, only nine percent of the CIOs indicate that their organization always uses formalized rules and procedures to guide daily operations. Over 44 percent state that their organization frequently uses such formal mechanisms for daily work. Thirty percent of the CIOs feel that their organization occasionally uses formal rules and procedures, while sixteen percent indicate that their organization rarely or never uses such mechanisms. Chart 4.10 demonstrates the sectoral differences related to use for formal rules and procedures.

Chart 4.10. Use of formal rules and procedures, by sector.

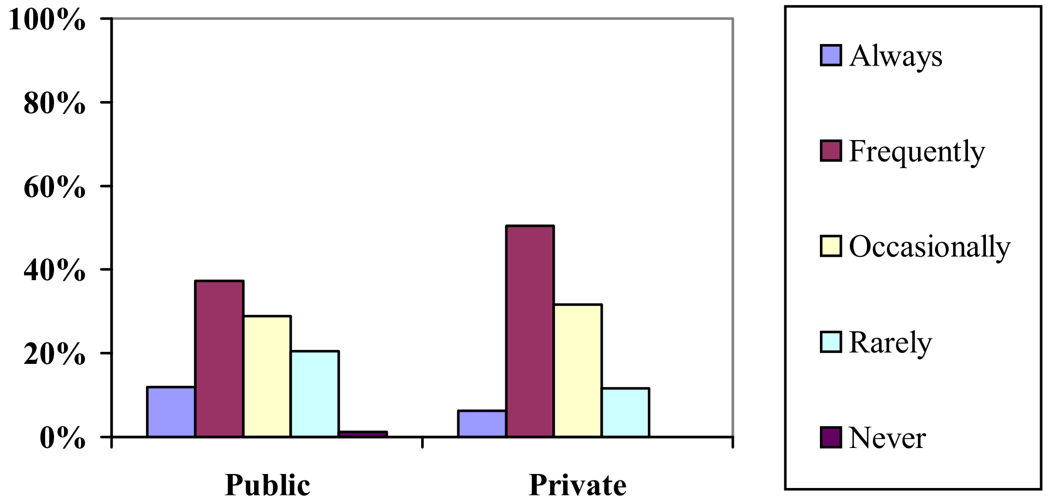


Chart 4.10 highlights the use of rules and procedures in the public and private sectors. Approximately twelve percent of public sector CIOs and six percent of private sector CIOs feel that their organization always uses formal rules and procedures to guide daily operations. Over 37 percent of public sector respondents and 50 percent of private sector respondents indicate that their organization frequently uses formal rules and procedures. In terms of occasional use of formal rules and procedures, 28.9 percent of public sector CIOs and 31.6 percent of private sector CIOs indicate that this is prevalent in their organization. Over 20 percent of respondents from the public sector feel that their organization rarely uses formal rules and procedures, compared to 11.6 percent of the private sector. Finally, one percent of the public sector indicates formal rules and procedures are never used in their organizations.

Critical Success Factor: End user involvement

In order to increase the support for and use of new technology applications, the end users must be involved from the onset of the project, in order to determine requirements and establish realistic but aggressive time frames. Both public and private sector literature highlights the importance of end user involvement because it establishes a sense of ownership in the project and engenders future support and usage.

Over fifty-four percent of the survey respondents indicate that end user involvement is significantly more influential than use of rewards (median comparison factor) in affecting technology project success. An additional 32.6 percent of the survey respondents indicate that end user involvement is slightly more influential than use of rewards. Nine percent of respondents feel that it is equal in influence to use of rewards, while approximately 3.9 percent of respondents feel that end user involvement is less influential than use of rewards. Chart 4.11 demonstrates the breakdown of responses on end user involvement by sector.

Chart 4.11. Influence of end user involvement, by sector

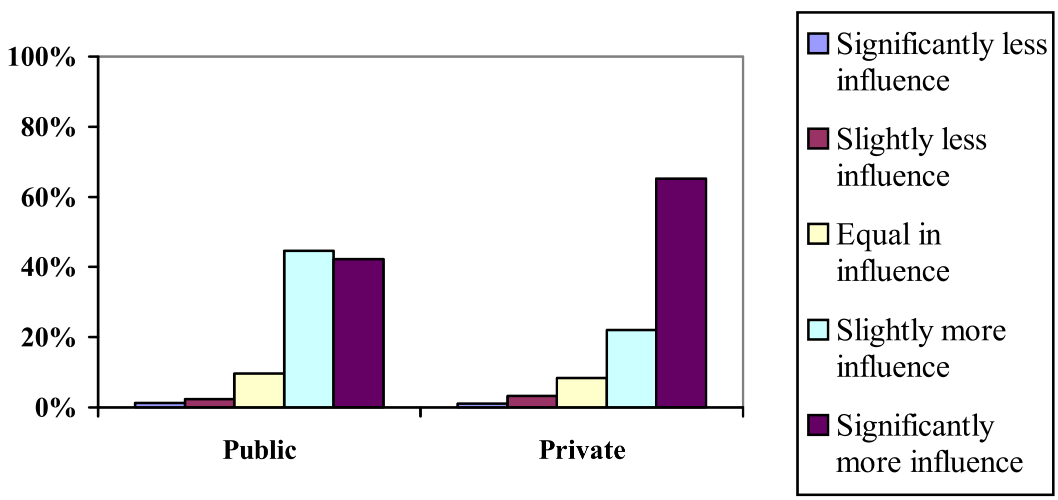


Chart 4.11 depicts the relative influence of end user involvement on IT project success. Only one percent of public and private sector respondents rate end user involvement as significantly less influential than use of rewards. Two percent of the public sector CIOs and three percent of private sector CIOs view end user involvement as slightly less influential

than the median factor. Approximately ten percent of respondents in the public sector and eight percent in the private sector rate end user involvement as equal in influence, compared to the median factor. Almost 45 percent of the public sector CIOs view end user involvement as slightly more influential as use of rewards, compared to 22 percent of the private sector CIOs. Finally, 42.2 percent of public sector respondents and 65.3 percent of private sector respondents rate end user involvement as significantly more influential than the median success factor—use of rewards.

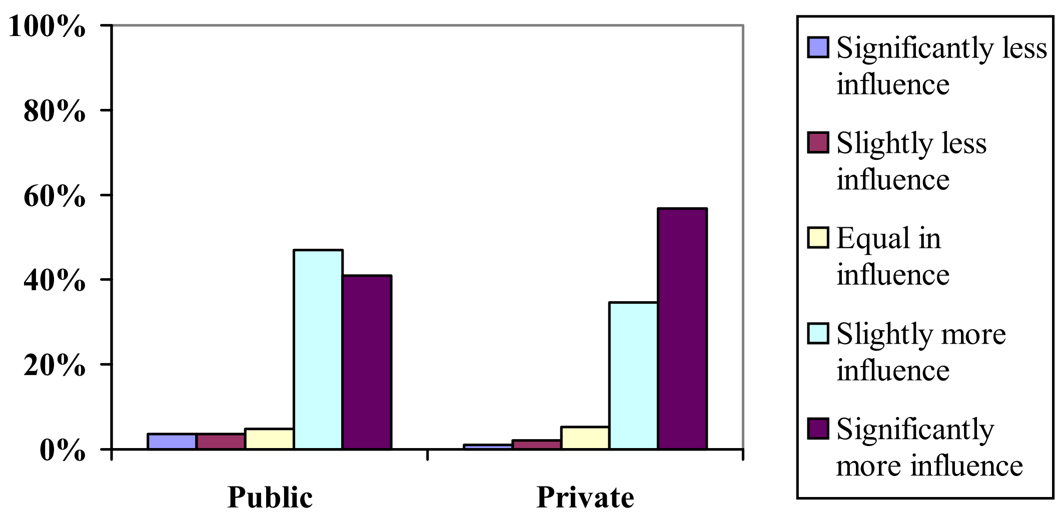
The survey respondents also evaluated their organizational performance on end user involvement. In the public sector, 13.3 percent of the respondents rated their organizational performance on end user involvement as poor or very poor, compared to 7.4 percent of the private sector. Approximately nineteen percent of the public sector respondents and 8.4 percent of the private sector rated their performance on end user involvement as adequate. Finally, 77.1 percent of the public sector respondents and 86.3 percent of the private sector respondents rated their organizational performance on end user involvement as good or very good.

Critical Success Factor: Stakeholder involvement

Stakeholder involvement is one of the most frequently cited critical success factors. Stakeholder involvement, coupled with end user involvement, ensures the needs of internal and external recipients are being met through adequate representation during the planning and testing phases. By including stakeholder involvement as a critical success factor, CIOs can foster external and internal project support, as well as ensure that projects will be designed with attention to alternatives.

Almost 50 percent of the survey respondents indicate that stakeholder involvement is significantly more influential than use of rewards (median comparison factor) in affecting technology project success. An additional 40 percent of the survey respondents indicate that it is slightly more influential than use of rewards. Only fiver percent of respondents feel that stakeholder involvement is equal in influence to use of rewards. Finally, 5.1 percent of respondents feel that stakeholder involvement is less influential than use of rewards. Chart 4.12 demonstrates the breakdown of responses on stakeholder involvement by sector.

Chart 4.12. Influence of stakeholder involvement, by sector



As illustrated in Chart 4.12, only 3.6 percent of public sector CIOs and one percent of private sector CIOs rate stakeholder involvement as significantly less influential than use of rewards. In addition, 3.6 percent of public sector respondents and 2.1 percent of private sector ones view the success factor to be slightly less influential than use of rewards. Almost five percent of public and private sector CIOs rate stakeholder involvement as equally influential compared to the median factor. Furthermore, 47 percent of public sector respondents view stakeholder involvement as slightly more influential than use of rewards, compared to 35 percent of private sector respondents. Finally, 41.0 percent of CIOs from the public sector and 56.8 percent from the private sector rate stakeholder involvement as significantly more influential than the median success factor—use of rewards.

In addition to the relative influence of stakeholder involvement, compared to use of rewards, the survey respondents also evaluated their organizational performance on the critical success factor. In the public sector, almost ten percent of the respondents rated their organizational performance on stakeholder involvement as poor or very poor, compared to fourteen percent of the private sector. Approximately 25 percent of the public sector respondents and 29 percent of the private sector rated their performance on stakeholder involvement as adequate. Finally, 65.1 percent of the public sector respondents and 56.8 percent of the private sector respondents rated their organizational performance on stakeholder involvement as good or very good.

Stakeholder inclusion and impact

In addition to assessing the influence and organizational performance on stakeholder involvement, this research also addresses issues of stakeholder inclusion and impact. Over 50 percent of the CIOs surveyed indicate that stakeholders are always involved in IT project design and implementation. An additional 40 percent feel that stakeholders are frequently involved, while nine percent indicate that stakeholders are occasionally or rarely involved in IT project design and implementation.

In the public sector, almost 50 percent of CIOs indicate that stakeholders are always involved, while 40 percent indicate that they are frequently involved. In the private sector, almost 52 percent of the CIOs feel that stakeholders are always involved while 41 percent feel they are frequently involved. Approximately 10 percent of public sector CIOs indicate that stakeholders are occasionally or rarely involved, compared to 7.4 percent of the private sector.

In terms of level of stakeholder involvement, over 78 percent of the CIOs indicate that stakeholders are somewhat or very involved in IT projects. An additional 20 percent feel that they are moderately involved, while less than two percent indicate that stakeholders are slightly or not involved. Chart 4.13 illustrates the sectoral differences in stakeholder involvement.

Chart 4.13. Level of stakeholder involvement, by sector.

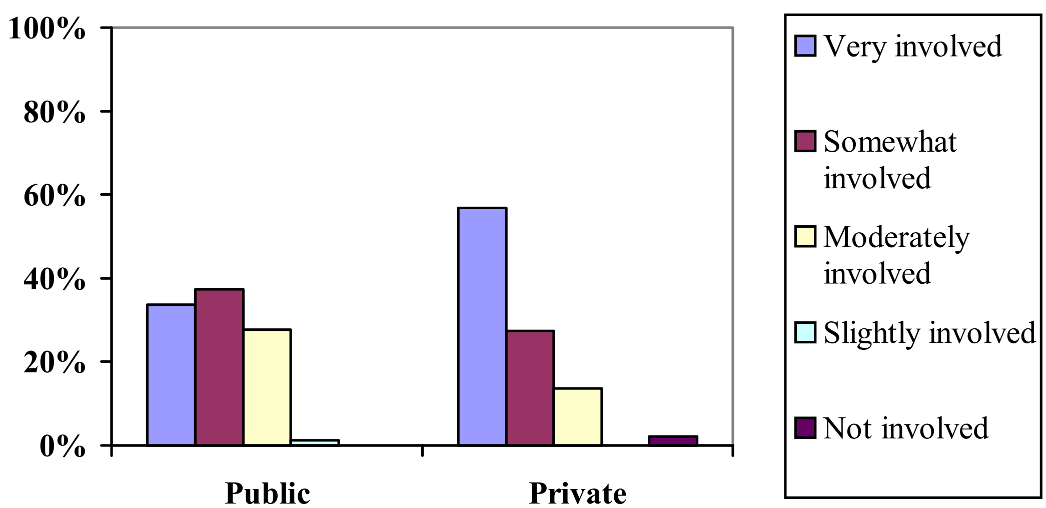
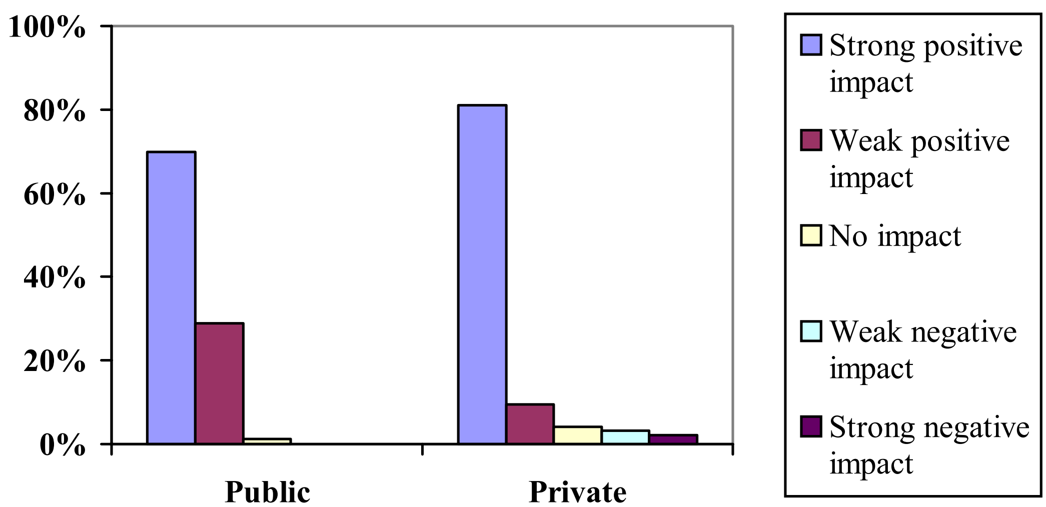


Chart 4.13 demonstrates that over 33 percent of public sector CIOs and 57 percent of private sector CIOs feel that stakeholders are very involved in the design and implementation of IT projects. Thirty-seven percent of public sector respondents and twenty-seven percent of private sector respondents indicate that stakeholders are somewhat involved. Only 1.2

percent of public sector CIOs feel that stakeholders are slightly involved in IT projects, while 2.1 percent of private sector CIOs indicate that they are not involved.

Finally, stakeholder impact on IT project success is an important factor to consider when gauging their influence. Over 75 percent of the CIOs indicate that stakeholder involvement has a strong positive impact on overall IT project success, while an additional 19 percent indicate that it has a weak positive impact. Only 2.8 percent of the CIOs surveyed feel that stakeholder involvement has no impact on IT project success, while another 2.8 percent feel that it has a negative impact. Chart 4.14 highlights the sectoral differences concerning stakeholder impact on project success.

Chart 4.14. Impact of stakeholder involvement, by sector.



As illustrated in Chart 4.14, 70 percent of public sector CIOs and 81 percent of private sector CIOs feel that stakeholder involvement has a strong positive impact on IT project success. Additionally, 30 percent of public sector respondents feel that it has a weak positive impact, compared to 10 percent of the private sector. Only 1.2 percent of the public sector and 4.2 percent of the private sector indicate that stakeholder involvement has no impact of IT project success. Additionally, in the private sector, three percent of CIOs feel that stakeholder involvement has a weak negative impact on success, while two percent feel that it has a strong negative impact.

Critical Success Factor: Defined, measurable project milestones

Realistic goals and expectations, articulated as *project milestones*, are critical to the successful adoption of information technology. It is essential to have small, realistic goals and expectations in order to foster confidence in the new technology and to provide for morale-boosting achievements associated with the new application. Milestones provide the opportunity to assess the work to date, make corrections if needed, and also provide small victories for successes achieved by the project staff.

Thirty-eight percent of the survey respondents indicate that defined, measurable milestones are significantly more influential than use of rewards in affecting technology project success. An additional 41.6 percent of the survey respondents indicate that defined, measurable milestones are slightly more influential than use of rewards. Sixteen percent of respondents feel that they are equal in influence to use of rewards, while approximately five percent of respondents feel that defined, measurable milestones are less influential than use of rewards. Chart 4.15 demonstrates the breakdown of responses on defined, measurable milestones by sector.

Chart 4.15. Influence of milestones, by sector

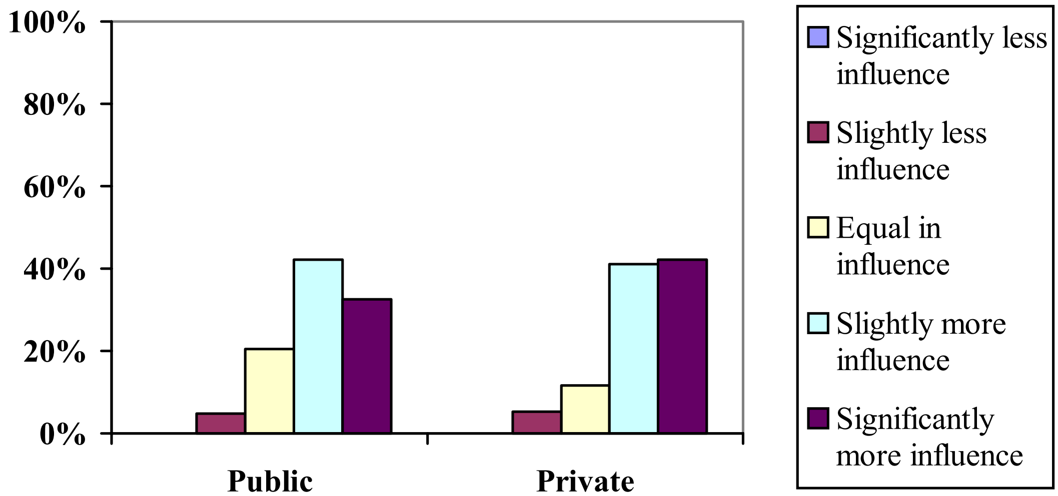


Chart 4.15 demonstrates the relative influence of project milestones based on organizational sector. Neither the public nor private sector respondents rate use of project milestones as significantly less influential than use of rewards. Furthermore, 4.8 percent of respondents from the public sector and 5.3 percent in the private sector view the success factor as slightly less influential. In the public sector, 20.5 percent of the CIO respondents feel that use of project milestones is equal in influence to use of rewards, compared to 11.6 percent of the private sector respondents. Approximately 42 percent of the public sector CIOs and 41 percent of the private sector CIOs rate use of project milestones as slightly more influential than use of rewards. Finally, almost thirty-three percent of respondents from the public sector view use of project milestones as significantly more influential than use of rewards, compared to approximately forty-two percent of private sector respondents.

The survey respondents also evaluated their organizational performance on defined, measurable milestones. In the public sector, 9.6 percent of the respondents rated their organizational performance on defined, measurable milestones as poor or very poor, compared to 14.7 percent of the private sector. Approximately 31 percent of the public sector respondents and 25 percent of the private sector rated their performance on defined, measurable milestones as adequate. Finally, 59.1 percent of the public sector respondents and 60.0 percent of the private sector respondents rated their organizational performance on milestones as good or very good.

Measures of success

Another important concept to consider when examining use of project milestones is the type of metrics or measures used to determine success. According to the CIOs surveyed, 12.4 percent use meeting time budgets as the primary measure of success, while 10.7 percent use meeting cost budgets. In addition, over twenty percent of the CIOs indicate that business metrics, such as return on investment or cost-benefit analysis, is the primary indicator of project success. Over 37 percent of the CIOs employ user satisfaction as the main measure of project success, while another 19 percent use a combination of methods to determine success. Chart 4.16 examines the sectoral differences related to success measures and metrics.

Chart 4.16. Measures of success, by sector.

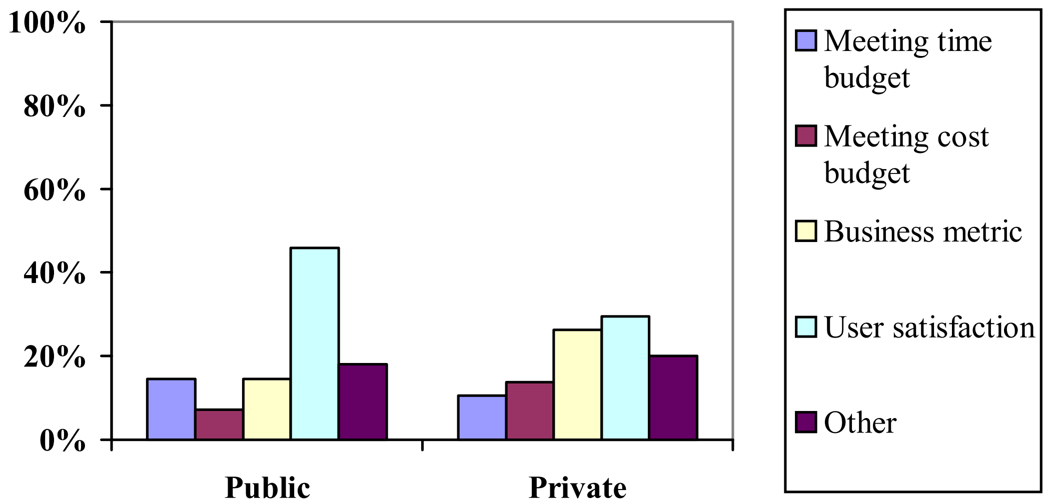


Chart 4.16 demonstrates that almost 15 percent of the public sector and 39 percent of the private sector use meeting time budgets as their primary measure of success. Seven percent of the public sector CIOs and fourteen percent of private sector CIOs use meeting cost budgets as the primary measure of success. In terms of using business metrics as the main indicator of success, 14.5 percent of public sector CIOs and 26.3 percent of private sector CIOs do so. Approximately 46 percent of the public sector respondents and 30 percent of private sector respondents indicate that user satisfaction is their primary success metric. Finally, 18.1 percent of public sector CIOs and 20 percent of private sector CIOs use a combination of the aforementioned methods to determine project success.

Critical Success Factor: Top management support

Top management support is one of the most crucial factors to successful adoption of technology. Top management support is essential for fostering end user adoption of new technologies. Top management support is the preeminent critical success factor, according to the literature review. According to the survey respondents, top management support is the most critical success factor.

Over seventy percent of the survey respondents indicate that top management support is significantly more influential than use of rewards (median comparison factor) in affecting technology project success. An additional 21 percent of the survey respondents indicate that it is slightly more influential than use of rewards. Only 4.5 percent of respondents feel that top management support is equal in influence to use of rewards. Finally, less than five percent of respondents feel that top management support is less influential than use of rewards. Chart 4.17 demonstrates the breakdown of responses on top management support by sector.

Chart 4.17. Influence of top management support, by sector

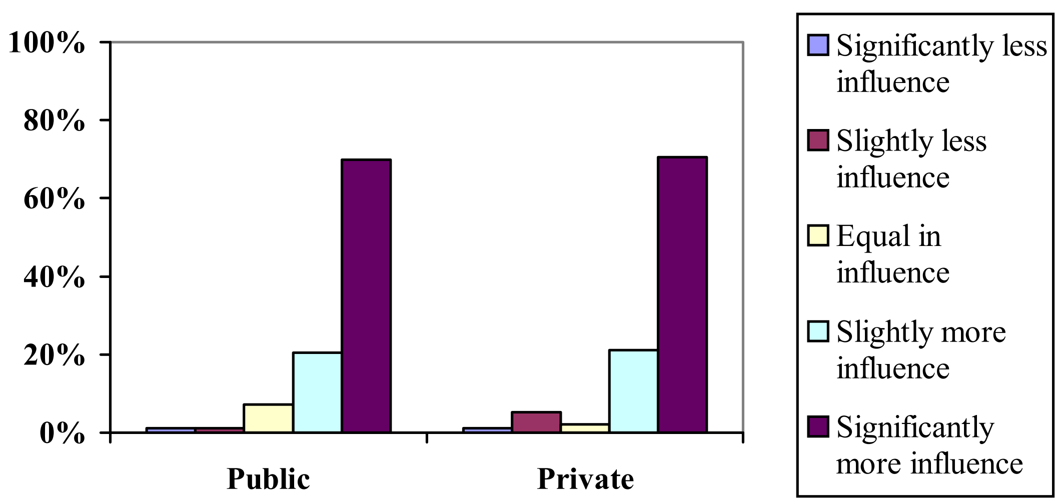


Chart 4.17 depicts the relative influence of top management support on IT project success. Only one percent of each sectors' respondents rate top management support as significantly less influential than use of rewards. Additionally, one percent of public sector

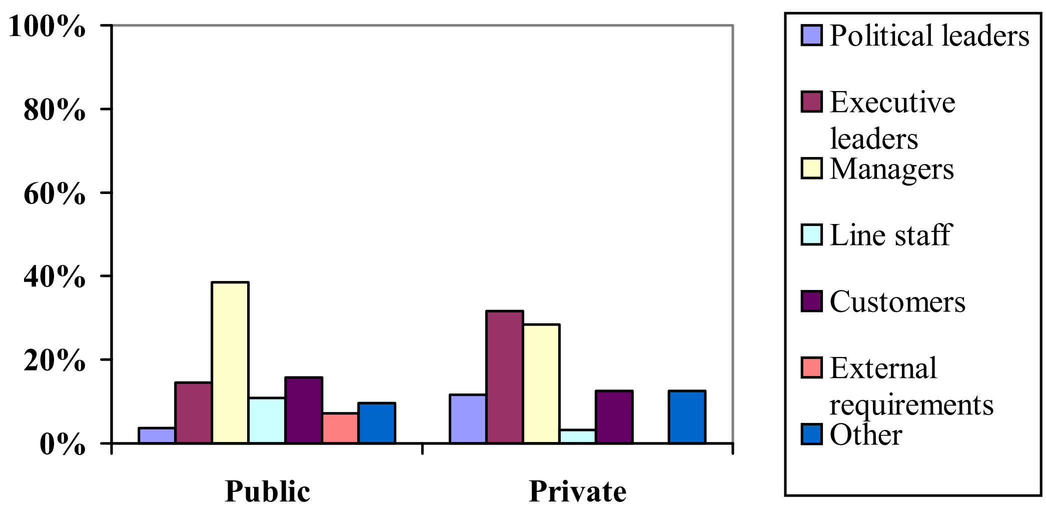
CIOs and two percent of private sector CIOs view top management support as slightly less influential than the median factor. Approximately ten percent of respondents in the public sector and eight percent in the private sector rate top management support as equal in influence, compared to the median factor. Over 44 percent of the public sector CIOs view top management support as slightly more influential as use of rewards, compared to 22 percent of the private sector CIOs. Finally, 42.2 percent of public sector respondents and 65.3 percent of private sector respondents rate top management support as significantly more influential than the median success factor—use of rewards.

In addition to the relative influence of top management support, compared to use of rewards, the survey respondents also evaluated their organizational performance on the critical success factor. In the public sector, 3.6 percent of the respondents rated their organizational performance on top management as poor or very poor, compared to 5.3 percent of the private sector. Approximately nineteen percent of the public sector respondents and eight percent of the private sector rated their performance on top management support as adequate. Finally, 77.1 percent of the public sector respondents and 86.3 percent of the private sector respondents rated their organizational performance on top management support as good or very good.

Idea Germination

Another indicator of top management support can be found in the location of the germination of the majority of ideas. Support from top management implies that the top management is engaged in identifying and seeding ideas for new technology projects. Accordingly, eight percent of the CIOs indicate that political leaders (i.e., elected officials or board of directors) supply the majority of new project ideas. Over 23 percent of the CIOs feel that such ideas are generated at the executive leadership level, while another 33 percent indicate that new project ideas are stimulated at the managerial level. Approximately seven percent of the CIOs surveyed indicate that the majority of new ideas are generated at the line staff level, compared to 14 percent of the CIOs who feel that they come from customers. Only three percent of the CIOs feel that external requirements provide the impetus for new ideas, while eleven percent indicate that they come from other areas. Chart 4.18 highlights new idea generation based on sector.

Chart 4.18. IT project idea germination, by sector.



As illustrated in Chart 4.18, almost four percent of the public sector respondents and twelve percent of private sector respondents feel that the majority of new IT project ideas occur at the political leadership level. Furthermore, 14.5 percent of public sector CIOs and 31.6 percent of private sector CIOs feel that executive leaders provide the majority of new project ideas. Approximately 39 percent of the public sector and 28 percent of the private sector indicate that new ideas germinate from the managerial level of the organization.

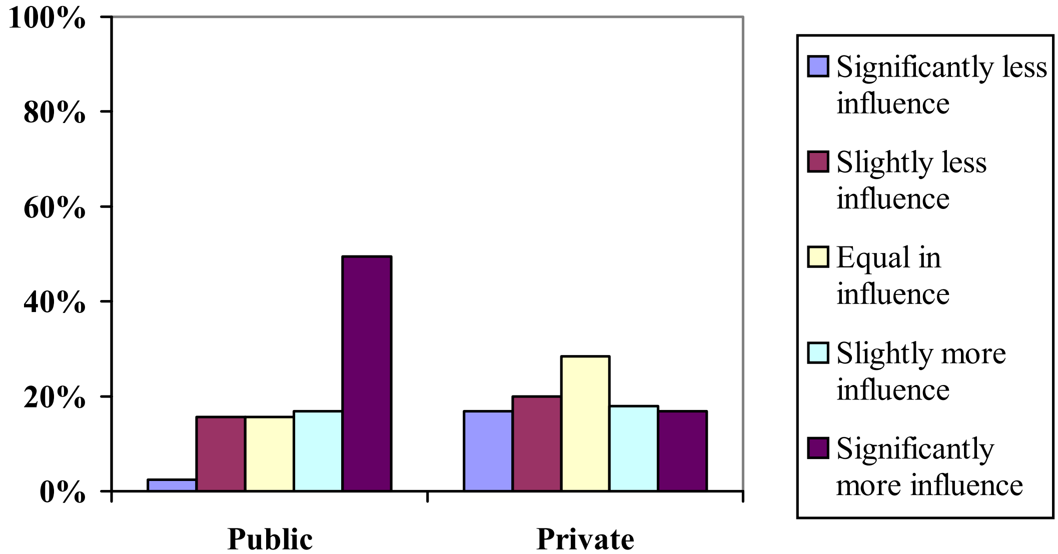
Eleven percent of respondents from the public sector and three percent from the private sector feel that line staff offer the majority of new ideas. Over fifteen percent of public sector CIOs and twelve percent of private sector CIOs indicate that customers provide the majority of new IT project ideas. Additionally, seven percent of the public sector CIOs feel that external requirements introduce new ideas. Finally, approximately ten percent of the public sector respondents and thirteen percent of private sector respondents indicate that new project ideas are generated from other areas.

Critical Success Factor: Political support

Political support (by elected officials or boards of directors) is critical to the success of information technology projects. Based on the literature review, there is little mention of political support within the private sector. Perhaps this is a function of the importance of management support, and relative power, compared to the board. However, the public sector literature repeatedly highlights the importance of political support to technology projects. Regardless of the sector, political support is essential for technology projects, primarily because political resistance can quickly disable such projects.

Almost 32 percent of the survey respondents indicate that political support is significantly more influential than use of rewards in affecting technology project success. An additional 17.3 percent of the survey respondents indicate that it is slightly more influential than use of rewards. Over twenty-two percent of respondents feel that political support is equal in influence to use of rewards. Eighteen percent of respondents feel that political support is slightly less influential than use of rewards, while 10.1 percent feel that it is significantly less influential. Chart 4.19 demonstrates the breakdown of responses on political support by sector.

Chart 4.19. Influence of political support, by sector



As illustrated in Chart 4.19, only two percent of public sector CIOS and seventeen percent of private sector CIOs rate political support as significantly less influential than use of rewards. In addition, 15.7 percent of public sector respondents and 20.0 percent of private sector ones view the success factor to be slightly less influential than use of rewards. Almost sixteen percent of public sector CIOs and twenty-eight percent of private sector CIOs rate political support as equally influential compared to the median factor. Furthermore, 16.9 percent of public sector respondents view political support as slightly more influential than use of rewards, compared to 17.9 percent of private sector respondents. Finally, 49.4 percent of CIOs from the public sector and 16.8 percent from the private sector rate political support as significantly more influential than the median success factor—use of rewards.

The survey respondents also evaluated their organizational performance on political support. In the public sector, 18.1 percent of the respondents rated their organizational performance on political support as poor or very poor, compared to 24.2 percent of the private sector. Approximately 31 percent of the public sector respondents and 44 percent of the private sector rated their performance on political support as adequate. Finally, 50.6 percent of the public sector respondents and 67.4 percent of the private sector respondents rated their organizational performance on political support as good or very good.

Critical Success Factor: Prototyping/piloting

Prototyping and/or piloting are main tenets of project management methodologies. The use of these techniques can significantly reduce change orders and user dissatisfaction once full implementation has occurred. The use of prototyping creates a sense of ownership among end users, and also requires their involvement. The prototyping phase is also critical for refining functionality and user requirements. The piloting process should be used to demonstrate the success of a given project initially and then its scalability and applicability to varying constraints. The piloting approach also allows for rapid expansion of the project.

Only twelve percent of the survey respondents indicate that use of prototyping/piloting is significantly more influential than use of rewards (median comparison factor) in affecting technology project success. An additional 28 percent of the survey respondents indicate that it is slightly more influential than use of rewards. Approximately 39 percent of respondents feel that use of prototyping/piloting is equal in influence to use of rewards. Finally, 20.8 percent of respondents feel that stakeholder involvement is less influential than use of rewards. Chart 4.20 demonstrates the breakdown of responses on use of prototyping/piloting by sector.

Chart 4.20. Influence of use of prototyping/piloting, by sector

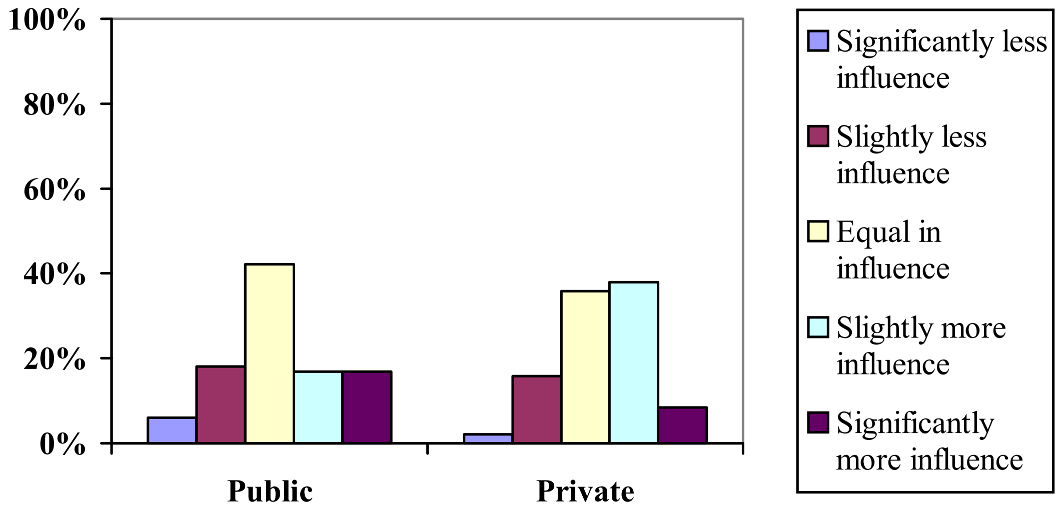


Chart 4.20 demonstrates the relative influence of use of prototyping and/or piloting according to organizational sector. Six percent of public sector CIOs and two percent of private sector CIOs rate use of prototyping and/or piloting as significantly less influential than the median critical success factor—use of rewards. Furthermore, 18.1 percent of respondents from the public sector and 15.8 percent in the private sector view the success factor as slightly less influential. In the public sector, 42.2 percent of the CIO respondents feel that use of prototyping and/or piloting is equal in influence to use of rewards, compared to 35.8 percent of the private sector respondents. Approximately 17 percent of the public sector CIOs and 38 percent of the private sector CIOs rate use of prototyping and/or piloting as slightly more influential than use of rewards. Finally, another seventeen percent of respondents from the public sector view use of prototyping and/or piloting as significantly

more influential than use of rewards, compared to approximately eight percent of private sector respondents.

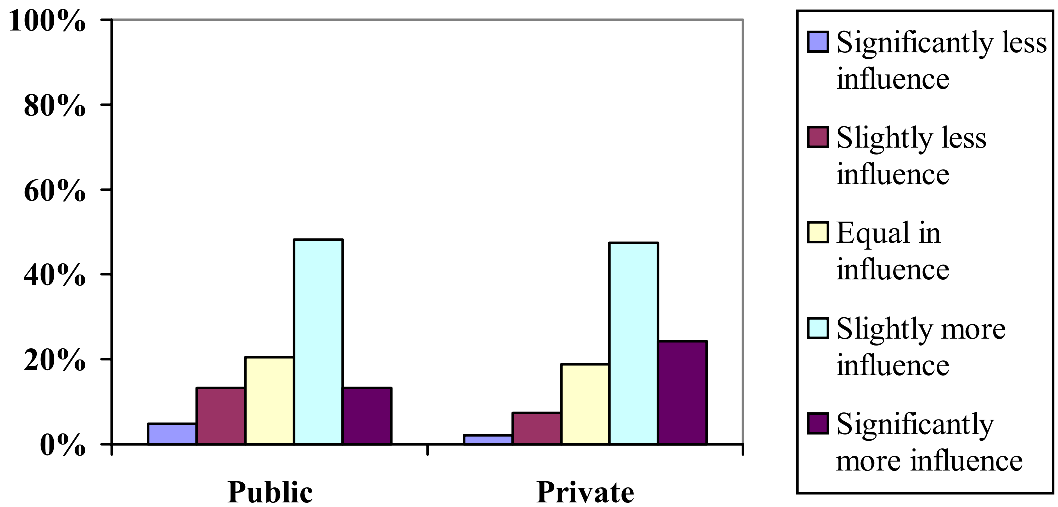
In addition to the relative influence of use of prototyping/piloting, compared to use of rewards, the survey respondents also evaluated their organizational performance on the critical success factor. In the public sector, 30.1 percent of the respondents rated their organizational performance on use of prototyping/piloting as poor or very poor, compared to 20.0 percent of the private sector. Approximately thirty-five percent of the public sector respondents and forty-six percent of the private sector rated their performance on use of prototyping/piloting as adequate. Finally, 34.9 percent of the public sector respondents and 33.7 percent of the private sector respondents rated their organizational performance on use of prototyping/piloting as good or very good.

Critical Success Factor: Use of cross-functional teams

The use of cross-functional teams is one of the emerging trends in the technology world. The selection of the proper project team is critical to the overall success of a technology project. These teams incorporate individuals from various departments within an organization for a variety of reasons. In essence, the technology staff and the business staff must collaborate on technology projects in order to create value-added outcomes for the organization.

Almost 20 percent of the survey respondents indicate that use of cross-functional teams is significantly more influential than use of rewards in affecting technology project success. Additionally, 47.8 percent of the survey respondents indicate that it is slightly more influential than use of rewards. Almost twenty percent of respondents feel that use of cross-functional teams is equal in influence to use of rewards. Approximately ten percent of respondents feel that use of cross-functional teams is slightly less influential than use of rewards, while three percent feel that it is significantly less influential. Chart 4.21 demonstrates the breakdown of responses on use of cross-functional teams by sector.

Chart 4.21. Influence of cross-functional teams, by sector



As shown in Chart 4.21, only five percent of public sector CIOs and two percent of private sector CIOs rate use of cross-functional teams as significantly less influential than use of rewards. In addition, 13.3 percent of public sector respondents and 7.4 percent of private sector ones view the success factor to be slightly less influential than use of rewards. Over twenty percent of public sector CIOs and nineteen percent of private sector CIOs rate use of cross-functional teams as equally influential compared to the median factor. Furthermore, 48.2 percent of public sector respondents view use of cross-functional teams as slightly more influential than use of rewards, compared to 47.4 percent of private sector respondents. Finally, over thirteen percent of CIOs from the public sector and twenty-four percent from the private sector rate use of cross-functional teams as significantly more influential than the median success factor—use of rewards.

The survey respondents also evaluated their organizational performance on use of cross-functional teams. In the public sector, over nineteen percent of the respondents rated their organizational performance on use of cross-functional teams as poor or very poor, compared to almost fourteen percent of the private sector. Approximately 31 percent of the public sector respondents and 29.5 percent of the private sector rated their performance on use of cross-functional teams as adequate. Finally, 49.4 percent of the public sector respondents and 56.8 percent of the private sector respondents rated their organizational performance on use of cross-functional teams as good or very good.

Rewards for teamwork

Another indicator of organizational commitment to use of cross-functional teams is the institutionalization of rewarding team-based efforts. Only 4.5 percent of the CIOs surveyed indicate that their organization always rewards teamwork and cooperation. In addition, 33.7 percent feel that their organization frequently rewards such behavior. Another thirty-three percent indicate that their organization occasionally rewards teamwork and cooperation. Finally, 28.6 percent of the CIOs feel that their organization rarely or never rewards teamwork or cooperation. Chart 4.22 highlights the differences between the public and private sectors related to rewards for teamwork.

Chart 4.22. Use of rewards for teamwork, by sector.

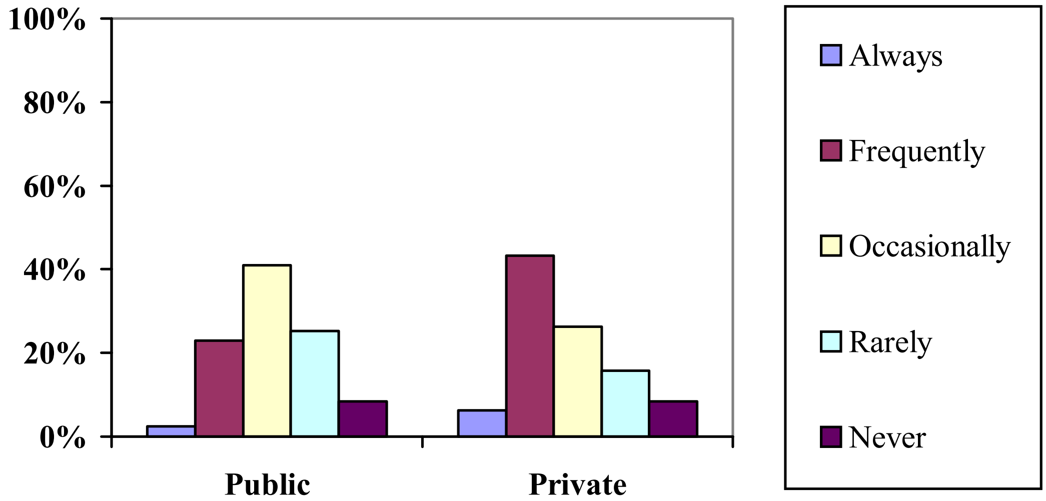


Chart 4.22 illustrates the significant differences between the two sector regarding rewards for teamwork. Approximately two percent of the public sector CIOs feel that their organization always rewards teamwork and cooperation, compared to six percent of the private sector. Almost 23 percent of the respondents from the public sector and 43 percent from the private sector indicate that their organization frequently rewards such behavior. Forty-one percent of public sector CIOs and twenty-six percent of private sector CIOs feel that teamwork and cooperation are rewarded occasionally. Finally, 33.7 percent of the public sector indicates that their organizations rarely or never reward teamwork, compared to 24.2 percent of the private sector.

Critical Success Factor: End user training

End user training is central to the adoption of the technology in the workplace. By incorporating training, end users will be more likely to adopt new technologies because the learning curve has been reduced. In addition, the implementation of a training program signifies top management support for a project through the designation of funds for training purposes.

Over twenty percent of the survey respondents indicate that end user training is significantly more influential than use of rewards (median comparison factor) in affecting technology project success. An additional 47.8 percent of the survey respondents indicate that it is slightly more influential than use of rewards. Approximately 23 percent of respondents feel that end user training is equal in influence to use of rewards. Finally, nine percent of respondents feel that end user training is less influential than use of rewards. Chart 4.23 demonstrates the breakdown of responses on end user training by sector.

Chart 4.23. Influence of end user training, by sector

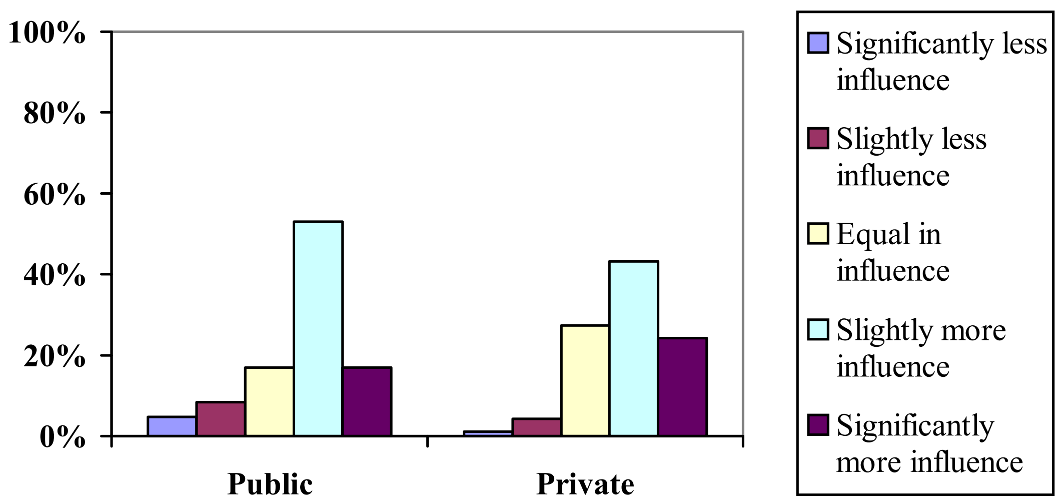


Chart 4.23 depicts the relative influence of end user training on IT project success. Only fiver percent of public sector respondents and one private sector respondents rate end user training as significantly less influential than use of rewards. Eight percent of public sector CIOs and four percent of private sector CIOs view end user training as slightly less

influential than the median factor. Approximately 17 percent of respondents in the public sector and 27 percent in the private sector rate end user training as equal in influence, compared to the median factor. Furthermore, 53 percent of the public sector CIOs view end user training as slightly more influential as use of rewards, compared to 43 percent of the private sector CIOs. Finally, 16.9 percent of public sector respondents and 24.2 percent of private sector respondents rate end user training as significantly more influential than use of rewards.

In addition to the relative influence of end user training, compared to use of rewards, the survey respondents also evaluated their organizational performance on the critical success factor. In the public sector, 25.3 percent of the respondents rated their organizational performance on end user training as poor or very poor, compared to 27.4 percent of the private sector. Approximately 50 percent of the public sector respondents and 62 percent of the private sector rated their performance on end user training as adequate. Finally, 24.1 percent of the public sector respondents and 10.6 percent of the private sector respondents rated their organizational performance on end user training as good or very good.

Critical Success Factor: Location of CIO in organization

The location of the CIO in the organization is another critical success factor. One of the most commonly cited qualities of effective CIOs includes having significant power and authority in the organization. By locating the CIO within the upper echelon of management, the organization signifies a commitment to new technology, which is critical for end user adoption and support.

Only 15.7 percent of the survey respondents indicate that location of the CIO within the organizational hierarchy is significantly more influential than use of rewards (median comparison factor) in affecting technology project success. An additional twenty percent of the survey respondents indicate that it is slightly more influential than use of rewards. Approximately 26 percent of respondents feel that location of the CIO is equal in influence to use of rewards. Finally, 37.6 percent of respondents feel that the location of the CIO within the organizational hierarchy is less influential than use of rewards. Chart 4.24 demonstrates the breakdown of responses on location of CIO by sector.

Chart 4.24. Influence of location of CIO, by sector

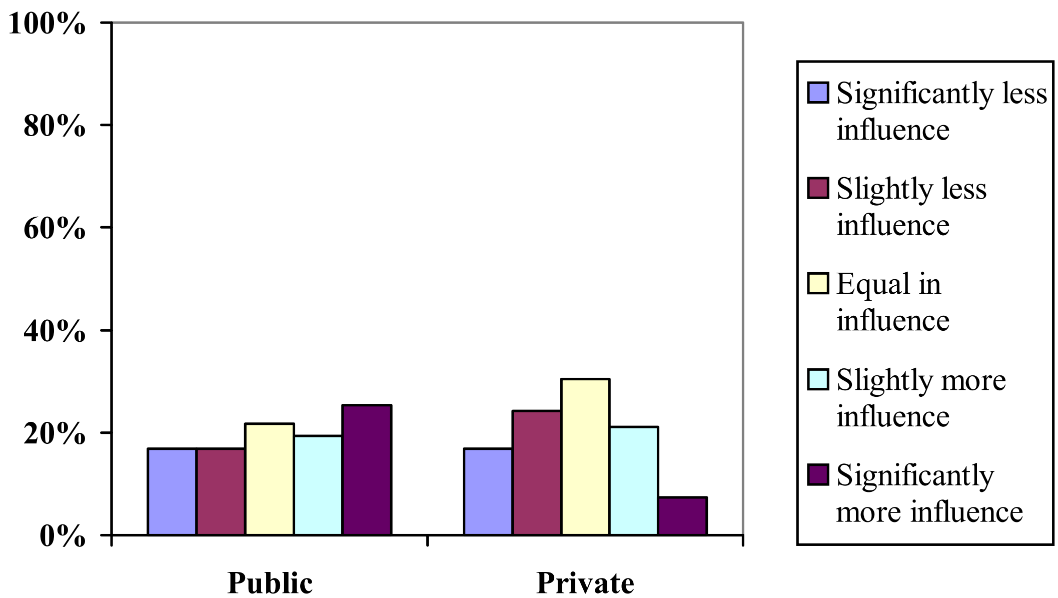


Chart 4.24 illustrates the relative influence of the location of the CIO within the organization. Almost seventeen percent of public and private sector CIOs rate the location of the CIO within the organization as significantly less influential than the median critical success factor—use of rewards. Furthermore, 16.9 percent of respondents from the public

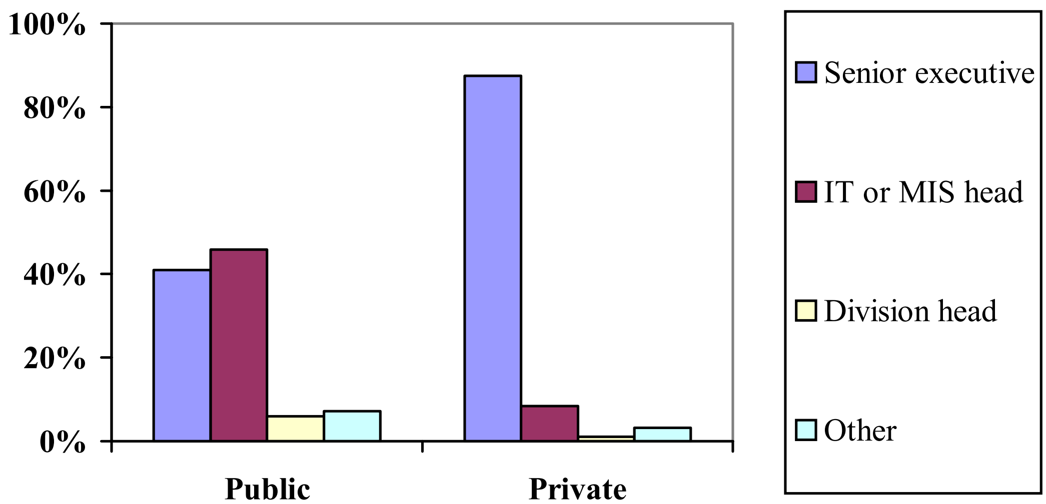
sector and 24.2 percent in the private sector view the success factor as slightly less influential. In the public sector, 21.7 percent of the CIO respondents feel that the location of the CIO within the organization is equal in influence to use of rewards, compared to 30.5 percent of the private sector respondents. Approximately 19 percent of the public sector CIOs and 21 percent of the private sector CIOs rate the location of the CIO within the organization as slightly more influential than use of rewards. Finally, another twenty-five percent of respondents from the public sector view the location of the CIO within the organization as significantly more influential than use of rewards, compared to approximately seven percent of private sector respondents.

In addition to the relative influence of location of CIO, the survey respondents also evaluated their organizational performance on the critical success factor. In the public sector, 22.9 percent of the respondents rated their organizational performance on location of CIO as poor or very poor, compared to 21.1 percent of the private sector. Approximately 24.1 percent of the public sector respondents and 25.3 percent of the private sector rated their performance on location of CIO as adequate. Finally, 53.0 percent of the public sector respondents and 53.7 percent of the private sector respondents rated their organizational performance on location of CIO as good or very good.

Location of CIO in Organization

Another indicator of the importance of the CIO within the organization is determined by the actual placement of the position within the hierarchy of authority. Over 65 percent of the CIOs surveyed indicate that the CIO position in their organization is located within the senior executive level. Another 26 percent indicate that the CIO is the departmental head of Information Technology or Management Information Services. Only 3.4 percent of the CIOs feel that the CIO operates at a division head level. Finally, five percent indicate some other position for the CIO. Chart 4.25 illustrates the sectoral differences with respect to location of the CIO within the organization.

Chart 4.25. Location of the CIO within the organization, by sector.



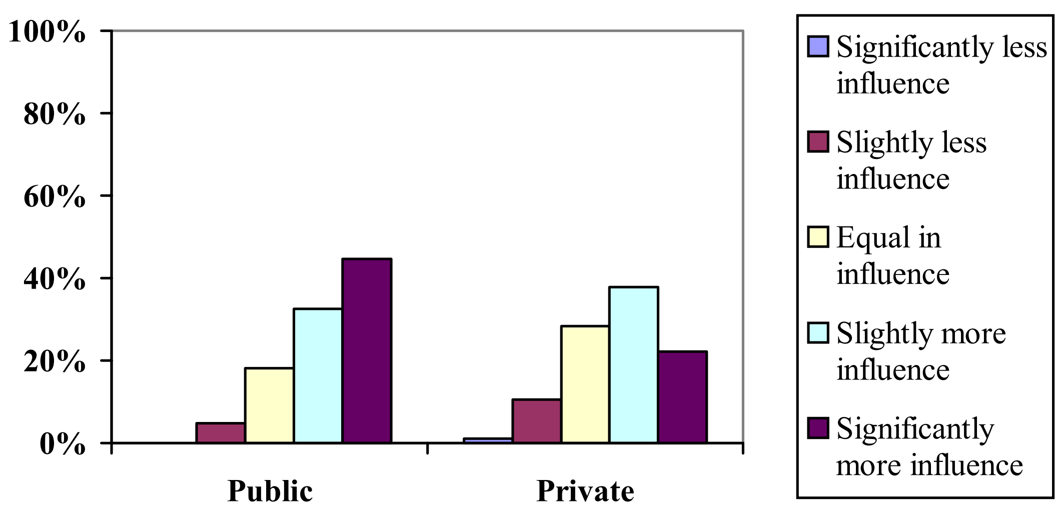
As evidenced by Chart 4.25, approximately 41 percent of public sector CIOs and 87.4 percent of private sector CIOs are located within the senior executive level of the organization. An additional 45.8 percent of the public sector and 8.4 percent of the private sector are located at the MIS or IT department head level. Only six percent of the public sector respondents and one percent of the private sector respondents feel that the CIO position is located at the division head level. Finally, 7.2 percent of public sector CIOs and 3.2 percent of private sector CIOs indicate that the CIO position is "Other."

Critical Success Factor: Financial resources

The lack of *financial resources*, evidenced by the serious budgetary issues facing both the public and private sectors, is a major concern for successful IT implementation. Adequate financial resources are essential for the design and implementation of new technologies.

Almost 33 percent of the survey respondents indicate that financial resources are significantly more influential than use of rewards (median comparison factor) in affecting technology project success. An additional 35 percent of the survey respondents indicate that it is slightly more influential than use of rewards. Approximately twenty-four percent of respondents feel that financial resources are equal in influence to use of rewards. Finally, eight percent of respondents feel that financial resources are less influential than use of rewards. Chart 4.26 demonstrates the breakdown of responses on financial resources by sector.

Chart 4.26. Influence of financial resources, by sector



As shown in Chart 4.26, no public sector CIOs and one percent of private sector CIOs rate adequate financial resources as significantly less influential than use of rewards. In addition, 4.8 percent of public sector respondents and 10.5 percent of private sector ones view the success factor to be slightly less influential than use of rewards. Over eighteen percent of public sector CIOs and twenty-eight percent of private sector CIOs rate adequate financial resources as equally influential compared to the median factor. Furthermore, 32.5 percent of public sector respondents view adequate financial resources as slightly more influential than use of rewards, compared to 37.9 percent of private sector respondents. Finally, almost forty-five percent of CIOs from the public sector and twenty-two percent from the private sector rate adequate financial resources as significantly more influential than the median success factor—use of rewards.

In addition to the relative influence of financial resources, compared to use of rewards, the survey respondents also evaluated their organizational performance on the critical success factor. In the public sector, over nineteen percent of the respondents rated their organizational performance on financial resources as poor or very poor, compared to almost fourteen percent of the private sector. Approximately 36 percent of the public sector respondents and 34 percent of the private sector rated their performance on financial resources as adequate. Finally, 44.6 percent of the public sector respondents and 52.6 percent of the private sector respondents rated their organizational performance on financial resources as good or very good.

Financial strain and impact on IT investments

In considering the influence of adequate financial resources, as well as organizational performance, it is also important to examine the current financial situation of the organizations included in this research study. Furthermore, consideration of the impact of the financial situation, according to the CIO, is also offered with respect to IT investments. In terms of financial strain, approximately 25 percent of the CIOs indicate that their organizations are facing major financial strain. Another 40 percent indicate that they are facing moderate strain. Twenty-one percent of the survey respondents feel that their organization is facing limited financial strain, compared to eleven percent who indicate they are facing no strain. Only three percent of the CIOs indicate that their organization currently has a surplus. Chart 4.27 highlights the sectoral differences related to levels of financial strain facing organizations.

Chart 4.27. Levels of organizational financial strain, by sector.

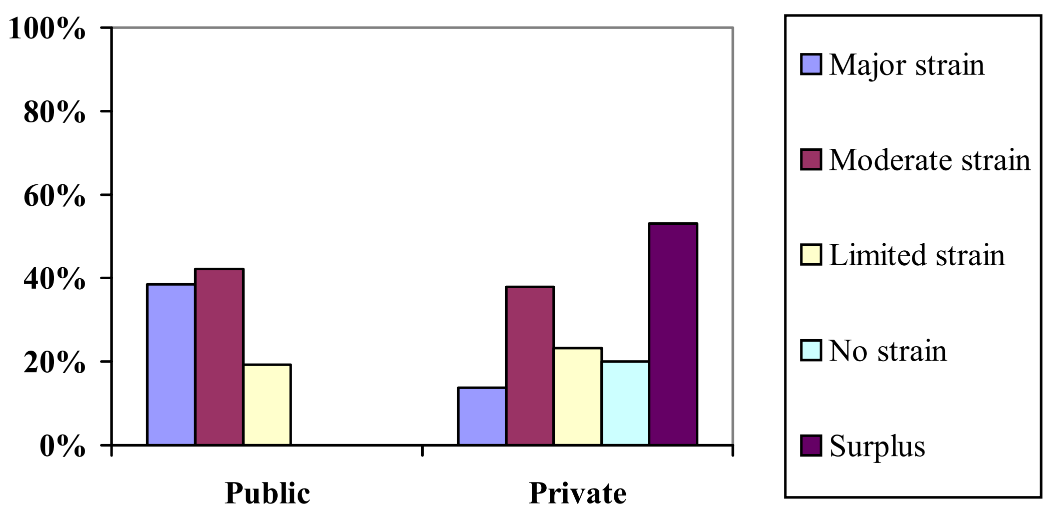
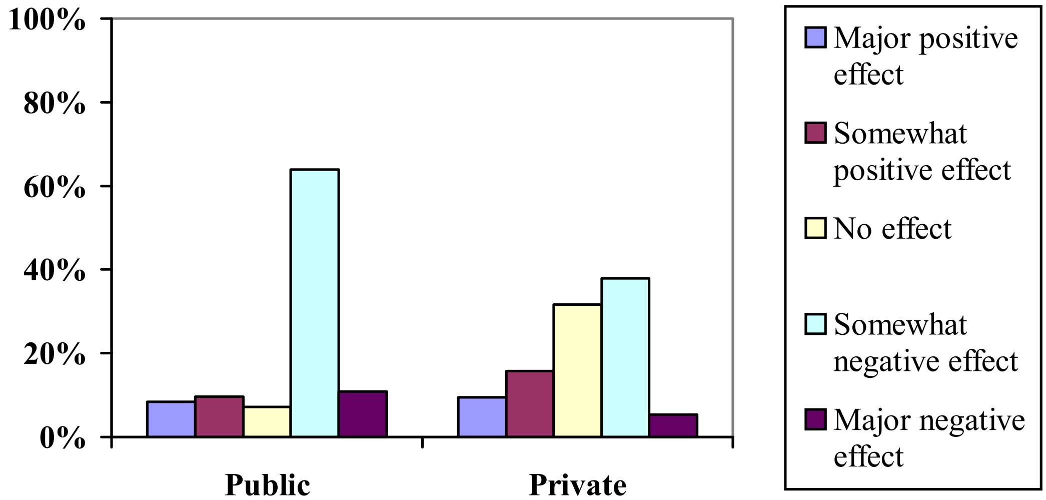


Chart 4.27 shows 38.6 percent of the public sector organizations are facing major financial strain, compared to 13.7 percent of the private sector ones. Approximately 42 percent of the public CIOs indicate that their organizations are facing moderate strain, as do 38 percent of the private sector CIOs. Nineteen percent of the public organizations are facing limited strain, compared to twenty-three percent of the private organizations. Finally, 25.3 percent of the private sector CIOs indicate that their organizations are facing no financial strain or have surpluses.

In terms of the impact of financial strain on IT investments, nine percent of the CIOs indicate that their current situation has had a major positive impact on IT investments. An additional thirteen percent indicate that the current financial situation has had a somewhat positive effect on IT investments. Twenty percent of the CIOs feel that the financial situation has had no effect on IT investments. Finally, 57.9 percent of the CIOs indicate that the current financial situation has had a negative effect on IT investments. Chart 4.28 illustrates the IT investment impact due to financial situation, based on sector.

Chart 4.28. Impact of financial situation on IT investments, by sector.



As illustrated in Chart 4.28, eight percent of public sector CIOs and nine percent of private sector CIOs feel that the current financial situation has had a major positive effect on IT investments. Almost ten percent of respondents from the public sector and sixteen percent of the private sector feel that the effect on IT investments has been somewhat positive. Only seven percent of the public sector CIOs feel that there has been no impact on IT investments, compared to over thirty-one percent of the private sector CIOs. Approximately 64 percent of the public sector and 38 percent of the private sector indicate that the current financial situation has had a somewhat negative effect on IT investments. Finally, 10.8 percent of public sector CIOs and 5.3 percent of private sector CIOs feel that there has been a major negative effect on IT investments.

Moderating Variable: Previous employment

Although this research study seeks to determine the effects of sectoral differences on ratings of critical success factor influence, along with perceptions of organizational performance on the factors, there is a moderating variable that must be examined to determine its effect on shaping the views of selected research participants. The influence of previous employment can be significant and may alter the opinions of a given CIO. For example, a public sector CIO that came from a private sector background may be more inclined to value the success factors traditionally associated with the private sector, despite her current organizational alignment. Due to this potential intervening variable, the CIOs were asked to identify their previous employment by sector and by position.

According to the survey respondents, less than eight percent of the CIOs were employed in the public sector in a technical capacity prior to their current appointment. Furthermore, 23 percent of the CIOs were public sector employees in a managerial capacity prior to current employment. Another 20 percent of the CIOs were private sector technical employees, compared to 42.7 percent who were private sector managerial employees prior to current position. Finally, 6.2 percent of the CIOs indicate some other form of employment prior to obtaining their current position. Chart 4.29 highlights the previous employment histories of the public and private sector CIOs.

Chart 4.29. Previous employment of CIOs, by sector.

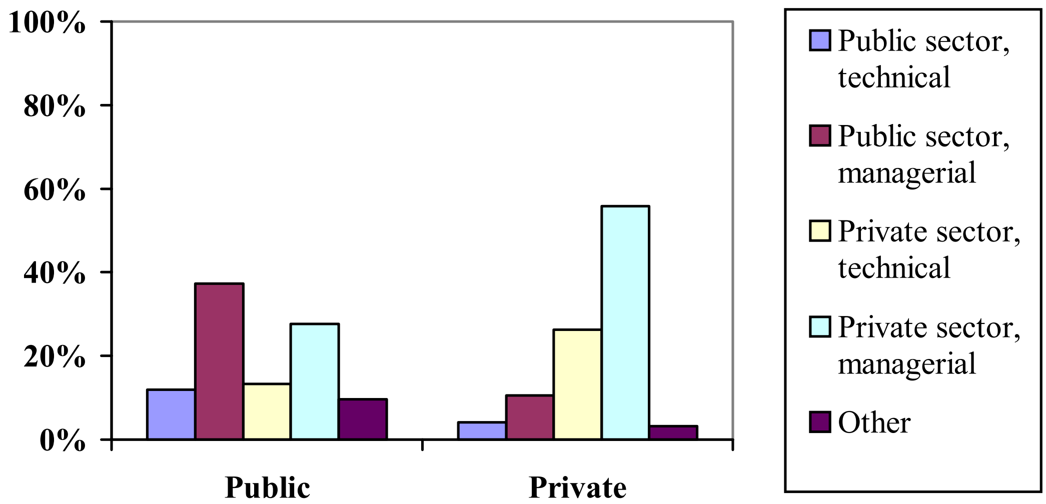


Chart 4.29 indicates that twelve percent of public sector CIOs were previously employed in the public sector in a technical capacity, compared to four percent of private sector CIOs. Approximately 37 percent of public sector respondents and 11 percent of private sector respondents were employed in the public sector in a managerial capacity. Thirteen percent of public sector CIOs and twenty-six percent of private sector CIOs were employed in the private sector in a technical capacity. Almost 28 percent of respondents from the public sector and 56 percent from the private sector were employed in the private sector in a managerial capacity prior to obtaining their current position. Finally, almost ten percent of the public sector CIOs and three percent of private sector CIOs were employed in some "Other" capacity prior to their current position.

Summary of Univariate Analysis

The variables included in this research project seek to assess the differences in public and private sectors with respect to a variety of critical success factors. Accordingly, the first step in such an assessment is to examine the descriptive statistics for each variable. Chapter 5 offers bivariate statistical analysis of the data in order to convey a more holistic picture.

CHAPTER 5: BIVARIATE ANALYSIS AND FINDINGS

The goal of this research study is to ascertain sector differences (public versus private) with respect to the influence of and performance on the fourteen critical success factors. Based on this research agenda, the primary statistical method employed is analysis of variance, supported by difference of means tests. The analysis of variance allows the researcher to determine the effects of a categorical independent variable on an interval dependent variable. Furthermore, by examining the aggregate means of the groups, the researcher can ascertain the direction of the relationship between the two sectors.

Chapter 5 offers the findings of bivariate analyses. The bivariate analyses were conducted for each combination of the dependent variables and the independent variable, sector (i.e. public or private). The initial bivariate analyses consist of examination of two-way contingency tables, chi-square tests of statistical significance, gamma, and Pearson's correlation coefficient. In addition, bivariate correlations were examined for each of the dependent variables to test for multicollinearity. As previously mentioned, none of the variables demonstrated multicollinearity. For further examination of the contingency tables and correlation matrices, please see Appendices B and C, respectively.

The first part of Chapter 5 highlights the results of the two-way contingency tables and analysis of variance to ascertain the significant differences in various critical success factors based on organizational sector. In addition, differences of means were analyzed to determine the direction of the relationship. Both the analysis of variance findings and the difference of means are arranged according to those findings that confirm the hypotheses, those that offer unexpected findings, and those that support the null hypotheses.

In addition, analysis of variance is performed on the difference between CIO perception of influence of a given success factor and his ranking of organizational performance on that factor. This measure of the difference between actual and ideal gives an indication of satisfaction of the Chief Information Officer with his current organizational constraints. In essence, those CIOs who have lower levels of dissonance are more likely be satisfied with their organization. The final bivariate analysis is analysis of covariance, in which the previous employment of the CIO is offered as a moderating variable. The analysis of covariance is performed to determine if the hypotheses are still accepted or rejected once the chief information officer's previous sector of employment has been controlled.

Confirmatory Findings

The findings contained in this section of the analyses of variance and differences of means do confirm the hypotheses presented in previous chapters. The confirmed hypotheses include: influence of highly qualified technology staff, performance on highly qualified technology staff, performance on use of rewards, influence of strategic technology planning, influence of stakeholder involvement, influence of project milestones, influence of top management support, influence of political support, performance on political support, influence of end user training, and performance on end user training.

Critical Success Factor: Influence of highly qualified technology staff

H2a: Both public and private sector CIOs will rate the importance of highly qualified technology staff ***should be*** *high in organizations.*

Highly qualified technology staff is a dependent variable for bivariate analysis with the independent variable, organizational sector. It was expected that the public and private sector CIOs would not have statistically significant rating differences with respect to the influence of highly qualified staff. According to the analysis of variance, there is no statistically significant difference between the public and private sectors with respect to the influence of highly qualified technology staff on IT project success ($F=1.961$, $p>.05$), as illustrated in Table 5.1.

Table 5.1 Analysis of variance results for highly qualified technology staff and sector.

STAFF

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.519	1	1.519	1.961	.163
Within Groups	136.279	176	.774		
Total	137.798	177			

Critical Success Factor: Performance on highly qualified staff

H2b: Public sector CIOs will rate the importance of highly qualified technology staff ***to be less important*** *in current organizations compared to private sector counterparts.*

In terms of organizational performance on highly qualified technology staff, it was expected that the public sector would rate their performance lower than their private sector counterparts, due to a variety of constraints, including financial issues, as discussed in the literature review. The analysis of variance indicates that there is a statistically significant difference between the public and private sectors and the organizational performance on highly qualified technology staff ($F=5.039$, $p<.05$, eta-squared=0.028). Given the effect size of the group differences, the independent variable only explains approximately 2.8 percent of the variance in the dependent variable, which is a very weak relationship. Further analysis of the mean differences indicates that the public sector (mean=3.78) rates their organizational performance on highly qualified technology staff lower than the private sector (mean=4.09). Thus, as demonstrated in Table 5.2, the hypothesis related to organizational performance on highly qualified technology staff is supported.

Table 5.2 Analysis of variance results for performance on highly qualified technology staff and sector.

Performance on highly qualified staff

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4.301	1	4.301	5.039	.026
Within Groups	150.244	176	.854		
Total	154.545	177			

Critical Success Factor: Performance on use of rewards

H3b: Public sector CIOs will rate the importance of rewards systems ***to be*** *lower in current organizations compared to private sector counterparts.*

The next dependent variable, use of rewards, was determined to be the median critical success factor, in terms of influence, according to the pretest respondents. Therefore, there is no assessment of the factor by the Chief Information Officers, because of its use in the instrument as a calibration mechanism. However, the CIOs did rate their organizational performance on the use of rewards.

It was expected that the public sector CIOs would rate their organizational performance on use of rewards lower than the private sector CIOs, due to organizational and cultural constraints highlighted in the literature review. According to the bivariate analysis, the relationship between the performance on use of rewards and organizational sector is statistically significant (χ^2=11.829, df=4, p<.05). The gamma value (0.347) indicates a weak to moderate association between performance on use of rewards and sector. As seen in Table 5.3, the bivariate relationship does support the hypothesis.

Table 5.3 Bivariate relationship between organizational performance on use of rewards and sector.

			SECTOR		
			Public	Private	Total
Performance on use of rewards	Very poor	Count	28	13	41
		Percent	33.7%	13.7%	23.0%
	Poor	Count	22	24	46
		Percent	26.5%	25.3%	25.8%
	Adequate	Count	21	36	57
		Percent	25.3%	37.9%	32.0%
	Good	Count	11	21	32
		Percent	13.3%	22.1%	18.0%
	Very good	Count	1	1	2
		Percent	1.2%	1.1%	1.1%
Total		Count	83	95	178
		Percent	100.0%	100.0%	100.0%

Furthermore, the analysis of variance indicates that there is a statistically significant difference between the public and private sectors and the organizational performance on use of rewards ($F=10.138$, $p<0.01$, eta-squared=0.055). Based on the effect size measure, the organizational sector only accounts for 5.5 percent of the variance in the rating of performance on use of rewards, which is a very weak relationship. Further analysis of the mean differences indicates that the public sector (mean=2.22) rates their organizational performance on use of rewards lower than the private sector (mean=2.72). Table 5.4 demonstrates that the hypothesis related to organizational performance on use of rewards can be accepted.

Table 5.4 Analysis of variance results for use of rewards and sector.

ANOVA

Performance on use of rewards

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	11.027	1	11.027	10.138	.002
Within Groups	191.423	176	1.088		
Total	202.449	177			

Critical Success Factor: Influence of strategic technology planning

H4a: Both public and private sector CIOs will rate the importance of strategic planning for information technology ***should be*** *high in organizations.*

It was expected that the both the public and private sectors would rate the influence of strategic technology planning should be high in organizations, due to a variety of reasons cited in the literature review. Based on the analysis of variance, this hypothesis is supported ($F=1.914$, $p>.05$). Thus, as demonstrated in Table 5.5, the hypothesis that there is no difference between the public and private sectors with respect to the influence of strategic planning is accepted.

Table 5.5 Analysis of variance of influence of strategic planning

Influence of strategic technology planning

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.150	1	2.150	1.914	.168
Within Groups	197.631	176	1.123		
Total	199.781	177			

Critical Success Factor: Influence of stakeholder involvement

H6a: Public sector CIOs will rate the importance of stakeholder involvement ***should be*** *lower in current organizations compared to private sector counterparts.*

It was expected that the public sector CIOs would rate the influence of stakeholder involvement to be lower in their organizations, compared to the private sector CIOs. According to the analysis of variance, there is a statistically significant difference between the public and private sectors with respect to the influence of stakeholder involvement on IT project success ($F=4.044$, $p<.05$, eta-squared=0.022). Given the effect size measure, the relationship between organizational sector and the rating is very weak. Through the examination of the difference of means, it can evident that the public sector (mean=4.18) does rate stakeholder involvement lower than the private sector (mean=4.44). Thus, as illustrated in Table 5.6, the hypothesis that there are sectoral differences related to the influence of stakeholder involvement is accepted.

Table 5.6 Analysis of variance of stakeholder involvement

Influence of stakeholder involvement

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.026	1	3.026	4.044	.046
Within Groups	131.721	176	.748		
Total	134.747	177			

Critical Success Factor: Influence of project milestones

*H7a: Both public and private sector CIOs will rate the importance of project milestones **should be** higher in organizations.*

It was expected that there would be no statistically significant group differences between the public and private sector CIOs with respect to the influence of project milestones. According to the analysis of variance (F=1.897, p>.05) and the bivariate analysis (χ^2=3.342, df=3, p>.05), the relationship between the influence of project milestones on IT project success and organizational sector is not statistically significant, as illustrated in Tables 5.7 and 5.8.

Table 5.7 Analysis of variance of project milestones and organizational sector

Influence of project milestones

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.371	1	1.371	1.897	.170
Within Groups	127.152	176	.722		
Total	128.522	177			

Table 5.8 Two-way contingency of influence of project milestones

			SECTOR		
			Public	Private	Total
Project milestones	Slightly less influence	Count	4	5	9
		Percent	4.8%	5.3%	5.1%
	Equal in influence	Count	17	11	28
		Percent	20.5%	11.6%	15.7%
	Slightly more influence	Count	35	39	74
		Percent	42.2%	41.1%	41.6%
	Significantly more influence	Count	27	40	67
		Percent	32.5%	42.1%	37.6%
Total		Count	83	95	178
		Percent	100.0%	100.0%	100.0%

Furthermore, Table 5.8 indicates that the chief information officers from both sectors do rate the influence of project milestones as slightly to significantly influential, as predicted in the hypothesis. Therefore, both the statistical significance and the directional indication of the project milestone hypothesis can be accepted.

Critical Success Factor: Influence of top management support

H8a: Both public and private sector CIOs will rate the importance of top management support ***should be*** *high in organizations.*

It was expected that there would be no statistically significant differences between public and private sector CIOs with respect to the influence of top management support. According to the analysis of variance (F=0.023, p>.05) and bivariate analysis (χ^2=4.771, df=4, p>.05), there is no statistically significant difference between the public and private sectors on this critical success factor. Furthermore, it was expected that both groups of CIOs would rate this factor to be significantly influential. As demonstrated in Table 5.9, the majority of the public and private sectors do rate top management support as significantly more influential than the median factor.

Table 5.9 Bivariate relationship between influence of top management support and sector.

			SECTOR		
			Public	Private	Total
Top Management Support	Significantly less influence	Count	1	1	2
		Percent	1.2%	1.1%	1.1%
	Slightly less influence	Count	1	5	6
		Percent	1.2%	5.3%	3.4%
	Equal in influence	Count	6	2	8
		Percent	7.2%	2.1%	4.5%
	Slightly more influence	Count	17	20	37
		Percent	20.5%	21.1%	20.8%
	Significantly more influence	Count	58	67	125
		Percent	69.9%	70.5%	70.2%
Total		Count	83	95	178
		Percent	100.0%	100.0%	100.0%

Critical Success Factor: Influence of political support

H9a: Public sector CIOs will rate the importance of political support ***should be*** *higher in organizations compared to private sector counterparts.*

It was expected that the public sector CIOs would rate the influence of political support higher than their private sector counterparts, based on the literature review. According to the analysis of variance (F=25.642, p=.00, eta-squared=0.127) and the bivariate analysis (χ^2=27.485, df=4, p=.000), there is a statistically significant difference between the public and private sectors with respect to the influence of political involvement on IT project success. Based on the effect size measure, the organizational sector accounts for 12.7 percent of the variance in the rating of influence of political support. As illustrated in Table 5.10, the political support hypothesis is accepted.

Table 5.10 Analysis of variance for influence of political support

Influence of political support

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	41.926	1	41.926	25.642	.000
Within Groups	287.765	176	1.635		
Total	329.691	177			

By examining the comparison of means, it can be determined that the public sector (mean=3.95) rates political support higher in influence than the private sector (mean=2.98). This finding supports the directional indication in the political support hypothesis (9a), so the hypothesis is accepted.

Critical Success Factor: Performance on political support

H9b: Public sector CIOs will rate the importance of political support ***to be*** *higher in current organizations compared to private sector counterparts.*

It was also expected that the public sector CIOs would rate their performance on political support higher than the private sector CIOs. In fact, the analysis of variance ($F=8.283$, $p<.01$, eta-squared=0.045), does demonstrate a statistically significant difference between the public and private sectors. Given the effect size measure, the organizational sector only accounts for 4.5 percent of the variance in the ratings. Further examination of the comparison of means indicates that the public sector (mean=3.51) rates their organizational performance on political support higher than the private sector (mean=3.04). This analysis supports the directional indication of the performance on political support hypothesis (9b). As illustrated in Table 5.11, the political support hypothesis can be accepted.

Table 5.11 Analysis of variance for performance on political involvement and sector.

Performance on political support

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	9.534	1	9.534	8.283	.004
Within Groups	202.579	176	1.151		
Total	212.112	177			

Critical Success Factor: Influence of end user training

*H12a: Both public and private sector CIOs will rate the importance of training **should be** high in organizations.*

It was expected that there would be no statistically significant differences between the public and private sector CIOs' ratings on the influence of training. Based on the analysis of variance (F=1.377, p>.05) and bivariate analysis (χ^2=7.739, df=4, p>.05), this hypothesis is accepted. Furthermore, the hypothesis predicted that both groups would rate the influence of training as high. An examination of the two-way contingency table, illustrated in Table 5.12, indicates that almost seventy percent of each group rates training as slightly or significantly more influential than the median factor.

Table 5.12 Bivariate relationship between influence of end user training and sector.

			SECTOR		
			Public	Private	Total
End user training	Significantly less influence	Count	4	1	5
		Percent	4.8%	1.1%	2.8%
	Slightly less influence	Count	7	4	11
		Percent	8.4%	4.2%	6.2%
	Equal in influence	Count	14	26	40
		Percent	16.9%	27.4%	22.5%
	Slightly more influence	Count	44	41	85
		Percent	53.0%	43.2%	47.8%
	Significantly more influence	Count	14	23	37
		Percent	16.9%	24.2%	20.8%
Total		Count	83	95	178
		Percent	100.0%	100.0%	100.0%

Critical Success Factor: Performance on end user training

H12b: Both public and private sector CIOs will rate the importance of training ***to be*** *low in current organizations.*

It was also expected that there would be no statistically significant differences between the public and private sector ratings of performance on training. According to the analysis of variance (F=1.293, p>.05), this hypothesis is accepted. Furthermore, the hypothesis predicted that both groups would rate their organizational performance on training as low. An examination of the difference of means, illustrated in Table 5.13, indicates that both groups do rate their performance as poor or adequate.

Table 5.13 Difference of means on performance on training

Performance on end user training

Organizational sector	Mean	N	Std. Deviation
Public	3.06	83	.967
Private	2.91	95	.851
Total	2.98	178	.908

Based on the analysis of variance and difference of means results, the hypothesis related to performance on training is accepted.

Unexpected Findings

This section contains the data analysis that does support part of the hypothesis, such as the presence or lack of a statistically significant difference based on sector, but also does not support the directional indication of the hypothesis. This section includes: influence of end user involvement and influence of prototyping and/or piloting.

Critical Success Factor: Influence of end user involvement

H5a: Both public and private sector CIOs will rate the importance of end user involvement ***should be*** *lower in organizations.*

It was expected that there would be no statistically significant difference between the public and private sector CIOs' ratings on the influence of end user involvement. According to the analysis of variance (ANOVA), the relative influence of end user involvement on IT project success is not statistically different between the public and private sectors ($F=3.382$, $p>.05$). As illustrated in Table 5.14, there is no statistically significant difference between the public and private sectors concerning the influence of end user involvement on IT project success, so the hypothesis can be accepted.

Table 5.14 Analysis of variance on end user involvement

Influence of end user involvement

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.399	1	2.399	3.382	.068
Within Groups	124.865	176	.709		
Total	127.264	177			

However, an examination of the difference of means indicates that both public and private sector CIOs rate the relative influence of end user involvement to be high, as illustrated in Table 5.15. Although the hypothesis can be accepted in terms of no statistically significant difference in ratings of influence, the directional indication that both groups rate the influence as low cannot be accepted.

Table 5.15 Difference of means on influence of end user involvement

Influence of end user involvement

Organizational sector	Mean	N	Std. Deviation
Public	4.24	83	.820
Private	4.47	95	.861
Total	4.37	178	.848

Critical Success Factor: Influence of prototyping and/or piloting

H10a: Both public and private sector CIOs will rate the importance of prototyping and/or piloting support ***should be*** *high in organizations.*

It was expected that there would be no statistically significant difference between the public and private sectors with respect to the influence of prototyping and/or piloting. According to the analysis of variance (F=.875, p>.05), this hypothesis is supported. As demonstrated in Table 5.16, there is no statistically significant difference between the public and private sectors with respect to the influence of prototyping and/or piloting on IT project success, so the hypothesis is accepted.

Table 5.16 Analysis of variance on influence of prototyping and/or piloting

Influence of prototyping/piloting

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.900	1	.900	.875	.351
Within Groups	181.055	176	1.029		
Total	181.955	177			

However, upon examination of the difference of means, it is determined that the directional indication of the hypothesis is not support. It was expected that both groups would rate the influence of prototyping and/or piloting to be high, when in fact, both groups rate the critical success factor to be moderate. Table 5.17 illustrates the moderate ratings as presented in the difference of means test.

Table 5.17 Difference of means on influence of prototyping and/or piloting

Influence of prototyping/piloting

Organizational sector	Mean	N	Std. Deviation
Public	3.20	83	1.113
Private	3.35	95	.920
Total	3.28	178	1.014

Null Findings

The findings contained in this section of the two-way contingency analysis do not support the hypotheses related to the critical success factors. This section includes findings on the influence of communication, performance on communication, performance on strategic technology planning, performance on end user involvement, performance on stakeholder involvement, performance on project milestones, performance on top management support, performance on prototyping and/or piloting, influence of cross-functional teams, performance on cross-functional teams, influence of CIO's location, performance on CIO's location, influence of adequate financial support, and performance on adequate financial support.

Critical Success Factor: Influence of communication

H1a: Public sector CIOs will rate the importance of communication ***should be*** *more important compared to private sector counterparts.*

It was expected that public sector CIOs would rate the influence of communication should be greater in the public sector compared to private sector counterparts due to various demands for communication, especially given the advent of horizontal government, as noted in the literature review. However, the ratings of influence of communication do not differ by sector (public versus private) in the bivariate analysis (χ^2=1.428, df=4, p>.05) or the analysis of variance (F=.672, p>.05). Thus, as demonstrated in Table 5.18, the hypothesis related to the influence of communication (Hypothesis 1A) is not supported.

Table 5.18 Bivariate relationship between influence of communication and sector.

			SECTOR		
			Public	Private	Total
Communication	Significantly less influence	Count	2	1	3
		Percent	2.4%	1.1%	1.7%
	Slightly less influence	Count	1	2	3
		Percent	1.2%	2.1%	1.7%
	Equal in influence	Count	9	9	18
		Percent	10.8%	9.5%	10.1%
	Slightly more influence	Count	23	32	55
		Percent	27.7%	33.7%	30.9%
	Significantly more influence	Count	48	51	99
		Percent	57.8%	53.7%	55.6%
Total		Count	83	95	178
		Percent	100.0%	100.0%	100.0%

Critical Success Factor: Performance on communication

*H1b: Public sector CIOs will rate the importance of communication **to be** less important in current organizations compared to private sector counterparts.*

In addition to assessing the influence of communication on IT project success, the Chief Information Officers also assessed their organizational performance on communication, as a success factor. It was expected that the public sector CIOs would rate their organizational performance lower than their private sector counterparts. However, according to the bivariate analysis, the relationship between performance on communication and organizational sector is not significant (χ^2=7.066, df=4, p>.05), as illustrated in Table 5.19.

Table 5.19 Bivariate relationship between organizational performance on communication and sector.

			SECTOR		
			Public	Private	Total
Performance on communication	Very poor	Count	1		1
		Percent	1.2%		.6%
	Poor	Count	13	14	27
		Percent	15.7%	14.7%	15.2%
	Adequate	Count	23	31	54
		Percent	27.7%	32.6%	30.3%
	Good	Count	29	42	71
		Percent	34.9%	44.2%	39.9%
	Very good	Count	17	8	25
		Percent	20.5%	8.4%	14.0%
Total		Count	83	95	178
		Percent	100.0%	100.0%	100.0%

However, the survey also used additional measures of organizational performance on communication, particularly assessments of horizontal and vertical communication. Another measure of communication is the frequency of horizontal information sharing. Again, the analysis of variance demonstrates no statistically significant difference between the public and private sectors.

The final measure of communication in the organization is the frequency of vertical information sharing. The relationship between vertical information sharing and organizational sector is not statistically significant, based on the analysis of variance. Given the aggregate statistics related to organizational performance on communication, it is concluded that there is no statistically significant difference between the public and private sectors related to this critical success factor. Table 5.20 highlights the analysis of variance results for all of the factors related to communication and demonstrates the lack of statistically significant differences between the public and private sectors.

Table 5.20 Analysis of variance results for communication and sector.

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Influence of communication	Between Groups	.001	1	.001	.002	.969
	Within Groups	131.527	176	.747		
	Total	131.528	177			
Performance on communication	Between Groups	.587	1	.587	.672	.413
	Within Groups	153.862	176	.874		
	Total	154.449	177			
Horizontal information sharing	Between Groups	.728	1	.728	1.795	.182
	Within Groups	71.390	176	.406		
	Total	72.118	177			
Vertical information sharing	Between Groups	.554	1	.554	1.182	.278
	Within Groups	82.547	176	.469		
	Total	83.101	177			

Critical Success Factor: Performance on strategic technology planning

H4b: Public sector CIOs will rate the importance of strategic planning for information technology ***to be*** *lower in current organizations compared to private sector counterparts.*

It was expected that the public sector CIOs would rate their organizational performance on strategic technology planning to be lower than their private sector counterparts, due to the legacy of unfounded mandates and political leadership changes. However, ratings of organizational performance on strategic planning do not differ by sector in the analysis of variance (F=3.153, p>.05) or bivariate analysis (χ^2=8.696, df=4, p>.05). Therefore, as demonstrated in Table 5.21, the strategic planning hypothesis cannot be accepted. In addition, the variables assessing the accountability of the CIO and the use of formal rules and procedures do not demonstrate statistically significant group differences for the public and private sectors. Table 5.21 highlights the results of the analysis of variance related to strategic technology planning.

Table 5.21 Analysis of variance on strategic technology planning

		Sum of Squares	df	Mean Square	F	Sig.
Performance on strategic technology planning	Between Groups	2.919	1	2.919	3.153	.077
	Within Groups	162.901	176	.926		
	Total	165.820	177			
Accountability of CIO	Between Groups	.000	1	.000	.000	.990
	Within Groups	58.612	176	.333		
	Total	58.612	177			
Use of formal rules and procedures	Between Groups	.751	1	.751	.963	.328
	Within Groups	137.389	176	.781		
	Total	138.140	177			

Critical Success Factor: Performance on end user involvement

H5b: Public sector CIOs will rate the influence of end user involvement ***to be*** *lower in current organizations compared to private sector counterparts.*

It was expected that the public sector CIOs would rate their organizational performance on end user involvement lower than their private sector counterparts, due to a variety of reasons illustrated in the literature review. However, the ratings between the groups (public versus private) do not significantly differ with respect to performance on end user involvement (F=0..20, p>.05). Therefore, as illustrated in Table 5.22, the hypothesis cannot be accepted.

Table 5.22 Analysis of variance for end user involvement and sector.

Performance on end user involvement

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.018	1	.018	.020	.888
Within Groups	155.539	176	.884		
Total	155.556	177			

Critical Success Factor: Performance on stakeholder involvement

H6b: Public sector CIOs will rate the influence of stakeholder involvement ***to be*** *lower in current organizations compared to private sector counterparts.*

It was expected that the public sector CIOs would rate their organizational performance on stakeholder involvement lower than their private sector counterparts, due to the complexities associated with defining stakeholders in the public sector. However, ratings of the performance on stakeholder involvement do not differ by sector (public versus private) in the analysis of variance ($F=1.488$, $p>.05$) or bivariate analysis ($\chi^2=5.573$, $df=4$, $p>.05$). Thus, as demonstrated in Table 5.23, the stakeholder involvement hypothesis cannot be accepted.

On the other hand, another measure of organizational performance on stakeholder involvement does exhibit significant group differences. The level of stakeholder involvement does exhibit significant group differences ($F=6.778$, $p=.01$, eta-squared=0.037). Again, the relationship between the independent and dependent variables is very weak. Finally, the variables assessing the involvement of stakeholders in planning for IT projects and the impact of stakeholder involvement do not demonstrate statistically significant group differences for the public and private sectors. Table 5.23 highlights the results of the analysis of variance related to stakeholder involvement. Based on the aggregate statistics, the hypothesis that the public sector will rate their organizational performance on stakeholder involvement lower than the private sector is not accepted.

Table 5.23 Analysis of variance for stakeholder involvement and sector.

		Sum of Squares	df	Mean Square	F	Sig.
Performance on stakeholder involvement	Between Groups	1.341	1	1.341	1.488	.224
	Within Groups	158.681	176	.902		
	Total	160.022	177			
Stakeholder involvemen in IT planning	Between Groups	.288	1	.288	.614	.434
	Within Groups	82.588	176	.469		
	Total	82.876	177			
Level of stakeholder involvement	Between Groups	4.891	1	4.891	6.778	.010
	Within Groups	126.997	176	.722		
	Total	131.888	177			
Impact of stakeholder involvement	Between Groups	.088	1	.088	.169	.681
	Within Groups	91.687	176	.521		
	Total	91.775	177			

Critical Success Factor: Performance on project milestones

H7b: Public sector CIOs will rate the importance of project milestones ***to be*** *lower in current organizations compared to private sector counterparts.*

It was expected that the public sector CIOs would rate their organizational performance on use of project milestones to be lower than their private sector counterparts, based on a variety of constraints discussed in the literature review. However, the ratings on performance on project milestones do not differ by sector (public versus private) in the bivariate analysis (χ^2=2.317, df=4, p>.05) and analysis of variance (F=.507, p>.05). Furthermore, the final measure of project milestone use, measured as metrics for success, also does not demonstrate statistically significant group differences for the public and private sectors. Table 5.24 highlights the results of the analysis of variance.

Table 5.24 Analysis of variance for performance on project milestones

		Sum of Squares	df	Mean Square	F	Sig.
Performance on project milestones	Between Groups	.368	1	.368	.442	.507
	Within Groups	146.693	176	.833		
	Total	147.062	177			
Measures of IT success	Between Groups	.541	1	.541	.340	.561
	Within Groups	280.139	176	1.592		
	Total	280.680	177			

Critical Success Factor: Performance on top management support

H8b: Public sector CIOs will rate the importance of top management support ***to be*** *lower in current organizations compared to private sector counterparts.*

It was expected that the public sector CIOs would rate their organizational performance on top management support lower than the private sector CIOs, based on the literature review. However, the ratings of performance on top management support do not differ by sector in the analysis of variance ($F=.002$, $p>.05$). Therefore, as illustrated in Table 5.25, the top management support hypothesis related to performance cannot be accepted.

However, another measure of performance on top management support does support the hypothesis. The level of idea germination does exhibit significant group differences ($F=4.749$, $p<.05$, eta-squared=0.026). The low effect size measure indicates that the group differences only explain 2.6 percent of the variance in the ratings. Further examination of the comparison of means indicates that the public sector ideas (mean=3.81) are generated at lower levels of the organization than their private sector counterparts (mean=3.24), as would be expected based on the hypothesis. However, based on the initial rating of the critical success factor and the low effect size of the secondary measure, the data does not fully support the top management support hypothesis, as illustrated in Table 5.25.

Table 5.25 Analysis of variance results for performance on top management support

		Sum of Squares	df	Mean Square	F	Sig.
Performance on top management support	Between Groups	.002	1	.002	.002	.961
	Within Groups	131.886	176	.749		
	Total	131.888	177			
Level of idea germinatioı	Between Groups	14.147	1	14.147	4.749	.031
	Within Groups	524.347	176	2.979		
	Total	538.494	177			

Critical Success Factor: Performance on prototyping and/or piloting

H10b: Public sector CIOs will rate the importance of prototyping and/or piloting ***to be*** *higher in current organizations compared to private sector counterparts.*

It was expected that the public sector CIOs would rate their organizational performance on prototyping and/or piloting to be higher than their private sector counterparts, due to legislative mandates and federal guidelines. However, the ratings of performance on the critical success factor do not differ by sector (public versus private) in the analysis of variance (F=.811, p>.05) or bivariate analysis (χ^2=6.747, df=4, p>.05). As illustrated in Table 5.26, the prototyping and/or piloting hypothesis cannot be accepted.

Table 5.26 Analysis of variance results for prototyping and/or piloting and sector.

Performance on prototyping/piloting

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.775	1	.775	.811	.369
Within Groups	168.197	176	.956		
Total	168.972	177			

Critical Success Factor: Influence of cross-functional teams

H11a: Both public and private sector CIOs will rate the influence of the use of cross-functional (inter-agency) teams in the development of information technology projects ***should be*** *higher in organizations.*

It was expected that there would be no statistically significant sector differences with respect to the influence of cross-functional teams. However, the ratings on the influence of the critical success factor do differ according to sector in the analysis of variance (F=4.722, p<.05, eta-squared=0.026). Based on the effect size measure, the sector differences only account for 2.6 percent of the variance in the ratings. Regardless, the cross-functional team hypothesis cannot be accepted, as illustrated in Table 5.27.

Table 5.27 Analysis of variance on influence of cross-functional teams by sector.

Influence of cross-functional teams

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4.651	1	4.651	4.722	.031
Within Groups	173.354	176	.985		
Total	178.006	177			

An examination of the difference of means indicates that the private sector rates the use of cross-functional teams as more influential to IT project success than the public sector (see Table 5.28).

Table 5.28 Difference of means on influence of cross-functional teams.

Influence of cross-functional teams

Organizational sector	Mean	N	Std. Deviation
Public	3.52	83	1.040
Private	3.84	95	.949
Total	3.69	178	1.003

Critical Success Factor: Performance on cross-functional teams

H11b: Public sector CIOs will rate the importance of the use of cross-functional (inter-agency) teams in the development of information technology projects ***to be*** *lower in current organizations compared to private sector counterparts.*

It was expected that the public sector CIOs would rate their organizational performance on the use of cross-functional teams lower than their private sector counterparts. However, the ratings on the critical success factor do not differ by sector (public versus private) in the analysis of variance (F=.214, p>.05) or bivariate analysis (χ^2=6.459, df=4, p>.05). Therefore, the findings of the study do not support the cross-functional team hypothesis (11b), indicating it cannot be accepted.

However, the analysis of variance (F=6.089, p<.05, eta-squared=0.033) does illustrate a statistically significant difference between the public and private sectors with respect to organizational rewards for teamwork and cooperation, a secondary measure of organizational performance on use of teams. Examination of the comparison of means indicates that the public sector (mean=3.14) is less likely to engage in rewards for teamwork, compared to the private sector (mean=2.77), as was predicted in the hypothesis. However, the low effect size indicates that the group differences only account for 3.3 percent of the variance, which is very weak. Table 5.29 highlights the results of the analysis of variance related to use of cross-functional teams. Based on the lack of statistically significant differences in the primary performance measure and the low effect size of the secondary measure, the cross-functional team hypothesis is not accepted

Table 5.29 Analysis of variance results for cross-functional teams and sector.

		Sum of Squares	df	Mean Square	F	Sig.
Performance on cross-functional teams	Between Groups	.227	1	.227	.214	.644
	Within Groups	186.133	176	1.058		
	Total	186.360	177			
Reward for teamwork and cooperation	Between Groups	6.268	1	6.268	6.089	.015
	Within Groups	181.170	176	1.029		
	Total	187.438	177			

Critical Success Factor: Influence of location of CIO in organization

H13a: Both public and private sector CIOs will rate the importance of the CIO position in the organization ***should be*** *high in organizations.*

Based on the literature review, it was expected that there would be no statistically significant differences between the public and private sector with respect to the influence of the location of the CIO. However, according to the analysis of variance ($F=4.491$, $p<.05$, eta-squared=0.025), there is a statistically significant difference between the public and private sectors with respect to the influence of the location of the CIO in the organization on IT project success. Given the effect size measure, the organizational sector only accounts for 2.5 percent of the variance in the ratings. However, this finding, as demonstrated in Table 5.30, does not allow the researcher to accept the hypothesis.

Table 5.30 Analysis of variance for the influence of the CIO location by sector.

Influence of location of CIO in organization

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7.586	1	7.586	4.491	.035
Within Groups	297.274	176	1.689		
Total	304.860	177			

Furthermore, an examination of the difference of means indicates that the public sector (mean=3.19) rates the influence of CIO location higher than their private sector counterparts (mean=2.78).

Critical Success Factor: Performance on location of CIO in organization

H13b: Public sector CIOs will rate the importance of the CIO position in the organization ***to be*** *lower in current organizations than private sector counterparts.*

It was expected that the public sector chief information officers would rate their organizational performance on the location of the CIO to be lower than their private sector counterparts. However, the ratings of performance of location of the CIO do not differ by sector in the analysis of variance (F=.209, p>.05) or bivariate analysis (χ^2=3.550, df=4, p>.05). Based on these findings, illustrated in Table 5.31, the hypothesis related to the organizational performance on CIO location cannot be accepted.

Table 5.31 Analysis of variance on location of CIO and sector.

Performance on CIO location in organization

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.308	1	.308	.209	.648
Within Groups	259.736	176	1.476		
Total	260.045	177			

Finally, the analysis of variance does illustrate a statistically significant difference between the public and private sectors with respect to the actual position of the top information officer in the organizational hierarchy (F=21.945, p=.00, eta-squared=0.111). Examination of the comparison of means indicates that the public sector position (mean=1.93) is lower in the organizational hierarchy than the private sector position (mean=1.24).

Critical Success Factor: Influence of adequate financial support

H14a: Both public and private sector CIOs will rate the importance of financial resources ***should be*** *high in organizations.*

Based on the literature review, it was expected that there would be no statistically significant differences between the public and private sector ratings on the influence of financial support. However, according to the analysis of variance, there is a statistically significant difference between the public and private sectors with respect to the influence of adequate financial support on IT project success ($F=11.387$, $p<.01$, eta-squared=0.061). According to the effect size measure, the organizational sector accounts for 6.1 percent of the variance in the ratings. Thus, as illustrated in Table 5.32, the hypothesis on the influence of financial support cannot be accepted.

Table 5.32 Analysis of variance on influence of financial support by sector.

Influence of adequate financial support

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	9.950	1	9.950	11.387	.001
Within Groups	153.786	176	.874		
Total	163.736	177			

Based on an examination of the difference of means, the public sector is more likely to rate the influence of adequate financial support higher than their private sector counterparts, means equal 4.17 and 3.69, respectively. This finding does indicate that both groups rate the influence of financial support as high, as predicted in the hypothesis. However, due to the statistically significant group differences, the hypothesis cannot be accepted.

Critical Success Factor: Performance on adequate financial support

H14b: Public sector CIOs will rate the importance of financial resources ***to be*** *lower in current organizations compared to private sector counterparts.*

It was expected that the public sector CIOs would rate their organizational performance on adequate financial resources lower than their private sector counterparts. However, ratings of the performance on the critical success factor do not differ by organizational sector in the analysis of variance ($F=.309$, $p>.05$) or bivariate analysis ($\chi^2=6.313$, $df=4$, $p>.05$). The findings of the analysis of variance do not allow the performance hypothesis related to financial support to be accepted, as illustrated in Table 5.33.

However, secondary measures of adequate financial support do demonstrate statistical significance based on organizational sector. The measure of amount of financial strain facing the organization does demonstrate statistically significant group differences ($F=34.728$, $p=.000$, eta-squared=0.165). Finally, the impact of financial strain on IT investments also exhibits statistically significant group differences ($F=7.966$, $p<.01$, eta-squared=0.043). Table 5.33 highlights the results of the analysis of variance.

Table 5.33 Analysis of variance performance on financial support by sector.

		Sum of Squares	df	Mean Square	F	Sig.
Performance on adequate financial support	Between Groups	.355	1	.355	.309	.579
	Within Groups	202.139	176	1.149		
	Total	202.494	177			
Financial strain facing organization	Between Groups	31.660	1	31.660	34.728	.000
	Within Groups	160.453	176	.912		
	Total	192.112	177			
Impact of financial strain on IT investment	Between Groups	9.111	1	9.111	7.966	.005
	Within Groups	201.293	176	1.144		
	Total	210.404	177			

Analysis of Variance of Differences between Perceived Influence and Organizational Performance

Another concept to consider when assessing critical success factors for technology project success is the difference between the CIO's perception of organizational performance on a given factor and her rating of its relative influence. Analysis of variance was also computed and examined for this difference to determine if the public or private sector has a higher proclivity for large differences between the actual and ideal ratings of a critical success factor. Given the high number of performance-related hypotheses that were not supported by the data analysis, it is important to understand if one sector faces greater levels of dissonance between ideal and actual critical success factors. The entire set of analyses of variance for the ideal versus actual ratings of the critical success factors is offered in Appendix D. This section focuses solely on those factors that demonstrate a statistically significant group difference.

Critical Success Factor: Strategic technology planning

The analysis of variance results for the difference between actual and ideal rating of the critical success factor, strategic technology planning, indicate statistically significant differences for the public and private sectors (see Table 5.34). Based on the effect size (eta-squared=0.047), the organizational sector accounts for 4.7 percent of the variance in the difference.

Table 5.34 Analysis of variance results for difference in strategic technology planning (actual versus ideal) and sector.

ANOVA

Difference of influence of and performance on strategic technology planning

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	10.078	1	10.078	8.685	.004
Within Groups	204.242	176	1.160		
Total	214.320	177			

An examination of the difference of means indicates that the public sector has higher levels of dissonance between their ratings of the influence of strategic technology planning and their organizational performance on such planning (mean= 0.1928) compared to their private sector counterparts (mean= -0.2842). Conversely, the private sector has lower scores on the influence of strategic technology planning, compared to their organizational performance on this critical success factor. In terms of the public sector, the dissonance could be a function of lower levels of commitment to and use of strategic technology planning, or it could be a reflection of the limited time and resources allocated for such strategic planning. Finally, one of the most problematic issues for the public sector with respect to strategic technology planning is the frequent shift in direction resulting from cyclical political leadership changes. Therefore, the public sector may be less willing to invest in the strategic technology planning process despite legislative mandates to engage in such processes (see Clinger-Cohen Act), which translate into greater dissonance between ideal and actual ratings of the critical success factor.

Critical Success Factor: Stakeholder involvement

The analysis of variance results for the difference between actual and ideal rating of the critical success factor, stakeholder involvement, indicate statistically significant differences for the public and private sectors (see Table 5.35). The effect size (eta-squared=0.063) indicates that the organizational sector accounts for 6.3 percent of the variance in the difference.

Table 5.35 Analysis of variance results for difference in stakeholder involvement (actual versus ideal) and sector.

ANOVA

Difference of influence of and performance on stakeholder involvement

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	8.397	1	8.397	11.840	.001
Within Groups	124.822	176	.709		
Total	133.219	177			

The examination of the differences of means indicates that the public sector has lower levels of dissonance between ideal and actual ratings of stakeholder involvement (mean= 0.4699), compared to the private sector (mean= 0.9053). One of the reasons for lower levels of dissonance may be the culture of the public sector. Inclusion and participation are central to mission of government, so stakeholder involvement is often encouraged and undertaken to a fault. In fact, too much stakeholder participation can lead to greater deadlock and more incremental changes, which does not bode well for technology initiatives. Regardless, the strength of government lies in balancing the inclusion versus action paradox and lower levels of dissonance indicate that the organizations are moving in the right direction.

Critical Success Factor: Political support

The next ANOVA examines the difference between perceived organizational performance on political involvement and its influence according to the Chief Information Officer. As demonstrated in Table 5.36, there is a statistically significant difference between the degrees of separation between actual and ideal ratings of political support and the organizational sector. The effect size measure (eta-squared=0.033) indicates that the organizational sector accounts for 3.3 percent of the variance in the difference.

Table 5.36 Analysis of variance results for difference in political support (actual versus ideal) and sector.

ANOVA

Difference of influence of and performance on political support

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	11.474	1	11.474	6.044	.015
Within Groups	334.127	176	1.898		
Total	345.601	177			

Obviously, political support is critical to successful IT projects in the public sector, based on the survey data. As such, it is important for the public sector to have low levels of dissonance between the ideal versus actual ratings of the critical success factor. Unfortunately, the public sector indicates higher levels of dissonance in this arena (mean= 0.4458) compared to the private sector (mean= -0.063). Despite the importance of political support, often CIOs are unable or unwilling to communicate the vision and goals of the IT department, except during budget hearings. This translates into a recognition that political support is critical but the daily operations of the organization often eclipse the care and feeding of the political process that can make or break most technology projects.

Critical Success Factor: End user training

The analysis of variance results for the difference between actual and ideal rating of end user training indicate statistically significant differences for the public and private sectors (see Table 5.37). The effect size measure (eta-squared=0.022) indicates that organizational sector only accounts for 2.2 percent of the variance in the difference.

Table 5.37 Analysis of variance results for difference in end user training (actual versus ideal) and sector.

ANOVA

Difference of influence of and performance on end user training

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4.561	1	4.561	4.051	.046
Within Groups	198.159	176	1.126		
Total	202.719	177			

Based on the difference of means, the public sector faces less dissonance in the training arena (mean= 0.6265) compared to the private sector (mean= 0.9474). However, both groups indicate high levels of dissonance, primarily due to a lack of resources dedicated to training. One of the most widely accepted success factors is end user training, which fosters support and acceptance for technology initiatives. However, it is often ignored during requirements definition and budgeting for such projects.

Critical Success Factor: Adequate financial support

The analysis of variance results for the difference between actual and ideal rating of adequate financial support indicate statistically significant differences for the public and private sectors, as demonstrated in Table 5.38. The effect size measure (eta-squared=0.058) indicates that organizational sector only accounts for 5.8 percent of the variance in the difference between the sectors.

Table 5.38 Analysis of variance results for difference in adequate financial support (actual versus ideal) and sector.

ANOVA

Difference of influence of and performance on adequate financial support

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	14.065	1	14.065	10.905	.001
Within Groups	226.997	176	1.290		
Total	241.062	177			

However, an examination of the difference of means indicates that the public sector has a much higher level of dissonance on this factor (mean= 0.7108) compared to their private sector counterparts (mean= 0.1474). Given the current fiscal crises facing the majority of state and local governments, this result is not surprising. However, it is important to consider the issue of funding for technology even during economic downturns. Another factor that may contribute to the dissonance of the public sector is their reliance on elected officials for budget appropriations. Often the politicians want to fund projects that offer a specific service, which can be touted during re-election campaigns. Rarely is technology considered to be a political issue, so its funding is often neglected.

Based on the results of the analysis of variance of sector differences between ideal and actual ratings of critical success factors, it does appear that the public sector is generally less satisfied with their performance on critical success factors, compared to their ideal placement of the factors. There are several reasons for this dissonance, including external requirements such as legislative mandates in the case of Clinger-Cohen; bending to political preferences, which face cyclical turn-over; and, significant financial problems stemming from widespread fiscal crisis at the state and local government level. Although these issues are seemingly ubiquitous, the chief information officers, chief administrative officers, and elected officials must develop a plan to address these discrepancies in order to improve the overall technology project success rate in the public sector.

Summary of Analysis of Variance

A summary of findings from the statistical significance tests measuring the group differences between the public and private sectors (independent variable) and the critical success factors (dependent variables) is presented in Table 5.39. Each of the hypotheses was examined using analysis of variance and the results of ANOVA and difference of means tests are presented in tabular form.

Table 5.39 Summary of Analysis of Variance Findings

Critical Success Factor	Dependent Variables	Significant Group Differences	Hypothesis Accepted
Communication			
	Influence	No	No
	Performance	No	No
	Horizontal information sharing	No	*
	Vertical information sharing	No	*
	Difference in actual versus ideal	No	**
Highly Qualified Staff			
	Influence	No	Yes
	Performance	Yes	Yes
	Difference in actual versus ideal	No	**
Use of Rewards			
	Performance	Yes	Yes
Strategic Planning			
	Influence	No	Yes
	Performance	No	No
	Accountability of CIO	No	*
	Rules and procedures	No	*
	Difference in actual versus ideal	Yes	**
End User Involvement			
	Influence	No	Yes
	Performance	No	No
	Difference in actual versus ideal	No	**
Stakeholder Involvement			
	Influence	Yes	Yes
	Performance	No	No
	Planning involvement	No	*
	Level of involvement	Yes	*
	Impact of involvement	No	*
	Difference in actual versus ideal	Yes	**
Project Milestones			
	Influence	No	Yes
	Performance	No	No
	Measures of success	No	*
	Difference in actual versus ideal	No	**
Top Management Support			
	Influence	No	Yes
	Performance	No	No
	Idea germination	Yes	*
	Difference in actual versus ideal	No	**

Table 5.39, Continued

Critical Success Factor	Dependent Variables	Significant Group Differences	Hypothesis Accepted
Political Support			
	Influence	Yes	Yes
	Performance	Yes	Yes
	Difference in actual versus ideal	Yes	**
Prototyping/Piloting			
	Influence	No	Yes
	Performance	No	No
	Difference in actual versus ideal	No	**
Cross-functional Teams			
	Influence	Yes	No
	Performance	No	No
	Reward for teamwork	Yes	*
	Difference in actual versus ideal	No	**
End User Training			
	Influence	No	Yes
	Performance	No	Yes
	Difference in actual versus ideal	Yes	**
Location of CIO in Organization			
	Influence	Yes	No
	Performance	No	No
	Position of top information officer	Yes	*
	Difference in actual versus ideal	No	**
Adequate Financial Support			
	Influence	Yes	No
	Performance	No	No
	Financial strain	Yes	*
	Impact of financial strain	Yes	*
	Difference in actual versus ideal	Yes	**

* Indicates variable that was used to measure organizational engagement of factor
** Indicates measure of congruence between actual and ideal rating of factor

As indicated in Table 5.39, thirteen of the hypotheses were accepted. For the most part, the hypotheses related to the influence of a critical success factor on IT project success were accurate. Given that the hypotheses were generated based on an exhaustive review of the literature, it is reasonable to assert that the current body of literature offers fairly good indication of the issues related to ideal critical success factors.

However, more research is needed on several factors, particularly understanding and predicting organizational performance on a factor. One factor that is critical to understand is communication, given the lack of supported hypotheses related to influence of and performance on the factor. A possible explanation for the lack of findings related to communication is that the importance of communication has been so prevalent in the literature and in project management training that individuals have become desensitized to it. In fact, the public sector is mandated to have routine, documented communications about IT projects (as legislated by the Clinger-Cohen Act) that many of its CIOs have become disenchanted with the importance of communication. Finally, the issue of open records laws also comes to bear on the communication critical success factor. Given the need for an accountable, open, and transparent government, the open records laws have extended into many communication channels, such as project-related electronic mail. This inability to conduct confidential communications about specific technology issues may have a negative impact on the role of communication, in terms of public sector CIOs' ratings of its influence and their performance.

Another area for future research involves cross-functional teams. The literature indicated that both the public and private sectors should rate the use of cross-functional teams as important to overall IT project success. However, the reality of the situation is that the public sector is less likely to view the cross-functional teams as important. One explanation for this finding is the historical "silo" or "stovepipe" nature of the public sector. Given the lack of integration and communication between various departments in a government organization, it is plausible that the employees, including the CIOs, are less likely to value cross-functional teams because of historical legacies and comfort zones.

Finally, the critical success factor, location of the CIO, is found to be more important in the public sector compared to the private sector. Although the literature indicated that both groups would view the location of the CIO as important to overall IT project success, the public sector clearly values this position more than the private sector, based on the analysis of variance. One explanation for the statistically significant difference between the two sectors is the relative newness of the CIO role in the public sector. As the position becomes more widespread, as in the private sector, the connotation of power associated with the CIO title will diminish, as has occurred in the private sector. Furthermore, many local governments do not include their IT department heads or CIOs within the management team. This lack of inclusion may also explain the perception of influence by the public sector.

In terms of the performance ratings, the literature did not accurately predict the majority of responses. For example, organizational performance on strategic technology planning was not significantly better in the private sector, despite their reliance on enterprise architectures and applications. This should be cause for concern among those organizations engaged in such large-scale technology efforts, such as enterprise resource planning system or human resource systems.

There was also no significant difference in terms of organizational performance on end user or stakeholder involvement. Given the complexities associated with defining the end user and stakeholder in the public sector, it was expected that they would rate their performance lower than their private sector counterparts. However, this was not found to be true. Perhaps many organizations recognize the influence and impact of end user and stakeholder involvement on IT project success, but cannot afford to incorporate the additional time or costs to include these groups. Table 5.39 demonstrates many other insignificant findings with respect to organizational performance on critical success factors. Given the prevalence of large-scale IT failures in both the public and private sectors, perhaps more attention to such organizational performance is warranted in future research.

Despite the results of the analysis of variance and difference of means tests, another variable may confound the findings of the data. Many of the chief information officers were previously employed in the opposing sector, which may bias their responses on both the influence of and the organizational performance on the critical success factors. Accordingly, the next section uses analysis of covariance to control for previous work sector and to more accurately test the critical success factor hypotheses.

Analysis of Covariance

Analysis of covariance (ANCOVA) is used to increase the sensitivity of the test of main effects and interactions by controlling for the covariate (error term) (Tabachnick and Fidell, 2001). In the case of this research study, the moderating variable, previous work experience, is used as a covariate to determine if previous work in a different sector will affect the results of the Chief Information Officers responses on the critical success factors. Conventional wisdom holds that individuals carry previous organizational traits to new organizations when job changes occur. Therefore, it is expected that individuals who were employed in the public sector and have moved into the private sector, or vice versa, will transfer expectations and assumptions to the new sector. For example, one Chief Information Officer that moved from the private sector to state government has instituted many private sector policies, such as outsourcing non-mission critical functions and enterprise-wide standardization of hardware and software. This section of the research seeks to determine if any of the findings from the analysis of variance section are altered when the previous work experience is controlled. Although all of the variables have been analyzed using ANCOVA, only those that demonstrate a change in significance from the ANOVA findings are reported in this section (see Appendix E for complete ANCOVA results).

Critical Success Factor: Performance on highly qualified staff

It was expected that public sector CIOs would rate their organizational performance on highly qualified staff lower than their private sector counterparts. In fact, during the original analysis of variance, this hypothesis was substantiated. Conversely, the analysis of covariance for performance on the factor highly qualified staff produces an opposing result. When the moderating variable, previous work experience, is controlled for, the previously significant findings (in ANOVA) become insignificant. Table 5.40 illustrates the results of the analysis of covariance.

Table 5.40 Analysis of covariance results for performance on highly qualified staff.

Tests of Between-Subjects Effects

Dependent Variable: Performance on highly qualified staff

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	4.404[a]	2	2.202	2.567	.080
Intercept	268.682	1	268.682	313.169	.000
Previous Work Experience	.103	1	.103	.120	.729
Sector	3.672	1	3.672	4.280	.040
Error	150.141	175	.858		
Total	2931.000	178			
Corrected Total	154.545	177			

a. R Squared = .028 (Adjusted R Squared = .017)

Given the weak relationship of the analysis of variance (eta-squared=0.028), it is not surprising that controlling for a non-significant variable creates an insignificant model (F=2.567, p>.05, eta-squared=0.028). However, this finding is important to consider in light of hypothesis 2b, which states that there should be a statistically significant difference between the public and private sectors related to organizational performance on highly qualified technology staff. Based on the results of the ANCOVA, the null hypothesis for 2b cannot be rejected.

Critical Success Factor: Influence of strategic technology planning

It was expected that there would be no statistically significant differences between the pubic and private sector ratings on the influence of strategic technology planning. The original analysis of variance supported this hypothesis. However, the analysis of covariance indicates that previous work experience does significant predict the ratings on the influence of strategic technology planning (F=13.728, p=.000). Furthermore, when the effects of the covariate are removed, the group differences between public and private sectors related to the critical success factor are statistically significant (F=7.890, p=001, eta-squared=0.083). Table 5.41 illustrates the findings of the analysis of covariance.

Table 5.41 Analysis of covariance results for influence of strategic technology planning

Tests of Between-Subjects Effects

Dependent Variable: Influence of strategic technology planning

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	16.525[a]	2	8.263	7.890	.001
Intercept	321.741	1	321.741	307.247	.000
Previous work experience	14.376	1	14.376	13.728	.000
Sector	.174	1	.174	.166	.684
Error	183.256	175	1.047		
Total	2229.000	178			
Corrected Total	199.781	177			

a. R Squared = .083 (Adjusted R Squared = .072)

Essentially, the effects of previous work experience confounded the original results of the analysis of variance. Once the effects of the moderating variable were removed, the sector differences related to ratings on influence of strategic technology planning are statistically significant. Therefore, hypothesis 4a, which states that there should be no sectoral difference related to ratings of influence of strategic technology planning, cannot be accepted.

Critical Success Factor: Performance on strategic technology planning

It was expected that the public sector CIOs would rate the organizational performance on strategic technology planning lower than their private sector counterparts. The original analysis of variance did not support the hypothesis. However, an examination of the analysis of covariance for the organizational performance on strategic technology planning offers contradictory results. The moderating variable, previous work experience, does significantly predict the ratings of organizational performance on strategic technology planning ($F=5.124$, $p<.05$). When the moderating variable, previous work experience, is introduced into the model as a control variable, the previously insignificant relationship between performance on strategic technology planning and organizational sector becomes significant ($F=5.424$, $p<.05$, eta-squared=0.046). Table 5.42 highlights the results of the analysis of covariance.

Table 5.42 Analysis of covariance results for performance on strategic technology planning

Tests of Between-Subjects Effects

Dependent Variable: Performance on strategic technology planning

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	7.553[a]	2	3.777	4.176	.017
Intercept	274.814	1	274.814	303.869	.000
Previous work experience	4.634	1	4.634	5.124	.025
Sector	4.905	1	4.905	5.424	.021
Error	158.267	175	.904		
Total	2270.000	178			
Corrected Total	165.820	177			

a. R Squared = .046 (Adjusted R Squared = .035)

In essence, when the effects of previous work experience are controlled for, hypothesis 4b-- there are statistically significant differences between the public and private sector with respect to organizational performance on strategic technology planning-- is accepted. Furthermore, an examination of the means for the public and private sectors indicates that the public sector rates their organizational performance on strategic technology planning lower than the private sector, as predicted in hypothesis 4b.

Critical Success Factor: End user involvement

In terms of end user involvement, the previous analysis of variance demonstrated no statistically significant group differences on influence ratings. However, the analysis of covariance indicates that previous work experience predicts the ratings on influence of end user involvement on IT project success ($F=8.855$, $p<.05$). In addition, the group differences based on sector become significant when controlling for previous work experience ($F=6.194$, $p<.05$, eta-squared=0.066). Table 5.43 demonstrates the results of the analysis of covariance.

Table 5.43 Analysis of covariance for influence of end user involvement

Tests of Between-Subjects Effects

Dependent Variable: Influence of end user involvement

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	8.413[a]	2	4.207	6.194	.003
Intercept	260.649	1	260.649	383.788	.000
Previous work experience	6.014	1	6.014	8.855	.003
Sector	.721	1	.721	1.061	.304
Error	118.851	175	.679		
Total	3519.000	178			
Corrected Total	127.264	177			

a. R Squared = .066 (Adjusted R Squared = .055)

In other words, the insignificant relationship between the public and private sectors and their ratings on influence of end user involvement that was demonstrated in the analysis of variance section is not supported when controlling for previous work experience. Therefore, the hypothesis that there is no statistically significant difference between the public and private sectors with respect to this factor (hypothesis 5a) cannot be accepted.

Critical Success Factor: Cross-functional teams

During the analysis of variance, statistically significant group differences were demonstrated between the public and private sectors with respect to the influence of cross-functional teams. However, the analysis of covariance, which controls for previous work experience, indicates that there is not statistically significant group difference ($F=2.465$, $p>.05$, eta-squared=0.027). Table 5.44 highlights the results of the analysis of covariance.

Table 5.44 Analysis of covariance for influence of cross-functional teams.

Tests of Between-Subjects Effects

Dependent Variable: Influence of cross-functional teams

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	4.878[a]	2	2.439	2.465	.088
Intercept	229.448	1	229.448	231.929	.000
WORK_EXP	.227	1	.227	.229	.633
SECTOR	3.823	1	3.823	3.865	.051
Error	173.128	175	.989		
Total	2603.000	178			
Corrected Total	178.006	177			

a. R Squared = .027 (Adjusted R Squared = .016)

Basically, when the effects of previous work experience are removed from the equation, there is no statistically significant difference between the public and private sectors for this critical success factor. Based on these findings, hypothesis 11a, which states that there will be no sectoral difference with respect to the influence on cross-functional teams, can be accepted. Furthermore, an analysis of the comparison of means indicates that both groups rate the influence of cross-functional teams higher than the median factor, which supports the directional component of the hypothesis.

Critical Success Factor: Location of the CIO in organization

The final change demonstrated through the analysis of covariance involves the ratings on the influence of the location of the CIO within the organization. Statistically significant group differences were demonstrated between the public and private sectors on the ratings of this factor in the ANOVA section. However, when analysis of covariance is used to remove the effects of previous work experience from the model, the statistically significant group differences for the public and private sectors evaporate ($F=2.277$, $p>.05$, eta-squared=0.025). Table 5.45 highlights the results of the analysis of covariance.

Table 5.45 Analysis of covariance for performance on location of CIO.

Tests of Between-Subjects Effects

Dependent Variable: Influence of location of CIO in organization

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	7.732[a]	2	3.866	2.277	.106
Intercept	151.131	1	151.131	89.012	.000
Previous work experience	.146	1	.146	.086	.769
Sector	7.606	1	7.606	4.480	.036
Error	297.127	175	1.698		
Total	1877.000	178			
Corrected Total	304.860	177			

a. R Squared = .025 (Adjusted R Squared = .014)

Therefore, hypothesis 13a, which states that there will be no statistically significant group difference concerning influence of location of the CIO in the organization, can be accepted.

Summary of Analysis of Covariance Findings

Analyses of covariance were performed to eliminate any moderating effects caused by the Chief Information officers' previous work experiences. As a result, six of the dependent variables demonstrated significant changes upon the removal of the effects of the moderating variable. Two of the changes, highly qualified staff and strategic technology planning, involved the organizational performance aspect of the critical success factor. These changes may be a function of previous work experience that the CIOs are using as a comparison to their current situation. The remaining four changes dealt with influence of specific factors, including strategic technology planning, end user involvement, use of cross-functional teams, and location of the CIO. The changes demonstrated in these variables may be caused by previous work experience that has shaped the expectations and ideals of the Chief Information Officers. Table 5.46 highlights the results of both the ANOVA and ANCOVA procedures.

Table 5.46. ANOVA and ANCOVA results for each hypothesis.

Critical Success Factor	**Dependent Variables**	**Hypothesis Accepted (ANOVA)**	**Hypothesis Accepted (ANCOVA)**
Communication			
	Influence	No	No
	Performance	No	No
Highly Qualified Staff			
	Influence	Yes	Yes
	Performance	**Yes**	**No**
Use of Rewards			
	Performance	Yes	Yes
Strategic Planning			
	Influence	**Yes**	**No**
	Performance	**No**	**Yes**

Table 5.46, Continued

Critical Success Factor	**Dependent Variables**	**Hypothesis Accepted (ANOVA)**	**Hypothesis Accepted (ANCOVA)**
End User Involvement			
	Influence	**Yes**	**No**
	Performance	No	No
Stakeholder Involvement			
	Influence	Yes	Yes
	Performance	No	No
Project Milestones			
	Influence	Yes	Yes
	Performance	No	No
Top Management Support			
	Influence	Yes	Yes
	Performance	No	No
Political Support			
	Influence	Yes	Yes
	Performance	Yes	Yes
Prototyping/Piloting			
	Influence	Yes	Yes
	Performance	No	No
Cross-functional Teams			
	Influence	**No**	**Yes**
	Performance	No	No
End User Training			
	Influence	Yes	Yes
	Performance	Yes	Yes
Location of CIO in Organization			
	Influence	**No**	**Yes**
	Performance	No	No
Adequate Financial Support			
	Influence	No	No
	Performance	No	No

As illustrated in Table 5.46, there are a total of thirteen hypotheses accepted based on the results of bivariate analyses. Nine of the accepted hypotheses relate to the influence of the critical success factors, while the remaining four address organizational performance on the given factors. In Chapter 6, the findings of the multivariate analysis are presented, in particular factor analysis.

CHAPTER 6: MULTIVARIATE ANALYSIS AND FINDINGS

The chapter involves multivariate analysis of the data. In particular, factor analysis is employed to determine if underlying constructs connect specific critical success factors, as a means of data reduction. This step in the research is performed to determine if an underlying structure can be used in modeling important success factors to IT projects, based on sector. However, this research does not attempt to create such a model. Instead, it is offered as a baseline for future research.

Combined Public and Private Sector Data

Principal components analysis (PCA) with varimax rotation was performed on the data in order to determine if there are underlying grouping constructs of the dependent variables (critical success factors). PCA is generally used when the research purpose is data reduction. In essence, the goal of this principal components analysis was to reduce the data set with many variables into a data set with a smaller number of variables by relating the variables into like factors (components).

The minimum eigenvalue for retaining a factor was set at 1.0, the most common cut-off point for factor analysis (Tabachnick and Fidell, 2001). The initial examination of the variables indicated that five factors met the eigenvalue cut-off criteria. Given that the factor analysis is exploratory in nature, each factor should have at least three variables (Garson, 2003). Two of the factors in the original analysis had only two variables, so the number of factors was restricted to four. With the restriction to four factors, each factor had at least three variables.

A large number of complex variables (those loading on more than one factor) as well as many variables with weak to moderate correlations with the factors, were present in the rotated factor matrix. Therefore, only variables with factor loadings above 0.45 and low communalities are included in the constructs. With a loading cut-off value of 0.45, no variables load on more than one factor. Table 6.1 lists the critical success factors, in descending order of correlation, that load for each of the four factors.

Table 6.1 Critical success factors composing the four factors

Variable	**Factor 1: Resources for support**	**Factor 2: Quality of IT department**	**Factor 3: Involvement techniques**	**Factor 4: Methods for facilitation of acceptance**
Political support	.819			
Adequate financial resources	.672			
CIO location	.625			
Strategic technology planning	.587			
Highly qualified staff		.766		
Project milestones		.676		
Communication		.603		
End user involvement			.787	
Stakeholder involvement			.710	
Top management support			.565	
Cross-functional teams			.464	
Prototyping/piloting				.733
End user training				.634
Use of rewards				.593

The next step in the factor analysis was to test the reliability of the newly created factors. Using reliability analysis in SPSS 11.0, the Cronbach alpha coefficients were computed for each of the four factors. Given the exploratory nature of this research, reliability coefficients of 0.50 or higher are considered sufficient (Srinivasan, 1985). Table 6.2 illustrates the coefficient matrix, with the highest loadings for each variable indicated in bold. In addition, the table offers the reliability coefficients, eigenvalues and percent of variance explained to demonstrate the robustness of the model.

Table 6.2 Factor loadings and reliability analysis for the four factors.

Variable	**Factor 1: Resources for support**	**Factor 2: Quality of IT department**	**Factor 3: Involvement techniques**	**Factor 4: Methods for facilitation of acceptance**
Communication	.034	**.305**	.124	-.136
Highly qualified staff	-.067	**.474**	-.176	-.035
Use of rewards	-.115	-.029	-.028	**.362**
Strategic technology planning	**.248**	.141	-.068	-.032
End user involvement	-.083	.072	**.419**	-.068
Stakeholder involvement	-.029	-.258	**.428**	.145
Project milestones	-.148	**.384**	-.015	.052
Top management support	.120	.044	**.319**	-.226
Political support	**.439**	-.180	.028	-.045
Prototyping/piloting	.078	-.090	-.054	**.426**
Cross-functional teams	.027	-.119	**.236**	.226
End user training	-.024	.124	-.035	**.316**
CIO location	**.313**	-.165	-.085	.206
Adequate financial support	**.313**	.035	.072	-.122
Cronbach's Alpha	.67	.62	.58	.59
Eigenvalue	3.364	1.846	1.462	1.158
% of Variance	24.03%	13.188%	10.44%	8.27%

As indicated in Table 6.2, the reliability coefficients range from 0.58 for involvement techniques (Factor 3) to 0.67 for resources (Factor 1). These reliability coefficients are deemed acceptable, using the 0.50 cut-off value.

Now that the factors have been deemed acceptable, the factor analysis is complete. The purpose of the analysis was to discover the underlying constructs that linked specific critical success factors together. Each of the fourteen critical success factors was placed within one of the four factors, based on a 0.45 loading cut-off value. Furthermore, the reliability analysis and percent of variance explained indicate that the factors and variables are well defined. By examining the mean ratings of each of the variables within the four factors, mean factor scores were computed. Table 6.3 illustrates the mean factor scores.

Table 6.3 Mean factor scores for the four factors.

	Factor 1: Resources for support	**Factor 2: Quality of IT department**	**Factor 3: Involvement techniques**	**Factor 4: Methods for facilitation of acceptance**
Mean	3.425	4.153	4.235	3.18

Based on the mean factor scores, it appears that the most important factor, based on the ratings of all Chief Information Officers (public and private), is Factor 3—Involvement Techniques. This factor is composed of the following variables: end user involvement, stakeholder involvement, top management support, and use of cross-functional teams. The second most important factor is Factor2—Quality of IT Department. This factor is composed of highly qualified staff, use of project milestones, and communication. The third most important factor is Factor 1—Resources for Support. The Resources factor is composed of political support, adequate financial support, location of the CIO, and strategic technology planning. The final factor, Factor 4—Methods for Facilitating Acceptance, is the least important based on CIO ratings. The factor is composed of prototyping and/or piloting, end user training, and use of rewards. Each of the factors offers insight into items that affect CIO decision-making about IT projects. The second step of the principal components analysis was to assess if the structure and mean scores of the factors established are retained when each sector is examined separately.

Comparison of public and private sector results

Again, PCA with varimax rotation was performed on the data in order to determine if there are underlying grouping constructs of the dependent variables (critical success factors). However, in order to assess organizational sector differences, the output was separated by sector. For both sectors, the minimum eigenvalue for retaining a factor was set at 1.0, as in the integrated examination. The initial examination of the variables indicated that five factors met the eigenvalue cut-off criteria. However, to remain consistent with the original requirement of at least three variables per factor for exploratory research, the number of factors was restricted to three. With the restriction to three factors, each factor in both the public and private sector analysis had at least three variables and no cross-loading occurred, using the previously established. Furthermore, with a loading cut-off value of 0.45, no variables load on more than one factor in the public sector data. However, the private sector data does have two factors that cross-load. For the purposes of parsimony, both variables have been included in the factors and will be included in mean score computations. Table 6.4 lists the critical success factors, in descending order of correlation, that load on each of the three factors in the public sector. Table 6.5 demonstrates the findings of the private sector data.

Table 6.4 Critical success factors composing the three factors for the public sector

Variable	Factor 1: Methods for facilitation and acceptance	Factor 2: Quality of IT department	Factor 3: Involvement techniques
End user training	.796		
Prototyping/piloting	.689		
Use of rewards	.578		
Highly qualified staff	.570		
CIO location	.566		
Project milestones	.481		
Strategic technology planning		.749	
Communication		.728	
Adequate financial resources		.627	
Political support		.601	
End user involvement			.855
Stakeholder involvement			.649
Top management support			.616
Cross-functional teams			.589

Table 6.5 Critical success factors composing the three factors for the private sector

Variable	Factor 1: Methods for facilitation and acceptance	Factor 2: Quality of IT department	Factor 3: Involvement techniques
Strategic technology planning	.761		
Prototyping/piloting	.693		
Political support	.655		
CIO location	.569		
End user training	.553		
Adequate financial resources	.508		
Cross-functional teams	.484		.473
Top management support		.807	
End user involvement		.640	.503
Highly qualified staff		.638	
Communication		.596	
Project milestones		.552	
Stakeholder involvement			.746
Use of rewards			.503

In comparing the factor structures between the public and private sector data, it is interesting to note the location of specific variables within the constructs. In particular, strategic technology planning, political support, use of rewards, and adequate financial support are located in different constructs in each sector. The location of the variables within the factors may be attributable to the differences in relative influence of the variables based on sector ratings. In addition to demonstrating a different factor structure between the public and private sectors, the relative importance of each of the factors was also assessed to ascertain sectoral differences.

The next step in the factor analysis was to test the reliability of the newly created factors. Using reliability analysis in SPSS 11.0, the Cronbach alpha coefficients were computed for each of the factors, with sufficient reliability coeffiecients of 0.50 or higher. . Table 6.6 illustrates the coefficient matrix for the public sector data, with the highest loadings for each variable indicated in bold. In addition, the table offers the reliability coefficients, eigenvalues and percent of variance explained to demonstrate the robustness of the model. Table 6.7 offers the same findings for the private sector data.

Table 6.6 Factor loadings and reliability analysis for the public sector factors.

Variable	**Factor 1: Methods for facilitation and acceptance**	**Factor 2: Strategy and support**	**Factor 3: Involvement techniques**
End user training	**.327**	-.075	.003
Prototyping/piloting	**.285**	-.074	.063
Use of rewards	**.247**	-.100	-.063
Highly qualified staff	**.204**	.097	-.077
CIO location	**.224**	-.011	-.005
Project milestones	**.165**	.115	.007
Strategic technology planning	.002	**.357**	-.116
Communication	-.064	**.363**	.044
Adequate financial resources	-.037	**.308**	.061
Political support	-.065	**.303**	.029
End user involvement	-.005	-.045	**.425**
Stakeholder involvement	-.063	.049	**.322**
Top management support	-.033	.071	**.305**
Cross-functional teams	1.73	-.058	**.292**
Cronbach's Alpha	.68	.63	.62
Eigenvalue	2.895	2.015	1.753
% of Variance	20.68%	14.39%	12.52%

As indicated in Table 6.6, the reliability coefficients range from 0.62 for involvement techniques (Factor 3) to 0.68 for facilitation/acceptance (Factor 1). These reliability coefficients are deemed acceptable, using the 0.50 cut-off value.

Table 6.7 Factor loadings and reliability analysis for the private sector factors.

Variable	**Factor 1: Methods for facilitation and acceptance**	**Factor 2: Support and involvement**	**Factor 3: Involvement techniques**
Strategic technology planning	**.299**	-.049	-.053
Prototyping/piloting	**.296**	-.191	.115
Political support	**.272**	.007	-.210
CIO location	**.233**	.018	-.188
End user training	**.168**	-.022	.170
Adequate financial resources	**.145**	.106	-.038
Cross-functional teams	**.190**	-.179	**.246**
Top management support	-.130	**.430**	-.159
End user involvement	-.118	**.257**	**.204**
Highly qualified staff	.006	**.298**	-.154
Communication	.026	**.201**	.102
Project milestones	-.081	**.217**	.156
Stakeholder involvement	-.040	-.110	**.432**
Use of rewards	-.096	.014	**.282**
Cronbach's Alpha	.75	.76	.48
Eigenvalue	4.166	1.676	1.421
% of Variance	29.76%	11.97%	10.15%

As indicated in Table 6.7, the reliability coefficients range from 0.48 for involvement techniques (Factor 3) to 0.76 for quality of IT department (Factor 2). Based on the 0.50 cut-off value, Factor 3 is excluded from further analysis. The remaining factors are deemed acceptable.

Now that all of the public sector factors and two of the private sector factors have been deemed acceptable, the factor analysis is complete. The purpose of the analysis was to discover the underlying constructs that linked specific critical success factors together, based on organizational sector. Each of the fourteen critical success factors was placed within one of the four factors, based on a 0.45 loading cut-off value. Furthermore, the reliability analysis and percent of variance explained indicate that the factors and variables are well defined, with the exception of one private sector factor. By examining the mean ratings of each of the variables within the three public sector factors and two private sector factors, mean factor scores were computed. Table 6.8 illustrates the public sector mean factor scores. Table 6.9 highlights the private sector mean factor scores

Table 6.8 Public sector mean factor scores for the three factors.

	Factor 1: Methods for facilitation of acceptance	**Factor 2: Strategy and support**	**Factor 3: Involvement techniques**
Mean	3.37	4.00	4.13

Based on the mean factor scores, it appears that the most important factor, based on the ratings of public sector Chief Information Officers, is Factor 3—Involvement Techniques. This factor is composed of the following variables: end user involvement, stakeholder involvement, top management support, and use of cross-functional teams. This finding replicates the finding of the aggregate data analysis. The second most important factor is Factor2—Strategy and Support. This factor is composed of strategic technology planning, communication, adequate financial support, and political support.

In terms of the private sector data, only two factors were examined for mean scores due to the lack of reliability of the third factor. Table 6.9 illustrates the mean scores for the private sector data.

Table 6.9 Private sector mean factor scores for the three factors.

	Factor 1: Methods for facilitation of acceptance	Factor 2: Support and involvement
Mean	3.40	4.33

Based on the mean factor scores, it appears that the most important factor, based on the ratings of private sector Chief Information Officers, is Factor 2—Internal Support and Involvement. This factor is composed of the following variables: top management support, end user involvement, highly qualified staff, communication, and project milestones. This factor is composed primarily of internal, controllable aspects of technology projects and offers interesting insight into the focus of the private sector CIO, compared to the public sector CIO.

Each of the factors offers insight into items that affect CIO decision-making about IT projects. In addition to an overall factor structure, each sector was also examined in terms of their factor structure and focus. The findings were significantly different for the public and private sectors and offers interesting possibilities for future research efforts.

CHAPTER 7: CONCLUSION AND IMPLICATIONS

The intended goal of this research is to illustrate the various factors that are critical to IT project success in the public and private sectors, as well as to ascertain which factors have more or less influence in each sector. Chapter One was offered as primer on the various critical success factors, the role of chief information officers, and the paucity of research about success factors based on sectoral differences. Chapter Two used extant literature to summarize the importance of the fourteen critical success factors, reviewed the role of the Chief Information Officer within the organization, and offers empirical data to attest to the hypothesized critical success factors. Chapter Three highlighted the research design and methodology utilized in this research study. Chapter Four presented the descriptive statistical findings of this research study. Chapter Five presented the bivariate and multivariate statistical analysis of the survey data. This chapter provides a summary of the findings and offers prescriptive recommendations for policy makers and future researchers.

The concept of critical success factors was introduced by Daniel (1961) and popularized by Rockart (1978). In much of the literature, critical success factors refer to those few items that can make or break a project. Accordingly, the literature also indicates the relative importance of various critical success factors. By empirically testing an assortment of findings, this research offers hypotheses about the public and private sector differences related to fourteen critical success factors. In this chapter, each of the hypotheses is offered in rank order based on the aggregate response of all Chief Information Officers. In addition, each of the hypotheses is examined with respect to the findings in order to offer prescriptive recommendations for policymakers.

Summary of Research Findings

The ability to predict more rigorously successful projects is critical in the wake of massive technology failures in both private and public settings. The identification and attention to various critical success factors is one mechanism for coping with the inherent risks of large-scale technology projects. Each of the critical success factors has been discussed in detail in previous chapters. However, this summary offers a brief explanation of each factors and highlights its ranking and implications according to the empirical data. The factors are ordered according to their ranking by the survey sample, in terms of aggregate relative importance.

Top Management Support: #1 Critical Success Factor

Top management support is the most important critical success factor, according to the CIOs surveyed. Over 90 percent of the CIOs indicated that top management support is more influential than the median factor, use of rewards. In addition, the majority of the literature on critical success factors places top management support at the apex of project success. Top management support is essential for fostering end user adoption of new technologies. It also fosters a culture of change and innovation. If top management is supportive of new technology projects, then lower-level employees will have the incentive to embrace the new technology despite the learning curve commonly associated with such a project. Top management support is the preeminent critical success factor according to both the survey of CIOs and the literature on critical success factors.

There is no statistically significant difference between the public and private sector ratings on the influence of or performance on top management support. Although surprising, this finding indicates that both sectors recognize the importance of top management support and encourage it within their organizations. Policymakers must continue to foster supportive environments for technology projects as a means to elicit user buy-in and participation, thereby reducing the likelihood of project failure.

Communication: #2 Critical Success Factor

Communication is often cited as a critical success factor in information technology initiatives. For the purposes of this research, this critical success factor is defined as open, shared information exchange across functional areas (horizontal communication) and hierarchical levels (vertical communication). Communication is the linkage between disparate groups and departments within public and private entities. Based on the survey data, communication is the second most important critical success factor, with 86 percent of the CIOs surveyed indicating that it is more influential than the median factor, use of rewards. Communication provides the framework for many of the other critical success factors, such as strategic planning and top management support.

There was no statistically significant difference between the public and private sectors with respect to the influence of or performance on communication. Both groups recognize the value of communication and many of the chief information officers indicated an institutionalized communication plan. This finding is especially important as enterprise approaches and cross-organizational technology projects become more mainstream. For example, many of the e-government projects at the federal level require integration and interoperability of agencies, departments, and technologies. Without meaningful, routine communication, these projects would be in serious jeopardy. Policymakers should continue to encourage communication within and across organizations in order to facilitate the enterprise and cross-organizational technology solutions that offer such large-scale benefits.

End User Involvement: #3 Critical Success Factor

End user involvement is the third most important critical success factor in information technology implementation. Over 85 percent of the CIOs surveyed indicate that end user involvement is more influential than use of rewards, the median factor. End user involvement is critical because of their role in determining requirements and establishing realistic but aggressive time frames. In addition, end user involvement engenders a sense of ownership in the project and promotes future support and use of the technology solution. Finally, failure to involve end users can result in misaligned goals, incorrect requirements, and employee resistance to change.

The influence of end user involvement is less highly regarded in the public sector than the private sector. This finding may be attributed to the classic problem of end user definition in the public sector—in essence, all citizens are end users at some level. The competing values and conflicting preferences of the end users create significant logjams for technology project designs and implementations. However, there is no statistically significant difference between the sectors with respect to organizational performance on end user involvement. Therefore, policymakers, particularly in the public sector, should encourage end user involvement, but limit such inclusion to representatives of immediate user groups, in order to foster end user buy-in and participation. By engaging the end user in the design and testing of a project, the technology staff is less likely to encounter employee resistance once project implementation begins. Furthermore, end user involvement allows for requirements and specifications to be tailored to end user standards, which can increase overall satisfaction with the project. However, policymakers should be warned against forcing widespread end user involvement because too much input can create significant scope creep and cause costly schedule and budget overruns.

Stakeholder Involvement: #4 Critical Success Factor

Stakeholder involvement is one of the top five most important critical success factors. Eighty-eight percent of the CIOs involved in the survey indicate that stakeholder involvement is more influential to project success than use of rewards, the median factor. It is essential for garnering organization-wide project support beyond the role of end user involvement (Ang, et al., 2002). Furthermore, stakeholder involvement, coupled with end user involvement, ensures the needs of internal and external recipients are being met through adequate representation during the planning and testing phases. By involving stakeholders in technology projects, a new level of complexity is introduced. This complexity is essential because it forces the technology project team to assess various individual and group interests, as well as competing alternatives, in order to identify the solution that best addresses the requirements and desires of the stakeholders.

Public sector CIOs rate stakeholder involvement as less influential than their private sector counterparts. Again, the issue of defining the stakeholder creates problems in the public sector because it can include all citizens. However, there are no statistically significant sectoral differences in terms of organizational performance on the critical success factor, which is encouraging. By including stakeholder involvement as a critical success factor, policymakers can foster external and internal project support, as well as ensure that projects will be designed with attention to alternatives. However, in the public sector, the definition of stakeholder must be narrow enough to create a small, target group for inclusion. It is also advisable to use a representative cross-section of the affected population in order to accurately capture the impact of the new technology project on each subset.

Project Milestones: #5 Critical Success Factor

The establishment of project milestones is the fifth most important critical success factor. Almost 80 percent of the CIOs rated project milestones as more influential than the median factor, use of rewards. Project milestones are critical because they allow the work involved in a large-scale technology project to be broken down into smaller, more manageable sections. By focusing on achieving each small goal, the team builds confidence in both the technology and themselves. In addition, the celebration of these small milestones allows for a period of rest and rejuvenation prior to moving on to the next goal. Without project milestones, technology applications can become overwhelming and burdensome to employees. Additionally, milestones provide the opportunity to assess the work to date, make corrections if needed, and also provide small victories for successes achieved by the project staff.

Both sectors rate the influence of project milestones as high in terms of achieving successful projects. Furthermore, there is no statistically significant difference between the sectors with regard to organizational performance on the critical success factor. Therefore, policymakers should continue to encourage the use of project milestones as a means of monitoring projects, as well as a method of rewarding technology staff for task completion.

Highly Qualified Technology Staff: #6 Critical Success Factor

Highly qualified technology staff is the sixth most important critical success factor, with over 75 percent of the CIOs surveyed indicating that highly qualified staff are more influential than the median factor, use of rewards. Problems associated with untrained and poorly skilled technology staff are often identified in public sector organizations. However, with the changes in the economy of the United States, many public sector organizations are now hiring highly skilled employees who have been laid off from the private sector. In addition, the influx of individuals to higher educational institutions suggests that the issue of skilled staff may become less problematic in future years. Regardless, the importance of high quality technology staff cannot be overlooked when assessing those factors that contribute to the success or failure of technology projects.

Both the public and private sector chief information officers rate the importance of highly qualified technology staff high (no statistically significant group difference). However, the public sector rates their organizational performance on this factor lower than their private sector counterparts ($p<0.05$). This finding, although not surprising, does illustrate a fundamental problem for the public sector. Too often highly qualified staff are unwilling to accept public sector jobs because of the significant pay discrepancies between the public and private sectors. Therefore, policymakers should engage in salary comparisons for similar jobs when preparing for new hires in the technology arena. The importance and prevalence of technology makes such staff critical to the mission of government and without highly skilled staff, the rates of technology project failure will increase, particularly as we move to horizontal government.

Adequate Financial Support: #7 Critical Success Factor

The lack of financial resources, evidenced by the serious budgetary issues facing both the public and private sectors, is a major concern for successful IT implementation. The survey of CIOs indicates that adequate financial support is the seventh most important critical success factor. Approximately 67 percent of the CIOs rated adequate financial support as more influential than use of rewards. According to the literature, the importance of adequate financial support is high, but the reality of the situation in many private and public sector organizations is overlooked. Regardless, adequate financial resources are essential for the design and implementation of new technologies and should be considered an important success factor. If funding does not exist to complete a project with the appropriate functionalities, then the project should be delayed or it should be scaled back.

In terms of sectoral differences, the public sector rates adequate financial support as more influential than does the private sector. Due to the traditional fiscal constraints of the public sector, this finding is not surprising, but it does warrant attention. In particular, policymakers must actively engage in planning and allocating funding for technology initiatives. Many public sector organizations have hardware and software that is no longer supported by the vendor, due to a lack of planning for cyclical replacements. It is imperative that technology be considered a compliment to and facilitator of the organizational mission and funding accordingly.

End User Training: #8 Critical Success Factor

End user training is central to the adoption of the technology in the workplace. Sixty-eight percent of the CIOs surveyed rated training as more influential than the median factor, use of rewards. Furthermore, Rocheleau and Wu (2002) note a fairly high rating of training importance in both the public and private sectors. However, other studies cite that lack of attention to training (Northrop, 2002) in both public and private sectors. Similarly, the CIOs surveyed indicated that while the importance of training is high, the actual attention to and funding of training initiatives within project budgets is very low. Despite these findings, the majority of critical success factor literature indicates that end user training is essential for project success (see Dickson and DeSanctis, 2001; Harvard Policy Group, 2001). By incorporating training, end users will be more likely to adopt new technologies because the learning curve has been reduced. In addition, the implementation of a training program signifies top management support for a project through the designation of funds for training purposes. Clearly, training is a critical success factor to successful IT project design and implementation and should be systematically recognized and funded.

Cross-functional Teams: #9 Critical Success Factor

The use of cross-functional teams is one of the emerging trends in the technology world. It was ranked as the ninth most important critical success factor by the CIOs. In fact, over 62 percent of the survey respondents indicated that the use of cross-functional teams is more influential for project success than use of rewards. Cross-functional teams incorporate individuals from various departments within an organization for a variety of reasons. According to Powers and Dickson (1973), the employment of people who understand the various facets of a given organization is essential to appropriate project definition, which sets the framework for the rest of the project success. Furthermore, Milis and Mercken (2002) note the need for team members with complementary skill sets, in order to foster "a sum that is greater than its parts." Finally, Teo and Ang (1999) further solidify the importance of cross-functional teams in their discussion of business and technology goal alignment. In essence, the technology staff and the business staff must collaborate on technology projects in order to create value-added outcomes for the organization.

Both public and private sector CIOs feel that use of cross-functional teams is important to overall technology project success. However, organizational performance on this factor is relatively low. Policymakers can create incentives for adopting cross-functional teams in large-scale technology initiatives. Such support would demonstrate the value of teamwork, as well as foster a sense of shared responsibility and community within the organization.

Political Support: #10 Critical Success Factor

Political support (by elected officials or boards of directors) is one of the lesser important critical success factors according to the CIOs. Approximately 47 percent of the CIOs surveyed indicated that political support is more influential than use of rewards, the median factor. Although political resistance can be detrimental to a technology project, it is probably not going to be one of the more significant failure points. In fact, the public sector exhibits more concern about political support due to the nature of elected officials and their power within the organization. Despite the low rating of political support by the aggregate sample of CIOs, it is important for public sector CIOs to be able to justify their projects to elected leaders and, as with top management support, political support can encourage employee adoption of new technologies, as well as provide adequate financial support through the budget process.

Strategic Technology Planning: #11 Critical Success Factor

Strategic planning for technology is the eleventh most important critical success factor according to the CIOs included in the survey. Approximately 51 percent of the CIOs rated strategic technology planning as more influential than the median factor, use of rewards. By engaging in holistic, long-range planning, greater levels of goal alignment between the technology unit and the business units can be developed. In addition, strategic planning for technology indicates a level of support and commitment from upper management, which is directly linked to the most important critical success factor—top management support.

There are significant sectoral differences with respect to the influence of strategic technology planning. The public sector is less likely to rate the influence of the factor as highly as the private sector. A history of mandated strategic planning, coupled with the reality of changing political winds, has created a disdain for such planning in the public sector. It is evident that strategic planning is important on both the private and public sector fronts and its use should be encouraged. Therefore, policymakers should encourage strategic technology planning and allow for plans to be carried out without significant disruption despite political turnover. By reducing the uncertainty and complexity in the public sector technology arena due to political changes, chances of technology project success can be improved.

Prototyping/Piloting: #12 Critical Success Factor

Prototyping and/or piloting are main tenets of project management methodologies. However, the CIOs surveyed for this research indicated that these two methodologies are among the least important of the critical success factors. Only 33 percent of the CIOs rated prototyping/piloting as more influential than the median factor, use of rewards. Regardless of the ratings, prototyping and/or piloting can enhance a project's viability by significantly reducing change orders and user dissatisfaction once full implementation has occurred. Furthermore, the use of prototyping creates a sense of ownership among end users, and also requires their involvement, which is the fourth most important critical success factor. The prototyping phase is important because it allows functionality and user requirements to be refined. The piloting process can be used to demonstrate the success of a given project initially and then its scalability and applicability to varying constraints. The piloting approach also allows for rapid expansion of the project. Finally, the use of prototyping and/or piloting can significantly reduce organizational resistance to new technologies as well as identify and correct system problems prior to full implementation (Hong and Kim, 2002). Policymakers should encourage the use of piloting and prototyping in large-scale technology projects, particularly those facing challenges in other critical success factors, as an alternative method to control scope creep and encourage end user support.

Use of Rewards: #13 Critical Success Factor

The use of reward systems is another critical success factor, albeit one of lower importance according to the CIOs included in the survey. Milis and Mercken (2002) note that appropriate implementation of reward systems can enhance technology project viability by creating defined goals, as well as by fostering teamwork in order to reap the benefits. Although use of rewards can be used as celebration for milestones achieved, there is a fear of creating expectations among employees when such rewards are employed. In addition, the economic downturn facing the United States has significantly limited the use of rewards in the private sector. In the public sector, little has been done to encourage use of rewards in due to historical and culture contexts as well as budgetary constraints. As expected, the public sector CIOs rate their organizational performance on the factor lower than their private sector counterparts. Many issues surround the use of rewards in the public sector--nonetheless, rewards have repeatedly been cited as a mechanism for improving the likelihood of technology project success and may be of value to organizations trying to develop successful IT projects.

Location of CIO in Organization: #14 Critical Success Factor

The location of the CIO in the organization is the least important critical success factor, according to the CIOs. Only 31 percent of the survey respondents rated location of the CIO as more influential than the use of rewards. However, much of the literature, particularly from the public sector, highlights the role of the CIO and signifies the criticality of having power and autonomy within the position. Extensive research has been conducted on the attributes and characteristics of successful CIOs in the private sector (see Dickson and DeSanctis; Harvard Policy Group; General Accounting Office). One of the most commonly cited aspects includes having significant power and authority in the organization. By locating the CIO within the upper echelon of management, the organization signifies a commitment to new technology, which is critical for end user adoption and support. Although not the most important, the location of the CIO within the management team can significantly impact the outcome of technology projects through the management of other critical success factors, such as financial and top management support.

Clearly, there are a host of factors that can contribute to the success or failure of a given technology project. This research study sought to examine the most commonly identified critical success factors and to ascertain the public and private sector associated with these factors. The findings of the survey indicate that, indeed there are some significant sectoral differences. However, the similarities and differences between the public and private sectors may become more pronounced as technology becomes more ubiquitous and technology projects become more enterprise or cross-organizational in nature. Therefore, future research in this area should center not only on the inherent differences between the public and private sectors, but also on the differences in cross-organizational technology initiatives versus traditional silo initiatives.

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Appendix A: Survey Instrument

CIO Study of Critical Success Factors

1. **Use of rewards** has been identified as the median success factor in IT project success, according to your peers who completed a pretest survey. Now, please indicate your opinion of the influence of the following success factors on IT project success in your organization compared to **use of rewards** (the median response). **Please rank each of the following critical success factors on a scale of 1 to 5 compared to use of rewards.**

Scale:
1 = significantly less influence than use of rewards
2 = slightly less influence than use of rewards
3 = equal in influence to use of rewards
4 = slightly more influence than use of rewards
5 = significantly more influence than use of rewards

Critical Success Factors	Compared to Use of Rewards				
	Significantly less influence	**Slightly less influence**	**Equal in influence**	**Slightly more influence**	**Significantly more influence**
a. Top management support	1	2	3	4	5
b. User involvement	1	2	3	4	5
c. Stakeholder involvement	1	2	3	4	5
d. Cross-functional teams	1	2	3	4	5
e. Communication	1	2	3	4	5
f. Strategic technology planning	1	2	3	4	5
g. High quality technology staff	1	2	3	4	5
h. Defined, achievable project milestones	1	2	3	4	5
i. Use of prototyping and/or piloting	1	2	3	4	5
j. End user training	1	2	3	4	5
k. Political support (i.e. Board of Directors, Elected or Appointed Officials)	1	2	3	4	5
l. Location of CIO in organization	1	2	3	4	5
m. Financial resources	1	2	3	4	5

2. Now, please rate your organization's **performance** on the following success factors. **Please rate each of the following critical success factors on a scale of 1 to 5.**

Scale:
1 = very poor
2 = poor
3 = adequate
4 = good
5 = very good

Critical Success Factors

	Very poor	**Poor**	**Adequate**	**Good**	**Very good**
a. Top management support	1	2	3	4	5
b. User involvement	1	2	3	4	5
c. Stakeholder involvement	1	2	3	4	5
d. Cross-functional teams	1	2	3	4	5
e. Communication	1	2	3	4	5
f. Strategic technology planning	1	2	3	4	5
g. High quality technology staff	1	2	3	4	5
h. Defined, achievable project milestones	1	2	3	4	5
i. Reward systems	1	2	3	4	5
j. Use of prototyping and/or piloting	1	2	3	4	5
k. End user training	1	2	3	4	5
l. Political support (i.e. Board of Directors, Elected or Appointed Officials)	1	2	3	4	5
m. Location of CIO in organization	1	2	3	4	5
n. Financial resources	1	2	3	4	5

3. Please list other critical success factors that you feel are relevant to your IT projects.

4. Where is the top information officer (i.e. CIO, CTO, IT Director) position located in your organizational chart?
    a. Senior executive level (i.e. Vice-President, Assistant Manager of Jurisdiction, etc)
    b. IT or MIS department head
    c. Other department head
    d. Division head
    e. Other; Please describe____________________________

5. What was your work experience prior to obtaining your current position?
    a. Public sector, technical
    b. Public sector, managerial
    c. Private sector, technical
    d. Private sector, managerial
    e. Other, please describe____

6. Within your organization, how often do peers in different departments (functional areas) share information?
    a. Always
    b. Frequently
    c. Occasionally
    d. Rarely
    e. Never

7. Do you feel that your organization shares information between hierarchical levels (i.e. between management and line staff)?
    a. Always
    b. Frequently
    c. Occasionally
    d. Rarely
    e. Never

8. Does the CIO position in your organization include accountability for IT project success?
    a. Yes, the CIO is solely accountable
    b. Yes, but the CIO shares accountability with others
    c. No, the accountability lies with someone else.
    d. No, there is no accountability required for projects.

9. Does your organization have formalized rules and procedures that guide your daily work?
    a. Always
    b. Frequently
    c. Occasionally
    d. Rarely
    e. Never

10. When developing IT projects, does your organization include various stakeholders (i.e. end users, management, customers/clients, and other departmental employees) in the planning stages?
    a. Always
    b. Frequently
    c. Occasionally
    d. Rarely
    e. Never

11. To what extent are your organization's stakeholders involved in the development of IT projects?
    a. Very involved
    b. Somewhat involved
    c. Moderately involved
    d. Slightly involved
    e. Not involved

12. Please describe the typical way your organization involves stakeholders in IT projects.

13. If your organization involves stakeholders, what is the impact on the project planning process?
    a. It has a strong positive impact.
    b. It has a weak positive impact
    c. It has no impact.
    d. It has a weak negative impact.
    e. It has a strong negative impact.

14. From where does the majority of your organization's IT project ideas germinate?
    a. Political leaders/stakeholders
    b. Executive leaders
    c. Managers
    d. Line staff
    e. Customers/clients
    f. External requirements (federal or state mandates, etc.)
    g. Others, please specify__________________

15. Does your organization reward cooperation and teamwork in tangible ways?
    a. Always
    b. Frequently
    c. Occasionally
    d. Rarely
    e. Never

16. How does your organization measure the success of its IT project?
    a. Meeting time budget
    b. Meeting cost budget
    c. Business metric (i.e. return on investment, cost-benefit analysis)
    d. User satisfaction
    e. Other, please specify____

17. Is your organization currently facing financial strain (i.e. budget crisis)?
    a. Major strain
    b. Moderate strain
    c. Limited strain
    d. No strain
    e. Currently have surplus

18. How much has your financial situation affected your organization's IT investments?
    a. Major positive effect
    b. Somewhat positive effect
    c. Neither positive or negative effect
    d. Somewhat negative effect
    e. Major negative affect

19. When you think back about an IT initiative that you consider successful, what made it a success?

20. When you think back about an IT initiative that you consider a failure, what made it a failure?

21. If you were going to advise someone else about IT project initiation, what are the key tips or lessons that you would convey?

22. Do you consider your organization to be:
    a. Public sector (if so, please answer question 23)
    b. Private sector (if so, please answer question 24)

23. At which of the following public sector organizations do you primarily work?
    a. Federal Government
    b. State Government
    c. Local Government
    d. K-12 Education
    e. Higher Education
    f. Military
    g. Other

24. At which of the following private sector organizations do you primarily work?
    a. Accommodations and food services
    b. Agriculture
    c. Arts, entertainment, and recreation
    d. Construction
    e. Educational services
    f. Finance and insurance
    g. Information
    h. Manufacturing
    i. Mining
    j. Other
    k. Professional, technical, and scientific services
    l. Real estate
    m. Retail trade
    n. Transportation and warehousing
    o. Utilities
    p. Wholesale trade

25. Approximately how many employees does your organization (i.e. company, jurisdictional government, etc.) employ?

26. Approximately how many employees does your IT department employ?

27. Which BEST describes your position?
    a. Clerical/secretarial
    b. Student
    c. Technical/professional
    d. Professor/teacher
    e. Manager/administrator
    f. Other; Please specify _________________________

28. Which BEST describes your highest level of education?
    a. High school
    b. Some college
    c. Associate's Degree
    d. Bachelor's Degree
    e. Graduate or Professional Degree

29. What is your age?

a. Under 21
b. 21-30
c. 31-40
d. 41-50
e. 51-60
f. 61-70
g. Over 70

Thank you for taking the time to complete this survey.
Your input is extremely important and greatly appreciated.

Appendix B: Two-Way Contingency Tables

Influence of communication * Organizational sector Crosstabulation

Count

		Organizational sector		Total
		Public	Private	
Influence of communication	Significantly less influence	2	1	3
	Slightly less influence	1	2	3
	Equal in influence	9	9	18
	Slightly more influence	23	32	55
	Significantly more influence	48	51	99
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.428[a]	4	.839
Likelihood Ratio	1.440	4	.837
Linear-by-Linear Association	.002	1	.969
N of Valid Cases	178		

a. 4 cells (40.0%) have expected count less than 5. The minimum expected count is 1.40.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.089			.839
Ordinal by Ordinal	Gamma	-.047	.133	-.353	.724
	Spearman Correlation	-.027	.075	-.352	.725[c]
Interval by Interval	Pearson's R	-.003	.075	-.039	.969[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Performance on communication * Organizational sector Crosstabulation

Count

		Organizational sector		Total
		Public	Private	
Performance on communication	Very poor	1	0	1
	Poor	13	14	27
	Adequate	23	31	54
	Good	29	42	71
	Very good	17	8	25
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.066[a]	4	.132
Likelihood Ratio	7.511	4	.111
Linear-by-Linear Association	.673	1	.412
N of Valid Cases	178		

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is .47.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.195			.132
Ordinal by Ordinal	Gamma	-.102	.116	-.875	.381
	Spearman Correlation	-.066	.076	-.883	.378[c]
Interval by Interval	Pearson's R	-.062	.076	-.820	.413[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Horizontal information sharing * Organizational sector Crosstabulation

Count

		Organizational sector		Total
		Public	Private	
Horizontal information sharing	Always	1	15	16
	Frequently	60	57	117
	Occasionally	21	18	39
	Rarely	1	5	6
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	14.481[a]	3	.002
Likelihood Ratio	17.109	3	.001
Linear-by-Linear Association	1.787	1	.181
N of Valid Cases	178		

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is 2.80.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.274			.002
Ordinal by Ordinal	Gamma	-.230	.136	-1.663	.096
	Spearman Correlation	-.122	.073	-1.635	.104[c]
Interval by Interval	Pearson's R	-.100	.073	-1.340	.182[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Vertical information sharing * Organizational sector Crosstabulations

Count

		Organizational sector		Total
		Public	Private	
Vertical information sharing	Always	3	7	10
	Frequently	49	62	111
	Occasionally	28	19	47
	Rarely	2	7	9
	Never	1	0	1
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.850[a]	4	.097
Likelihood Ratio	8.424	4	.077
Linear-by-Linear Association	1.181	1	.277
N of Valid Cases	178		

a. 5 cells (50.0%) have expected count less than 5. The minimum expected count is .47.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.206			.097
Ordinal by Ordinal	Gamma	-.190	.134	-1.391	.164
	Spearman Correlation	-.104	.074	-1.381	.169[c]
Interval by Interval	Pearson's R	-.082	.074	-1.087	.278[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Influence of highly qualified staff * Organizational sector Crosstabulations

Count

		Organizational sector		Total
		Public	Private	
Influence of highly qualified staff	Significantly less influence	0	1	1
	Slightly less influence	7	3	10
	Equal in influence	18	18	36
	Slightly more influence	37	41	78
	Significantly more influence	21	32	53
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.299[a]	4	.367
Likelihood Ratio	4.727	4	.316
Linear-by-Linear Association	1.951	1	.162
N of Valid Cases	178		

a. 3 cells (30.0%) have expected count less than 5. The minimum expected count is .47.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.154			.367
Ordinal by Ordinal	Gamma	.172	.118	1.444	.149
	Spearman Correlation	.107	.074	1.432	.154[c]
Interval by Interval	Pearson's R	.105	.075	1.401	.163[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Performance on highly qualified staff * Organizational sector Crosstabulations

Count

		Organizational sector		
		Public	Private	Total
Performance on highly qualified staff	Very poor	3	0	3
	Poor	7	2	9
	Adequate	17	20	37
	Good	34	40	74
	Very good	22	33	55
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.935[a]	4	.094
Likelihood Ratio	9.237	4	.055
Linear-by-Linear Association	4.926	1	.026
N of Valid Cases	178		

a. 4 cells (40.0%) have expected count less than 5. The minimum expected count is 1.40.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.207			.094
Ordinal by Ordinal	Gamma	.212	.115	1.805	.071
	Spearman Correlation	.134	.074	1.793	.075[c]
Interval by Interval	Pearson's R	.167	.071	2.245	.026[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Performance on use of rewards * Organizational sector Crosstabulation

Count

		Organizational sector		Total
		Public	Private	
Performance on use of rewards	Very poor	28	13	41
	Poor	22	24	46
	Adequate	21	36	57
	Good	11	21	32
	Very good	1	1	2
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	11.892[a]	4	.018
Likelihood Ratio	12.067	4	.017
Linear-by-Linear Association	9.641	1	.002
N of Valid Cases	178		

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is .93.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.250			.018
Ordinal by Ordinal	Gamma	.347	.103	3.267	.001
	Spearman Correlation	.237	.072	3.232	.001[c]
Interval by Interval	Pearson's R	.233	.072	3.184	.002[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Influence of strategic technology planning * Organizational sector Crosstabulation

Count

		Organizational sector		Total
		Public	Private	
Influence of strategic technology planning	Significantly less influence	5	1	6
	Slightly less influence	9	23	32
	Equal in influence	23	35	58
	Slightly more influence	32	21	53
	Significantly more influence	14	15	29
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	12.841[a]	4	.012
Likelihood Ratio	13.273	4	.010
Linear-by-Linear Association	1.905	1	.168
N of Valid Cases	178		

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 2.80.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.259			.012
Ordinal by Ordinal	Gamma	-.192	.109	-1.753	.080
	Spearman Correlation	-.131	.075	-1.753	.081[c]
Interval by Interval	Pearson's R	-.104	.076	-1.384	.168[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Performance on strategic technology planning * Organizational sector Crosstabulation

Count

		Organizational sector		Total
		Public	Private	
Performance on strategic technology planning	Very poor	2	1	3
	Poor	20	9	29
	Adequate	21	35	56
	Good	31	36	67
	Very good	9	14	23
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.696[a]	4	.069
Likelihood Ratio	8.815	4	.066
Linear-by-Linear Association	3.116	1	.078
N of Valid Cases	178		

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 1.40.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.216			.069
Ordinal by Ordinal	Gamma	.178	.113	1.561	.119
	Spearman Correlation	.117	.075	1.563	.120[c]
Interval by Interval	Pearson's R	.133	.074	1.776	.077[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Accountability of CIO * Organizational sector Crosstabulation

Count

		Organizational sector		
		Public	Private	Total
Accountability of CIO	Yes, CIO solely accountable	26	27	53
	Yes, but CIO shares accountability	52	66	118
	No, accountability with someone else	4	0	4
	No accountability	1	2	3
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.228[a]	3	.156
Likelihood Ratio	6.759	3	.080
Linear-by-Linear Association	.000	1	.989
N of Valid Cases	178		

a. 4 cells (50.0%) have expected count less than 5. The minimum expected count is 1.40.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.169			.156
Ordinal by Ordinal	Gamma	.003	.152	.019	.985
	Spearman Correlation	.001	.076	.019	.985[c]
Interval by Interval	Pearson's R	-.001	.075	-.013	.990[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Use of formal rules and procedures * Organizational sector Crosstabulation

Count

		Organizational sector		Total
		Public	Private	
Use of formal rules and procedures	Always	10	6	16
	Frequently	31	48	79
	Occasionally	24	30	54
	Rarely	17	11	28
	Never	1	0	1
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.833[a]	4	.145
Likelihood Ratio	7.238	4	.124
Linear-by-Linear Association	.963	1	.326
N of Valid Cases	178		

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is .47.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.192			.145
Ordinal by Ordinal	Gamma	-.107	.120	-.890	.374
	Spearman Correlation	-.068	.076	-.901	.369[c]
Interval by Interval	Pearson's R	-.074	.076	-.981	.328[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Influence of end user involvement * Organizational sector Crosstabulation

Count

		Organizational sector		Total
		Public	Private	
Influence of end user involvement	Significantly less influence	1	1	2
	Slightly less influence	2	3	5
	Equal in influence	8	8	16
	Slightly more influence	37	21	58
	Significantly more influence	35	62	97
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	11.372[a]	4	.023
Likelihood Ratio	11.479	4	.022
Linear-by-Linear Association	3.337	1	.068
N of Valid Cases	178		

a. 4 cells (40.0%) have expected count less than 5. The minimum expected count is .93.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.245			.023
Ordinal by Ordinal	Gamma	.329	.119	2.645	.008
	Spearman Correlation	.196	.074	2.649	.009[c]
Interval by Interval	Pearson's R	.137	.075	1.839	.068[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Performance on end user involvement * Organizational sector Crosstabulation

Count

		Organizational sector		Total
		Public	Private	
Performance on end user involvement	Very poor	2	0	2
	Poor	9	7	16
	Adequate	13	30	43
	Good	42	35	77
	Very good	17	23	40
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	9.743[a]	4	.045
Likelihood Ratio	10.662	4	.031
Linear-by-Linear Association	.020	1	.888
N of Valid Cases	178		

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is .93.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.228			.045
Ordinal by Ordinal	Gamma	-.030	.117	-.257	.797
	Spearman Correlation	-.019	.075	-.257	.797[c]
Interval by Interval	Pearson's R	.011	.075	.141	.888[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Influence of stakeholder involvement * Organizational sector Crosstabulation

Count

		Organizational sector		Total
		Public	Private	
Influence of stakeholder involvement	Significantly less influence	3	1	4
	Slightly less influence	3	2	5
	Equal in influence	4	5	9
	Slightly more influence	39	33	72
	Significantly more influence	34	54	88
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.573[a]	4	.233
Likelihood Ratio	5.636	4	.228
Linear-by-Linear Association	3.975	1	.046
N of Valid Cases	178		

a. 6 cells (60.0%) have expected count less than 5. The minimum expected count is 1.87.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.174			.233
Ordinal by Ordinal	Gamma	.273	.124	2.122	.034
	Spearman Correlation	.157	.074	2.108	.036[c]
Interval by Interval	Pearson's R	.150	.072	2.011	.046[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Performance on stakeholder involvement * Organizational sector Crosstabulation

Count

		Organizational sector		Total
		Public	Private	
Performance on stakeholder involvement	Very poor	3	2	5
	Poor	5	11	16
	Adequate	21	28	49
	Good	38	42	80
	Very good	16	12	28
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.428[a]	4	.489
Likelihood Ratio	3.475	4	.482
Linear-by-Linear Association	1.483	1	.223
N of Valid Cases	178		

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 2.33.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.137			.489
Ordinal by Ordinal	Gamma	-.163	.116	-1.394	.163
	Spearman Correlation	-.104	.074	-1.384	.168[c]
Interval by Interval	Pearson's R	-.092	.075	-1.220	.224[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Stakeholder involvement in IT planning * Organizational sector Crosstabulation

Count

		Organizational sector		Total
		Public	Private	
Stakeholder involvement in IT planning	Always	41	49	90
	Frequently	33	39	72
	Occasionally	7	7	14
	Rarely	2	0	2
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.413[a]	3	.491
Likelihood Ratio	3.176	3	.365
Linear-by-Linear Association	.616	1	.433
N of Valid Cases	178		

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is .93.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.116			.491
Ordinal by Ordinal	Gamma	-.067	.135	-.498	.619
	Spearman Correlation	-.037	.075	-.496	.620[c]
Interval by Interval	Pearson's R	-.059	.075	-.784	.434[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Level of stakeholder involvement * Organizational sector Crosstabulation

Count

		Organizational sector		Total
		Public	Private	
Level of stakeholder involvement	Very involved	28	54	82
	Somewhat involved	31	26	57
	Moderately involved	23	13	36
	Slightly involved	1	0	1
	Not involved	0	2	2
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	13.714[a]	4	.008
Likelihood Ratio	14.991	4	.005
Linear-by-Linear Association	6.564	1	.010
N of Valid Cases	178		

a. 4 cells (40.0%) have expected count less than 5. The minimum expected count is .47.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.267			.008
Ordinal by Ordinal	Gamma	-.369	.110	-3.163	.002
	Spearman Correlation	-.230	.073	-3.132	.002[c]
Interval by Interval	Pearson's R	-.193	.077	-2.603	.010[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Impact of stakeholder involvement * Organizational sector Crosstabulation

Count

		Organizational sector		Total
		Public	Private	
Impact of stakeholder involvement	Strong positive impact	58	77	135
	Weak positive impact	24	9	33
	No impact	1	4	5
	Weak negative impact	0	3	3
	Strong negative impact	0	2	2
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	15.554[a]	4	.004
Likelihood Ratio	17.807	4	.001
Linear-by-Linear Association	.170	1	.680
N of Valid Cases	178		

a. 6 cells (60.0%) have expected count less than 5. The minimum expected count is .93.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.283			.004
Ordinal by Ordinal	Gamma	-.209	.158	-1.300	.194
	Spearman Correlation	-.098	.076	-1.309	.192[c]
Interval by Interval	Pearson's R	.031	.070	.412	.681[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Influence of project milestones * Organizational sector Crosstabulation

Count

		Organizational sector		Total
		Public	Private	
Influence of project milestones	Slightly less influence	4	5	9
	Equal in influence	17	11	28
	Slightly more influence	35	39	74
	Significantly more influence	27	40	67
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.342[a]	3	.342
Likelihood Ratio	3.352	3	.340
Linear-by-Linear Association	1.888	1	.169
N of Valid Cases	178		

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is 4.20.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.136			.342
Ordinal by Ordinal	Gamma	.186	.119	1.536	.124
	Spearman Correlation	.114	.074	1.526	.129[c]
Interval by Interval	Pearson's R	.103	.075	1.377	.170[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Performance on project milestones * Organizational sector Crosstabulation

Count

		Organizational sector		Total
		Public	Private	
Performance on project milestones	Very poor	1	2	3
	Poor	7	12	19
	Adequate	26	24	50
	Good	36	46	82
	Very good	13	11	24
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.317[a]	4	.678
Likelihood Ratio	2.331	4	.675
Linear-by-Linear Association	.443	1	.506
N of Valid Cases	178		

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 1.40.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.113			.678
Ordinal by Ordinal	Gamma	-.056	.119	-.468	.639
	Spearman Correlation	-.035	.075	-.466	.642[c]
Interval by Interval	Pearson's R	-.050	.074	-.665	.507[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Measures of IT success * Organizational sector Crosstabulation

Count

		Organizational sector		Total
		Public	Private	
Measures of IT success	Meet time budget	12	10	22
	Meet cost budget	6	13	19
	Business metric	12	25	37
	User satisfaction	38	28	66
	Other	15	19	34
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.544[a]	4	.074
Likelihood Ratio	8.672	4	.070
Linear-by-Linear Association	.341	1	.559
N of Valid Cases	178		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 8.86.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.214			.074
Ordinal by Ordinal	Gamma	-.093	.110	-.847	.397
	Spearman Correlation	-.064	.075	-.849	.397[c]
Interval by Interval	Pearson's R	-.044	.075	-.583	.561[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Influence of top management support * Organizational sector Crosstabulation

Count

		Organizational sector		Total
		Public	Private	
Influence of top management support	Significantly less influence	1	1	2
	Slightly less influence	1	5	6
	Equal in influence	6	2	8
	Slightly more influence	17	20	37
	Significantly more influence	58	67	125
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.771[a]	4	.312
Likelihood Ratio	5.086	4	.279
Linear-by-Linear Association	.023	1	.879
N of Valid Cases	178		

a. 6 cells (60.0%) have expected count less than 5. The minimum expected count is .93.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.162			.312
Ordinal by Ordinal	Gamma	.013	.151	.086	.932
	Spearman Correlation	.006	.075	.085	.932[c]
Interval by Interval	Pearson's R	-.011	.074	-.152	.879[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Performance on top management support * Organizational sector Crosstabulation

Count

		Organizational sector		Total
		Public	Private	
Performance on top management support	Very poor	1	0	1
	Poor	2	5	7
	Adequate	16	8	24
	Good	23	44	67
	Very good	41	38	79
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	10.889[a]	4	.028
Likelihood Ratio	11.432	4	.022
Linear-by-Linear Association	.002	1	.961
N of Valid Cases	178		

a. 4 cells (40.0%) have expected count less than 5. The minimum expected count is .47.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.240			.028
Ordinal by Ordinal	Gamma	-.049	.125	-.396	.692
	Spearman Correlation	-.030	.076	-.401	.689[c]
Interval by Interval	Pearson's R	-.004	.076	-.049	.961[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Level of idea germination * Organizational sector Crosstabulation

Count

		Organizational sector		Total
		Public	Private	
Level of idea germination	Political leaders	3	11	14
	Executive leaders	12	30	42
	Managers	32	27	59
	Line staff	9	3	12
	Customers	13	12	25
	External requirements	6	0	6
	Other	8	12	20
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	21.840[a]	6	.001
Likelihood Ratio	24.747	6	.000
Linear-by-Linear Association	4.650	1	.031
N of Valid Cases	178		

a. 2 cells (14.3%) have expected count less than 5. The minimum expected count is 2.80.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.331			.001
Ordinal by Ordinal	Gamma	-.304	.099	-3.009	.003
	Spearman Correlation	-.218	.072	-2.961	.003[c]
Interval by Interval	Pearson's R	-.162	.074	-2.179	.031[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Influence of political support * Organizational sector Crosstabulation

Count

		Organizational sector		Total
		Public	Private	
Influence of political support	Significantly less influence	2	16	18
	Slightly less influence	13	19	32
	Equal in influence	13	27	40
	Slightly more influence	14	17	31
	Significantly more influence	41	16	57
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	27.485[a]	4	.000
Likelihood Ratio	29.360	4	.000
Linear-by-Linear Association	22.509	1	.000
N of Valid Cases	178		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 8.39.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.366			.000
Ordinal by Ordinal	Gamma	-.500	.088	-5.312	.000
	Spearman Correlation	-.359	.068	-5.096	.000[c]
Interval by Interval	Pearson's R	-.357	.066	-5.064	.000[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Performance on political support * Organizational sector Crosstabulation

Count

		Organizational sector		Total
		Public	Private	
Performance on political support	Very poor	2	11	13
	Poor	13	12	25
	Adequate	26	42	68
	Good	25	22	47
	Very good	17	8	25
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	12.716[a]	4	.013
Likelihood Ratio	13.396	4	.009
Linear-by-Linear Association	7.956	1	.005
N of Valid Cases	178		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.06.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.258			.013
Ordinal by Ordinal	Gamma	-.297	.105	-2.762	.006
	Spearman Correlation	-.201	.073	-2.725	.007[c]
Interval by Interval	Pearson's R	-.212	.070	-2.878	.004[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Influence of prototyping/piloting * Organizational sector Crosstabulation

Count

		Organizational sector		Total
		Public	Private	
Influence of prototyping/piloting	Significantly less influence	5	2	7
	Slightly less influence	15	15	30
	Equal in influence	35	34	69
	Slightly more influence	14	36	50
	Significantly more influence	14	8	22
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	11.861[a]	4	.018
Likelihood Ratio	12.210	4	.016
Linear-by-Linear Association	.876	1	.349
N of Valid Cases	178		

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 3.26.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.250			.018
Ordinal by Ordinal	Gamma	.125	.113	1.102	.270
	Spearman Correlation	.084	.076	1.115	.267[c]
Interval by Interval	Pearson's R	.070	.076	.935	.351[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Performance on prototyping/piloting * Organizational sector Crosstabulation

Count

		Organizational sector		Total
		Public	Private	
Performance on prototyping/piloting	Very poor	8	2	10
	Poor	17	17	34
	Adequate	29	44	73
	Good	22	27	49
	Very good	7	5	12
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.747[a]	4	.150
Likelihood Ratio	6.996	4	.136
Linear-by-Linear Association	.812	1	.368
N of Valid Cases	178		

a. 1 cells (10.0%) have expected count less than 5. The minimum expected count is 4.66.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.191			.150
Ordinal by Ordinal	Gamma	.083	.116	.716	.474
	Spearman Correlation	.055	.076	.725	.470[c]
Interval by Interval	Pearson's R	.068	.076	.901	.369[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Influence of cross-functional teams * Organizational sector Crosstabulations

Count

		Organizational sector		Total
		Public	Private	
Influence of cross-functional teams	Significantly less influence	4	2	6
	Slightly less influence	11	7	18
	Equal in influence	17	18	35
	Slightly more influence	40	45	85
	Significantly more influence	11	23	34
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.329[a]	4	.255
Likelihood Ratio	5.417	4	.247
Linear-by-Linear Association	4.625	1	.032
N of Valid Cases	178		

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 2.80.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.170			.255
Ordinal by Ordinal	Gamma	.248	.113	2.152	.031
	Spearman Correlation	.158	.073	2.119	.035[c]
Interval by Interval	Pearson's R	.162	.073	2.173	.031[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Performance on cross-functional teams * Organizational sector Crosstabulation

Count

		Organizational sector		Total
		Public	Private	
Performance on cross-functional teams	Very poor	5	3	8
	Poor	11	10	21
	Adequate	26	28	54
	Good	25	44	69
	Very good	16	10	26
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.459[a]	4	.167
Likelihood Ratio	6.515	4	.164
Linear-by-Linear Association	.215	1	.643
N of Valid Cases	178		

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 3.73.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.187			.167
Ordinal by Ordinal	Gamma	.045	.115	.391	.696
	Spearman Correlation	.030	.076	.397	.692[c]
Interval by Interval	Pearson's R	.035	.076	.463	.644[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Reward for teamwork and cooperation * Organizational sector Crosstabulation

Count

		Organizational sector		Total
		Public	Private	
Reward for teamwork and cooperation	Always	2	6	8
	Frequently	19	41	60
	Occasionally	34	25	59
	Rarely	21	15	36
	Never	7	8	15
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	11.751[a]	4	.019
Likelihood Ratio	11.991	4	.017
Linear-by-Linear Association	5.919	1	.015
N of Valid Cases	178		

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 3.73.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.249			.019
Ordinal by Ordinal	Gamma	-.305	.106	-2.819	.005
	Spearman Correlation	-.205	.073	-2.782	.006[c]
Interval by Interval	Pearson's R	-.183	.073	-2.468	.015[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Influence of end user training * Organizational sector Crosstabulation

Count

		Organizational sector		Total
		Public	Private	
Influence of end user training	Significantly less influence	4	1	5
	Slightly less influence	7	4	11
	Equal in influence	14	26	40
	Slightly more influence	44	41	85
	Significantly more influence	14	23	37
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.739[a]	4	.102
Likelihood Ratio	7.920	4	.095
Linear-by-Linear Association	1.374	1	.241
N of Valid Cases	178		

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 2.33.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.204			.102
Ordinal by Ordinal	Gamma	.087	.119	.729	.466
	Spearman Correlation	.055	.075	.726	.469[c]
Interval by Interval	Pearson's R	.088	.074	1.173	.242[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Performance on end user training * Organizational sector Crosstabulation

Count

		Organizational sector		Total
		Public	Private	
Performance on end user training	Very poor	3	2	5
	Poor	18	24	42
	Adequate	42	59	101
	Good	11	1	12
	Very good	9	9	18
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	11.495[a]	4	.022
Likelihood Ratio	12.878	4	.012
Linear-by-Linear Association	1.291	1	.256
N of Valid Cases	178		

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 2.33.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.246			.022
Ordinal by Ordinal	Gamma	-.163	.126	-1.290	.197
	Spearman Correlation	-.097	.075	-1.299	.196[c]
Interval by Interval	Pearson's R	-.085	.075	-1.137	.257[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Influence of location of CIO in organization * Organizational sector Crosstabulation

Count

		Organizational sector		Total
		Public	Private	
Influence of location of CIO in organization	Significantly less influence	14	16	30
	Slightly less influence	14	23	37
	Equal in influence	18	29	47
	Slightly more influence	16	20	36
	Significantly more influence	21	7	28
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	11.585[a]	4	.021
Likelihood Ratio	11.904	4	.018
Linear-by-Linear Association	4.404	1	.036
N of Valid Cases	178		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 13.06.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.247			.021
Ordinal by Ordinal	Gamma	-.216	.104	-2.051	.040
	Spearman Correlation	-.154	.075	-2.068	.040[c]
Interval by Interval	Pearson's R	-.158	.074	-2.119	.035[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Performance on CIO location in organization * Organizational sector Crosstabulation

Count

		Organizational sector		Total
		Public	Private	
Performance on CIO location in organization	Very poor	6	9	15
	Poor	13	11	24
	Adequate	20	24	44
	Good	22	34	56
	Very good	22	17	39
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.550[a]	4	.470
Likelihood Ratio	3.560	4	.469
Linear-by-Linear Association	.210	1	.647
N of Valid Cases	178		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.99.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.140			.470
Ordinal by Ordinal	Gamma	-.052	.110	-.473	.636
	Spearman Correlation	-.036	.075	-.474	.636[c]
Interval by Interval	Pearson's R	-.034	.075	-.457	.648[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Location of top information officer in organization * Organizational sector Crosstabulation

Count

		Organizational sector		Total
		Public	Private	
Location of top information officer in organization	Senior executive level	34	83	117
	IT or MIS Head	38	8	46
	Division head	5	1	6
	Other	6	3	9
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	43.140[a]	3	.000
Likelihood Ratio	45.551	3	.000
Linear-by-Linear Association	19.623	1	.000
N of Valid Cases	178		

a. 4 cells (50.0%) have expected count less than 5. The minimum expected count is 2.80.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.442			.000
Ordinal by Ordinal	Gamma	-.757	.077	-6.924	.000
	Spearman Correlation	-.470	.065	-7.067	.000[c]
Interval by Interval	Pearson's R	-.333	.069	-4.685	.000[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Influence of adequate financial support * Organizational sector Crosstabulation

Count

		Organizational sector		Total
		Public	Private	
Influence of adequate financial support	Significantly less influence	0	1	1
	Slightly less influence	4	10	14
	Equal in influence	15	27	42
	Slightly more influence	27	36	63
	Significantly more influence	37	21	58
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	11.945[a]	4	.018
Likelihood Ratio	12.472	4	.014
Linear-by-Linear Association	10.756	1	.001
N of Valid Cases	178		

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is .47.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.251			.018
Ordinal by Ordinal	Gamma	-.382	.104	-3.501	.000
	Spearman Correlation	-.250	.071	-3.428	.001[c]
Interval by Interval	Pearson's R	-.247	.070	-3.375	.001[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Performance on adequate financial support * Organizational sector Crosstabulation

Count

		Organizational sector		Total
		Public	Private	
Performance on adequate financial support	Very poor	4	2	6
	Poor	12	11	23
	Adequate	30	32	62
	Good	16	33	49
	Very good	21	17	38
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.313[a]	4	.177
Likelihood Ratio	6.422	4	.170
Linear-by-Linear Association	.310	1	.577
N of Valid Cases	178		

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 2.80.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.185			.177
Ordinal by Ordinal	Gamma	.060	.113	.533	.594
	Spearman Correlation	.041	.076	.539	.591[c]
Interval by Interval	Pearson's R	.042	.076	.556	.579[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Financial strain facing organization * Organizational sector Crosstabulation

Count

		Organizational sector		Total
		Public	Private	
Financial strain facing organization	Major strain	32	13	45
	Moderate strain	35	36	71
	Limited strain	16	22	38
	No strain	0	19	19
	Currently have surplus	0	5	5
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	32.322[a]	4	.000
Likelihood Ratio	41.706	4	.000
Linear-by-Linear Association	29.169	1	.000
N of Valid Cases	178		

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 2.33.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.392			.000
Ordinal by Ordinal	Gamma	.577	.085	6.032	.000
	Spearman Correlation	.388	.063	5.590	.000[c]
Interval by Interval	Pearson's R	.406	.056	5.893	.000[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Impact of financial strain on IT investment * Organizational sector Crosstabulation

Count

		Organizational sector		Total
		Public	Private	
Impact of financial strain on IT investment	Major positive effect	7	9	16
	Somewhat positive effect	8	15	23
	No effect	6	30	36
	Somewhat negative effect	53	36	89
	Major negative effect	9	5	14
Total		83	95	178

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	22.062[a]	4	.000
Likelihood Ratio	23.498	4	.000
Linear-by-Linear Association	7.665	1	.006
N of Valid Cases	178		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.53.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.332			.000
Ordinal by Ordinal	Gamma	-.396	.108	-3.573	.000
	Spearman Correlation	-.260	.073	-3.576	.000[c]
Interval by Interval	Pearson's R	-.208	.074	-2.822	.005[c]
N of Valid Cases		178			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

Appendix C: Correlation Matrix

Correlation Matrix

	COMMUNIC	P_COMMUN	INFO_HOR	INFOR_VE	STAFF
COMMUNIC	1.0000				
P_COMMUN	.0796	1.0000			
INFO_HOR	.1297	-.1372	1.0000		
INFOR_VE	-.0194	-.3517	.4295	1.0000	
STAFF	.2122	-.1814	-.0298	.1498	1.0000
P_STAFF	.2146	.0160	-.3103	-.0716	.6066
P_REWARD	-.0212	-.0806	-.2646	-.1173	.1545
STRATEGI	.4171	-.0625	-.0876	.0373	.3696
P_STRATE	.0347	.2826	-.3720	-.2084	.1230
CIO_ACCO	-.0796	-.0086	.0536	.3010	-.2893
RULES_PR	-.2463	-.0663	.0370	.0439	-.0864
USER_INV	.0251	.1223	-.0690	-.3767	-.0391
P_USERIN	.0612	.4909	-.0675	-.1748	-.1895
STAKEHLD	.1752	-.0584	.2073	-.0541	-.2725
P_STAKEH	.0411	.2561	.0092	-.0333	-.4106
STKE_PLA	-.0325	-.2989	.2966	.2882	.0556
INVL_STK	.0020	-.1783	.2643	.2296	.1101
STK_IMPA	.0626	-.0492	.3052	.2246	.1510
MILESTON	.3972	-.0578	.0423	.0482	.3392
P_MILES	.0936	.4315	-.0841	-.0297	.1228
MEASURE	-.0335	-.0276	.0754	-.1393	.0749
TOP_MGMT	-.0095	.2248	-.3281	-.2387	-.0308
P_TOPMGM	-.0105	.2777	-.3928	-.2588	-.0533
IDEAS	-.1588	-.1457	.2936	.1626	-.0941
POLITICA	.1805	-.1131	-.0989	.1135	.0829
P_POLITI	.2189	-.0032	-.1880	.0140	.0714
PROTOTYP	-.0163	-.0303	-.1659	-.0092	.1625
P_PROTOT	-.0505	-.0838	-.0178	.0816	.1167
CROSS_FN	.0639	-.1014	-.2222	-.1347	.2059
P_CROSSF	-.0172	-.0403	-.2516	-.0308	.1786
COOPERAT	-.0351	-.2741	.2020	.3376	-.1492
TRAINING	.1158	-.0466	-.0999	.0553	.4256
P_TRAINI	.0853	.4563	-.1100	-.0560	.0235
CIO_LOCA	-.1035	-.1021	-.1076	.1145	.2402
P_CIOLOC	.1156	-.1790	-.3534	.0029	.3559
TOP_INFO	-.0559	-.1716	-.1376	-.1241	-.0690
FINANCE	.3122	.0918	-.2394	-.0909	.0893
P_FINANC	.2873	.1231	-.1497	-.1377	.0826
STRAIN	-.0731	-.0281	.0745	.0792	-.0575
EFF_STRA	-.0534	-.1685	.2502	.2581	-.0064
WORK_EXP	-.3006	.2506	-.0563	-.1859	-.2392
WOR_SEC	-.1788	.2532	.1402	-.0071	-.2016

Correlation Matrix

	COMMUNIC	P_COMMUN	INFO_HOR	INFOR_VE	STAFF
PUBL_ORG	-.1153	.1382	.0816	-.0054	-.1597

	P_STAFF	P_REWARD	STRATEGI	P_STRATE	CIO_ACCO
P_STAFF	1.0000				
P_REWARD	.2224	1.0000			
STRATEGI	.1702	.0935	1.0000		
P_STRATE	.2638	.0494	.4202	1.0000	
CIO_ACCO	-.2406	.0811	-.2093	-.2370	1.0000
RULES_PR	-.0465	.0785	-.2186	-.2559	.1927
USER_INV	.1041	-.1949	-.2036	-.0147	-.1042
P_USERIN	-.1342	-.2458	.0100	.1805	.0454
STAKEHLD	-.0702	-.0147	-.1110	-.1553	.0132
P_STAKEH	-.2425	-.0321	-.0480	.1490	.1311
STKE_PLA	-.0550	.1879	-.0633	-.2381	.2692
INVL_STK	-.0519	.0770	-.0346	-.2612	.3068
STK_IMPA	.0624	-.0145	.0492	-.1159	.3018
MILESTON	.1828	.2030	.2496	.0607	-.0602
P_MILES	.1892	-.0937	.0481	.4244	-.1199
MEASURE	.0476	-.0195	.0809	-.1239	-.3326
TOP_MGMT	.1513	-.0454	-.0461	.1332	-.0176
P_TOPMGM	.0365	-.0833	.0256	.2883	.0075
IDEAS	-.0178	-.1836	.0133	-.0893	-.2265
POLITICA	.1433	.0623	.3470	.2134	.1670
P_POLITI	.0996	.0618	.1505	.0816	.1561
PROTOTYP	.2686	.3238	.0162	.1685	.1120
P_PROTOT	.1658	.2777	-.0867	.2698	.1251
CROSS_FN	.2944	.1359	.0190	.2389	-.3073
P_CROSSF	.3280	.1403	.0420	.3365	-.1327
COOPERAT	-.2127	-.3234	.1660	-.0448	.1480
TRAINING	.3838	.3488	.1759	.2432	-.1064
P_TRAINI	.1093	-.0125	.0642	.0915	.0466
CIO_LOCA	.2240	.1526	.1581	.3077	-.1310
P_CIOLOC	.3265	.4314	.2957	.2056	-.1335
TOP_INFO	.0680	.2074	-.0004	-.0329	.0634
FINANCE	.1435	-.0254	.3148	.2743	.0771
P_FINANC	.1427	.0649	.0312	.0768	.0028
STRAIN	.0712	-.1134	-.0166	-.0667	.1145
EFF_STRA	-.2190	-.3670	-.0436	-.2374	.2419
WORK_EXP	.0321	.0598	-.4202	-.1380	.1679
WOR_SEC	-.0669	-.1132	-.3961	-.2031	.2487
PUBL_ORG	-.1326	-.0186	-.0578	-.0472	-.0785

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Correlation Matrix

	RULES_PR	USER_INV	P_USERIN	STAKEHLD	P_STAKEH
RULES_PR	1.0000				
USER_INV	-.0044	1.0000			
P_USERIN	.0666	.5268	1.0000		
STAKEHLD	.1532	.3653	.2427	1.0000	
P_STAKEH	.0733	.1654	.5533	.6389	1.0000
STKE_PLA	.1073	-.3360	-.3049	-.0963	-.1471
INVL_STK	.1942	-.2958	-.3598	-.2577	-.4285
STK_IMPA	.1012	-.1591	-.1699	-.2005	-.3702
MILESTON	-.3217	.0090	-.0946	.0695	-.0503
P_MILES	-.3826	.0538	.1500	-.0802	.1739
MEASURE	.1125	.1722	-.0372	-.0087	-.2161
TOP_MGMT	.0966	.4300	.2110	.2044	.0576
P_TOPMGM	.0126	.3805	.3267	.0935	.2613
IDEAS	.0601	.0909	-.0066	.2933	.1200
POLITICA	.1154	-.1214	-.0501	.1639	.0803
P_POLITI	.0371	.0403	.1531	.0170	.1437
PROTOTYP	.2730	.0254	-.0547	.0452	.0217
P_PROTOT	.1933	.1933	.0986	.1103	.1474
CROSS_FN	-.0526	.4808	.2668	.2122	.0536
P_CROSSF	-.0671	.2678	.3264	.0397	.1384
COOPERAT	.1772	-.2326	-.0536	-.1100	.0591
TRAINING	.0976	-.0255	-.0155	-.0292	-.1060
P_TRAINI	.0247	.0122	.3491	-.1842	.0058
CIO_LOCA	.0622	-.1027	-.0534	-.1517	-.0650
P_CIOLOC	-.0517	-.1062	-.2008	.0473	.0087
TOP_INFO	-.0250	-.0202	-.1457	.0009	-.1509
FINANCE	-.0360	.0436	-.0087	-.0649	-.0415
P_FINANC	-.0250	.2156	.0337	.0015	.0215
STRAIN	.1142	.1980	.0527	.1366	-.0786
EFF_STRA	.1817	-.1622	.0895	-.0575	.0833
WORK_EXP	.2550	.1436	.1019	.0330	.0974
WOR_SEC	.2507	.0260	.0523	-.0150	.0536
PUBL_ORG	.1653	-.1820	-.0102	.0723	.1292

Correlation Matrix

	STKE_PLA	INVL_STK	STK_IMPA	MILESTON	P_MILES
STKE_PLA	1.0000				
INVL_STK	.5406	1.0000			
STK_IMPA	.2804	.6646	1.0000		
MILESTON	-.0245	.0536	.1268	1.0000	
P_MILES	-.3843	-.2021	-.0724	.4116	1.0000
MEASURE	-.0419	-.0422	.0019	-.1326	-.1950
TOP_MGMT	-.3986	-.2910	-.1493	-.0570	.0521
P_TOPMGM	-.4176	-.3764	-.1779	-.0530	.1998
IDEAS	.0226	-.0238	.1078	-.0320	-.0831
POLITICA	.1010	.0832	.1261	-.0221	-.1052
P_POLITI	-.1054	-.1469	-.0503	-.1209	-.0234
PROTOTYP	.1941	.2092	.0596	.2767	.0018
P_PROTOT	.0462	.0150	-.0438	.1419	.0633
CROSS_FN	-.1494	-.2213	-.0588	.0955	.0203
P_CROSSF	-.0727	-.1810	-.0500	-.0110	.0365
COOPERAT	.2303	.2261	.1365	-.2291	-.2252
TRAINING	-.0227	.1188	.1261	.3614	.1705
P_TRAINI	-.1902	.0336	.0880	-.1050	.1670
CIO_LOCA	.0321	-.0253	-.0002	.0561	-.0500
P_CIOLOC	.0108	-.1501	-.1763	.2755	-.0240
TOP_INFO	.2702	.1924	.1056	-.1476	-.2170
FINANCE	-.0724	-.0249	.1001	.0903	.0009
P_FINANC	-.1028	-.1877	-.1260	-.1095	-.0031
STRAIN	.0270	.0689	.1678	.1423	.0410
EFF_STRA	.1171	.2585	.1981	-.2000	-.1174
WORK_EXP	-.0045	.1037	.0757	-.2631	-.0260
WOR_SEC	.1039	.2820	.2386	-.1988	.0321
PUBL_ORG	-.2515	-.0857	-.1179	-.0934	.0106

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Correlation Matrix

	MEASURE	TOP_MGMT	P_TOPMGM	IDEAS	POLITICA
MEASURE	1.0000				
TOP_MGMT	.1030	1.0000			
P_TOPMGM	-.0540	.3838	1.0000		
IDEAS	.1378	-.1153	-.1599	1.0000	
POLITICA	-.1407	.2059	-.0980	-.0787	1.0000
P_POLITI	-.0647	.0324	.4079	-.2128	.1869
PROTOTYP	-.2035	.0472	-.0793	.0835	.1233
P_PROTOT	-.1853	.0043	.0643	.1005	.0103
CROSS_FN	.0944	.1144	.3002	.0676	-.0470
P_CROSSF	.0212	-.0191	.1075	.0868	.1384
COOPERAT	-.1950	-.0457	-.0776	.1854	.2042
TRAINING	-.1421	.0419	-.0830	.0598	-.0319
P_TRAINI	-.1406	.1314	-.0966	-.0551	.0846
CIO_LOCA	.0245	.0102	.1066	-.0314	.2280
P_CIOLOC	-.0289	-.0653	.2452	-.1893	.1435
TOP_INFO	.0228	.0462	-.2614	.0717	.1275
FINANCE	.0382	.1578	.2501	-.2056	.2848
P_FINANC	.0295	.1136	.2812	-.1478	-.0869
STRAIN	-.0730	.2535	.1331	.1525	.0835
EFF_STRA	-.1533	-.2120	-.2270	.0660	.0858
WORK_EXP	-.0348	.0227	.1350	.0534	-.1337
WOR_SEC	-.0989	-.0552	.0758	.0616	-.0784
PUBL_ORG	-.0655	.0207	.1105	-.0293	-.1393

	P_POLITI	PROTOTYP	P_PROTOT	CROSS_FN	P_CROSSF
P_POLITI	1.0000				
PROTOTYP	-.0577	1.0000			
P_PROTOT	.1303	.6226	1.0000		
CROSS_FN	.0908	.1495	.1862	1.0000	
P_CROSSF	.1096	.2198	.2333	.6998	1.0000
COOPERAT	-.0732	-.0744	-.0634	-.1998	-.1045
TRAINING	-.0889	.4913	.3617	.1794	.1419
P_TRAINI	.1241	-.1023	-.0365	-.1041	.0540
CIO_LOCA	.2805	.3436	.3380	.3181	.3414
P_CIOLOC	.4174	.3139	.2190	.2995	.2279
TOP_INFO	-.3100	.0309	-.1336	-.0910	-.0132
FINANCE	.3193	.1976	.0806	.0884	-.0130
P_FINANC	.5901	-.0074	.2642	.0133	-.0789
STRAIN	-.0760	.0633	-.0964	-.1221	-.2199
EFF_STRA	-.1673	-.0105	-.1823	-.1883	.0873
WORK_EXP	.1404	.0486	-.0231	.0211	.0984
WOR_SEC	.0626	.0087	-.0777	-.1109	-.0476
PUBL_ORG	-.0678	-.2192	-.2598	-.2196	-.2208

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Correlation Matrix

	COOPERAT	TRAINING	P_TRAINI	CIO_LOCA	P_CIOLOC
COOPERAT	1.0000				
TRAINING	-.1805	1.0000			
P_TRAINI	-.1156	.2814	1.0000		
CIO_LOCA	-.0208	.3044	.0357	1.0000	
P_CIOLOC	-.2569	.2507	-.1569	.4682	1.0000
TOP_INFO	.1328	-.0093	-.0731	-.4168	-.2658
FINANCE	-.1436	-.0218	-.1810	.2322	.1763
P_FINANC	-.2592	-.0945	.0294	.0491	.2384
STRAIN	.1093	.0650	-.1199	-.0452	-.1206
EFF_STRA	.4844	-.1298	.0821	-.2167	-.3009
WORK_EXP	.0181	-.0564	.2635	.0438	-.0643
WOR_SEC	.1765	-.1401	.2374	-.0186	-.2291
PUBL_ORG	.1918	.0453	-.0228	-.1215	-.0308

	TOP_INFO	FINANCE	P_FINANC	STRAIN	EFF_STRA
TOP_INFO	1.0000				
FINANCE	-.1308	1.0000			
P_FINANC	-.2682	.4647	1.0000		
STRAIN	-.0310	.0681	-.1089	1.0000	
EFF_STRA	.1135	-.2678	-.4020	-.1150	1.0000
WORK_EXP	.0098	-.1658	.0725	-.0042	.1014
WOR_SEC	-.0204	-.1378	-.0048	.0359	.2062
PUBL_ORG	-.0476	-.1867	-.1144	.0024	.2243

	WORK_EXP	WOR_SEC	PUBL_ORG
WORK_EXP	1.0000		
WOR_SEC	.8877	1.0000	
PUBL_ORG	.1703	.1004	1.0000

Appendix D: ANOVA of Non-Significant Differences between Actual and Ideal Ratings of CSFs

Critical Success Factor: Communication

Table 1. Analysis of variance results for difference in communication scores (actual versus ideal) and sector.

ANOVA

Difference of influence of and performance on communication

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.537	1	.537	.381	.538
Within Groups	247.665	176	1.407		
Total	248.202	177			

Critical Success Factor: Highly qualified technology staff

Table 2 Analysis of variance results for difference in qualified staff scores (actual versus ideal) and sector.

ANOVA

Difference of influence of and performance on highly qualified staff

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.708	1	.708	.759	.385
Within Groups	164.241	176	.933		
Total	164.949	177			

Critical Success Factor: End user involvement

Table 3 Analysis of variance results for difference in end user involvement (actual versus ideal) and sector.

ANOVA

Difference of influence of and performance on end user involvement

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.006	1	2.006	1.889	.171
Within Groups	186.870	176	1.062		
Total	188.876	177			

Critical Success Factor: Project milestones

Table 4 Analysis of variance results for difference in project milestones (actual versus ideal) and sector.

ANOVA

Difference of influence of and performance on project milestones

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.160	1	3.160	2.764	.098
Within Groups	201.199	176	1.143		
Total	204.360	177			

Critical Success Factor: Top management support

Table 5 Analysis of variance results for difference in top management support (actual versus ideal) and sector.

ANOVA

Difference of influence of and performance on top management support

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.007	1	.007	.007	.936
Within Groups	188.089	176	1.069		
Total	188.096	177			

Critical Success Factor: Prototyping and/or piloting

Table 6 Analysis of variance results for difference in prototyping and/or piloting (actual versus ideal) and sector.

ANOVA

Difference of influence of and performance on prototyping and/or piloting

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.005	1	.005	.006	.939
Within Groups	141.596	176	.805		
Total	141.601	177			

Critical Success Factor: Cross-functional teams

Table 7 Analysis of variance results for difference in cross-functional teams (actual versus ideal) and sector.

ANOVA

Difference of influence of and performance on cross-functional teams

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.824	1	2.824	2.441	.120
Within Groups	203.631	176	1.157		
Total	206.455	177			

Critical Success Factor: Location of CIO

Table 8 Analysis of variance results for difference in location of CIO (actual versus ideal) and sector.

ANOVA

Difference of influence of and performance on location of CIO in organization

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4.835	1	4.835	2.506	.115
Within Groups	339.575	176	1.929		
Total	344.410	177			

Appendix E: Analysis of Covariance Results

Tests of Between-Subjects Effects

Dependent Variable: Influence of communication

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	.629[a]	2	.314	.420	.658
Intercept	1008.788	1	1008.788	1348.653	.000
WOR_SEC	.628	1	.628	.839	.361
SECTOR	.070	1	.070	.094	.760
Error	130.899	175	.748		
Total	3532.000	178			
Corrected Total	131.528	177			

a. R Squared = .005 (Adjusted R Squared = -.007)

Tests of Between-Subjects Effects

Dependent Variable: Performance on communication

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	4.422[a]	2	2.211	2.579	.079
Intercept	547.036	1	547.036	638.092	.000
WOR_SEC	3.835	1	3.835	4.473	.036
SECTOR	2.084	1	2.084	2.431	.121
Error	150.027	175	.857		
Total	2356.000	178			
Corrected Total	154.449	177			

a. R Squared = .029 (Adjusted R Squared = .018)

Tests of Between-Subjects Effects

Dependent Variable: Influence of highly qualified staff

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	2.891[a]	2	1.445	1.875	.156
Intercept	850.251	1	850.251	1102.939	.000
WOR_SEC	1.372	1	1.372	1.780	.184
SECTOR	2.500	1	2.500	3.243	.073
Error	134.907	175	.771		
Total	2938.000	178			
Corrected Total	137.798	177			

a. R Squared = .021 (Adjusted R Squared = .010)

Tests of Between-Subjects Effects

Dependent Variable: Performance on highly qualified staff

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	4.364[a]	2	2.182	2.543	.082
Intercept	773.208	1	773.208	900.990	.000
WOR_SEC	6.298E-02	1	6.298E-02	.073	.787
SECTOR	3.347	1	3.347	3.900	.050
Error	150.181	175	.858		
Total	2931.000	178			
Corrected Total	154.545	177			

a. R Squared = .028 (Adjusted R Squared = .017)

Tests of Between-Subjects Effects

Dependent Variable: Performance on use of rewards

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	11.160[a]	2	5.580	5.105	.007
Intercept	318.705	1	318.705	291.565	.000
WOR_SEC	.133	1	.133	.122	.727
SECTOR	10.343	1	10.343	9.462	.002
Error	191.289	175	1.093		
Total	1300.000	178			
Corrected Total	202.449	177			

a. R Squared = .055 (Adjusted R Squared = .044)

Tests of Between-Subjects Effects

Dependent Variable: Influence of strategic technology planning

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	14.285[a]	2	7.142	6.738	.002
Intercept	729.788	1	729.788	688.494	.000
WOR_SEC	12.135	1	12.135	11.449	.001
SECTOR	.003	1	.003	.003	.957
Error	185.496	175	1.060		
Total	2229.000	178			
Corrected Total	199.781	177			

a. R Squared = .072 (Adjusted R Squared = .061)

Tests of Between-Subjects Effects

Dependent Variable: Performance on strategic technology planning

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	6.514[a]	2	3.257	3.578	.030
Intercept	675.898	1	675.898	742.483	.000
WOR_SEC	3.595	1	3.595	3.949	.048
SECTOR	5.262	1	5.262	5.780	.017
Error	159.306	175	.910		
Total	2270.000	178			
Corrected Total	165.820	177			

a. R Squared = .039 (Adjusted R Squared = .028)

Tests of Between-Subjects Effects

Dependent Variable: Influence of end user involvement

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	4.125[a]	2	2.063	2.931	.056
Intercept	893.075	1	893.075	1269.203	.000
WOR_SEC	1.726	1	1.726	2.453	.119
SECTOR	.893	1	.893	1.268	.262
Error	123.139	175	.704		
Total	3519.000	178			
Corrected Total	127.264	177			

a. R Squared = .032 (Adjusted R Squared = .021)

Tests of Between-Subjects Effects

Dependent Variable: Performance on end user involvement

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	.298[a]	2	.149	.168	.846
Intercept	694.983	1	694.983	783.352	.000
WOR_SEC	.280	1	.280	.316	.575
SECTOR	5.648E-03	1	5.648E-03	.006	.936
Error	155.259	175	.887		
Total	2685.000	178			
Corrected Total	155.556	177			

a. R Squared = .002 (Adjusted R Squared = -.009)

Tests of Between-Subjects Effects

Dependent Variable: Influence of stakeholder involvement

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	3.986[a]	2	1.993	2.667	.072
Intercept	890.454	1	890.454	1191.707	.000
WOR_SEC	.959	1	.959	1.284	.259
SECTOR	1.554	1	1.554	2.080	.151
Error	130.762	175	.747		
Total	3457.000	178			
Corrected Total	134.747	177			

a. R Squared = .030 (Adjusted R Squared = .018)

Tests of Between-Subjects Effects

Dependent Variable: Performance on stakeholder involvement

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1.558[a]	2	.779	.860	.425
Intercept	644.351	1	644.351	711.587	.000
WOR_SEC	.217	1	.217	.239	.625
SECTOR	1.558	1	1.558	1.720	.191
Error	158.465	175	.906		
Total	2490.000	178			
Corrected Total	160.022	177			

a. R Squared = .010 (Adjusted R Squared = -.002)

Tests of Between-Subjects Effects

Dependent Variable: Influence of project milestones

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1.416[a]	2	.708	.975	.379
Intercept	866.086	1	866.086	1192.423	.000
WOR_SEC	.045	1	.045	.062	.804
SECTOR	1.357	1	1.357	1.869	.173
Error	127.107	175	.726		
Total	3147.000	178			
Corrected Total	128.522	177			

a. R Squared = .011 (Adjusted R Squared = .000)

Tests of Between-Subjects Effects

Dependent Variable: Performance on project milestones

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1.086[a]	2	.543	.651	.523
Intercept	617.104	1	617.104	739.803	.000
WOR_SEC	.718	1	.718	.861	.355
SECTOR	.774	1	.774	.928	.337
Error	145.976	175	.834		
Total	2441.000	178			
Corrected Total	147.062	177			

a. R Squared = .007 (Adjusted R Squared = -.004)

Tests of Between-Subjects Effects

Dependent Variable: Influence of top management support

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	.124[a]	2	.062	.091	.913
Intercept	1032.719	1	1032.719	1508.384	.000
WOR_SEC	.108	1	.108	.158	.692
SECTOR	.057	1	.057	.084	.772
Error	119.814	175	.685		
Total	3815.000	178			
Corrected Total	119.938	177			

a. R Squared = .001 (Adjusted R Squared = -.010)

Tests of Between-Subjects Effects

Dependent Variable: Performance on top management support

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	.718[a]	2	.359	.479	.620
Intercept	856.017	1	856.017	1142.057	.000
WOR_SEC	.716	1	.716	.956	.330
SECTOR	.127	1	.127	.169	.682
Error	131.169	175	.750		
Total	3292.000	178			
Corrected Total	131.888	177			

a. R Squared = .005 (Adjusted R Squared = -.006)

Tests of Between-Subjects Effects

Dependent Variable: Influence of political support

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	42.776[a]	2	21.388	13.045	.000
Intercept	646.657	1	646.657	394.420	.000
WOR_SEC	.850	1	.850	.518	.472
SECTOR	32.031	1	32.031	19.537	.000
Error	286.915	175	1.640		
Total	2427.000	178			
Corrected Total	329.691	177			

a. R Squared = .130 (Adjusted R Squared = .120)

Tests of Between-Subjects Effects

Dependent Variable: Performance on political support

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	9.701[a]	2	4.850	4.194	.017
Intercept	526.422	1	526.422	455.132	.000
WOR_SEC	.167	1	.167	.144	.704
SECTOR	9.098	1	9.098	7.866	.006
Error	202.412	175	1.157		
Total	2102.000	178			
Corrected Total	212.112	177			

a. R Squared = .046 (Adjusted R Squared = .035)

Tests of Between-Subjects Effects

Dependent Variable: Influence of prototyping/piloting

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1.225[a]	2	.613	.593	.554
Intercept	520.829	1	520.829	504.317	.000
WOR_SEC	.325	1	.325	.315	.575
SECTOR	.444	1	.444	.430	.513
Error	180.730	175	1.033		
Total	2098.000	178			
Corrected Total	181.955	177			

a. R Squared = .007 (Adjusted R Squared = -.005)

Tests of Between-Subjects Effects

Dependent Variable: Performance on prototyping/piloting

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1.022[a]	2	.511	.532	.588
Intercept	468.616	1	468.616	488.287	.000
WOR_SEC	.247	1	.247	.257	.613
SECTOR	.398	1	.398	.414	.521
Error	167.950	175	.960		
Total	1887.000	178			
Corrected Total	168.972	177			

a. R Squared = .006 (Adjusted R Squared = -.005)

Tests of Between-Subjects Effects

Dependent Variable: Influence of cross-functional teams

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	5.133[a]	2	2.567	2.598	.077
Intercept	716.333	1	716.333	725.149	.000
WOR_SEC	.482	1	.482	.488	.486
SECTOR	5.107	1	5.107	5.170	.024
Error	172.872	175	.988		
Total	2603.000	178			
Corrected Total	178.006	177			

a. R Squared = .029 (Adjusted R Squared = .018)

Tests of Between-Subjects Effects

Dependent Variable: Performance on cross-functional teams

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	.529[a]	2	.264	.249	.780
Intercept	632.232	1	632.232	595.384	.000
WOR_SEC	.302	1	.302	.285	.594
SECTOR	.419	1	.419	.394	.531
Error	185.831	175	1.062		
Total	2332.000	178			
Corrected Total	186.360	177			

a. R Squared = .003 (Adjusted R Squared = -.009)

Tests of Between-Subjects Effects

Dependent Variable: Influence of end user training

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	3.132[a]	2	1.566	1.781	.172
Intercept	783.094	1	783.094	890.576	.000
WOR_SEC	1.913	1	1.913	2.175	.142
SECTOR	2.376	1	2.376	2.702	.102
Error	153.880	175	.879		
Total	2694.000	178			
Corrected Total	157.011	177			

a. R Squared = .020 (Adjusted R Squared = .009)

Tests of Between-Subjects Effects

Dependent Variable: Performance on end user training

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	9.038[a]	2	4.519	5.778	.004
Intercept	354.582	1	354.582	453.356	.000
WOR_SEC	7.974	1	7.974	10.195	.002
SECTOR	4.053	1	4.053	5.182	.024
Error	136.872	175	.782		
Total	1724.000	178			
Corrected Total	145.910	177			

a. R Squared = .062 (Adjusted R Squared = .051)

Tests of Between-Subjects Effects

Dependent Variable: Influence of location of CIO in organization

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	7.898[a]	2	3.949	2.327	.101
Intercept	471.370	1	471.370	277.779	.000
WOR_SEC	.312	1	.312	.184	.669
SECTOR	5.500	1	5.500	3.241	.074
Error	296.962	175	1.697		
Total	1877.000	178			
Corrected Total	304.860	177			

a. R Squared = .026 (Adjusted R Squared = .015)

Tests of Between-Subjects Effects

Dependent Variable: Performance on CIO location in organization

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	8.141[a]	2	4.070	2.828	.062
Intercept	724.812	1	724.812	503.533	.000
WOR_SEC	7.832	1	7.832	5.441	.021
SECTOR	.283	1	.283	.197	.658
Error	251.904	175	1.439		
Total	2378.000	178			
Corrected Total	260.045	177			

a. R Squared = .031 (Adjusted R Squared = .020)

Tests of Between-Subjects Effects

Dependent Variable: Influence of adequate financial support

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	10.120[a]	2	5.060	5.764	.004
Intercept	801.793	1	801.793	913.407	.000
WOR_SEC	.170	1	.170	.194	.660
SECTOR	7.678	1	7.678	8.746	.004
Error	153.616	175	.878		
Total	2893.000	178			
Corrected Total	163.736	177			

a. R Squared = .062 (Adjusted R Squared = .051)

Tests of Between-Subjects Effects

Dependent Variable: Performance on adequate financial support

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	.418[a]	2	.209	.181	.835
Intercept	610.234	1	610.234	528.469	.000
WOR_SEC	6.294E-02	1	6.294E-02	.055	.816
SECTOR	.210	1	.210	.182	.670
Error	202.076	175	1.155		
Total	2390.000	178			
Corrected Total	202.494	177			

a. R Squared = .002 (Adjusted R Squared = -.009)