

ABSTRACT

Wendy Creasey. THE INFLUENCES OF INFORMATION TECHNOLOGY ORGANIZATIONAL PERFORMANCE IN HIGHER EDUCATION (Under the direction of Dr. James McDowelle) Department of Educational Leadership, March 2008.

Higher education administrators are continually trying to control the costs of Information Technology (IT) investments and demonstrate the value of IT to the organization. As many administrators implement structures and processes, it is important to understand the impact of these on IT performance. Using a national sample of Chief Information Officers (CIOs) and high-level administrators, this study of higher education institutions examines the influences of IT performance. This research study examines the impact of IT governance, decision-making location, alignment of priorities, communication, and organizational strategy. As part of this research study, measures of organizational performance were developed to measure CIO perceptions of performance. As a result, this study provides a general profile of top performing IT organizations at higher education institutions.

THE INFLUENCES OF INFORMATION TECHNOLOGY ORGANIZATIONAL
PERFORMANCE IN HIGHER EDUCATION

A Dissertation

Presented to

the Faculty of the Department of Educational Leadership

East Carolina University

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Education

by

Wendy Creasey

March, 2008

©Copyright 2008
Wendy Creasey

THE INFLUENCES OF INFORMATION TECHNOLOGY ORGANIZATIONAL
PERFORMANCE IN HIGHER EDUCATION

by

Wendy Creasey

APPROVED BY:

DIRECTOR OF DISSERTATION: _____
James McDowelle

COMMITTEE MEMBER: _____
William Rouse, Jr.

COMMITTEE MEMBER: _____
Johna Faulconer

COMMITTEE MEMBER: _____
Ken Wilson

CHAIR OF THE DEPARTMENT OF EDUCATIONAL LEADERSHIP:

Lynn Bradshaw

DEAN OF THE GRADUATE SCHOOL:

Patrick Pellicane

DEDICATION

For Olivia, through your eyes the world always looks bright.

ACKNOWLEDGEMENTS

I would like to acknowledge the guider of my dissertation, James McDowelle. Through good advice, lots of encouragement, and laughter, he painlessly guided the improvement of the dissertation to the final product. Ken Wilson, it is a joy to have you on my committee, you have always encouraged me and provided such solid advice. Thanks to you and Christa for your friendship. Many thanks to Art Rouse, who has the ability to make everyone feel special. Johna Faulconer, you are a so encouraging. Thanks to Gwen Joyner for her preparation assistance. A big thank you to my family, who are so supportive of me. A special thanks to my grandmothers, who worked hard and sacrificed much for their families.

TABLE OF CONTENTS

LIST OF TABLES.....	xi
INTRODUCTION.....	1
Problem Statement.....	1
Purpose Statement.....	3
Research Question.....	4
Hypotheses.....	4
Hypotheses 1.....	4
Hypotheses 2.....	4
Hypotheses 3.....	4
Hypotheses 4.....	5
Hypotheses 5.....	5
Hypotheses 6.....	5
Hypotheses 7.....	5
Statement of Importance/Significance.....	5
Limitations of the Study.....	6
Delimitations of Study.....	6
Definition of Terms.....	6
Organization of the Study.....	8
REVIEW OF LITERATURE.....	9
Introduction to Sections.....	9
Organizational Performance.....	9

IT Governance.....	13
IT Governance Defined.....	13
Decision Making.....	15
Alignment.....	21
IT Governance Summary.....	25
Organizational Strategy.....	28
Summary.....	31
METHODOLOGY.....	33
Introduction.....	33
Purpose Statement.....	33
Research Question.....	33
Hypotheses.....	34
Hypothesis 1.....	34
Hypotheses 2.....	34
Hypotheses 3.....	34
Hypotheses 4.....	34
Hypotheses 5.....	35
Hypotheses 6.....	35
Hypotheses 7.....	35
Population.....	35
Operationalization of Variables.....	36
Organizational Performance.....	36

IT Governance – Overall.....	40
IT Governance – Decision Making.....	40
IT Governance – Alignment.....	40
IT Governance – Communication.....	41
Organizational Strategy.....	41
Demographics.....	42
Size.....	42
Public or Private.....	42
Instrument.....	42
Validity.....	42
Reliability.....	50
Survey.....	50
Data Analysis.....	52
Data Reduction and Scales.....	52
Hypothesis 1.....	53
Well Defined IT Governance.....	53
Effective IT Governance.....	53
Hypothesis 2.....	54
Overall IT Decision Making.....	54
Decision Making IT Strategy and Policy.....	54
Decision Making IT Architecture and Standards.....	54

Decision Making IT Expenditures.....	55
Hypothesis 3.....	55
Hypothesis 4.....	55
Hypothesis 5.....	56
Hypothesis 6.....	56
Hypothesis 7.....	56
Institutional Review Board (IRB) Approval.....	57
RESULTS.....	58
Purpose Statement.....	58
Research Question.....	58
Data Collection.....	59
Demographics.....	60
Data Reduction and Reliability.....	66
Data Analysis of Hypothesis 1.....	72
Data Analysis of Hypothesis 2.....	74
Overall Primary Decision Making Authority.....	74
Primary Decision Making Authority of Strategy.....	75
Primary Decision Making Authority of IT Infrastructure.....	76
Primary Decision Making Authority of IT Expenditures.....	77
Data Analysis of Hypothesis 3.....	77
Data Analysis of Hypothesis 4.....	78
Data Analysis of Hypothesis 5.....	78

Data Analysis of Hypothesis 6.....	83
Data Analysis of Hypothesis 7.....	85
Summary.....	86
Summary of Hypothesis 1 Data Analysis.....	86
Summary of Hypothesis 2 Data Analysis.....	86
Summary of Hypothesis 3 Data Analysis.....	87
Summary of Hypothesis 4 Data Analysis.....	88
Summary of Hypothesis 5 Data Analysis.....	88
Summary of Hypothesis 6 Data Analysis.....	89
Summary of Hypothesis 7 Data Analysis.....	89
Conclusion.....	90
CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS.....	91
Introduction.....	91
Review of the Purpose Statement.....	91
Limitations of the Study.....	91
Organizational Performance and IT Governance.....	92
Organizational Performance and Decision Making Authority.....	93
Organizational Performance and Alignment.....	96
Organizational Performance and Communication.....	97
Organizational Performance and Strategy.....	98
Organizational Performance and Size.....	100
Organizational Performance and Institution Type.....	101

Summary of Implications.....	103
Recommendations for Further Study.....	103
Conclusions.....	105
REFERENCES.....	107
APPENDIX A: COVER LETTER.....	112
APPENDIX B: SURVEY INSTRUMENT.....	113
APPENDIX C: INSTITUTIONAL REVIEW BOARD APPROVAL LETTER	118

LIST OF TABLES

1. Summary Organizational Strategies.....	30
2. Size and Setting Classification.....	37
3. Type of Institutional Control.....	38
4. General Description of Measures.....	43
5. Type of Institutional Control Population and Study Comparison.....	61
6. Size Population and Study Comparison.....	62
7. Decision Making Variables.....	64
8. Item 1-14 Performance Variables.....	67
9. Item 1-14 Performance Variables Rotated Factor Matrix Factor Loadings.....	68
10. Organizational Performance Means and Standard Deviations.....	70
11. Hypothesis 1: Organizational Performance Means and Standard Deviations...	71
12. Hypothesis 1: IT Governance and Organizational Performance Pearson Correlations.....	73
13. Hypothesis 3: IT Alignment and Organizational Performance Pearson Correlations.....	79
14. Hypothesis 4: IT Communication and Organizational Performance Pearson Correlations.....	80
15. Hypothesis 5: IT Strategy and Organizational Performance Pearson Correlations.....	84

INTRODUCTION

Problem Statement

The investments in technology at universities across the nation are complex and financially expensive. Over time there has been an increased emphasis and reliance on technology as a common convenience, as well as a strategy to improve business (Henderson & Venkatraman, 1993). Naturally, this reliance on technology has resulted in technology becoming an integral part of higher education organizations. The investment and reliance on technology is increasing, and businesses have had difficulty determining the value of information technology (IT) contributions (Henderson & Venkatraman). To remedy the balance between investment in technology and value, there is an emphasis to (a) align business processes with IT investments, (b) demonstrate return on investments, and (c) demonstrate the impact of technology on learning outcomes. Demands on university information technology administrators are emerging and changing the expectations of administrators.

The issue of understanding IT value has been at the forefront of business operations since the beginning of the infusion of technology into organizational settings. Additionally, IT accountability is present in government legislation and policy. Recently higher education administrators have been held accountable to provide (a) measurements, (b) process, and (c) policy. Moreover, administrators are expected to respond to chancellors, provosts, boards, and committees to (a) justify expenditures, (b) engage in strategic planning, (c) manage their organizations, and (d) understand the value of IT investments. These accountability measures are a result of the shift of IT from being

primarily involved in administrative processes to becoming pervasive and ubiquitous across organizations (Green, 2006).

The development and changes in IT have been so rapid that standards and best practices have lagged behind in development and adoption rates; however, standards and best practices are quickly becoming the norm in businesses and beginning to be adopted by higher education. These standards and methods are best practices centered on how to regulate, control, and account for technology investments (IT Governance Institute, n.d.).

In parallel, the Department of Education Spellings Report (U.S. Department of Education, 2006) calls for increased (a) accountability, (b) access, and (c) affordability to higher education. The Spellings Report is affecting public expectations of universities and national educational policy. Similarly, initiatives such as the University of North Carolina Presidential Advisory Council on Efficiency and Effectiveness [PACE] (2006) initiative, which emphasize efficiency and accountability with specific expectations of compliance for universities, further illustrates the significance of the subject.

Additionally, there are projects such as the Roadmap to Redesign at the Rensselaer Institute that focus on measuring how technology impacts learning, while lowering costs. Costs are lowered by using technology to increase the number of students that can be simultaneously taught and reducing the number of faculty required to teach the students. For an administrator, these projects and changes in business process are being introduced into university IT operations for the first time. As an administrative leader, understanding these issues, best practices, and measures and their impact on the performance of the organization is both a challenge and necessity (Green, 2006).

A review of the literature was conducted to examine organizational performance measures and finds there is an inconsistency and lack of standards (Albrecht, Bender, Katz, Pirani, Salaway, Sitko, & et al., 2004; Dougherty, 2004; Graves, 2005; Gunes, Basoglu, & Kimiloglu, 2003; Hawkins, 2003; Kaplan & Norton, 2007; Lee & Yu, 2004; Lewis, 1994; Lim, 1995; Pirani & Albrecht, 2005; Ruben, 2007). Performance definitions are unique to the environment being studied; however, business frequently uses transaction costs of IT or business financial metrics. Closely linked to performance is IT governance. IT governance focuses on who has the decision making authority and alignment of priorities, which is the management of these decisions as they relate to institutional mission and goals. Both performance and IT governance are closely linked to the overall organizational strategy that helps define what is important to an organization (Peterson, 2004; Rau, 2004; Weill & Ross, 2005).

Purpose Statement

The purpose of this study of public and private institutes of higher education was to examine whether (a) overall IT governance, (b) decision making placement in the organization, (c) alignment of priorities, (d) communication and (e) organizational strategy influence perceived organizational performance. The influence of demographics such as size and public versus private were examined. As part of this research study, measures of organizational performance and measures in other conceptual areas were developed. The research project was distributed to a national sample of Chief Information Officers (CIOs) and/or to the responsible administrator at higher education colleges and

universities. The research will aid higher education administrators in understanding the impact of these practices in higher education IT management.

Research Question

Does overall IT governance, the location of the decision authority within an institution, the alignment of priorities across the organization, the organizational strategy and demographics (i.e., size and public versus private) influence organizational performance?

Hypotheses

Hypothesis 1

H₀: There is not a relationship between IT governance and organizational performance. H_a: Organizational performance will be higher for institutions where IT governance is well defined and effective.

Hypothesis 2

H₀: There is not a relationship between placement of decision authority within an institution and organizational performance, IT governance, and IT alignment. H_a: Organizational performance, IT governance, and IT alignment increases depending on where the decision making authority is placed within the organization.

Hypothesis 3

H₀: There is not a relationship between alignment of priorities and organizational performance. H_a: Organizational performance increases as the alignment of priorities increase.

Hypothesis 4

H₀: There is not a relationship between communication and organizational performance. H_a: Organizational performance increases as communication increases.

Hypothesis 5

H₀: There is not a relationship between organizational strategy and organizational performance. H_a: Organizational performance increases depending on the primary organizational strategy chosen by the organization.

Hypothesis 6

H₀: There is not a relationship between the size of the organization and organizational performance. H_a: Organizational performance increases as the size of the organization increases.

Hypothesis 7

H₀: There is not a relationship between the public versus private types of organization and organizational performance. H_a: Organizational performance will increase for public institutions.

Statement of Importance/Significance

This research is meaningful to higher education administrators who are seeking to understand the influences of IT organizational performance. Additionally, a perspective on decision making and alignment as it relates to IT governance is important as new methods of management are applied to IT in higher education. The information gathered in this report offers practical guidance to those responsible for IT operations. Understanding the relationship of organizational strategy to IT performance aids in

understanding whether this area is important to embrace and communicate to the organization. According to Mintzberg (1991), finding the organizational fit creates “a sense of order” (p. 58) that without it leaves an organization confused and essentially in crisis. There is a limited amount of research in the higher education field and many of the business processes do not apply yet to higher education; however, there are trends in the higher education field that indicate business processes will be more applicable in the future (Green, 2006). Thus, the study is important.

Limitations of the Study

The IT governance and organizational strategy literature focuses on business, markets, returns and financial profits. Although many of the specific measurements (e.g., profits, return on investment) do not apply to higher education; the concepts of decisions making, alignment, and governance are applicable to higher education IT administration. The major limitation of this study is that the scales and measures proposed are new or modified from others surveys, leaving them untested to the specific applications. Additionally, with the saturation of web surveys, it was challenging to achieve the desired response rate.

Delimitations of Study

The delimitation of the study is the opportunity to study the influences of organizational performance in higher education.

Definition of Terms

Best Practices – Best practices are widely agreed upon management practices in the field of Information Technology. These include Information Technology

Infrastructure Library (ITIL) and Control Objectives for Information and Related Technology (COBIT) (IT Governance Institute, n.d.).

Organizational Performance – Organizational performance is defined as indicators of success that are indicative of meeting the mission and goals of the organization (Division, 1998, p. 18), and specific to the organization (Miller, 2007, p. 130). For example, in higher education dimensions could include (a) effectiveness, (b) productivity, (c) quality, (d) customer satisfaction, (e) efficiency, (f) innovation, and (g) financial durability (Miller, p. 130).

IT governance - IT governance is defined as the placement of decision making authority, alignment processes, and communication that ensure IT meets the goals and objectives of the organization (IT Governance Institute, n.d., ¶ 3; Weill & Ross; 2005).

Decision Making - Decision making is the process of making key choices on behalf of the organization. A key aspect of decision making is where authority is placed within the organization. Decision making is a key component of IT governance (Weill & Ross, 2004).

Alignment - Alignment is a process, in which management techniques are used to promote coordination between business goals and IT investments (Weill & Ross, 2005). Alignment is another key component of IT governance.

Organizational Strategies - Organizational strategy is the primary focus of the organization. There are three primary strategies: (a) customer service, (b) innovation, and (c) efficiency (Treacy & Wiersema, 1993).

Organization of the Study

The dissertation is organized into five chapters. Chapter 1 details the statement of the problem and an overview of the research. Chapter 2 reviews the literature in the area of organizational performance, IT governance, and organizational strategy. Chapter 3 details the methodology. Chapter 4 details the results of the study. Chapter 5 discusses the findings, implications, and recommended research.

REVIEW OF LITERATURE

Introduction to Sections

The first section discusses organizational performance and the variety of measures available in different industries. The second section defines Information Technology (IT) governance, discusses the background, and details research on decision making and alignment. The third section discusses the importance of organization strategies and their relationship to IT governance and performance. Finally, the last section summarizes chapter 2.

Organizational Performance

Organizational performance is defined in a variety of ways depending on the discipline and the type of organization. The literature on performance is contentious in the defining of organizational performance (Gunes et al., 2003). According to Sink and Tuttle (as cited in Miller, 2007), in the context of higher education evaluation, organizational performance can be measured both subjectively and objectively in order to capture the performance of an organization. A subjective measure would be based on individual agreement that an organization had met its goals (i.e., on a numerical scale rate the success of your organization in meeting project deadlines). While, an objective measure would include quantifiable data demonstrating the project deadlines had been met, such as the difference between expected completion date and actual completion date. Miller states the following about assessing organizational performance,

A good assessment program provides multiple indicators because organizational performance is complicated, organizational missions

in higher education are multifaceted, information needs of assessment users are varied, and organizations have numerous critical success factors. Furthermore, multiple indicators are needed because assessors must monitor unintended outcomes that may result from intentional changes introduced into the systems. (p. 221)

In higher education IT, it has historically been difficult to create standard performance measurements for the comparison and understanding of investments (Hawkins, 2003). According to Graves (2005), higher education is increasingly required to demonstrate the impact of IT investments on campuses, specifically learning. However, with the pervasiveness of IT and the reduction of IT to a necessary convenience, the cost of IT is difficult to track because it is part of everything that we do (Hawkins, 2003). Although there are no standards for higher education, the trend of increased efficiency and accountability, along with positive organizational performance are critical demands made on higher education IT (Green, 2006).

In the business literature, measures of profit and return on investment dominate the reporting. Recent research by Weill and Ross (2005) indicates that these measures of profit and return on investment used by top performers have different results based on the measurement used. Similarly, other research (Gunes et al., 2003) indicates that there are many factors, internal and external to an organization that impact performance. When measuring performance and comparing subjective and objective measures, similar outcomes have been produced (Bergeron & Raymond, 2001, as cited in Gunes et al.).

Asking an executive how well they performed and comparing the results to a financial metric would produce similar measures of success or failure.

The examination of general literature on organizational performance produced a variety of measures depending on the field and the purpose of the study. In Lim (1995), the research focused on (a) quality of service, (b) fund raising dollars, and (c) economic data to measure organizational performance. A university case study on change measured organizational performance using (a) staff profile, (b) funding received, (c) number and amount of grants, (d) scores of incoming students, and (e) indicators demonstrating organizational goals (Lewis, 1994). Lee and Yu (2004) reviewed the literature on organizational performance and found businesses were using (a) staff turnover in sales, (b) return on investments, (c) profit metrics, (d) rate of growth, and (e) persistency rates. Non profits such as hospitals used (a) occupancy rates, (b) rates of reduction related to length of stay, and (c) staff turnover rates (Lee & Yu).

Higher education measures of performance are being developed as a result of the Spellings Commission Report (U.S. Department of Education, 2006) and through national standard incentives such as the Baldrige Award (Ruben, 2007). The Baldrige Award uses a method for assessment and improvement that links mission and goals to indicators of organization efficiency. The method includes measures such as (a) student turn over, (b) attendance, (c) satisfaction, (d) market share. Organizations that have participated in this self-assessment and won this government award have been more successful and demonstrated higher performance on a variety of measures (Ruben).

Government recommendations for performance measures in IT focus on improvement (change from baseline) and are different based on goals and organizational level within the organization (Division, 1998). Research on IT funding in higher education (Goldstein, 2004) discusses organizational success as (a) receiving value from IT investments, (b) maintaining funding and (c) providing adequate resources.

Developed by Kaplan and Norton (2007), the balanced scorecard method, offers a mechanism for understanding performance. Their balanced score card approach to capturing performance has been used in a variety of disciplines including higher education. The system uses multiple measures in four areas: (a) financial (b) customers (c) internal processes and (d) learning and growth. Regardless of the type of organization, measures should be balanced across the four categories (Kaplan & Norton, 2007). Stanford University and Massachusetts Institute for Technology's IT organizations used the balanced scorecard approach and were able to standardize their performance measures by connecting their goals and performance metrics (Dougherty, 2004). These university IT organizations used measures such as (a) client satisfaction and (b) help desk calls per full time equivalent.

Using similar methods and linking performance measures to goals, administrators at the University of Southern California, San Diego used performance measures, such as (a) IT funding per student, (b) percentage of IT funding spent on IT staff and (c) number of campus computers per student (Pirani & Albrecht, 2005). Research by Albrecht et al. (2004) indicates higher education IT organizations used a number of measures to capture performance including (a) self –assessment, (b) satisfaction surveys, (c) balanced score

card, (d) Baldrige Award process, (e) focus groups, (f) bench marking, and (g) audits. Organizations use measures of performance that are relevant to the organizations goals and the attainment of those goals (Lim, 1995).

A review of the literature indicates there are not consistent measures of organizational performance for higher education IT. Leaders of IT in higher education, Ward and Hawkins (2003), discuss strategies that contribute to organizational success. While their discussion does not specifically address measures of organizational performance, the characteristics of institutional success described by the IT leaders contribute to the development of what is organizational performance in higher education IT. They advise higher education IT leaders that to achieve success, (a) meeting budget expectations, (b) standards and (c) agreed upon levels of support are of the utmost importance. These strategies produce (a) better cost, (b) more stable infrastructure, and (c) quality support (Ward & Hawkins, 2003). Moreover, academic participation in IT decision making and shared ownership of IT decisions within an institution contribute to success (Ward & Hawkins, 2003). Shared decision making and creating value for internal and external stake holders is a unique challenge for nonprofits (Weill & Ross, 2004). This shared decision making and the responsibility of structuring IT management is paramount to higher education and discussed further in the next section on IT governance.

IT Governance

IT Governance Defined

IT governance is defined as being the placement of decision making authority,

alignment processes, and communication that ensure IT meets the goals and objectives of the organization (IT Governance Institute, n.d., ¶ 3; Weill & Ross, 2005).

The increase in scope and impact of IT is markedly different from when IT began in the 1970s as a very compartmentalized field dealing only with data processing. Additionally, the desperation of leaders to discover and control the huge investments in IT and understand IT investment value is critical (Ross & Weill, 2002). It is this change in scope and growth in the field that resulted in the need for IT governance (Weill & Ross, 2004, p. viii). The IT governance literature is abundant in the business field and there is a strong presence of IT governance in government agency policy and legislation (Division, 1998); however, there is a lack of definition in higher education IT (CIO Leadership Series, 2006). Although IT governance is more pervasive in the business field, a study by Weill and Ross (2005), of international business leaders indicated that IT governance was not formally implemented or well understood in many organizations. In a separate study of businesses, the number one reason for not implementing an IT governance strategy was cost (IT Governance Institute, 2004).

Recent accountability trends will require formalized IT governance in order to successfully be accountable, efficient, and maximize performance. Unfortunately, in higher education IT, regular assessment and agreement on standards are not yet common (Green, 2006). IT governance is present on some campuses. Chief Information Officers (CIOs) of higher education institutions were surveyed and approximately half of the respondents thought the IT governance on their campus was effective (Albrecht et al., 2004).

According to Weill and Ross (2005), there are three primary governance mechanisms: (1) decision making structures (2) alignment and (3) formal communication. Similarly, the IT governance definition from the IT Governance Institute (n.d.) emphasizes (a) leadership in decision making, including structure and process of the organization and (b) alignment and sustainability of the overall organizational mission and strategies. In the next sections, the two primary components of IT governance are discussed: (a) decision making structure and (b) alignment.

Decision Making

According to Peterson (2004), IT governance is much more than the historical debate of decentralized versus centralized IT professionals; instead the issue focuses on who makes the IT decisions, not the resulting decision. To be successful, it is important to prevent decision making that is not synchronized within the organization; without synchronization there is a conflict in purpose (Weill & Ross, 2005). Poor synchronization can be characterized by either IT professionals or executive leadership making decisions independently of one another. For example, often presidents of companies are often more concerned with cost instead of strategic direction and impact of technology (Ross & Weill, 2002).

The literature (Ross & Weill, 2002) indicates, successful companies have senior leadership involved in decision making, while in organizations where senior leadership abdicated their responsibilities the organization did not perform effectively. Leaders in higher education IT, advocate that important IT decisions such as how much to spend on IT and where to spend it should be managed by a cross section of the institution's

leadership with direct input and understanding from the institutions president (Ward & Hawkins, 2003). Research on decision making authority and existing typologies need to be explored to understand the decision making concept (Mintzberg, 1980; Peterson, 2004; Rau, 2004; Weill & Ross, 2005).

Although, not referring specifically to IT, Mintzberg's (1980) five parameters of decisions as "*decision as decentralization*" analysis fits well with the IT governance literature and describes decision making within organizations. These five types are part of a larger Minitzberg organizational model. Decentralization refers to the degree decision authority is dispersed within an organization. The concept is divided into (a) vertical decentralization and (b) horizontal decentralization. Vertical decision decentralization is formal and occurs throughout the organization hierarchy, while horizontal decision decentralization is considered informal and occurs outside of the known organizational structure. Two other types of decision making are (a) selective and (b) parallel. Selective describes power location within multiple organizational areas because of the required processes. Parallel decision-making occurs when there is one area with the authority to make decisions.

By combining vertical, horizontal, selective, and parallel, five decision types are formed (Mintzberg, 1980). These are (a) vertical and horizontal centralization, in which all power for decision making, both formal and informal, is with the chief executive(s), (b) limited horizontal decentralization, in which, formalized power is with the chief executive while the informal power is with management in charge of work standardization and processes, (c) limited vertical decentralization, in which multiple

areas that are parallel to one another will have formal power, (d) horizontal and vertical decentralization, in which decision authority follows the formal organizational structure (e) selective decentralization in which decision making is distributed all over the organization. Essentially, these five types describe the location of decision making authority within an organization.

Similarly, to other business literature, Mintzberg (1980) associates overall organizational structures, such as centralization and decentralization with certain types of decision making authority. For example, vertical and horizontal centralization is characteristic of a centralized organization focusing on efficiency, where as selective decentralization is representative of a young organization that relies on experts. Mintzberg's "*decision as decentralization*" typology does not specifically discuss IT governance and IT decisions. However, there is a similarity that resonates between these two bodies of literature.

Similar to Mintzberg's analysis describing decision location, in the IT governance literature, Weill and Ross (2005) developed a typology that consists of a matrix of five decision areas by six archetypes. The decision areas are the major decision areas where decisions will need to be made in IT. The five decision areas include, (a) IT principles (e.g., strategic decisions), (b) IT Infrastructure (e.g., decisions on core services), (c) IT architecture (e.g., decisions on business requirements), (d) business application (e.g., decisions regarding internal developed applications), and (e) prioritization and investment (e.g., the decision to invest or not invest). This range of decision types presented by Weill and Ross (2005) are present in higher education

organizations that must determine how to fund network upgrades, appropriate trends in the technology, and prepare for the needs of faculty and students.

Six organizational decision types or archetypes are described by Weill and Ross (2005); these focus on who makes the decision in the organization. The typology includes (a) business monarchy, in which decisions are made by the Chief Financial Officer (CFO), (b) IT monarchy, in which decisions are made by the CIO, (c) federal system, in which the decisions are made collaboratively by the CFO, Chief Executive Officer (CEO), and the IT department, (d) duopoly, in which decisions are made by business and IT leaders, (e) feudal system, in which decisions are made separately by business and IT leaders, and (f) anarchy, in which decisions are decentralized and made by all areas. The decision types are reflective of organizational structure.

Weill and Ross (2005) recommend their model be applied by using the following method (a) select a decision making structure (b) align processes by selecting a method of governance, and (c) implementation of formal communication. For example, if university strategic decisions on investment are made by the president and networking and server (infrastructure and architecture) decisions are made by IT, then they are a business monarchy and an IT monarchy in that order. If for example, all decisions were made by distributed departments around the university and everyone had their own email system and servers, and support; then it would be considered anarchy. According to Weill and Ross (2005), multiple decision types are used in one organization; however, top performing companies tended to make decisions in a similar pattern. For example, centralized decision making was characteristic of companies focusing on profit. In

contrast, decentralized decision making systems were more likely to be focused on growth and innovation. Most importantly, this varied by the performance outcome emphasized.

Peterson's (2004) research discusses decisions using three primary decision areas (a) corporate executives, (b) business executives and (c) IT executives. Peterson's research emphasizes the complexity of IT governance. Instead of focusing on the placement of decisions within the organization, this research focuses on how decisions are integrated and coordinated. According to Peterson, focusing on the placement, such as decentralization and centralization presents a political understanding of decision making. Three types of IT governance are described, including (a) structural, (b) process, and (c) relational. These three types are considered recommended Horizontal Integration Capabilities (HICs). HICs are a method to enable decision making and coordination horizontally across an organization. The three types describe where the decision making is located. The first type, structural governance focuses on formal roles and positions. In this type, decision making between business and IT is through formal coordination of committees or groups. The second type, process governance is the level at which monitoring, rules, standards, methodologies, and metrics are integrated. Decision making is mandated through these processes and integrates IT and business decisions. Similar to structural governance, process governance is generally mandated through administration. The last type, relational governance focuses on (a) building relationships, (b) cross team collaboration, (c) shared learning, (d) knowledge integration and (e) problem solving. In

addition to formal or realized IT decision making, there is also deviated IT decision making in which decision making is delegated and informal IT governance develops.

Another perspective on decision making is discussed by Henderson and Venkatramann (1993). In this model, decision making authority location is dependent on the desired roles of the organization. Their Strategic Alignment Model (SAM) defines leadership roles to include IT or business management being visionary or as the prioritizer of projects. The significance of this model is that it blends who makes the decisions with the emphasis on roles. In addition, the model considers that the perspective is different based on what is important to the organization. The model also considers internal and external components. In business, the market would be an external component, while in higher education external considerations may include a shift in age of students and an increase in demand for distance education.

Both Mintzberg (1980) and Weill and Ross (2005), focus on the flow of decisions through the organizational hierarchy. The major decisions locations in both models consider whether decisions are centralized or decentralized. Weill and Ross (2005) take the concept further by applying the location of decisions to the type of IT decisions.

Current IT literature indicates that most IT decision making structure is no longer vertical instead it is horizontal, impacting every part of the institution (Peterson, 2004; Ward & Hawkins, 2003). To that end, Peterson (2004) contends that HICs examine decision making as coordination across the organization, the centralization and decentralization emphasis is often a political consideration. The emphasis on coordination is a simpler model of IT governance compared to Weill and Ross (2004).

Similarly, in an article by Ward and Hawkins, they discuss, in the context of campus IT decision making, the importance of disregarding traditional formal structures. They consider technology decision making a horizontal function.

The Henderson and Venkatramann (1993) model includes decision making and places emphasis on determining business and IT roles in the organization. These models are important in understanding IT governance in higher education IT, where survey results indicate IT administrative leaders were more involved in IT governance than academic leaders. In contrast, private institutions were more likely to make decisions outside of a governance structure than public institutions (Albrecht et al., 2004). Lastly, non-profits and government organizations are considered to govern differently, since shared governance through committee decision making often dominates (Weill & Ross, 2004). Shared governance facilitates the creation of value for IT investments, although the consensus building and distribution of decisions slows down the process (Weill & Ross, 2004).

Various approaches to the analysis of decision making structure and processes have been discussed in this section; the next element of IT governance to be examined is alignment.

Alignment

Alignment is noted by Weill and Ross (2005), as being one of the key governance mechanisms. The researchers describe alignment processes as the management strategy that insures effective governance. These processes include a number of strategies including assessment and impact of IT on goals. These management techniques to

produce better alignment are an essential component of IT governance (IT Governance Institute, n.d.; Weill & Ross, 2005). Similar to the literature on decision making, alignment research is also found primarily in the business literature and integrated with decision making. In this section, we will discuss research on alignment and the importance of alignment for successful IT governance.

Research on higher education indicates (Albrecht et al., 2004) that alignment between IT investments and institutional priorities resulted in more value from the investments and an increased likelihood that objectives were met. However, a survey by the IT Governance Institute (2004) indicated only 52% of respondents surveyed considered IT very important to their overall strategy. General management perceived IT to be more important than IT management; while 25% perceived IT to be a commodity, 25% perceived it as strategic, and 46% perceived it as both (IT Governance Institute, 2004). These results indicate there continues to be a difference of opinion as to the value and understanding of IT.

Henderson and Venkatraman's (1993) research on alignment emphasizes the importance of alignment between the two primary decision makers and strategy types in an organization (a) business/finance and (b) IT. Further, it explores IT as a strategic tool and not a resource limited to providing infrastructure services, such as server administration and networking. By exercising alignment with business goals, organizations can prevent the latest IT innovations from driving business strategies unless there is understanding of (a) fit, (b) solutions, (c) resources, and (d) priorities (Luftman & Brier, 1999). These concepts are key in universities where creativity and innovation have

the potential to drive choices, but not provide the most economical or practical delivery of service.

A study by Luftman and Brier (1999) applied the Henderson and Venkatramann (1993) model and concluded there were several key factors that enable strategic alignment with IT. Important factors were IT's involvement in (a) strategy development (b) understanding business requirements (c) partnering with business and (d) prioritizing projects. Regarding leadership, senior executive support and the demonstration of leadership by IT were important. Similarly, a study of higher education indicates that institutions with well structured IT governance that include academic leaders consequently report better alignment with institutional priorities (Albrecht et al., 2004).

Luftman and Brier (1999) developed a process for strategic alignment which includes six steps. These steps are (a) set goals (b) understand business and IT importance, (c) assess and prioritize the differences between business and IT requirements, (d) create an action plan, (e) assess the results of the process, and (f) work toward sustaining alignment. Organizations that are considered successful at business and IT alignment consider (a) business and IT equally, (b) develop skills, (c) create a team environment, (d) agree upon outcomes, (e) have urgency in their IT projects, (f) deploy IT to create customer value, and (g) have an air of open communication (Luftman & Brier, 1999).

Later work by Luftman (2003) developed specific criteria to assess the alignment of IT with business strategy. This assessment model focuses on six criteria to determine organization maturity. Maturity in these areas indicates better alignment. These maturity

areas are (a) communications, (b) competency, (c) governance, (d) partnership, (e) technology scope and (f) skills.

The development of processes to assess alignment, such as Luftman's, are useful tools for business and could be applied to higher education. Similarly, government research driven by legislation also indicates the importance of practical methods to align goals and determine the results gained from IT investments (Division, 1998).

The research (Henderson & Venkatraman, 1993; Luftman, 2003; Luftman & Brier, 1999) provides direction for understanding alignment and the importance of alignment to the success of organizations. Although there are processes for developing alignment, the difficulty is in the sustainment of alignment (Henderson & Venkatraman, 1993; Luftman, 2003; Luftman & Brier). Luftman and Brier detail IT governance alternatives and considerations that in combination can enhance and sustain IT and business alignment. They recommend IT and business staff work together instead of separate locations. The co-location will promote better synchronization. To promote an understanding of budget impact and good communication, the CIO is recommended to report to the CEO. Insourcing and outsourcing should be explored to promote better alignment of priorities. Lastly, a formal assessment process should be implemented (Luftman & Brier).

In higher education, additional mechanisms that promote alignment between goals and organizational choices are methods of practice including the (a) Baldrige Award and (b) balanced score card method. Through a process that requires institutional involvement from all facets of the higher education institution, teams align goals and indicators to

understand value (Ruben, 2007). Similarly, the balanced score card can be used as a strategic tool to align decisions and measures of success (Kaplan & Norton, 2007). The balanced score card method gathers data and information from multiple areas including (a) financial, (b) customers, (c) internal processes, and (d) learning and growth. By balancing performance, as well as value of a project, across these multiple perspectives organizations can achieve greater understanding of decisions and promote alignment. Although not specifically, discussing governance, frameworks like the Baldrige Award and the balanced score card that require alignment of mission and goals to measures of success are becoming more prevalent in higher education.

IT Governance Summary

IT governance also goes through different stages of maturation which range from (a) inactive and sporadic at the most immature level and (b) mature and advanced at the well developed level (Rau, 2004). Further, IT governance can result in outcomes that are unintended (Peterson, 2004). In a university, successful IT governance is described to have real authority and have the ability to be convened quickly (Goldstein, 2004). A formal process that only makes decisions twice a year would not be considered effective. At an institution of higher learning, IT governance would be reflected by having executive leadership engaged in the decision making in regards to the institutions mission and strategy. Higher education, IT leaders contend, IT must be part of the overall institutional goals to be successful (Ward & Hawkins, 2003). Moreover, the ability for IT governance and organizations to be adaptive and flexible will enhance their performance and ability to be strategic (Albrecht et al., 2004; Peterson, 2004). This flexibility in

implementing incremental changes versus completely reorganizing can be achieved by organizing by cross team projects versus organizational function. The result is a disregard for the organizational structure.

Additionally, to be successful in IT governance, Ross and Weill (2002) suggest there are six key areas where executives must weigh in and make decisions or face negative consequences. These areas include (a) IT spending level, (b) which processes to fund, (c) which IT capabilities are required, (d) level of service to provide, (e) level of security and privacy risk to sustain, and (f) responsible party for IT failure. In essence, IT governance is essential to determine (a) allocation of funding, (b) degree of funding and (c) purpose of funding. If these decisions are not made in concert between IT and business executives, then there will not be any value realized from IT. Furthermore, key to decision making in the research is communication (Luftman, 2003; Peterson, 2004; Weill & Ross, 2005). Not for profit top performers had executive committees that focused on all of IT, as well as (a) a committee of business and IT leaders, (b) an IT leadership committee, and (c) an architecture committee (Weill & Ross, 2004). According to Weill and Ross (2004), the pattern of decision making was different than for nonprofit organizations. Compared to business, there was less separation of function and roles.

Communication is important to success if executed correctly and a barrier if executed ineffectively. Processes that aid in alignment such as the balanced score card approach require high levels of communication and alignment of goals to implement successfully (Kaplan & Norton, 2007). Communication in the research is through a

variety of areas including (a) the relationships between IT and business staff, (b) the inclusion of external and internal stake holders, and (c) the constant sharing of information (Luftman, 2003; Luftman & Brier, 1999; Peterson, 2004; Weill & Ross, 2004).

According to Mintzberg (1980), organizational size can determine the decision making practices. Specifically, larger organizations are more formalized and bureaucratic which here would refer to the structure of the decision making pattern. The common decision making pattern in a larger organization is limited vertical decentralization. This type is when decision making is made in parallel, such as a provost, CIO, and a financial officer (CFO). Smaller organizations tend to have decision making authority centralized. In a smaller organization, it is easier to be involved in all the decision making, than it is in a large organization.

In this section, several models of IT governance have been discussed. IT governance is a complicated field where there is not one method of governance; instead consideration should be given to the many factors of an organization including their organizational strategy (i.e., culture and style) (Rau, 2004). A common factor in the models discussed, in addition to decision making and alignment, is the organizational strategy. In the next section, organizational strategy and the relationship to IT governance will be examined.

Organizational Strategy

In the literature, organizational strategy is referred to in many ways, including value governance (Peterson, 2004), demand factors (Rau, 2004), service areas (Rau),

styles (Rau), culture (Treacy & Wiersema, 1993), value disciplines (Treacy & Wiersema) and system forces (Mintzberg, 1991). Although, some of the authors have three to five types, the literature can be reduced to three primary categories of organizational strategy. They are (a) customer service, (b) innovation and (c) efficiency. These three types will be discussed further in this section (Mintzberg, 1991; Peterson; Rau; Treacy & Wiersema).

According to the literature, it is important to understand organizational strategy in order to understand IT governance (Henderson & Venkatraman, 1993; Peterson, 2004; Rau, 2004; Weill & Ross, 2005). For example, an organization that is focused on efficiency will govern differently, than an organization that is focused on innovation. All organizations have a primary strategy that sets the stage for their unique environment. Although, organizations are not expected to have multiple strategies, organizations are expected to have one dominant strategy with some characteristics of all strategies (Treacy & Wiersema, 1993). Moreover, to be successful organizations need to consider strengths and the organization's culture in making the selection of their dominant organizational strategy. Organizations must then be prepared to internalize the dominant strategy (Treacy & Wiersema). For example, internalizing the dominant strategy would include frequently communicating it to the employees of the organization (a) directly and (b) indirectly. Indirect communication would include (a) project choices, (b) recruitment and (c) funding allocation (Treacy & Wiersema).

The first organizational strategy considered is customer service. Customer service focuses on providing quality service to the customer and focusing on customer needs through analytics and understanding behavior. In higher education IT, this would include

personalized support. The second type, innovation, focuses on providing leadership in the development, implementation and integration of new technologies. This would be characteristic of developing innovative tools to enhance the delivery of education. The third type is efficiency. Efficiency focuses on delivering the service or product at the lowest cost with the broadest impact (Henderson & Venktrammann, 1993; Mintzberg, 1991; Peterson, 2004; Rau, 2004; Treacy & Wiersema, 1993). In IT this relates to the implementation of standards and services that lower cost and are for the masses.

Eichen (2006) discusses organizational strategies in the context of higher education and asserts that organizations must choose a strategy and share the strategy with their customers, and staff. This choice will drive staff skills and set expectations for both staff and customers. Eichen further asserts understanding these strategies is essential in higher education IT, as IT leaders are having to understand the business drivers of higher education. Without the clear alignment with one of the organizational strategies, then there is lack of focus and fragmentation (Peterson, 2004). An organization cannot ignore any one of these strategies but cannot focus on all three equally or risk the “*muddled middle*” (Rau, 2004). Minitzberg (1991) cautions that an organization should not be so entrenched in one strategy to prohibit the natural flow of change; organizations of certain strategies follow an evolution over time that is similar. Similarly, organizations must be ready to change strategies as needed to sustain success (Treacy & Wiersema, 1993). Table 1 summarizes organizational strategies stated in the literature.

Understanding the IT governance literature on decision making and alignment processes requires understanding and discussion of the three primary organizational

Table 1

Summary Organizational Strategies

Commonalities	Mintzberg (1991)	Treacy & Wiersema (1993)	Henderson & Venkatrama (1993)	Peterson (2004)	Rau (2004)
Innovation	Innovation /Direction	Product Leadership	Technology Transformation/Product Leadership	Strategic	Technological Excellence
Customer Service	Proficiency/ Concentration	Customer Intimacy	Service	Solution	Customer Care
Efficiency	Efficiency	Operational Excellence	Strategic Execution	Service	Production Efficiency

strategies categorized here. The organizational emphasis on strategy determines the decision making structure and process of alignment of the organization (Henderson & Venkatraman, 1993; Mintzberg, 1991; Rau, 2004; Peterson, 2004; Weill & Ross, 2005). Further, the organizational strategy emphasized determines performance goals and outcomes (Weill & Ross, 2005).

Summary

The research presented here describes the current literature that is relevant to organizational performance, IT governance, and organizational strategies. The literature is driven by the need of organizations to improve and understand performance and the factors contributing to the differentiation between top performers from low performers. Performance is directly related to financial metrics and competition in a business. In higher education it is related to a variety of factors including (a) improving student learning, (b) meeting goals and objectives, (c) satisfying customers, (d) receiving budget increases, and (e) having alignment and synergy in decision making. However, the expectations of higher education IT are changing rapidly and there is a trend in higher education, in part due to the Spellings Commission Report (U.S. Department of Education, 2006) that has changed the expectations of higher education to one of accountability (Green, 2006). These changes in the environment have increased the need to understand what influences performance in higher education IT and enhance understandings of IT governance and strategies.

The literature described indicates that performance can be influenced with IT governance (Albrecht et al., 2004; Henderson & Venktrammann, 1993; Luftman & Brier,

1999; Peterson 2004; Weill & Ross, 2005). Although a mass of the research and performance measures are used in business, and the metrics are primarily financial, the impact of IT governance and the sub-components decision making and alignment differ based on the decision making structure and the degree of alignment. Moreover, the organizational strategy emphasized can vary from organization to organization. Communication, size of the organization, and whether an organization is private or public, can also impact the performance of an organization. In higher education, where committees and shared governance is important in the creation of value more research is needed. Research needs to explore the impact of these concepts on performance measures that make sense in higher education. Understanding the impact of these types on performance as it relates to higher education is important as administrators map their future. Chapter 3 details the methods used to study these concepts.

METHODOLOGY

Introduction

In this chapter, the research design and method are discussed in detail. First, the purpose statement and research question are reviewed. Second, the population is described. Third, the variables for the study are operationalized and discussed. Fourth, the questions for the survey instrument are discussed. The fifth section, details the survey data collection methods. Lastly, each hypothesis and the analysis are discussed in detail.

Purpose Statement

The purpose of this study of public and private institutes of higher education was to examine whether (a) overall Information Technology (IT) governance, (b) decision making placement in the organization, (c) alignment of priorities, (d) communication and (e) organizational strategy influence perceived organizational performance. The influence of demographics such as size and public versus private were examined. As part of this research study, measures of organizational performance and measures in other conceptual areas were developed. The research project was distributed to a national sample of Chief Information Officers (CIOs) and/or to the responsible administrator at higher education colleges and universities. The research will aid higher education administrators in understanding the impact of these practices in higher education IT management.

Research Question

Does overall IT governance, the location of the decision authority within an institution, the alignment of priorities across the organization, the organizational strategy

and demographics (i.e., size and public versus private) influence organizational performance?

Hypotheses

Hypothesis 1

H₀: There is not a relationship between IT governance and organizational performance. H_a: Organizational performance will be higher for institutions where IT governance is well defined and effective.

Hypothesis 2

H₀: There is not a relationship between placement of decision authority within an institution and organizational performance, IT governance, and IT alignment. H_a: Organizational performance, IT governance, and IT alignment increases depending on where the decision making authority is placed within the organization.

Hypothesis 3

H₀: There is not a relationship between alignment of priorities and organizational performance. H_a: Organizational performance increases as the alignment of priorities increase.

Hypothesis 4

H₀: There is not a relationship between communication and organizational performance. H_a: Organizational performance increases as communication increases.

Hypothesis 5

H₀: There is not a relationship between organizational strategy and organizational performance. H_a: Organizational performance increases depending on the primary organizational strategy chosen by the organization.

Hypothesis 6

H₀: There is not a relationship between the size of the organization and organizational performance. H_a: Organizational performance increases as the size of the organization increases.

Hypothesis 7

H₀: There is not a relationship between the public versus private types of organization and organizational performance. H_a: Organizational performance will increase for public institutions.

Population

The unit of analysis for this study was higher education institutions. This includes colleges and universities offering 4 year degrees or higher and excluding associate degrees. According to the Carnegie Foundation for the Advancement in Teaching Downloads (2007), there were 1,541 institutions that meet this requirement. In the Carnegie classification file, the setting and classification variable was used to select all four year and professional institutions; only records with a Carnegie classification were included (Carnegie Foundation for the Advancement in Teaching Downloads, 2007). The specific variables and ranges selected were (a) where the sizeset 2005 variable ranges from 6 to 18, (b) CC2000 variable was not equal to -3, and (c) control was not equal to 3.

Private for profits were excluded from the population because they were expected to behave similarly to a business.

The subjects for this study were all Chief Information Officers (CIO) at public and private institutions of higher education four year or more degree granting institutions. Where there was not a CIO titled position, the director of information technology or an equivalent was used. When neither a CIO nor a Director of Information Technology can be located, the survey was sent to the Provost, Financial Officer, or the Chancellor/President, in that order. Participants were asked to forward the name of the appropriate individual or to forward the survey to their designee.

The entire population was surveyed; a sample was not used. The email of the CIOs or other representative for each of the selected institutions was gathered from the Higher Education Directory and a search of websites to complete the contact list. Table 2 contains the distribution of the population size and type of institution. Institutional control information is described in Table 3.

Operationalization of Variables

In this section, the dependent variable(s) and each of the independent variables are described. Details on the operationalization of each of the concepts are discussed.

Organizational Performance

Organizational Performance – Organizational performance was defined as indicators of success that were indicative of meeting the mission and goals of the organization (Division, 1998, p. 18) and specific to the organization (Miller, 2007 , p. 130). For example, in higher education dimensions could include (a) effectiveness, (b)

Table 2

Size and Setting Classification

Classification	<i>f</i>	%
Very small four-year, primarily nonresidential	73	4.7
Very small four-year, primarily residential	56	3.6
Very small four-year, highly residential	154	10.0
Small four-year, primarily nonresidential	118	7.7
Small four-year, primarily residential	168	10.9
Small four-year, highly residential	303	19.7
Medium four-year, primarily nonresidential	147	9.5
Medium four-year, primarily residential	157	10.2
Medium four-year, highly residential	113	7.3
Large four-year, primarily nonresidential	122	7.9
Large four-year, primarily residential	87	5.6
Large four-year, highly residential	32	2.1
Exclusively graduate/professional	11	.7
Total	1541	100.0

Table 3

Type of Institutional Control

Type	<i>f</i>	%
Public	565	36.7
Private not-for-profit	976	63.3
Total	1541	100.0

productivity, (c) quality, (d) customer satisfaction, (e) efficiency, (f) innovation, and (g) financial durability (Miller, p. 130).

The absence in the literature was the ability to demonstrate the value of IT investments in increasing performance and meeting these missions and goals (Henderson & Venkatraman, 1993). Organizational performance was measured through 14 items. Research indicates that measures in this area were inconsistent in higher education (Albrecht et al., 2004). Moreover, when compared subjective measures revealed the same results as objective financial measures (Bergeron & Raymond, 2001, as cited in Gunes et al., 2003). The subjective measures were inspired by and adapted from Gunes et al. and an assimilation of the definition of success in the readings (Miller, 2007; Ward & Hawkins, 2003).

One overall question on organization performance was asked, followed by a series of specific organizational performance questions. Respondents were asked if (a) quantity of services increased, (b) quality of services increased, (c) budgeted dollars increased, (d) customer satisfaction improved, (e) there were improvements compared to peers, (f) if there were improvements compared to peers, (g) if the organizational image improved, (h) new innovative technologies were used, (i) technology is up to date and will scale for several years, (j) project deadlines were met and within budget, (k) staff ratios to faculty and students are appropriate, (l) software and hardware standards are in place, (m) service levels are appropriate, and (n) staff have the appropriate skills to support mission. Respondents rated these items on a scale of one to five indicating agreement. The following values were associated with each scale level (a) five represents strongly agree,

(b) four represents agree, (c) three represents neutral, (d) two represents disagree, and (e) one represents strongly disagree.

IT Governance – Overall

Several facets of IT governance were measured. First, two questions on overall IT governance were asked. The first question asked of respondents whether the institution has a well defined IT governance process. The follow-up question was whether the IT governance process was effective at the participant's institution. These two questions give overall indicators of IT governance processes and effectiveness.

IT Governance – Decision Making

Several measures were used to measure this concept. As indicated by the research (Peterson, 2004; Weill & Ross, 2005), a key component of IT governance is about where the decision making authority is located both organizationally and through a structural process. Respondents were asked who makes the decisions in three primary areas (a) strategies and policies, (b) infrastructure standards and (c) IT expenditures. One overall question on who primarily makes IT decisions was asked of respondents. The choices for each question were (a) Top Leaders (Academic, IT, Financial), (b) Academic Leaders, (c) IT Leaders, (d) Financial Leaders, (e) IT Committees, (f) Faculty Committees, and (g) Committees representing all groups. These questions were inspired from the research done by Weill and Ross (2004).

IT Governance - Alignment

Key to success (Henderson & Venkatraman, 1993; Luftman, 2003; Luftman & Brier, 1999) is the alignment of priorities between IT and the overall organization.

Participants were asked to rate the degree that priorities are aligned across the organization. Respondents rated these items on a scale of one to five indicating agreement. The following values were associated with each scale level (a) five represents strongly agree, (b) four represents agree, (c) three represents neutral, (d) two represents disagree, and (e) one represents strongly disagree.

IT Governance - Communication

Effective communication is key to IT Governance (IT Governance Institute, n.d.; Weill & Ross, 2005). Communication was measured by asking respondents if communication regularly occurs through a variety of methods and to rate their response on a scale of 1 to 5 indicating agreement. The rating of 5 represents strongly agree while a 1 represents strongly disagree.

Organizational Strategy

Organizational strategy was measured using the questions that elicit from respondents the dominant strategy to providing service in their organizations. Three types deduced from the literature are: (a) customer service, (b) innovation, and (c) efficiency (Mintzberg, 1991; Peterson, 2004; Rau, 2004; Treacy & Wiersema, 1993). These were measured by asking participants to rank order the three organizational strategies in their organization. Participants were asked to select their primary organizational strategy. These measures were influenced by the researchers mentioned, but particularly the narrative by Eichen (2006) applying the concepts to university IT.

Demographics

Size

Mintzberg (1980) emphasizes organizational size in understanding the placement of decisions within the organization. Size was included in the study. Size was operationalized by asking the respondents to identify the number of students who were enrolled at their institution.

Public or Private

In the reviewed research (Albrecht et al., 2004) IT Governance was adopted less frequently by private colleges versus public colleges. Respondents were asked whether their institution was private or public and if for profit private.

Instrument

This section reviews the measures that were used in the study. The concept measured is listed in parentheses beside each of the items (see Table 4).

Validity

An important component of research is validity. Validity is described as measuring what the intended to concept or construct (Babbie, 2001). The validity of the survey items was tested by requesting feedback from several CIOs of universities or colleges. Written feedback was requested from the CIOs. The feedback was considered in the final development of the survey instrument.

Table 4

General Description of Measures

Item#	Question	Scale	Concept
1	Overall, IT provided value to my institution.	Strongly Agree (5) to Strongly Disagree (1)	Organizational Performance-Overall
2	There was an increase in the quality of services provided by the IT department in the last year.	Strongly Agree (5) to Strongly Disagree (1)	Organizational Performance
3	There was an increase in the quantity of services provided by the IT department in the last year.	Strongly Agree (5) to Strongly Disagree (1)	Organizational Performance
4	There was an increase in budgeted dollars available to the IT department for projects in the last year.	Strongly Agree (5) to Strongly Disagree (1)	Organizational Performance
5	There was improvement in customer satisfaction with IT in the last year.	Strongly Agree (5) to Strongly Disagree (1)	Organizational Performance
6	There were improvements in the IT provided to my institution compared to peer institutions.	Strongly Agree (5) to Strongly Disagree (1)	Organizational Performance
7	There was an improvement in my IT department's organizational image.	Strongly Agree (5) to Strongly Disagree (1)	Organizational Performance

Table 4

General Description of Measures (continued)

Item#	Question	Scale	Concept
8	New innovative technologies were used to deliver IT services to my institution.	Strongly Agree (5) to Strongly Disagree (1)	Organizational Performance
9	Technology at my institution is up to date and will scale for several years.	Strongly Agree (5) to Strongly Disagree (1)	Organizational Performance
10	Project deadlines were met last year and were within budget.	Strongly Agree (5) to Strongly Disagree (1)	Organizational Performance
11	Staff ratios to faculty and student population are appropriate for my organization.	Strongly Agree (5) to Strongly Disagree (1)	Organizational Performance
12	Software and hardware standards are in place that guide the implementation of technology on my campus.	Strongly Agree (5) to Strongly Disagree (1)	Organizational Performance
13	Service levels that set the expectation of support are in place that is appropriate for the level of staffing in my organization.	Strongly Agree (5) to Strongly Disagree (1)	Organizational Performance

Table 4

General Description of Measures (continued)

Item#	Question	Scale	Concept
14	IT staff in my department have the appropriate skills to support our institutions organizational mission.	Strongly Agree (5) to Strongly Disagree (1)	Organizational Performance
15	Communication regularly occurs from the IT department to the organization through a variety of methods	Strongly Agree (5) to Strongly Disagree (1)	IT governance – Communication
16	My institution has a well defined IT governance process.	Strongly Agree (5) to Strongly Disagree (1)	IT governance Overall
17	The IT governance process at my institution is effective.	Strongly Agree (5) to Strongly Disagree (1)	IT governance Overall
18	Overall, who makes the decisions that govern IT?	Leader of the Institution, Top Leaders (Academic, IT, Financial), Academic Leaders, IT Leaders, Financial Leaders, IT Committees, Faculty Committees, Committees representing all of these groups	IT governance – Decision Making-Overall

Table 4

General Description of Measures (continued)

Item#	Question	Scale	Concept
19	Who primarily makes the decisions that govern IT strategies and policy?	Leader of the Institution, Top Leaders (Academic, IT, Financial), Academic Leaders, IT Leaders, Financial Leaders, IT Committees, Faculty Committees, Committees representing all of these groups	IT governance – Decision Making
20	Who primarily makes the decisions that govern IT infrastructure standards?	Leader of the Institution, Top Leaders (Academic, IT, Financial), Academic Leaders, IT Leaders, Financial Leaders, IT Committees, Faculty Committees, Committees representing all of these groups	IT governance – Decision Making

Table 4

General Description of Measures (continued)

Item#	Question	Scale	Concept
19	Who primarily makes the decisions that govern IT expenditures?	Leader of the Institution, Top Leaders (Academic, IT, Financial), Academic Leaders, IT Leaders, Financial Leaders, IT Committees, Faculty Committees, Committees representing all of these groups	IT Governance – Decision Making
21	IT priorities are aligned with institutional priorities (i.e., institutional mission, strategic plan).	Strongly Agree (5) to Strongly Disagree (1)	IT Governance – alignment
22	IT priorities are tracked to understand value and resources expended.	Strongly Agree (5) to Strongly Disagree (1)	IT Governance – alignment
23	Providing the most services at the lowest cost is important to the IT organization on my campus.	Strongly Agree (5) to Strongly Disagree (1)	Organizational Strategy
24	Creating positive customer relationships with one to one service and unique tools is important to the IT organization on my campus.	Strongly Agree (5) to Strongly Disagree (1)	Organizational Strategy

Table 4

General Description of Measures (continued)

Item#	Question	Scale	Concept
25	Developing innovative tools to deliver services is important to the IT organization on my campus.	Strongly Agree (5) to Strongly Disagree (1)	Organizational Strategy
26	Rank order the following three strategies in order of importance. *Service – creating long term customer relationships *Efficiency – providing the most services for the lowest cost *Innovation- developing and implementing new applications and methods	Rank 1 to 3	Organizational Strategy
27	What is the size of your student population?	Less than 5,000 5,000-10,000 10,000-20,000 20,000-30,000 Over 30,000	Size
28	Is your institution public or private?	Public or Private (profit or non profit)	Institutional Control
29	Please indicate what best describes your position.	CIO IT Leader Financial Leader Academic Leader President or Chancellor Other (Please Specify)	

Table 4

General Description of Measures (continued)

Item#	Question	Scale	Concept
30	Any thoughts you would like to communicate to the researcher?		

Reliability

Reliability is generally defined as being able to consistently measure a concept or achieving the same result through replication (Babbie, 2001). Since this instrument is new, reliability was deduced from (a) consistency with the literature and (b) statistical consistency. Regarding statistical consistency, the dependent variable was examined for internal consistency, which is a correlation between individual items and groups of items. This was measured using the Chronbach alpha statistic. High levels of internal consistency are indicated by a Chronbach alpha $\geq .7$. The internal consistency measure indicates the items all appear to be measuring the same concept. As explained in greater detail in the data analysis section, this concept was applied to all scale or scales used in the study.

Survey

Survey data were collected using a web survey tool. Perseus a web survey tool, freely available at East Carolina University, was used for data collection. A modified form of Dillman's (2007) tailored design method for electronic surveys was used. The major advantage to an email survey was cost (Dillman). The normal concerns related to web surveys are lack of computer ownership and computer literacy (Dillman). Neither of these concerns apply to a survey of CIOs.

The survey distribution method available within the Perseus application distributes surveys based on calendar dates and only resends surveys to the email addresses that have not responded. In order to do this, the application does store email addresses. However, as a researcher, the choice was made not to view the identity of

respondents. The researcher had sole access to the data while in Perseus. Once the survey was completed, the data was downloaded to the researcher's computer without identifiers and permanently removed from the university server.

The collection of data required the following steps:

Step 1 - A personal email, serving as the cover letter was mailed to the CIOs or representative of each of the selected institutions letting them know the organization has been selected for the research study. The purpose of the study was described. CIOs were asked to fill out the survey or (a) forward the survey to their designee for completion or (b) send the name of their designee and the survey would be resent to the designee. A copy of the letter is found in Appendix A. The contents of the survey can be found in Appendix B. In the event they were concerned about confidentiality, they had the option to receive alternative instructions to print out and mail their survey if they so desired (Dillman, 2007). The initial email invitation was sent on January 16, 2008.

Step 2- Respondents received a reminder to fill out the survey on January 22, 2008. A link to the survey was included in the reminder (Dillman, 2007). Only respondents who have not filled out the survey received the follow-up email.

Step 3 - Respondents who had not filled out the survey received a second reminder on January 28, 2008. A link to the survey was included in the reminder (Dillman, 2007). Only respondents who had not filled out the survey received the follow-up email.

Step 4 – The last reminder was sent on January 30, 2008. A link to the survey was included in the reminder (Dillman, 2007). Only respondents who had not filled out the

survey received the follow-up email. The survey instrument was closed on February 1, 2008.

Data Analysis

Statistical analysis of the study was conducted using SPSS, a statistical software package. The data from Perseus were imported into SPSS. Basic frequencies, descriptive statistics, graphs and plots were used to understand the data. Using these methods the data was cleaned and checked for data anomalies and errors.

Data Reduction and Scales

The study had the possibility of yielding several scales based on the results of the study. To determine if there was more than one scale, factor analysis with varimax rotation was used to analyze the 14 items. Thresholds guiding the analysis were eigenvalues over 1 and factor scores greater than .3. Factors that met these requirements were used to create the scales. Reliability analysis using Chronbach's alpha was used to measure the internal consistency of the measures. A Chronbach's alpha $> .7$ indicates internal consistency of the items.

Using the same techniques and thresholds, the two IT alignment items were tested to determine if they create one measure of IT alignment. Similarly, if IT governance effectiveness items have a chronbach's alpha $> .7$, then the two items were summed to create one overall measure.

In the next section, the data analyses for each of the hypotheses are discussed in detail.

Hypothesis 1

H₀: There is not a relationship between IT governance and organizational performance. H_a: Organizational performance will be higher for institutions where IT Governance is well defined and effective.

Well Defined IT Governance

A Pearson's correlation matrix was calculated to determine if IT organizational performance increases as the Well Defined IT governance variable increases. The analysis was performed on each organizational performance scale.

It was expected that as IT organizational performance scale(s) increase, so does the Well Defined IT governance variable. This was indicated by a $p \leq .05$, and a positive correlation r value. The strength of the relationship was determined by using .6 or greater as a threshold to indicate a strong relationship.

Effective IT Governance

A Pearson's correlation was calculated to determine if IT organizational performance increases as the IT governance effectiveness variable increases. The analysis was performed on each organizational performance scale.

It was expected that as IT organizational performance scale(s) increases, so will the IT governance effectiveness variable. This was indicated by a $p \leq .05$, and a positive correlation r value. The strength of the relationship was determined by using .6 or greater as a threshold to indicate a strong relationship.

Hypothesis 2

H₀: There is not a relationship between placement of decision authority within an institution and organizational performance, IT governance, and IT alignment. H_a: Organizational performance, IT governance, and IT alignment increases depending on where the decision making authority is placed within the organization.

A series of one way analysis of variance tests were performed to determine if IT organizational performance variable(s), IT governance, and IT alignment increase depending on the type of decision and authority placement within the university. This was indicated by a $p \leq .05$. The analysis was performed on each organizational performance scale.

Overall IT Decision Making

It was expected that the dependent variable IT organizational performance, IT governance, and IT alignment was higher if the overall decision making authority was located with a cross section of the top leaders. This was indicated by $p \leq .05$ for the test.

Decision Making IT Strategy and Policy

It was expected that the dependent variable IT organizational performance, IT governance, and IT alignment was higher if the IT strategy and policy decision making authority was located with a cross section of top leaders. This was indicated by $p \leq .05$ for the test.

Decision Making IT Architecture and Standards

It was expected that the dependent variable IT organizational performance, IT governance, and IT alignment was higher if the IT Architecture and Standards making

authority was located with IT Leaders. This was indicated by $p \leq .05$ for the test.

Decision Making IT Expenditures

It was expected that the dependent variable IT organizational performance, IT governance, and IT alignment was higher if the IT expenditure decision making authority was located with a cross section of top leaders. This was indicated by $p \leq .05$ for the test.

Hypothesis 3

H_0 : There is not a relationship between alignment of priorities and organizational performance. H_a : Organizational performance increases as the alignment of priorities increase.

A Pearson's correlation matrix was calculated to determine if IT organizational performance increases as the alignment variable(s) increase. The analysis was performed on each organizational performance scale and the alignment scale. Significance was indicated by a $p \leq .05$, and a positive correlation r value. The strength of the relationship was determined by using .6 or greater as a threshold to indicate a strong relationship.

Hypothesis 4

H_0 : There is not a relationship between communication and organizational performance. H_a : Organizational performance increases as communication increases.

A Pearson correlation was examined to determine if organizational performance scale(s) increase as communication increases. Significance was indicated by, a $p \leq .05$ was expected. A strong relationship was indicated by a Pearson $r \geq .6$.

Hypothesis 5

H₀: There is not a relationship between organizational strategy and organizational performance. H_a: Organizational performance increases depending on the primary organizational strategy chosen by the organization.

The hypothesis was tested by examining the organizational performance scale(s) and organizational strategy variables in a correlation matrix. A separate oneway analysis of variance test was performed with the organizational performance scale(s) as dependent variable(s). The organizational strategy variable where individuals rank their primary strategy was recoded into one variable, where your primary strategy was the data point.

Hypothesis 6

H₀: There is not a relationship between the size of the organization and organizational performance. H_a: Organizational performance increases as the size of the organization increases.

A oneway analysis of variance was performed to test this hypothesis. A $p < .05$ indicates significance.

Hypothesis 7

H₀: There is not a relationship between the public versus private types of the organization and organizational performance. H_a: Organizational performance will increase for public institutions.

This hypothesis was tested using a oneway analysis of variance with organizational performance scale(s) as the dependent variable and the public versus

private variable as the independent variable. Significance was indicated by a $p \leq .05$ and a higher mean value for the public category.

Institutional Review Board (IRB) Approval

IRB approval was obtained through the exempt program since human subjects are not put in jeopardy and sensitive data was not involved (see Appendix D).

RESULTS

This chapter discusses the findings of this study. This chapter is organized in the following sections: (a) purpose of the study, (b) research question, (c) data collection, (d) demographics, (e) data reduction and reliability, (f) data analysis by hypothesis, and (g) summary of each hypothesis.

Purpose Statement

The purpose of this study of public and private institutes of higher education was to examine whether (a) overall Information Technology (IT) governance, (b) decision making placement in the organization, (c) alignment of priorities, (d) communication, and (e) organizational strategy influence perceived organizational performance. The influence of demographics such as size and public versus private were examined. As part of this research study, measures of organizational performance and measures in other conceptual areas were developed. The research project was distributed to a national sample of Chief Information Officers (CIOs) and/or to the responsible administrator at higher education colleges and universities. The research will aid higher education administrators in understanding the impact of these practices in higher education IT management.

Research Question

The following research question was addressed by the study:

Does overall IT governance, the location of the decision authority within an institution, the alignment of priorities across the organization, the organizational strategy and demographics (i.e., size and public versus private) influence organizational performance?

Data Collection

The electronic version of the Higher Education Directory, also known as the Red Book, was purchased. The directory contains name, email, and phone numbers of administrators in leadership positions at universities and colleges in the United States. Email address from 1,492 of the 1,541 universities and colleges selected were found. If a CIO was not listed, then the highest ranking IT administrator was selected. If not found then, either an academic, financial, or president position was selected. Where an email address was not listed, then a search of the institutions web site was conducted. In some cases, this did not yield an address. In a few cases, institutions did not have a website. These institutions were removed from the study reducing the number of institutions to 1,492.

The survey was created in Perseus and tested extensively to ensure data inputs worked as anticipated. On January 16, 2008, the initial survey invitations were distributed. Initially, 123 of the emails were returned. Since email returns were so dependent on the variety of systems used and email returns can take place over long spans of time, this number has no impact on response rate calculation. The web sites of the returned email respondents were searched to replace the selected participant. As requested in the initial invitation, if the selected participant was not the appropriate contact at the institution, they responded to the email with the appropriate contact. When this occurred, the original participant was removed from the participant list and the new participant added. The first reminder was sent on January 22, 2008. The 2nd reminder was sent on January 28th. The final reminder was sent on January 30th. The survey was closed

on February 1st. The final number of completed questionnaires was 433. Eight incomplete questionnaires were removed. The response rate of the survey was $433-8/1492=29\%$.

The (N=425) data was exported to SPSS 15 and downloaded from the Perseus server. Once downloaded, the email address of the individuals who were interested in receiving a copy of the results were separated into a separate file to remove any name linkages. The next section discusses the overall demographics of the study.

Demographics

Frequencies were calculated on the size and institutional type variable to compare to the Carnegie file data. Table 5 contains the results. Several (N=10) respondents, selected private for profit as the instrument type on the instrument. The selection of the category by the respondents was assumed to have been an oversight. These 10 cases were grouped with institutions that were listed as private. Frequencies were calculated on the population and the study results for institution type and size of the institution. These results are displayed in Table 5 and Table 6. The frequencies for type of institution appear to be representative of the population. There was less than 1% difference in public institutions in the population and the study and 1.1% difference between private institutions in the population and the study. A chi-square analysis was calculated using weighted data and there was not a significant difference $\chi^2 (1, N=425) = .138, p=.71$. Similarly, in Table 6 the size of the institution frequencies and percentages of the population to the study were compared and the differences were less than 5% across each of the size categories. The study data for size of institution indicates the data collected were similar to the population of study $\chi^2 (4, N=425) = .624, p=.18$. The survey

Table 5

Type of Institutional Control Population and Study Comparison

Type	Population		Study	
	<i>f</i>	<i>%</i>	<i>f</i>	<i>%</i>
Public	565	36.7	160	37.6
Private not-for-profit	976	63.3	265	62.4
Total	1541	100.0	425	100.0

Table 6

Size Population and Study Comparison

Type	Population		Study	
	<i>f</i>	<i>%</i>	<i>f</i>	<i>%</i>
Less than 5,000	1002	65	256	60.2
5,000-10,000	234	15.2	73	17.2
10,000-20,000	183	11.9	53	12.5
20,000-30,000	85	5.5	25	5.9
Over 30,000	37	2.4	18	4.2
Total	1541	100.0	425	100.0

respondents were primarily CIOs 56.7% and IT leaders 28.5%. Financial leaders 6.4% (27), Academic leaders 4.7%, Presidents .9% and other roles 2.8% consisted of 13.8 % of the total respondents.

The primary decision maker that governs IT consisted of top leaders (43.8 %), IT leaders (38.4%), and committees (7.5%) representing all of these groups. The primary decision maker of strategies and policy consisted of top leaders (36%), IT leaders (41.9%), IT committees (7.5%), and committees representing all of these groups (9.4%). The primary decision maker of IT infrastructure standards consisted of IT leaders (80.9%) and top leaders (12.7%). The primary decision maker of IT expenditures consisted of IT leaders (40.9%), and of top leaders (40.5%), and financial leaders (7.5%). The categories leader of the institution, financial leader, academic leader, faculty committees, and IT committees consistently yielded a lower % of the responses.

To effectively analyze the data, the four decision making variables were collapsed into three categories: (a) IT leaders, (b) top leaders (academic, IT, financial), and (c) other. The percentage distributions of the new variables are displayed in Table 7.

Respondents were asked to rate the three strategies, (a) service, (b) efficiency, and (c) innovation from 1 to 3. To create one variable that represented primary strategy, the number one strategy of each variable was calculated. The result was one strategy variable that represents the value ranked as the most important to the respondents. Service was rated first by 62.8% of the respondents, efficiency by 30.4%, and innovation by 6.1%. There were three missing values due to respondents that rated more than one item the same value (N=423).

Table 7

Decision Making Variables

	<i>f</i>	<i>%</i>
Primary decision maker to govern IT		
IT Leader	163	38.4
Top Leaders	186	43.8
Other	76	17.9
Total	425	100.0
Primary decision maker to govern IT strategies and policy		
IT Leader	178	41.9
Top Leaders	153	36
Other	94	22.1
Total	425	100.0
Primary decision maker to govern IT infrastructure standards		
IT Leader	344	80.9
Top Leaders	54	12.7
Other	27	6.4
Total	425	100.0

Table 7

Decision Making Variables (continued)

	<i>f</i>	<i>%</i>
Primary decision maker to govern IT expenditures		
IT Leader	174	40.9
Top Leaders	172	40.5
Other	79	18.6
Total	425	100.0

Data Reduction and Reliability

Fourteen performance variables were asked of respondents. The performance variables were measured using a 5 item Likert scale. All items were transformed so (a) 5=Strongly Agree, (b) 4=Agree, (c) 3=Neutral, (d) 2=Disagree, and (e) 1=Strongly Disagree. The greater the value the greater the agreement for each item. A factor analysis using principle components analysis and varimax rotation was calculated using the fourteen performance items to reduce the items into one or multiple scales. Four factors were extracted with eigenvalues over the value of 1 (see Table 8). The four extracted factors explain 59.88% of the variance. Factor loadings for each component of .3 or higher were produced using varimax with kaiser normalization. In some cases, loadings of greater than .3 were produced for more than one factor. The highest loading for each factor was not always selected, because in some cases it did not make sense (see Table 9).

Factor 1 consists of items that represent IT operational performance. These items include (a) technology is up to date and will scale for several years, (b) project deadlines were met and within budget, (c) staff ratios to faculty and students are appropriate, (d) software and hardware standards are in place, (e) service levels are appropriate, and (f) IT staff have the appropriate skills to support the mission. Factor 2 and Factor 3 consists of items loaded on both factors. The items that represent IT general and IT performance are selected to create a scale. These items include, (a) quality of services, (b) improved customer satisfaction, (c) improved departmental image, (d) increase in quantity of services, and (e) increase in performance compared to peers. The two items (a) IT funding increased and (b) innovative technology used to deliver services were examined

Table 8

Item 1 – 14 Performance Variables

<u>Component</u>	<u><i>Eigenvalue Total</i></u>	<u>% of Variance</u>	<u>Cumulative Variance</u>
1	4.456	31.82	31.82
2	1.645	11.75	46.58
3	1.212	8.65	52.23
4	1.070	7.64	59.88

Table 9

Item 1 – 14 Performance Variables Rotated Factor Matrix Factor Loadings

Item	Factor Loadings			
	1	2	3	4
1. Overall, IT provided value to my institution			.671	
2. Increase in quality of services		.727	.347	
3. Increase in the quantity of services		.400	.584	
4. Increase in budgeted dollars				.856
5. Improvement in customer satisfaction		.852		
6. Improvements in IT compared to peers		.394	.479	
7. Improvement in IT organizational image		.812		
8. New innovative technologies were used			.759	
9. Technology is up to date and will scale for several years	.566		.538	
10. Project deadlines were met and within budget	.454			
11. Staff ratios to faculty and students are appropriate	.645			.446
12. Software and hardware standards are in place	.635			
13. Service levels are appropriate	.786			
14. IT staff have the appropriate skills to support mission	.640			-.322

individually. The variable, overall did IT provide value to your institution, resulted in 98.6% agreement from respondents and was not examined due to lack of variation. Table 10 contains means and standard deviations of the 14 organizational performance items.

Reliability analysis using cronbach alpha was conducted for each of the two performance scales to understand the internal consistency of the variables for each scale. IT operational performance had strong reliability ($\alpha = .737$). IT general performance had strong reliability ($\alpha = .795$). For each scale, all items were summed together to create one variable. The descriptive statistics for each of the performance areas were computed: (a) IT operational performance (M=20.4, SD=3.9), (b) IT general performance (M=11.4, SD=2.09), (c) IT funding performance (M=6.7, SD=1.8), and (d) innovative technology services (M=3.79, SD=.88) (see Table 11).

Factor analysis, using principal components analysis and varimax rotation, was conducted on the two alignment variables: (a) IT priorities are aligned with institutional priorities (rotated factor score = .764) and (b) IT priorities are tracked (rotated factor score=.764). One eigenvalue (1.57) over the value of 1 was produced with 76.3% of the variance accounted for with the factor. Reliability analysis was calculated using the cronbach statistic. The reliability statistic was marginally acceptable ($\alpha = .687$). One alignment scale was created by summing the two items (M=7.37, SD=1.58).

Factor analysis, using principal components analysis and varimax rotation, was conducted on the two IT governance variables: (a) institution has a well defined IT governance process (rotated factor score =.874) and (b) IT governance process is

Table 10

Organizational Performance Means and Standard Deviations

Item	M	SD
1. Overall, IT provided value to my institution	4.75	.516
2. Increase in quality of services	4.14	.787
3. Increase in the quantity of services	4.14	.795
4. Increase in budgeted dollars	3.10	1.193
5. Improvement in customer satisfaction	3.63	.826
6. Improvements in IT compared to peers	3.56	.820
7. Improvement in IT organizational image	3.65	.850
8. New innovative technologies were used	3.79	.869
9. Technology is up to date and will scale for several years	3.51	1.030
10. Project deadlines were met and within budget	3.71	.887
11. Staff ratios to faculty and students are appropriate	2.63	1.125
12. Software and hardware standards are in place	3.73	.932
13. Service levels are appropriate	3.10	1.022
14. IT staff have the appropriate skills to support mission	3.73	.911

Note. N=425.

Table 11

Hypothesis 1: Organizational Performance Means and Standard Deviations

	<i>M</i>	<i>SD</i>
IT Operational Performance	20.4	3.9
IT General Performance	11.4	2.09
IT Funding Performance	6.7	1.8
Innovative Technology	3.79	.88

effective (rotated factor score = .874). One eigenvalue (1.71) over the value of 1 was produced with 85.4% of the variance accounted for with the factor. Chronbach alpha was calculated and indicates strong reliability ($\alpha = .829$). One IT governance scale was created by summing the two items ($M=6.69$, $SD=1.81$).

Data Analysis of Hypothesis 1

H_0 : There is not a relationship between IT governance and organizational performance. H_a : Organizational performance will be higher for institutions where IT Governance is well defined and effective.

Pearson's correlation for the performance variables and the IT governance scale was calculated. IT operational performance increases as IT governance increases ($r=.494$, $p<.001$). The relationship was significant and moderately strong. IT general performance increases as IT governance increases ($r=.268$, $p=.001$). The relationship was significant; however, it is a weak relationship. Funding performance increases as governance increases ($r=.104$, $p=.032$), the relationship is very weak, although significant. The innovative delivery of services increases as IT governance increases ($r=.207$, $p=.001$), the relationship was weak, although significant. The results of hypothesis 1 are summarized in Table 12.

Data Analysis of Hypothesis 2

H_0 : There is not a relationship between placement of decision authority within an institution and organizational performance, IT governance, and IT alignment. H_a : Organizational performance, IT governance, and IT alignment increases depending on where the decision making authority is placed within the organization.

Table 12

Hypothesis 1: IT Governance and Organizational Performance Pearson Correlations

	IT Governance
IT Operational Performance	r=.494**
IT General Performance	r=.268**
IT Funding Performance	r=.104*
Innovative Technology	r=.207**

Note. *p<.01; **p<.001.

Analysis of variance was conducted on each of the organizational performance dependent variables, the IT governance and IT alignment scales, and with each of the primary decision making authority variables as the independent variable.

Overall Primary Decision Making Authority

The analysis of variance test with operational performance as the dependent variable indicated the effect of primary decision making authority was significant, $F(2,424) = 4.433$, $p = .012$. Post hoc analysis using Least Significant Difference (LSD) tests indicated the mean difference of IT operational performance was significantly higher for top leaders ($M = 21.03$, $SD = 3.75$) than where IT leaders were the primary decision maker ($M = 19.8$, $SD = 3.8$), $p = .004$. The effect of primary decision making authority on general IT performance was significant, $F(2,424) = 3.98$, $p = .019$. LSD post hoc analysis indicated the mean difference of general IT performance was significant when top leaders ($M = 11.7$, $SD = 1.9$) were the primary decision makers compared to when IT leaders were the primary decision makers ($M = 11.07$, $SD = 2.25$), $p = .005$. The effect of primary decision making authority on IT funding performance was not significant, $F(2,424) = 1.024$, $p = .360$. The primary decision making authority effect on innovative delivery of service performance was significant, $F(2,424) = 3.9$, $p = .004$. LSD post hoc tests ($p = .006$) indicate performance significantly increases when top leaders ($M = 3.9$, $SD = .898$) were the primary decision making authority compared to IT leaders ($M = 3.9$, $SD = .97$).

Analysis of variance test examining the effect of primary decision authority and IT governance was significant, $F(2,424) = 8.7$, $p < .001$. Post hoc LSD tests indicate IT

governance was significantly higher when top leaders ($M=7.07$, $SD=1.68$, $p<.001$) were the primary decision making authority compared to IT leaders ($M=6.28$, $SD=1.8$).

Primary decision making authority had a significant effect on IT alignment, $F(2,424)=5.6$, $p=.004$. Post hoc LSD tests indicate when top leaders ($M=7.6$, $SD=1.5$, $p=.001$) were the primary decision maker IT alignment was significantly higher when compared to IT leaders ($M=7.07$, $SD=1.51$).

Primary Decision Making Authority of Strategy

The analysis of variance test with IT operational performance as the dependent variable indicated the effect of primary decision making authority over strategy was significant, $F(2,424) =5.2$, $p=.006$. Post hoc analysis using Least Significant Difference (LSD) tests indicated the mean difference of operational was higher when top leaders ($M=21.09$, $SD=3.8$) were the primary strategy decision maker compared to when IT leaders were the primary decision maker ($M=19.7$, $SD=3.9$), $p=.004$. The effect of primary strategy decision making authority on general IT performance was not significant, $F(2,424) =1.7$, $p=.185$. The effect of primary decision strategy making authority on IT funding performance was not significant, $F(2,424) =1.5$, $p=.215$.

The primary strategy decision making authority effect on innovative IT delivery of service performance was significant, $F(2,424) =3.5$, $p=.03$. LSD post hoc tests ($p=.009$) indicate significant performance increases when top leaders ($M=3.9$, $SD=.79$) were the primary strategy decision making authority compared to IT leaders ($M=3.6$, $SD=.94$) An analysis of variance test examining the effect of primary strategy decision authority and IT governance was significant, $F(2,424) =9.5$, $p<.001$. Post hoc LSD tests

indicate IT governance was significantly higher when top leaders ($M=7$, $SD=1.7$, $p<.001$) and other groups such as committees and other leaders ($M=7.0$, $SD=1.8$, $p=.001$) make the primary strategy decisions compared to IT leaders ($M=6.3$, $SD=1.8$). Primary strategic decision making authority did not have a significant effect on IT alignment, $F(2,424) = 2.67$, $p=.071$.

Primary Decision Making Authority of IT Infrastructure

The analysis of variance test with IT operational performance as the dependent variable indicated the effect of primary decision making authority over IT infrastructure was significant, $F(2,424) = 3.2$, $p=.039$. Post hoc analysis using Least Significant Difference (LSD) tests indicated the mean difference of IT operational performance was significantly higher when top leaders ($M=21.65$, $SD=4.5$) were the primary strategy decision maker compared to when IT leaders were the primary decision maker ($M=20.2$, $SD=3.7$), $p=.011$. The effect of primary IT infrastructure decision making authority on general IT performance was not significant, $F(2,424) = .481$, $p=.619$. The effect of primary decision IT infrastructure making authority on IT funding performance was not significant, $F(2,424) = .436$, $p=.647$. The primary strategy decision making authority effect on innovative delivery of service performance was significant, $F(2,424) = 4.98$, $p=.007$. LSD post hoc tests ($p=.005$) indicate performance significantly increases when top leaders ($M=4.1$, $SD=.79$) are the primary IT infrastructure decision making authority compared to IT leaders ($M=3.75$, $SD=.88$). The primary decision authority on IT infrastructure had a significant effect on IT governance, $F(2,422) = 5.7$, $p=.004$. Post hoc LSD tests indicated mean IT governance scores were significantly higher when top

leaders ($M=7.22$, $SD=1.81$, $p=.012$) and other groups ($M=7.44$, $SD=1.9$, $p=.014$) were the primary IT infrastructure decision maker compared to IT leaders ($M=6.55$, $SD=1.64$). IT infrastructure decision making authority placement did not have a significant effect on IT alignment, $F(2,424) = 1.7$, $p=.186$.

Primary Decision Making Authority of IT Expenditures

Analysis of variance tests with the performance variables as the dependent variables indicated the primary decision making authority of IT expenditures did not have a significant effect on (a) IT operational performance, $F(2,424)=1.7$, $p=.176$, (b) general IT performance, $F(2,424) = .518$, $p=.596$, (c) IT funding performance $F(2,424)=2.24$, $p=.107$ and (d) innovative technology performance, $F(2,424)=1.29$, $p=.277$. Primary decision making authority for IT expenditures did not have a significant effect on IT governance, $F(2,424) = .559$, $p=.572$. Similarly, there was not a significant effect on IT alignment, $F(2, 242)=.680$, $p=.507$.

Data Analysis of Hypothesis 3

H_0 : There is not a relationship between alignment of priorities and organizational performance. H_a : Organizational performance increases as the alignment of priorities increase.

Pearson's correlations for the performance variables and the IT alignment scale were calculated. Operational performance significantly increases as IT alignment increases ($r=.559$, $p<.001$). The relationship was moderately strong. General IT performance significantly increased as IT alignment increases ($r=.437$, $p<.001$). The relationship was moderately strong. Funding performance significantly increases as

governance increases ($r=.193$, $p>.001$), the relationship was weak. The innovative delivery of services significantly increases as IT alignment increases ($r=.346$, $p=.001$), the relationship was moderately strong. The results of hypothesis 3 are summarized in Table 13.

Data Analysis of Hypothesis 4

H_0 : There is not a relationship between communication and organizational performance. H_a : Organizational performance increases as communication increases.

Pearson's correlation for the performance variables and the IT communication variable were calculated. Operational performance significantly increases as IT communication ($r=.433$, $p<.001$) increases. The relationship was moderate. General IT performance significantly increases as IT communication increases ($r=.388$, $p<.001$). The relationship was moderately strong. There was not a significant increase in IT funding performance if communication increases ($r=.065$, $p>.182$). The innovative delivery of services significantly increases as IT communication increases ($r=.274$, $p=.001$), the relationship was not strong. The results of hypothesis 3 are summarized in Table 14.

Data Analysis of Hypothesis 5

H_0 : There is not a relationship between organizational strategy and organizational performance. H_a : Organizational performance increases depending on the primary organizational strategy chosen by the organization.

Analysis of variance was calculated to examine the effect of primary organizational strategy on the four IT performance variables. Primary organizational strategy had a significant effect on IT operational performance, $F(2,421) = 13.56$,

Table 13

Hypothesis 3: IT Alignment and Organizational Performance Pearson Correlations

	IT Alignment
IT Operational Performance	r=.559**
IT Customer Satisfaction Performance	r=.437**
IT Funding Performance	r=.193*
Innovative Technology	r=.346**

Note. *p<.01; **p<.001.

Table 14

Hypothesis 4: IT Communication and Organizational Performance Pearson Correlations

	IT Communication
IT Operational Performance	r=.433**
IT Customer Satisfaction Performance	r=.388**
IT Funding Performance	r=.065
Innovative Technology	r=.274**

Note. *p<.01; **p<.001.

$p \leq .001$. LSD post hoc tests indicate IT operational performance was significantly higher for institutions that selected service ($M=21.04$, $SD=3.6$, $p < .001$) and innovation ($M=21.2$, $SD=5.4$, $p = .006$) when compared to institutions that selected efficiency ($M=18.99$, $SD=3.8$) as the primary strategy.

Primary organizational strategy had a significant effect on general IT performance, $F(2,421) = 10.02$, $p \leq .001$. LSD post hoc tests indicated general IT performance was significantly higher for institutions that selected service ($M=11.8$, $SD=1.9$) as their primary strategy when compared to institutions that selected efficiency ($M=10.9$, $SD=2.1$, $p \leq .001$) and innovation ($M=10.65$, $SD=3.2$, $p = .009$).

Primary organizational strategy had a significant effect on IT funding performance, $F(2,421) = 3.16$, $p = .043$. LSD post hoc tests indicated IT funding performance significantly increases for institutions who selected service ($M=3.2$, $SD=1.9$, $p = .04$) and innovation ($M=3.4$, $SD=1.2$, $p = .041$) as their primary organizational strategy as compared to efficiency ($M=2.9$, $SD=1.6$).

Primary organizational strategy had a significant effect on IT innovative services performance, $F(2,421) = 5.8$, $p \leq .003$. LSD post hoc tests indicated IT innovative services performance was significantly higher for institutions that selected service ($M=3.87$, $SD=.79$, $p < .001$) and innovation ($M=3.96$, $SD=1.14$, $p = .037$) as their primary strategy when compared to efficiency ($M=2.57$, $SD=.93$).

Pearson's correlation of the three IT strategy likert items and the four organizational performance variables were examined. The IT strategy likert items include (a) providing the most services for the lowest cost is important (efficiency strategy), (b)

creating positive customer relationships with one to one service and unique tools is important (service strategy), and (c) developing innovative tools to deliver services is important (innovation strategy). There was not a significant relationship between IT operational performance and efficiency ($r=.076$, $p=.119$). There is a significant relationship between IT operational performance and service strategy ($r=.355$, $p<.001$). As IT operational performance increases, service strategy increased. The relationship was moderately significant. There was a significant relationship between IT operational performance and innovation strategy ($r=.299$, $p<.001$). The relationship was not strong.

There was a relationship between general IT performance and the efficiency strategy ($r=.211$, $p<.001$). As general IT performance increases, so does the innovation strategy ($r=.299$, $p<.001$). The relationship was not strong.

There was a significant relationship between general IT performance and both the service strategy ($r=.389$, $p<.001$) and the innovation strategy ($r=.317$, $p<.001$). As general IT performance increases, so did the service and innovation strategy identification. Both of these relationships were moderately strong.

There was not a relationship between IT funding performance and the three IT strategies: (a) efficiency ($r=-.055$, $p=.255$), (b) service ($r=.045$, $p=.358$), and (c) innovation ($r=.033$, $p=.499$).

There was a significant positive relationship between IT innovative performance and efficiency ($r=.131$, $p=.007$) although the relationship is weak. As IT innovative performance increased, so did efficiency. There was a positive significant relationship between IT innovation performance and service ($r=.277$, $p<.001$). As IT innovation

performance increased, so did identification with the service strategy. The relationship was not strong. Similarly, IT innovation performance significantly increased as the innovation strategy increased ($r=.421$, $p<.001$). The relationship was moderate. Pearson correlations are shown in Table 15.

Data Analysis of Hypothesis 6

H_0 : There is not a relationship between the size of the organization and organizational performance. H_a : Organizational performance increases as the size of the organization increases.

The size variable was collapsed into three categories to provide a: (a) small, (b) medium, and (c) large grouping. Less than 5,000 was grouped as small; 5,001-20,000 was grouped as medium; and above 20,000 was grouped as large. The new size categories resulted in 60.2% of the institutions were small, 30% are medium, and 10% are large. Analysis of variance tests were calculated with the performance variables as the independent variables to examine the effect of institution size. Institutional size did not have a significant effect on operational performance, $F(2,424) = 2.414$, $p=.091$. Institutional size did have a significant effect on general IT performance, $F(2, 424) = 7.523$, $p=.001$. LSD post hoc tests indicated small ($M=11.1$, $SD=2.25$, $p=.001$) and medium institutions ($M=11.9$, $SD=1.7$) were significantly higher on general IT performance. There was a significant difference between size and IT funding, $F(4,424) = 4.09$, $p=.001$ and innovative performance, $F(4,424)=4.024$, $p=.01$. For IT funding performance, the differences were between small ($M=3.05$, $SD=1.15$, $p=.049$) and medium ($M=3.03$, $SD=1.21$) and medium and large schools ($M=2.27$, $SD=1.32$, $p=.007$).

Table 15

Hypothesis 5: IT Strategy and Organizational Performance Pearson Correlations

	Efficiency	Service	Innovation
IT Operational Performance	r=.076	r=.355**	r=.299**
General IT Performance	r=.211**	r=.389**	r=.317**
IT Funding Performance	r=-.055	r=.045	r=.033
Innovative Technology	r=.131**	r=.277**	r=.421**

Note. *p<.01; **p<.001.

Medium size schools were significantly higher on IT funding performance compared to small and large schools. Innovative performance was higher for medium ($M=3.9$, $SD=.73$, $p=.006$) schools compared to small ($M=3.7$, $SD=.94$).

Data Analysis of Hypothesis 7

H_0 : There is not a relationship between the public versus private types of the organization and organizational performance. H_a : Organizational performance will increase for public institutions.

Analysis of variance tests were calculated for the four IT operational performance variables to test the effect of institution type. Since there were only two categories, post hoc tests were not necessary to understand significant differences. IT operational performance did not significantly differ for private and public institutions. Institution type had a significant effect on general IT performance, $F(1, 424) = 4.57$, $p=.033$. Public institutions ($M=11.7$, $SD=2.01$) had significantly higher general IT performance compared to private institutions ($M=11.25$, $SD=2.11$). Institution type had a significant effect on IT funding performance, $F(1,424) = 10.28$, $p=.001$. Private institutions ($M=3.2$, $SD=1.17$) indicated a significantly higher mean score on IT funding performance when compared to public institutions ($M=2.9$, $SD=1.2$). Institution type had a significant effect on IT innovation performance, $F(1,424) = 4.68$, $p=.033$. Public institutions ($M=3.9$, $SD=7.3$) had a significantly higher mean score on IT innovation performance than private institutions ($M=3.7$, $SD=.94$)

Summary

Summary of Hypothesis 1 Data Analysis

H₀: There is not a relationship between IT governance and organizational performance. H_a: Organizational performance will be higher for institutions where IT governance is well defined and effective.

The null hypothesis that there was not a relationship between IT governance and IT organizational performance was rejected. The data support the alternative hypothesis, as IT governance increases organizational performance increases. Pearson correlation statistical test indicated there was a relationship between IT operational performance, general IT performance, IT funding performance, and innovative technology performance. The alternative hypothesis that organizational performance would be higher for institutions with well defined and effective IT governance was supported. There was a stronger relationship for IT operational performance and IT governance, a moderate relationship between IT general performance and innovative technology, and a weak relationship between IT funding performance and effective and well defined IT governance.

Summary of Hypothesis 2 Data Analysis

H₀: There is not a relationship between placement of decision authority within an institution and organizational performance, IT governance, and IT alignment. H_a: Organizational performance, IT governance, and IT alignment increases depending on where the decision making authority is placed within the organization.

The data analysis to test hypothesis 2 is partially rejected and the alternative hypothesis was partially supported. Operational, general, and innovative technology performance, IT governance, and IT alignment were significantly higher for institutions where top leaders were the primary decision making authority compared to institutions where the primary decision making authority were the IT leaders. There was no difference between whether IT funding increased and who made the primary decisions at the institution.

Similarly, where top leaders were the primary strategy and infrastructure decision authority operational, innovative technology performance, and IT governance was higher than when IT leaders were the primary authority. No significant differences were found for IT funding and general IT performance, and IT alignment. There were no differences on the organizational performance, IT governance, and IT alignment variables and who was the primary authority on IT expenditures.

Summary of Hypothesis 3 Data Analysis

H_0 : There is not a relationship between alignment of priorities and organizational performance. H_a : Organizational performance increases as the alignment of priorities increase.

The null was rejected and the data support the alternative that as IT alignment increases so does organizational performance. There was a significant relationship for each of the four IT performance variables. There were stronger relationships found for operational and general IT performance; however, there were relationships with IT funding and innovative technology albeit they were weak to moderately strong.

Summary of Hypothesis 4 Data Analysis

H₀: There is not a relationship between communication and organizational performance. H_a: Organizational performance increases as communication increases.

The null hypothesis that there is no relationship between organizational performance and communication was rejected for the IT operational performance, general IT performance, and IT innovative technology variables. There was support for the alternative that operational, general, and innovative performance increases as communication scores for institutions increases. However, we failed to reject the null hypothesis in regards to IT funding. There was not a relationship between IT funding performance and communication scores.

Summary of Hypothesis 5 Data Analysis

H₀: There is not a relationship between organizational strategy and organizational performance. H_a: Organizational performance increases depending on the primary organizational strategy chosen by the organization.

The null hypothesis that there is no relationship between organizational performance and organizational strategy was rejected. The data analysis indicates there was support that organizational performance did increase depending on the primary strategy selected. Specifically, the data analysis indicate institutions that chose service or innovation as their primary strategy were ranked higher on organizational, IT funding and innovative performance than institutions that chose efficiency. Institutions that chose service as their primary ranked higher on customer service performance than institutions that choose innovative and efficiency. Similarly, examination of the strategy likert

questions where respondents indicated agreement with a strategy indicated that as operational performance increased so did the affiliation with service and innovation as a strategy. Customer satisfaction and IT funding performance increased, as affiliation with all strategies increased.

Summary of Hypothesis 6 Data Analysis

H_0 : There is not a relationship between the size of the organization and organizational performance. H_a : Organizational performance increases as the size of the organization increases.

The null hypothesis there that is no relationship between the size of an organization and organizational performance was partially rejected. There was support for three of the organizational performance variables: (a) general IT, (b) IT funding, and (c) IT innovation. There was not a difference between size of the institutions on operational performance. General IT performance was significantly higher at medium institutions compared to smaller institutions. IT innovation performance was higher for medium schools compared to small and large schools. Medium size schools were significantly higher on IT funding performance compared to small and large schools.

Summary of Hypothesis 7 Data Analysis

H_0 : There is not a relationship between the public versus private types of organization and organizational performance. H_a : Organizational performance will increase for public institutions.

The null hypothesis there is not a relationship between institution type and organizational performance was rejected for general IT, IT funding, and innovation

performance. For these three performance variables the analysis indicates there was partial support for the alternative. There was a significant relationship between general IT, IT funding, and innovation depending on the type of institution. The null hypothesis is not rejected for the operational performance variable. Analysis indicates general IT performance was higher for public institutions. Private institutions had a higher score on IT funding performance than public institutions. Lastly, public institutions had a higher mean score on IT innovation than private institutions.

Conclusion

In this section, the results of the study were discussed in detail including the results of each hypothesis. In the next section, the results of the study are discussed including, implications, and recommendations for further research and the conclusion.

CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

Introduction

The purpose of this chapter is to review the main findings of the study, explore implications of the study, and recommend future research. This chapter includes the following sections: introduction, purpose statement, discussion of findings and implications for each research area, recommendations for future research, and the conclusion.

Review of the Purpose Statement

The purpose of this study of public and private institutes of higher education was to examine whether (a) overall Information Technology (IT) governance, (b) decision making placement in the organization, (c) alignment of priorities, (d) communication, and (e) organizational strategy influence perceived organizational performance. The influence of demographics such as size and public versus private were examined. As part of this research study, measures of organizational performance and measures in other conceptual areas were developed. The research project was distributed to a national sample of Chief Information Officers (CIOs) and/or to the responsible administrator at higher education colleges and universities. The research will aid higher education administrators in understanding the impact of these practices in higher education IT management.

Limitations of the Study

The primary limitation of the study is the results are based on CIO and/or administrator perceptions. The questions in the study asked CIOs to rate themselves on how they perceive others such as their peers and customers feel about the service their

department provides. Self-evaluations are difficult and can be impacted by other uncontrolled factors. Additionally, the scales were new with this study and have not been tested extensively; although, consistencies within the data indicate the scales make sense and are reliable. Moreover, instead of using objective measures to measure performance, this study used subjective measures. Although, subjective and objective measures tend to provide similar results there is an element of bias with subjective measures.

Additionally, we did not receive responses to the survey from CIO's only; instead, other administrators participated. The perception of other administrators such as Presidents, Provosts, and Chief Financial Officers could have created a bias that was not controlled for in the study.

Organizational Performance and IT Governance

1. *The overall implication of these results are that through well defined and effective IT governance, institutions of higher education can improve their IT performance in operations, general improvement of IT image and customer satisfaction, IT innovation, and IT funding.*

This study demonstrated overwhelming support for IT governance's impact on organization performance across all types of performance concepts. Although, we see positive relationships on the impact of IT governance on performance, not all respondents indicated that IT governance was well defined or effective at their institution. Similar to results in the literature (Green, 2006), in this study only 49.2% of respondents agreed their institution had well defined IT governance and 49.6% thought that IT governance at

their institution was effective. In institutions where IT governance was not well defined and effective, there were lower levels of performance.

The study results are a strong statement for the recommendation that without IT governance in higher education, IT organizational performance suffers. Higher education administration can make a difference and improve performance by instituting methods of IT governance within their institution. To create successful organizations, administrators should be strongly encouraged to examine structures, and processes that result in both effective, and well defined IT governance.

Often IT governance is ignored in (a) historical practices, (b) poor leadership, (c) unfocused management, and (d) strong divisions between historical silos at institutions. IT governance with proper implementation can break down these practices and divisions, through the alignment of priorities and recognizing each aspect of the institution as a part of the process. Moreover, IT governance will provide overall support for the national trend in higher education to make strides toward (a) accountability, (b) access, and (c) affordability. With the overwhelming support for all types of performance, institutions that do not have IT governance methods in place are operating at a deficit.

Organizational Performance and Decision Making Authority

2. *The overall implication of these results are that organizations should adopt structures that enable top leaders to collaboratively participate in the decision making processes surrounding IT. Collaboration by top leaders on primary decision making authority improves performance in key areas including*

operational IT, general IT and innovative IT performance, IT governance, and IT alignment.

Decision making authority is extremely important to successful IT governance. The study results indicate that decisions made in isolation by one primary IT administrator can decrease performance and IT governance effectiveness. The study had mixed results in the other decision making areas when IT performance, IT governance, and IT alignment were examined.

In the business literature, senior leadership at successful companies were involved in decision making, where they were not involved the organization was not as effective (Ross & Weill, 2002). Similarly, IT leaders in higher education (Ward & Hawkins, 2003) advocate that IT decisions should be managed by a cross section of leadership. The findings of the study provide support for a cross section of leadership to make primary decisions in higher education institutions. According to Weill and Ross (2004), where decisions are made by a cross section of the Chief officers (information, executive, and financial) collaboratively, the typology is referred to as a federal system. In higher education, the Chief Academic Officer would be included in the collaborative team. Although, in nonprofits where shared governance dominates, making decisions by committee is the standard (Weill & Ross, 2004), decision making by committee was indicated by only a small percentage of the institutions in this study. The IT monarchy (Weill & Ross, 2004), where the CIO is the primary decision making authority, was common in the study. However, in several key performance areas where the IT leader is the primary decision making authority performance was lower when compared to a more

collaborative federal system. Both IT governance and alignment were higher when the primary decisions were made by a collaborative group compared to the IT leader.

Albrecht et al. (2004) reported similar results indicating that where IT governance was well structured and included academic leaders there was better alignment.

Overall, there were strong indications in this study that IT performance, IT governance, and IT alignment improve when higher education institutions make decisions among the top leaders compared to singularly locating decision making with the IT leader. Whether IT funding increased did not depend on where the decisions were made in this study. Funding may be out of the control of the decision makers and dependent on other events such as (a) legislation, (b) economy, (c) enrollment, and (d) external forces.

The findings of this study indicate higher education institutions who want to be successful and perform well should engage cross sections of their leadership to participate in the decision making at their institution. Decision making in isolation or singularly by IT leaders negatively impacts performance in key areas. To accomplish collaborative decision-making by top leaders, IT needs to be viewed as a strategic asset by the highest levels of administration. For decision making to be effective, education would be an important component of the process, to insure all administrative decision makers understand the impact of their decisions. Contrary to expectations, decision making authority in the area of expenditures did not have an impact on performance, governance, or alignment.

Organizational Performance and Alignment

3. *The overall implications of these results are that tracking projects and alignment with missions and goals should be adopted by organizations to enhance their organizational performance.*

There was support in the study findings that as IT alignment increases organizational performance increases across all performance concepts. This study finding provides support for alignment practices in higher education institutions. A few of these practices include methods that enable institutions to acquire and sustain alignment, such as (a) Malcolm Baldrige criteria and (b) balanced score cards. Interesting, in this study, you would expect operational and general IT performance to increase; however, so did IT funding and innovative delivery of services. This indicates, where alignment was thought to help control the quest for innovation by renegade priorities, when aligned with priorities, it can also increase the innovative delivery of services. In addition, when priorities were aligned, IT funding tends to increase. Well tracked and aligned priorities, may lead to increased funding for institutions with good practices. In essence, alignment with priorities should not be seen as an inhibitor of performance but as a method to enhance performance through (a) maintaining clear direction of institutional priorities, (b) tracking projects and resources, and (c) synchronizing an IT unit with the overall goals and missions of an institution. In higher education, synchronization between units should include the major areas of a higher education institution, such as (a) academics, (b) student life, and (c) facilities.

Organizational Performance and Communication

4. *The overall implications of these results are that institutions should adopt frequent communication in a variety of formats to help enhance IT performance at higher education institutions.*

Results indicate operational IT, general IT, and innovative IT performance increase as communication increases for institutions. Although, there was a trend in these IT performance areas, the trend was not demonstrated in the area of IT funding performance.

Communication is a key component of IT governance and alignment of priorities and considered the pinnacle of many of the processes and methods used to improve alignment such as (a) Malcolm Baldrige criteria and (b) balanced scorecard approaches. Research in this area indicates communication is a key component when (a) working with both internal and external stake holders, (b) sharing information within the organization, and (c) bringing together IT and business employees (Luftman, 2003; Luftman & Brier, 1999; Peterson, 2004; Weill & Ross, 2004). This study finds top performers at higher education institutions communicate often in a variety of formats.

These findings support the implication that higher education institutions should increase their communication in order to improve performance. In a university community where shared governance is common and the culture is unique, the ability to gain support for initiatives and manage expectations is critical. A key method for success is communication. Through successful communication, an institution can create (a) awareness of priorities, (b) set expectations successfully, (c) be responsive to needs, and

(d) ultimately create an environment where there is a transparency between the community and leadership. Based on study results, communication is certainly a trait of the more successful institutions.

Organizational Performance and Strategy

5. *Implications of the study results are that institutions who are striving for efficiency should consider how to balance these strategies with customer service, in order to avoid decreases in key areas of IT performance.*

Operational and general IT performance increased depending on the primary strategy chosen by a higher education institution. In this study, 63% of the institutions choose service as their primary strategy, 31% efficiency, and 6% innovation. The majority of the institutions indicated that service, which is placing a primary organizational emphasis on customer service, was their primary strategy. In higher education environments where customers are the same for many years and support for initiatives depend on shared governance, maintaining relationships and providing quality service is critical for success. Although, efficiency was a primary strategy for only 31% of the study participants, national higher education trends emphasizing efficiency are expected to have an impact in the future on primary strategy selection and result in an increase in efficiency being chosen as the primary strategy for institutions.

Institutions whose primary strategy was service or innovation had higher operational performance than those that choose efficiency. Similarly, institutions that choose service ranked higher on general IT performance than institutions that choose

efficiency or innovation. Service institutions tend to be higher on more IT performance scales than the other strategies.

The results of this study indicate that the majority of institutions were service oriented. A service oriented institution performs better operationally and on general IT performance, while efficiency results in a decrease in both of these performance areas. Innovative institutions also appeared to perform better operationally. The selection of strategies could be driven by the amount of resources that an institutions had. However, in this study there was not a significant difference as to whether budgets increased according to the primary strategy selected. The study did not indicate whether innovative and service strategy institutions are better funded when compared to institutions focusing on efficiency.

Higher education institutions need to weigh the consequences of choosing the efficiency strategy in their unique higher education environment. Operational factors, which include (a) staff skills, (b) service levels and standards, and (c) staff ratios, appear to suffer when an organization focuses on efficiency rather than service and innovation. This would be a concern considering operational performance items are necessary to maintain the health of an IT organization. Similarly, general IT performance which includes (a) improvement of image, (b) quality and quantity of services, and (c) departmental image also suffer when an organization focuses on efficiency and innovation compared to service. The study results could be capturing an organizational shift from one strategy to another in the wake of the societal trends impacting higher education. Whereas, organizations may not have had an opportunity to fully explore

efficiency and the balance necessary to maintain general IT performance. It is also important to note that the measures focused on improvement as an indication of general IT performance.

The ability to be successful with a primary strategy is connected to an organization's communication with staff and the community through the articulation of the strategy and the setting of expectations (Eichen, 2006). If expectations are not set, then a community and staff would not understand why choices are made. Additionally, Mintzberg (1991) cautions that organizations should be flexible in the strategies chosen and be ready to change to maintain success. Findings of the study indicated that some performance areas were lower if the primary strategy of the organization was efficiency. Key for institutions of higher education is to consider whether they are choosing efficiency as a strategy to provide more for less or if they chose this response because a lack of funding leaves them no other alternative. If the latter is the case, then institutions need to be aware that performance appears to suffer.

Organizational Performance and Size

6. *An implication of the study is that the size of the institutions affects some areas of IT organizational performance.*

There was support in the study that organizational performance: (a) general IT, (b) IT funding, and (c) IT innovation differ depending on the size of the institution. Specifically, general IT performance was higher at medium schools than smaller; IT innovation performance was higher at medium schools compared to small and large

schools; and medium size schools were higher on IT funding performance compared to small and large schools.

The trend of medium schools ranking higher on performance could be explained by smaller schools having fewer resources than medium schools, which could affect performance in these areas. Whereas, large schools may have resources, but due to their size the resources are distributed across the institutions instead of being centralized. This distribution creates a similar situation to smaller schools, which is lack of resources or at a minimum lack of coordinated resources. Both large schools and small schools struggle with either lack of resources or distributed resources. As a result, medium schools are situated comfortably in between and may not encounter the size struggles of the small and large institutions. Therefore, it appears institutions are dealing with different issues based on their size. Medium schools were identified as consistently out performing both small and large institutions, in several key performance areas indicating they may have more in control of their resources resulting in improved performance.

Organizational Performance and Institution Type

- 7. An implication of the study is that institution type should be considered when examining the impact on organizational performance. There are differences in performance due to unique differences between public versus private institutions.*

The study findings indicate there was a relationship between general IT performance, IT funding, and innovation performance and whether an institution is private or public. General IT performance was higher for public institutions; private

institutions had a higher score on IT funding performance than public institutions; and public institutions had a higher mean score on IT innovation than private institutions.

General IT performance consisted of factors that focus on quantity, quality, as well as peer and departmental image, these factors may be more difficult to maintain in a private IT department compared to a public institution. The constant growth and expansion of services is an indication that the department is keeping up with trends and continuing to be flexible as the IT market changes. For the most part, private institutions are more challenged in this area than public institutions due to the continued decrease in private funding for higher education. Similarly, the IT funding performance variable indicated that public institutions were more likely to experience an increase in funding than private institutions. Again, private institutions may suffer more quickly during tough economic times and changes in private giving than a public institutions, which generally lags behind the general economy in feeling the impact of a recession. Lastly, private institutions were higher on innovation of services. This could be attributed to the ability to be more flexible than public institutions. A study by Albrecht et al. (2004) indicated private institutions were more likely to make decisions outside of traditional structures which indicates increased flexibility.

When considering operational performance, regardless of institution type, performance was the same. The same concepts that create operational performance tend to apply regardless of the setting. These findings indicate although operational performance may be the same, there are unique differences between public and private institutions surrounding other key performance areas. The culture that impacts

performance at a private institution may be more similar to business than a public institution.

Summary of Implications

In summary, there are several strong implications as a result of this study of IT performance influences. Higher education institutions should adopt well defined and effective IT management practices to improve IT performance. This should include the alignment of priorities with the mission of the institution and the tracking of projects for the usage of resources and their value to the institution. Structures and processes need to be in place where the decision making authority over IT is shared by the top leaders of the institution. These processes will enhance the effectiveness of IT governance and enable the alignment that is needed to improve performance. The communication of the priorities should receive priority and be used as a mechanism to share the strategy of the organization. Consideration should be given to the strategy chosen by the institution, since an emphasis on efficiency tends to detract from positive performance. Lastly, the size and type of the institution should be considered when trying to achieve positive performance. The lack of structure and process in smaller institutions due to size and the ability to be more flexible in private structure should be noted.

Recommendations for Further Study

Three recommendations for future research are advocated and discussed in this section.

1. *Conduct further research on the IT governance methods used by top performers.*

This study provided great insight into the influences of organizational performance in higher education. To expand on the findings and provide information of value to higher education institutions, it is recommended further study explore the methods of IT governance used by institutions who believe they have well defined and effective IT governance. This knowledge would help develop best practices for organizations seeking to implement IT governance and subsequently improve their performance. Moreover, an understanding of the barriers to implementing IT governance should be explored. Specifically, understanding why institutions do not implement IT governance processes and structures is important for future study.

2. *Conduct further research on the differences in size and institution type.*

The findings of the study indicated there were differences on IT performance dependent on the size and type of institution. The data collected cannot fully explain these differences. Therefore, future research should explore the culture and unique environmental conditions that institutions of varying size and type are faced with in order to understand how they can enhance their performance. This would improve the information available to institutions of all type as they adapt their management methods to improve their performance.

3. *Conduct further research on strategies that investigates how leaders orient themselves to a strategy and communicate to their customers.*

More research is needed to understand the performance results related to the efficiency data. Are these results due to a lack of funding and resources or are they indicative of a strategy. Additionally, institutions that selected service and innovation

performed better in some areas. An investigation into how these institutions orient themselves to a strategy and communicate to their customers would provide critical information to higher education administrators that could enhance their best practices. Specifically, additional research is needed to understand why institutions with efficiency as the primary strategy suffer from the decreased performance in key areas.

Conclusions

In this study of higher education institutions IT governance, IT alignment, IT decision making authority, organizational strategy, and demographics such as size and institution type were examined to determine if they influenced IT organizational performance. As a result, this study provided a general profile of top performing IT organizations at higher education institutions. Top performers tend to have well defined and effective IT governance, tracked and aligned priorities, decisions were made collaboratively among top leaders, and they communicate often in a variety of formats, and do not choose efficiency as their primary organizational strategy. Additional research needs to be conducted to understand (a) specific methods of IT governance used, (b) differences surrounding size and institution type, and (c) how leaders orient themselves to a strategy.

The strong implication of the study that alignment and collaborative decision making can improve IT performance suggests that IT should be viewed as a strategic tool at higher education institutions. In addition, the ability of alignment to improve both IT innovation and IT funding performance indicates IT is a critical component to have aligned with the missions and goals of the institution. IT is not just a convenience, but

also a tool that can provide value and enhance the delivery of services when managed appropriately. Thus, IT should be considered at the highest levels of an institution. This study offers insight into IT performance at higher education institutions that can contribute to the field of IT management.

REFERENCES

Albrecht, R., Bender, R. M., Katz, R. N., Pirani, J. A., Salaway, G., Sitko, T. D., & et al. (2004). *IT alignment in higher education, Volume 3*: Educause Center for Applied Research. Retrieved March, 2007, from <http://www.educause.edu/ir/library/pdf/EKF/ekf0403.pdf>

Babbie, E. (2001). *The practice of social research*. Blemont, CA: Wadsworth/Thomson Learning.

Carnegie Foundation for the Advancement in Teaching Downloads (2007). Retrieved October 21, 2007, from Carnegie Foundation for the Advancement in Teaching: www.carnegiefoundation.org/dynamic/downloads/file_1_612.xls

CIO Leadership Series. (2006, February). *Edutech Report*, 405.

Dillman, D. (2007). *Mail and internet surveys: The tailored design method*. Hoboken, NJ: John Wiley and Sons.

Division, A. A. (1998). *Executive guide: Measuring performance and demonstrating results of information technology investments*. United States General Accounting Office. Washington, DC: General Accounting Office.

Dougherty, J. D. (2004). Management by fact: Benchmarking University IT services. *Educause Quarterly*, 14-25.

Eichen, M. (2006). Value disciplines: A lens for successful decision making in IT. *Educause Quarterly*, 32-39.

- Goldstein, P. J. (2004). *Information technology funding in higher education*. Educause. Boulder: Educause Center for Applied Research (ECAR). Retrieved March 2007, from <http://www.educause.edu/ir/library/pdf/ers0407/rs/ers0407w.pdf>
- Graves, W. (2005). Improving institutional performance through IT enabled innovation. *Educause Review*, 79-98.
- Green, K. C. (2006). Bring data: A new role for information technology after the Spellings Commission. *Educause Review*, 30-46.
- Gunes, F., Basoglu, A. N., & Kimiloglu, H. (2003). Business and information technology strategies and their impact on organizational performance. *Management of Engineering and Technology PICMET '03; Technology Management for Reshaping the World*. (pp. 208-216). Portland: IEEE.
- Hawkins, B. (2003). IT data collection and assessment. *Educause Review*, 64.
- Henderson, J. C., & Venkatraman, N. (1993). Strategic alignment: Leveraging information technology for transforming organizations. *IBM Systems Journal*, 4-16.
- Information Technology Infrastructure Library (2007, February 11). What is ITIL. Retrieved November 28, 2007, from www.ital-officialsite.com/AboutITIL/WhatisITIL.asp
- IT Governance Institute (n.d.). *About IT governance*. Retrieved September 18, 2007, from www.itgi.org
http://www.itgi.org/template_ITGI.cfm?Section=About_IT_Governance1&Template=/ContentManagement/HTMLDisplay.cfm&ContentID=19657

- IT Governance Institute. (2004). IT governance *global status report*. Retrieved November 5, 2007, from www.itgi.org - http://www.itgi.org/template_ITGI.cfm?template=/ContentManagement/ContentDisplay.cfm&ContentID=24632
- Kaplan, R. S., & Norton, D. P. (2007). Using the balanced scorecard as a strategic management system. *Harvard Business Review*, 150-161.
- Lee, S. K., & Yu, K. (2004). Corporate culture and organizational performance. *Journal of Managerial Psychology*, 340-359.
- Lewis, D. S. (1994). Organizational change: Relationship between reactions, behavior and organizational performance. *Journal of Organizational Change Management*, 41-55.
- Lim, B. (1995). Examining the organizational culture and organizational performance link. *Leadership and Organizational Development Journal*, 16-21.
- Luftman, J. (2003). Assessing IT/business alignment. *Information Systems Management*, 9-15.
- Luftman, J., & Brier, T. (1999). Achieving and sustaining business IT alignment. *California Management Review*, 109-122.
- Miller, B. A. (2007). *Assessing organizational performance in higher education*. San Francisco: Jossey-Bass.
- Mintzberg, H. (1980). Structure in 5's: A synthesis of the research on organization design. *Management Science*, 322-341.

Mintzberg, H. (1991). The effective organization: Forces and forms. *Sloan Management Review*, 54-67.

Presidential Advisory Council on Efficiency and Effectiveness. (2006, November).

Retrieved October 20, 2007, from President's Advisory Committee on Efficiency and Effectiveness

<http://www.northcarolina.edu/content.php/finance/pace/index.htm>PC Magazine. (2007).

Peterson, R. (2004). Crafting information technology governance. *Information Systems Management*, 7-22.

Pirani, J. A., & Albrecht, B. (2005). *University of California, San Diego: Increasing operational efficiencies through business process redesign and analytics.*

EDUCAUSE Center for Applied Research. Bolder, Colorado: EDUCAUSE.

Rau, K. (2004). Effective governance of IT: Design objectives, roles and relationships. *Information Systems Management*, 35-42.

Ross, J. W., & Weill, P. (2002). Six IT decisions your IT people shouldn't make. *Harvard Business Review*, 85-91.

Ruben, B. D. (2007). Higher education assessment: Linking accreditation standards and the Malcolm Baldrige Award. *New Directions for Higher Education*, 59-82.

Treacy, M., & Wiersema, F. (1993). Customer intimacy and other value disciplines. *Harvard Business Review*, 84-93.

- U.S. Department of Education. (2006, September). *A test of leadership: Charting the future of US higher education*. Retrieved November, 2007, from A Report of the Commission Appointed by Secretary of Education Margaret Spellings:
<http://www.ed.gov/about/bdscomm/list/hiedfuture/reports/final-report.pdf>
- Ward, D., & Hawkins, B. (2003). Presidential leadership for information technology. *The Presidency*, 1-11.
- Weill, P., & Ross, J. W. (2004). *IT governance: How top performers manage IT decision rights for superior rights*. Boston, Massachusetts: Harvard Business School Press.
- Weill, P., & Ross, J. W. (2005). A matrixed approach to designing IT governance. *MIT Sloan Management Review*, 25-34.

APPENDIX A: COVER LETTER

To: Study Participant

From: Wendy Creasey

RE: Graduate Research Study on IT Performance (Request for Assistance)

I am conducting research for my dissertation on the influences of Organizational Performance. Besides being a doctoral student, I have worked in Information Technology for over 15 years and value your participation in this survey. Please take a few moments to fill out the survey by clicking on the link below. The survey will take about 5 minutes to complete. If you are not the appropriate person to report on who makes IT decisions and organizational performance, please forward me the name of the appropriate individual or forward them the survey. All data is confidential and will only be described in aggregated format in the dissertation. At the completion of the study, summary results will be shared with all survey respondents who participated. If you would prefer to fill out a paper survey, respond to this email with your address. A survey and a stamped addressed envelope will be sent to you. If you have any questions, please do not hesitate to email me.

Sincerely,

Wendy Creasey

Doctoral Student East Carolina University

APPENDIX B: SURVEY INSTRUMENT

I. The following questions are about how your IT organization performed last year in a variety areas. Please indicate your agreement with each of the statements.

	Strongly Agree	5	4	3	2	1	Strongly Disagree
1. Overall, IT provided value to my institution.						○○○○○	
2. There was an increase in the quality of services provided by the IT department in the last year.						○○○○○	
3. There was an increase in the quantity of services provided by the IT department in the last year.						○○○○○	
4. There was an increase in budgeted dollars available to the IT department for projects in the last year.						○○○○○	
5. There was improvement in customer satisfaction with IT in the last year.						○○○○○	
6. There were improvements in the IT provided to my institution compared to peer institutions.						○○○○○	
7. There was an improvement in my IT department's organizational image.						○○○○○	
8. New innovative technologies were used to deliver IT services to my institution.						○○○○○	
9. Technology at my institution is up to date and will scale for several years.						○○○○○	
10. Project deadlines were met last year and were within budget.						○○○○○	
11. Staff ratios to faculty and student population are appropriate for my organization.						○○○○○	

12. Software and hardware standards are in place that guide the implementation of technology on my campus.	○ ○ ○ ○ ○
13. Service levels that set the expectation of support are in place that is appropriate for the level of staffing in my organization.	○ ○ ○ ○ ○
14. IT staff in my department have the appropriate skills to support our institutions organizational mission.	○ ○ ○ ○ ○

II. The following questions are about who makes the decisions that govern IT at your organization. Please indicate the primary decision maker in each of the following areas.

15. Who primarily makes the decisions that govern IT??	<input type="radio"/> Leader of the Institution <input type="radio"/> Top Leaders (Academic, IT, Financial) <input type="radio"/> Academic Leaders <input type="radio"/> IT Leaders <input type="radio"/> Financial Leaders <input type="radio"/> IT Committees <input type="radio"/> Faculty Committees <input type="radio"/> Committees representing all of these groups
16. Who primarily makes the decisions that govern IT strategies and policy?	<input type="radio"/> Leader of the Institution <input type="radio"/> Top Leaders (Academic, IT, Financial) <input type="radio"/> Academic Leaders <input type="radio"/> IT Leaders <input type="radio"/> Financial Leaders <input type="radio"/> IT Committees <input type="radio"/> Faculty Committees <input type="radio"/> Committees representing all of these groups
17. Who primarily makes the decisions that govern IT infrastructure standards?	<input type="radio"/> Leader of the Institution <input type="radio"/> Top Leaders (Academic, IT, Financial)

18. Who primarily makes the decisions that govern IT expenditures?	<input type="radio"/> Academic Leaders <input type="radio"/> IT Leaders <input type="radio"/> Financial Leaders <input type="radio"/> IT Committees <input type="radio"/> Faculty Committees <input type="radio"/> Committees representing all of these groups <input type="radio"/> Leader of the Institution <input type="radio"/> Top Leaders (Academic, IT, Financial) <input type="radio"/> Academic Leaders <input type="radio"/> IT Leaders <input type="radio"/> Financial Leaders <input type="radio"/> IT Committees <input type="radio"/> Faculty Committees <input type="radio"/> Committees representing all of these groups
--	--

III. The next several questions ask about communication, IT governance effectiveness, and alignment. IT governance refers to the process in which decisions are made and aligned with institutional priorities. Please indicate your agreement with each statement.

	Strongly		Strongly
	Agree		Disagree
		5	1
		4	
		3	
		2	
		1	

19. Communication regularly occurs from the IT department to the organization through a variety of methods.	○○○○○
20. My institution has a well defined IT governance process.	○○○○○
21. The IT governance process at my institution is effective.	○○○○○
22. IT priorities are aligned with institutional priorities (i.e.,	○○○○○

institutional mission, strategic plan).

23. IT priorities are tracked to understand value and resources expended.

○ ○ ○ ○ ○

IV. The following questions ask about the primary purpose or strategy of your IT organization. Please indicate your agreement with the following statements.

Strongly

Strongly

Agree

Disagree

5 4 3 2 1

24. Providing the most services at the lowest cost is important to the IT organization on my campus.

○ ○ ○ ○ ○

25. Creating positive customer relationships with one to one service and unique tools is important to the IT organization on my campus.

○ ○ ○ ○ ○

26. Developing innovative tools to deliver services is important to the IT organization on my campus.

○ ○ ○ ○ ○

V. Rank order the following three organizational purposes or strategies in the order of importance from 1 to 3.

*Service – creating long term customer relationships

1 2 3

*Efficiency – providing the most services for the lowest cost

1 2 3

*Innovation- developing and implementing new applications and methods

1 2 3

VI. Demographics.

What is the size of your student population?

- Less than 5,000
- 5,001-10,000
- 10,001 to 20,000
- 20,001-30,000
- Over 30,000

- Less than 5

Indicate your institution type.

- Public
- Private Non Profit
- Private for Profit

Please indicate what best describes your position.

- CIO
- IT Leader
- Financial Leader
- Academic Leader
- President or Chancellor
- Other (Please Specify)

Any thoughts you would like to share with the researcher?
If you would like to receive a copy of the results, please enter your email address.

APPENDIX C: INSTITUTIONAL REVIEW BOARD APPROVAL LETTER



University and Medical Center Institutional Review Board
East Carolina University
Ed Warren Life Sciences Building • 600 Moye Boulevard • LSB 104 • Greenville, NC 27834
Office 252-744-2914 • Fax 252-744-2284 • www.ecu.edu/irb
Chair and Director of Biomedical IRB: L. Wiley Nifong, MD
Chair and Director of Behavioral and Social Science IRB: Susan L. McCammon, PhD

TO: Wendy Creasey, Department of ITCS, ECU, 133 Austin
FROM: UMCIRB
DATE: December 10, 2007
RE: Exempt Category Research Study
TITLE: "The Influences of Information Technology Organizational Performance in Higher Education"

UMCIRB #07-0768

This research study has undergone expedited review on 12/10/07. This research study meets the criteria for an exempt status because it is research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects and any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation. Dr. S. McCammon deemed this **unfunded study no more than minimal risk**. This research study does not require any additional interaction with the UMCIRB unless there are changes in this study because the changes may impact the level of review required.

The following items were reviewed:

- Internal Processing Form
- Cover Email
- Survey Instrument
- COI Disclosure Form (dated 12/5/07)
- Dissertation

Dr. S. McCammon does not have a potential for conflict of interest on this study.

The UMCIRB applies 45 CFR 46, Subparts A-D, to all research reviewed by the UMCIRB regardless of the funding source. 21 CFR 50 and 21 CFR 56 are applied to all research studies under the Food and Drug Administration regulation. The UMCIRB follows applicable International Conference on Harmonisation Good Clinical Practice guidelines.