

Information Technology Management in Higher Education:  
An Evidence-Based Approach to Improving Chief Information Officer Performance

Meredith L. Weiss

A dissertation submitted to the faculty of the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the School of Information and Library Science.

Chapel Hill  
2010

Approved by,

José-Marie Griffiths

Jeff Huskamp

Ben Rosen

Paul Solomon

Barbara Wildemuth

© 2010  
Meredith L. Weiss  
ALL RIGHTS RESERVED

## **ABSTRACT**

**MEREDITH WEISS: Information Technology Management in Higher Education:  
An Evidence-Based Approach to Improving Chief Information Officer Performance  
(Under the direction of José-Marie Griffiths)**

It is critical to higher education institutions that chief information officers (CIOs) succeed since they control information and technology assets, oversee tremendous resources, and facilitate the accomplishments of institutions and their members. The CIO holds a complex and demanding position. Currently there is little quantitative research on how to succeed as a CIO. Available literature about the CIO position is almost entirely based on expert opinion or the experiences of past CIOs and although these insights and experiences are extremely valuable, quantitative research studies are needed to validate, expand, and revise current success recommendations. Available chief information officer studies focus heavily on clarifying the roles in which a CIO must excel as well as the skills, abilities, attributes, and knowledge a CIO must possess in order to succeed.

According to evidence-based management literature, although leadership matters, a leader's actions "rarely explain more than 10 percent of the differences in performance between the best and the worst organizations and teams" and leaders may have the most positive impact by improving organizational and group performance, valuing employees, and developing systems that enable others to succeed (Pfeffer & Sutton, 2006h, pp. 192 - 200). Therefore, rather than focusing on the specific CIO roles, skills, abilities, attributes, and

knowledge requirements, this study examines the environment the CIO creates among his/her staff and how it impacts CIO and information technology (IT) organization performance.

The results of this study are consistent with the hypothesis that CIOs whose centralized IT organizations perform well in organizational quality areas and who create high-performance IT cultures are perceived as having more successful IT organizations and as being more successful CIOs. Further, this study identifies the factors that are most associated with satisfaction with the centralized IT organization and the CIO, organizational quality and high-performance areas of opportunity for improvement, factors CIOs believe are most important for the success of the IT organization, areas to include in CIO performance reviews, criteria to assist with CIO hiring, and factors to include in employee job descriptions and incentives. Finally, it begins the development of a much needed framework for CIO success.

## **DEDICATION**

To my sons, Lennon and Dylan, may you have the confidence and determination to do whatever you set your mind to and the self-respect, empathy, kindness, and wisdom to value and help others along your journey. I love you and wish you a lifetime of happiness.

## ACKNOWLEDGEMENTS

First and foremost, I want to extend a special thank you to my committee chair Dr. José-Marie Griffiths who happily agreed to take on a doctoral student during the beginning of a new deanship. For her willingness to do so and her constant support, advice, guidance, insightfulness, collegiality, and kindness, I am forever grateful.

I would like to thank my entire doctoral committee for their advice and insight throughout this process. I learned a great deal from each one of them and I am extremely grateful for their guidance. I would especially like to thank:

- Dr. Jeff Huskamp for his invaluable insight from the position of a current CIO. His genuine interest in my research is very motivating and I am extremely grateful for his appreciation of this study.
- Dr. Ben Rosen for his statistical guidance and extremely helpful feedback. His recommendations kept me on track and improved my work tremendously.
- Dr. Paul Solomon for his constant support, availability, calmness, and business insight. He is incredibly helpful to so many doctoral students at UNC.
- Dr. Barbara Wildemuth for her ongoing support on this dissertation as well as on articles I wrote throughout the doctoral program. Her counsel, support, and advice were invaluable.

I would also like to extend an extremely appreciative thank you to:

- Dr. Laura N. Gasaway for introducing me to Dr. José-Marie Griffiths and supporting me throughout the Ph.D. program.
- Dr. Richard Hawthorne for his advice, encouragement, and willingness to proofread very long documents.

- all my friends who have encouraged me and checked in with me for the past five years. I would especially like to thank Dana Hanson-Baldauf for her friendship, advice, and support.
- the faculty and my fellow Ph.D. students at the School of Information and Library Science at the University of North Carolina at Chapel Hill. They are an absolutely amazing group of people.
- Chris Wiesen at the Odum Institute for Research in Social Science for his many hours of statistical assistance.
- the extremely busy CIOs, faculty, students, and staff who made the time to participate in this study.

Finally, a very special thank you to my wonderful and supportive family which has grown by two young boys during this process.

- Melissa for supporting me through this process and listening to endless hours about technology despite the fact that she doesn't even like computers.
- Lennon and Dylan for making me laugh and smile every day.
- Howard for always encouraging me to try. Many times, his simple advice 'Go ahead, give it a shot. What's the worst thing that can happen?' has given me the confidence to try new things and believe in myself. This has been invaluable and I hope to pass on his 'can do' attitude to my boys.
- Hedy for her constant cheerleading. I couldn't hire a public relations firm any better!
- Adam for always checking in and keeping our family well fed through this process.
- Sammy and Lucy for keeping me company through many late nights.

## TABLE OF CONTENTS

LIST OF TABLES .....	xiii
LIST OF FIGURES .....	xvi
LIST OF ABBREVIATIONS.....	xvii
Chapter	
I. INTRODUCTION .....	1
Introduction and purpose of the study .....	1
Identification of the problem and need for the study .....	2
Research questions.....	6
Methodology overview and theoretical framework.....	8
Summary .....	9
II. LITERATURE REVIEW.....	10
The Chief Information Officer (CIO) .....	10
The CIO in higher education.....	10
Constituencies of the CIO in higher education .....	11
The roles of the CIO in higher education.....	17
Challenges surrounding the position of CIO in higher education.....	37
Top concerns for CIOs in higher education.....	46
Summary of the CIO in higher education literature.....	48
The CIO outside higher education .....	49



Current trends in the position.....	49
CIO and/or IT department success measures.....	51
How to be a successful CIO in industry.....	55
Top concerns for CIOs outside higher education .....	62
Summary of the CIO outside higher education literature .....	63
Evidence-based management (EBM) literature .....	64
Definition and basic principles of evidence-based management.....	64
History of evidence-based management .....	65
Evidence-based medicine.....	65
Early evidence-based management.....	66
Other areas of evidence-based practice.....	67
Evidence-based management.....	67
Differences between evidence-based management and other areas of evidence based practice.....	68
Barriers to evidence-based management .....	68
Evaluating evidence .....	70
Implementing evidence-based management .....	71
Evidence-based management summary .....	74
Evidence-based management in practice .....	74
What does evidence-based management literature state about building a high-performance culture? .....	74
What does evidence-based management literature state about human resource (HR) management?.....	76
What does evidence-based management literature state about leadership?.....	79

	Evidence-based management studies that inform this dissertation study .....	82
	Summary of the evidence-based management literature .....	85
	Research questions revisited and contribution this study makes to the field.....	86
III.	METHODOLOGY .....	90
	Theoretical framework.....	90
	Operationalization of variables .....	92
	Inter-institutional differences in IT user satisfaction .....	103
	Sampling Frame .....	104
	Survey Distribution and Administration.....	104
IV.	ANALYSIS AND STUDY FINDINGS.....	108
	Participation overview .....	108
	Descriptive survey data.....	109
	Research questions.....	110
	Research question 1 - factors associated with user satisfaction.....	110
	Research question 2 - organizational quality .....	127
	Research question 3 - organizational quality area combinations.....	129
	Research question 4 - high-performance .....	130
	Research question 5 - important to IT organization success.....	135
	Research question 6 - user satisfaction perceptions.....	136
	Research question 7 - elements tied to success.....	139
	Research question 8 - performance reviews .....	141
	Research question 9 - central IT organization importance .....	143
V.	DISCUSSION .....	144

Research question 1 - factors associated with user satisfaction.....	144
Research questions 2-4 - organizational quality and high-performance.....	145
Research question 5 - important to IT organization success.....	150
Research question 6 - user satisfaction perceptions.....	151
Research question 7 - elements tied to success.....	152
Research question 8 - performance reviews .....	153
Research question 9 - central IT organization importance .....	154
Limitations .....	155
<b>VI. CONCLUSIONS AND FURTHER STUDY .....</b>	<b>159</b>
Findings of interest to current CIOs.....	161
Findings of interest to future CIOs .....	166
Findings of interest to those evaluating CIOs.....	167
Findings of interest to those hiring CIOs.....	168
A framework for CIO success - a beginning .....	169
Conclusion .....	172
<b>APPENDIX A: Chief Information Officer (CIO) Survey .....</b>	<b>174</b>
<b>APPENDIX B: Campus Technology Survey .....</b>	<b>183</b>
<b>APPENDIX C: Doctoral/Research Universities.....</b>	<b>203</b>
<b>APPENDIX D: Introductory Email to CIO .....</b>	<b>210</b>
<b>APPENDIX E: Introductory Email to CIO's Assistant .....</b>	<b>212</b>
<b>APPENDIX F: Follow Up Email to CIO.....</b>	<b>214</b>
<b>APPENDIX G: How Your Institution Can Participate – Simple Instructions.....</b>	<b>217</b>

APPENDIX H: Email to CIO Listserve.....	218
APPENDIX I: Email to Faculty.....	220
APPENDIX J: Between Universities Variance .....	222
APPENDIX K: Research Question One Results .....	223
APPENDIX L: Research Question Two Results .....	232
APPENDIX M: Research Question Three Results.....	233
APPENDIX N: Research Question Four Results .....	234
APPENDIX O: Research Question Five Results.....	239
APPENDIX P: Research Question Six Results .....	240
APPENDIX Q: Research Question Seven Results .....	253
APPENDIX R: Research Question Eight Results .....	254
APPENDIX S: Research Question Nine Results.....	255
APPENDIX T: Internal Consistency .....	256
REFERENCES .....	284

## LIST OF TABLES

### Table

1. Factors potentially impacting user satisfaction.....	6
2. Nine areas used to define organizational quality .....	6
3. High-performance culture categories.....	7
4. Summary- constituencies of the chief information officer in higher education ...	17
5. Summary- the roles identified for the chief information officer in higher education.....	37
6. Summary- skills, abilities, attributes, and knowledge requirements identified for the chief information officer in higher education .....	45
7. Top concerns for CIOs in higher education in 2007.....	46
8. Top concerns for CIOs in higher education historically .....	47
9. Evaluation methods, tools, metrics, and approaches used by industry CIOs .....	55
10. Summary- suggested skills, abilities, attributes, and knowledge requirements identified for a successful chief information officer in industry.....	61
11. Summary- top concerns for CIOs outside higher education .....	63
12. Operationalization of variables: nine areas used to define organizational quality.....	93
13. Operationalization of variables: high-performance culture categories.....	96
14. Operationalization of variables: factors potentially impacting user satisfaction.....	99
15. Operationalization of variables: overall IT organization and CIO satisfaction .....	102

16. Institution participation overview .....	108
17. Individual participation overview .....	109
18. Factors correlated with satisfaction with the centralized IT organization .....	112
19. Factors correlated with satisfaction with the centralized IT organization (research universities only) .....	113
20. Factors correlated with satisfaction with the CIO.....	114
21. Factors correlated with satisfaction with the CIO (research universities only) .....	115
22. Percentage of participants who responded not sure about factors .....	116
23. Percentage of participants who responded not sure about overall satisfaction..	117
24. Faculty satisfaction correlation comparison .....	119
25. Student satisfaction correlation comparison .....	121
26. Non-centralized IT staff satisfaction correlation comparison.....	123
27. Non-IT staff satisfaction correlation comparison .....	125
28. Mean overall satisfaction scores .....	126
29. Organizational quality questions.....	127
30. High-performance culture results by category.....	132
31. CIO perceptions of IT organization success factors .....	136
32. CIO and IT perception of campus user satisfaction.....	138
33. Centralized IT employee success perceptions.....	140
34. Centralized IT employee success perceptions (research universities only).....	141

35. Elements CIOs believe are most heavily factored into their performance reviews..... 142

36. Importance of the centralized IT department..... 143

## LIST OF FIGURES

### Figure

1. Overall user satisfaction..... 91
2. Percentage of participants who responded not sure about factors ..... 116
3. Percentage of participants who responded not sure about overall satisfaction... 117
4. Mean overall satisfaction scores ..... 126



## LIST OF ABBREVIATIONS

- CIO Chief Information Officer – The title commonly given to the senior technology leader of an organization (Moberg et al., 2000; Brown, 2004).
- CTO Chief Technology Officer – A position often designed to alleviate some of the pressure on the CIO by passing the majority of technical responsibility to the CTO (Beatty et al., 2005).
- DRU Doctoral/Research Universities (The Carnegie Foundation Staff, 2008).
- EBM Evidence-Based Management – The process by which managers seek out the best scientific evidence available and translate findings into organizational problem solving practices (Rousseau, 2006; Rousseau, 2007).
- IS Information System – An application within the information technology environment (Post & Anderson, 2003; Lineman, 2005).
- IT Information Technology – “The use of hardware, software, services, and supporting infrastructure to manage and deliver information” (North Dakota Information Technology Department Staff, 2008).
- RU/H Research universities with high research activity (The Carnegie Foundation Staff, 2008).
- RU/VH Research universities with very high research activity (The Carnegie Foundation Staff, 2008).

## **INTRODUCTION**

### **Introduction and Purpose of the Study**

During the past few decades, technology has become increasingly pervasive and has radically changed many peoples' day to day lives. This is evidenced by the abundance of new technologies that have been rapidly adopted including personal computers, the World Wide Web, email, cell phones, instant messengers, digital video recorders, video games, fax machines, global positioning systems, video conferencing units, and the list goes on and on. Technology has impacted the ways in which people interact as well as changed how many carry out routine functions such as shopping, driving, banking, and finding information. New technologies are not only impacting peoples' personal lives but are transforming industries as well. Some people believe new technologies are even "flattening the world" (Friedman, 2005).

Higher education is not unlike any other industry in that its leaders need to understand and embrace new technologies, leverage information technology (IT) to further business goals, and learn how best to operate in a new, rapidly changing environment. Higher education leaders must examine how technology is impacting their day to day jobs as well as how it will impact the future of colleges and universities. This is no small task. It is one that is complex, expanding, and constantly changing.

To begin to address these large issues, many organizations, including higher education institutions, have created a new technology leadership position often termed the chief information officer (CIO). It is this person who is charged with the enormous and

complex task of overseeing current technology and information assets while strategically planning with other organizational leaders for the future of not only the technology department but also the organization. The purpose of this study is to determine where the chief information officer in higher education should focus effort in order to improve his/her performance, positively impact the institution and its members, and begin to position the higher education organization for the future.

### **Identification of the Problem and Need for the Study**

The chief information officer (CIO) in higher education holds an extremely visible and complex position comprised of numerous roles and requiring a diverse set of skills, abilities, attributes, and knowledge. The person with this title has a tremendous amount of responsibility and serves many constituencies. Beyond these complexities, there are additional issues surrounding the position including high turnover, lack of career progression, confusion regarding the proper training and background needed, unclear definitions of and metrics for success, and a lack of people aspiring to the role (Applegate & Elam, 1992; Moberg et al., 2000; Hawkins, 2004; Katz et al., 2004; Schaffer, 2004).

In reviewing the literature over 30 constituencies, over 50 roles, and almost 50 skills, abilities, attributes, and knowledge requirements were identified as being necessary for a successful CIO. In addition, chief information officers are working in rapidly changing environments with tremendous funding constraints, unique organizational cultures, differing administrative structures, increased privacy and security concerns, greater functional requirements, changing political climates, high expectations, intellectual property conflicts, inadequate IT management approaches, aging systems, increasing accountability, expensive

initiatives, complex governance and decision making structures, increasing strategic responsibility, and changing institutional priorities (Moberg et al., 2000; Brooks, 2003; Hawkins, 2004; Clark, 2005; Hogue & Dodd, 2006; Lineman, 2007). It is easy to see how a role such as this could easily be perceived as overwhelming. Despite these challenges, colleges and universities “need to ensure effective IT leadership at the highest levels” (Katz et al., 2004, p. 6).

In sorting through the plethora of recommendations for this position, a clear question arose -- With all the information out there, in what areas should one focus to become a successful CIO? Available literature about the CIO position is almost entirely based on expert opinion or the experiences of past CIOs and, although these insights and experiences are extremely valuable, quantitative research studies are needed to validate, expand, and revise current success recommendations. Very little data was found that linked any of these CIO roles, skills, abilities, attributes, and knowledge requirements to CIO success empirically. In fact, complicating this further, the definition of CIO success itself is unclear and there seems to be no standard metrics or evaluation methods used to measure CIO performance. A 2003 study found that IT success in higher education was usually evaluated in terms of user satisfaction, technology reliability, and budget control (Griffiths, 2003). Although technology reliability and budget control are somewhat easily quantifiable for evaluation, user satisfaction is more difficult. Since user satisfaction is being used as a critical component in evaluating IT success, how does a CIO focus effort to succeed in satisfying users? A framework is needed to determine what makes a CIO successful for those in the position looking to improve and for those in the process of selecting their next

technology leader (Hawkins, 2004). This study begins the research necessary to develop such a framework.

It is clear in reading current literature surrounding the CIO in higher education that evidence is needed to develop a framework for CIO success -- evidence of what can be done to improve CIO performance and how that performance is being evaluated. Therefore, evidence-based management literature was consulted as a starting point from which to begin this study and the process of developing a framework for CIO success.

In reviewing the evidence-based management literature, one of perhaps the most surprising findings was that, although leadership matters, leaders do not have a “massive influence” over organizational performance (Pfeffer & Sutton, 2006h, p. 194). In fact, “their actions rarely explain more than 10 percent of the differences in performance between the best and the worst organizations and teams” (Pfeffer & Sutton, 2006h, p. 192).

*Leadership is a difficult craft because the expectations are always so high, the blame so swift and harsh, and leaders have less impact over what happens to their organizations than most people imagine. But it is a craft that people can develop over time and that some are better than others... there is evidence about the steps leaders can take to have a more positive effect on their organizations (Pfeffer & Sutton, 2006h, p. 214).*

The literature notes that where organizational leaders may have the most positive impact is in improving organizational and group performance, valuing employees, and developing systems that enable others to succeed (Pfeffer & Sutton, 2006h).

*One must bear in mind that one-half of organizations won't believe the connection between how they manage their people and the profits they earn. One-half of those who do see the connection will do what many organizations have done-try to make a single change to solve their problems, not realize that the effective management of people requires a more comprehensive and systematic approach. Of the firms that make comprehensive changes, probably only about one-half will persist with their practices long enough to actually derive economic benefits (Pfeffer & Veiga, 1999, p. 47).*

To this end, Pfeffer notes that “the best way to encourage performance is to build a high-performance culture. We know the components of such a system, and we ought to pay attention to this research and implement its findings” (Pfeffer, 2007a, p. 3). Therefore, rather than focusing on the specific CIO roles, skills, abilities, attributes, and knowledge requirements as many have in the past, this study focuses on the technology environment the CIO creates among his/her staff and how that impacts CIO performance in terms of user satisfaction. CIO performance is determined differently than it has been in most previous higher education technology leadership studies. CIO and technology department performance in this study is evaluated by internal college or university stakeholders rather than solely the perceptions of the CIO or those within the technology organization. The study employs an evidence-based management approach to investigate if combinations of management practices within the centralized academic technology organization correlate with higher perceptions of CIO and technology organization performance. Further, it investigates if there is a correlation between high-performance culture and overall satisfaction with CIO and IT department. Finally, it identifies what constitutes user satisfaction in the eyes of internal college and university constituencies.

It is important to improve chief information officer performance since one of the position’s primary roles is that of enabler. A successful CIO, therefore, has arguably facilitated the success of those around him/her. In facilitating that success, s/he is helping higher education institutions succeed in their education, scholarly, and service missions.

## Research Questions

1. *Which factors are most associated with user satisfaction with the centralized technology organization (Table 1)? Which factors are most associated with satisfaction with the CIO?*

<b>Table 1: Factors Potentially Impacting User Satisfaction</b>
Academic Alignment
Communication
Enablement
Fiscal Responsibility
Importance
Innovation
Reliability
Responsiveness
Shared Governance
Support

2. *Are technology organizations with a higher straight average of performance in the nine areas used to define organizational quality (Table 2) viewed as performing better than those which do not?*

<b>Table 2: Nine Areas Used to Define Organizational Quality</b>
Accountability
Capability
Coordination and Control
Direction
Environment and Values
External Orientation
Innovation
Leadership
Motivation

(Leslie et al., 2006; Smet et al., 2007a)

3. *Are technology organizations with a higher performance in certain combinations of the nine areas used to define organizational quality (Table 2) viewed as performing better than those which do not?*

4. *Are current higher education technology leaders building high-performance organizations that value, respect, and develop their employees (Table 3)? Is there a correlation between the degree to which this is done and perceptions of CIO and technology organization performance? Are technology organizations with a higher performance in certain combinations of high-performance categories viewed as performing better than those which do not?*

<b>Table 3: High-Performance Culture Categories</b>
Good Pay
Meaningful Jobs
Psychological Safety and Job Security
Staff Development
Systems, Procedures, and Information Availability
Teamwork and Team Rewards
Valued, Well-Treated Employees
Work Climate/Recognition

(Pfeffer, 1999a; Pfeffer, 1999b; Pfeffer & Sutton, 2006h; Pfeffer, 2007a)

5. *What do CIOs believe is important for the success of the centralized information technology organization?*
6. *Do CIOs have an accurate understanding of how satisfied their campus users are? Do centralized information technology employees?*
7. *Do centralized information technology employees believe the elements tied to their success are the same as those tied to the centralized technology organization's success?*
8. *Do CIOs have a clear understanding of what metrics will be used to evaluate their performance? Which elements do CIOs believe are most heavily factored into their performance reviews? Do CIOs believe that those conducting their performance reviews have adequate guidelines and information to carry out meaningful evaluations?*
9. *How important do users believe the centralized information technology department is to their success and that of their institution?*



## **Methodology Overview and Theoretical Framework**

This study is based upon evidence-based management studies in 2006 and 2007 by Leslie, Loch, Palmer, Schaninger, and Smet. They found correlations between combinations of management practices and superior financial results in 230 global businesses (Leslie et al., 2006; Smet et al., 2007). Additionally, it builds upon 1999, 2006, and 2007 works by Pfeffer and Sutton who outline the keys to creating high-performance cultures (Pfeffer, 1999a; 1999b; Pfeffer & Sutton 2006h; Pfeffer, 2007a).

This study investigates if superior performance in the nine areas used to define organizational quality and the creation of a high-performance culture correlate with perceptions of CIO and technology organization performance. Further, this study identifies the factors that are most associated with satisfaction with the centralized IT organization and the CIO, organizational quality and high-performance areas of opportunity for improvement, factors CIO's believe are most important for the success of the IT organization, areas to include in CIO performance reviews, criteria to assist with CIO hiring, and factors to include in employee job descriptions and incentives. Finally, it begins the development of a much needed framework for CIO success. Chief information officers at institutions identified with doctoral level programs through The Carnegie Foundation for the Advancement of Teaching (DRU: Doctoral/Research Universities, RU/H: Research Universities – high research activity, RU/VH: Research Universities – very high research activity) were contacted to request their school's participation in this study which was conducted using an online survey tool (The Carnegie Foundation Staff, 2008).

## **Summary**

The chief information officer in higher education holds a complex and demanding position. Currently there is little quantitative research on how to succeed as a CIO. The literature states that perhaps the best way for leaders to positively impact their organizations is by improving group performance, valuing employees, and enabling others to succeed (Pfeffer & Sutton, 2006h). Therefore, this study takes an evidence-based management approach to identify higher education CIOs whose organizations exemplify superior organizational performance in the nine areas used to define organizational quality and/or those that create high-performance cultures have more satisfied campus users. It also begins the development of a much needed framework for CIO success. It is critical to higher education institutions that CIOs succeed since they control information and technology assets, oversee tremendous resources, and facilitate the accomplishments of the institution and its members.

## **LITERATURE REVIEW**

Several areas of literature were researched in preparation for this study and will be reviewed below. First, chief information officer (CIO) literature within higher education will be discussed. Second, CIO literature outside higher education is examined. Finally, evidence-based management literature is reviewed.

### **The Chief Information Officer (CIO)**

#### ***The CIO in Higher Education***

The title of chief information officer (CIO) is commonly given to the senior technology leader of an organization (Moberg et al., 2000; Brown, 2004). The CIO is a somewhat recent addition to the higher education administrative team initially appearing in the late 1970s (Hawkins, 2004). The role of the CIO has evolved during its short history from a technical authority to an institutional leader who creates a school's information technology strategy and accompanying technology policies (Drabier, 2003; Penrod, 2003; Brown 2004; Hawkins, 2004). Over 92% of CIOs in higher education report to a chancellor/president/CEO, an executive/other vice president, or a provost/academic vice president (Moberg et al., 2000). As a key member of an institution's executive administrative team, the CIO has responsibilities toward a large number of constituencies and takes on a wide range of roles (Zastrocky & Schlier, 2000; Penrod, 2003). In order to provide an understating of the CIO

position, literature surrounding the higher education CIO's constituencies and roles will first be explored.

### *Constituencies of the CIO in Higher Education*

#### *Operational Administrators*

Operational administrators will be defined in this study as senior administrative stakeholders that directly oversee day to day operations of the college or university. In a higher educational environment, these positions might include vice chancellors, vice presidents, and/or directors of such areas as finance, administration, athletics, institutional research, development, libraries, academic advancement, student affairs, and other similar positions. It is important that these individuals understand their role in facilitating the achievement of campus goals and advancing the school's mission through the use of technology (Hawkins, 2004). Not all technology decisions should be made by the CIO and the information technology department. Research shows that one of the most important factors in the success of technology initiatives is that senior non-technology executives take a leadership role in key technology decisions that effect organizational strategy.

*Although it is important for campus to have a good CIO, the CIO alone is not responsible for how well IT is used on campus. As information technology and information resources have become more pervasive and more important, the collective direction and wisdom of the entire executive team is required to ensure that IT fulfills its potential (Hawkins & Oblinger, 2005, p. 13).*

It is important that operational administrators "take responsibility for overseeing the systems that manage the information assets in their specified domains and for working with each other and the CIO to maximize the institutional effectiveness and efficiency in using technology" (Ward & Hawkins, 2003, p.39). It is these individuals that are most familiar with the needs and limitations of their users and should therefore be involved in the strategic

technology decisions that directly or indirectly impact their respective areas and the university as a whole.

In order for a CIO to communicate effectively with operational administrators and encourage them to take a leadership role in key technology decisions, the information leader must have a true appreciation and understanding of their contribution to the institution. It is imperative that the CIO realize the role each group plays for the university and how it operates. The technology team should strive to be seen as a strategic partner for these administrators. Knowing their strengths, weaknesses, resource needs, and challenges can help create a sense of “being in this together” (Zastrocky & Schlier, 2000; Hawkins, 2006). According to Hawkins, effective IT professionals need to make it apparent that they are aware of and appreciate the fact that the institution and others at the decision making table have priorities that must be dealt with. IT professionals must be team players who know both when to advocate for IT resources and when to reduce the importance of their needs if another campus initiative should take precedence (Hawkins, 2006).

### *Executive Leaders*

There are technology decisions that raise strategic issues for higher educational institutions which require attention from the most senior institutional leaders. These individuals comprise the CIO’s second audience which will be referred to in this study as “executive leaders.” These individuals are employed by the college or university, oversee the operational administrators, and have strategic responsibility for the institution as a whole. In higher education, these include the positions of chancellor, provost, president, and similar titles. These individuals must realize that technology decisions are comparable in importance to finance, government relations, and private fundraising where ultimate responsibility lies

with them. Therefore their leadership role extends to technology decision making as well (Hawkins, 2004; Duderstadt et al., 2002).

*Today, information technology is inextricably woven throughout the fabric of higher education and has assumed a strategic role in the fulfillment of the campus mission. It is thus imperative that campus IT decisions involve not only the chief technology administrator but also the president or chancellor and his or her leadership team (Ward & Hawkins, 2003, p.39).*

According to Ayati and Curzon, support from this level is the most critical component of a CIO's success (Ayati & Curzon, 2003).

*When higher education leaders fail to engage in IT decision-making, and fail to identify information technology as a key responsibility of functional-area executives, their colleges and universities miss countless opportunities to make strategic use of the technology, the campuses make unwise investments, and the institutional budgets bleed from IT expenditures (Ward & Hawkins, 2003, p.46).*

Since it is not uncommon for people throughout the campus community to perceive IT as a black hole for resources, it is important for CIOs to gain credibility and promote initiatives that advance the mission of the institution. Therefore, the chief information officer must understand the mission and strategic direction of the institution and its leadership. This is the only way to communicate effectively with executive leaders and gain their support. Appearing selfish in looking for resources will cost the CIO campus credibility. The chief information officer must be able to communicate resource and project needs in a way that puts him/her in the proper goal specific institutional context. This is a critical part of being an effective technology leader (Hawkins, 2006).

#### *External Executive Stakeholders*

Beyond the executive leaders often lie trustees, boards of governors, legislatures, and similar audiences. The CIO faces unique challenges in addressing these audiences since it is not often that they have direct contact. Messages from time to time may be delivered through

direct presentations but often CIOs reach these audiences through other channels such as through the executive leaders, publications, and/or the media. Little literature surrounds the best way to communicate with these audiences. It can be assumed that communicating effectively with this audience would involve a similar strategy to that used when communicating with executive leaders insofar as promoting initiatives that advance the mission of the institution. Therefore, it is once again critical that the chief information officer understand the mission and strategic direction of the institution and its leadership (Hawkins, 2006). With this constituency group, it is important that the CIO be familiar with higher education issues and legislation, know the key political figures and donors as well as their positions on issues, and know who the organization's supporters are as well as its adversaries (Zastrocky & Schlier, 2000).

#### *Professional Schools and Colleges*

In addition to understanding the needs of the central administrative departments and the college or university as a whole, it is important for the CIO to understand the challenges, technologically and otherwise, for the professional schools and colleges that make up the academic environment. This involves several groups of people including deans, faculty, administrators (including school based technology directors), students, and staff. When communicating with these constituencies, emphasizing collaboration and partnership is essential (Bucher, et al., 2001). Similarly to communication with the operational administrators, it is also important that the CIO have a true appreciation and understanding of these groups' contributions to the institution and how they operate. The technology team should once again strive to be seen as a strategic partner (Zastrocky & Schlier, 2000; Hawkins, 2006). In order to avoid misunderstandings, CIOs must manage these

constituencies' expectations by clearly communicating timeframes, priorities, and resources (Ayati & Curzon, 2003).

#### *Technology Department*

Internally to the technology function, the CIO must communicate with her administrators, staff, business partners, and vendors. In some locations, this includes dealing with unions (Moberg, 2000). In communicating with this group it is important that expectations are clearly set. Additionally, meeting with staff, soliciting feedback, building relationships, and getting to know what motivates technology team members is important for CIO success (Bucher et al., 2001).

#### *Advisory/Governance Committees*

Advisory committees can be extremely helpful to a CIO if managed effectively. These groups are often more about governance than advice since members are often the voice of key constituencies that need to be paid attention to. The purpose of these groups is usually to help define direction and policy. In order to communicate effectively with these individuals, the CIO must be prepared to act on the information they provide or explain why s/he did not. A technology leader that does not do so risks participant drop out or adversarial relationship development. The CIO should consider consulting with key members outside committee meetings to cultivate critical relationships (Hawkins, 2006).

#### *Other External Audiences*

The CIO serves and interacts with various other external audiences including the general public, media, and community leaders and members. As with all of the CIO's constituencies, the CIO must manage his/her interactions with these groups and listen to them to find out their needs, expectations, and/or perceptions. Bucher et al. recommend preparing



a sound bite in advance that concisely states the CIO's goals and plans (Bucher et al., 2001). Due to the increasing dependency of colleges and universities on information technology, there is more and more public interest in regard to what schools are doing with IT. This can be both positive and negative for the IT leader. Although spotlighting technology achievements can greatly benefit the organization, the CIO may also be contacted to discuss more unpleasant topics such as security failures or information loss. It is critical that the CIO know how to communicate effectively with the media in all possible situations (Hawkins, 2006).

### *Peers*

CIOs may turn to peers for advice and professional development. In addition, information technology professionals often publish, attend, and/or present at industry conferences to network and expand their knowledge base. EDUCAUSE (<http://www.EDUCAUSE.edu/>) and Gartner (<http://www.gartner.com/>) are examples of organizations that offer conferences and publish articles that serve these purposes for higher education CIOs.

**Table 4:  
Summary- Constituencies of the Chief Information Officer in  
Higher Education**

<u><i>Internal Audiencies</i></u>	<u><i>External Audiencies*</i></u>
<b>University Wide</b>	Advisory Committees
Campus Wide Committees	Alumni
Executive Leaders	Board of Governors
Central University Staff	Community Groups
Operational Administrators	Community Leaders
Unions	Donors
<b>Central Technology</b>	General Public
Advisory Committees	Peers
Business Partners	Legislature
IT Administrators	Media
IT Staff	Trustees
Vendors	State Boards
<b>School Based</b>	
Administrators	
Deans	
Faculty	
IT Directors	
Staff	
<b>Students</b>	
Distance Education Students	
Graduate Students	
Professional/Executive Students	
International Students	
Undergraduates	
Visiting Students	
* in general not employed primarily by the institution	

*The Roles of the CIO in Higher Education*

The chief information officer wears many hats in the world of higher education. Overall the position in the academic environment may be defined today similarly to how the CIO role was first defined in 1981 as a senior executive of the organization with both

business management and information system expertise who is responsible for information policy, management, control, and standards (Synott & Gruber, 1981; Zastrocky & Schlier, 2000; Beatty et al., 2005). More recently, however, expectations and scope of the role have increased to include a strategic responsibility whereby the CIO leverages technology to achieve organizational goals. In so doing, the position has been elevated in many cases to an executive level position that goes beyond information resource management to one that participates in overall organizational strategic planning (Applegate & Elam, 1992; Zastrocky & Schlier, 2000; Beatty et al., 2005). The CIO is both the head of information systems as well as a member of the CEO's executive team (Zastrocky & Schlier, 2000). The primary functions of the CIO role include involvement in organizational strategic planning, information systems planning, leading information policy development, managing information resources, and overseeing new system development. According to Synott and Gruber, CIOs must be leaders, managers, and visionaries with the ability to position technology as a strategic resource (Synott & Gruber, 1982; Penrod, 2001). With more than 100 years IT management experience, Bucher, Hawkins, Horgan, Moberg, Paterson, and Todd agree that overall the CIO needs three primary skills: communication, alliance building, and collaboration (Bucher, et al., 2001). Clearly, CIOs need many different skill sets and take on many roles. These roles, as identified in higher education CIO literature, will be explored next.

#### *Academic/Author/Researcher*

There is debate surrounding whether or not the CIO should be an academic. It is clear, however, that s/he must have a solid understanding of the academic environment (Hawkins, 2004). Many technology leaders conduct research and contribute to industry and

academic publications such as EDUCAUSE. Doing so fosters dialog, facilitates relationship building, and encourages information sharing between campus leaders (EDUCAUSE Quarterly Staff, 2008). It is also important that the CIO stay abreast of current technologies and industry trends (Gottschalk, 2002).

### *Business Partner*

The CIO should actively seek to create partnerships with internal business units, other colleges and universities, and private enterprise to gain economies of scale as well as to provide unique educational and support opportunities for his/her constituencies. The central technology department is no longer the only technology expert on campus. Library, academic, and administrative departments often have their own technology expertise. They generally have technology knowledge specific to their respective areas and often determine which IT solutions they will implement. The CIO must recognize this and work collaboratively to ensure that their solutions work with the campus infrastructure (Drabier, 2003).

### *Central System and Infrastructure Provider*

The CIO oversees the campus technology infrastructure in support of the institution's mission. This usually includes administrative, instructional, and research computing as well as networking, data storage, and information security (Jackson, 2004).

### *Change Agent*

Since technology implementation and use often involves change, the CIO must be able to facilitate institutional change (Penrod, 2001; Hawkins, 2004). As a change agent, it is critical to communicate changes widely. The organization's goals should be clearly defined and a consistent message must be delivered regularly (Brooks, 2003). It is important to

realize that the CIO is an agent of change but is not, however, the campus change agent. In 2004 Hawkins notes:

*The effective CIO understands that in advocating for technological change, his or her ultimate credibility comes from effectively communicating and realistically evaluating the goals, costs, options, tradeoffs, and risks associated with pursuing a proposed technological direction, implementation, or innovation. The CIO must be an active participant in campus discussions and must be able to help other institutional leaders understand the complexities of information resources, service delivery, technologies, and the information demands of the community (Hawkins, 2004).*

Although not the campus change agent, the CIO certainly has a role in overarching institutional change. Hogue and Dodd summarize the CIO's change agent role well stating that s/he "must participate in and influence change in the institution's structure, processes, and culture, transcending boundaries in instruction, scholarship, service, business processes, and administration" (Hogue & Dodd, 2006, pp. 49-50).

In this role, the CIO may face resistance. To mitigate this, it is important to have a clear understanding of the expectations regarding the scope of the CIO's change agent role and to include constituencies when setting priorities and making decisions. In the event that one of these groups decides to go over the CIO's head, it is important that the person above is aware and supportive of the IT leaders decisions (Bucher, et al., 2001).

#### *Coach/Motivator/Mentor/Mentee*

The CIO is increasingly expected to assume the role of coach and teacher (Hawkins, 2004). Often, CIOs have been mentored and become mentors. Mentoring relationships are important in that they nurture organizational talent (Kuo, 2000). "Veteran IT professionals are often charged with identifying and developing future IT leaders, while future leaders often seek current leaders to whom they can turn for support and guidance" (Hogue & Pringle, 2005, p. 50). Mentoring relationships should be mutually beneficial. The mentor

and mentee must understand, support, and help to achieve each other's goals. Finally for the mentor-mentee relationship to work well, both should commit to honesty and active listening as well as learn from each other, lead by example, and maintain flexibility (Hogue & Pringle, 2005).

#### *Coalition Builder/Collaborator/Facilitator*

The chief information officer must be a coalition builder (Hawkins, 2004). Collaboration is necessary to build coalitions and successful, high-performance organizations. According to Agee and Holisky, collaboration is necessary to overcome the academic and IT cultural divide to accomplish the institution's mission more effectively than could be done single-handedly. In order to achieve this level of collaboration, the CIO and the academic leaders "need to commit to, plan for, and model collaborative behavior" (Agee & Holisky, 2003, p.64).

This can be done by adopting a leadership style that is more collaborative than authoritative. The CIO does not unilaterally make decisions and sell the campus on specific technologies. Instead, s/he must act as a facilitator "who listens to many campus constituencies, encourages involvement and ownership of technological tools and processes, synthesizes the many needs and ideas, and articulates the collective IT vision for the campus" (Drabier, 2003, p.8).

By using collaboration as a leadership strategy, CIOs can minimize conflict between institutional players, leverage limited financial and personnel resources to increase accomplishments, and develop a powerful tool for institutional change (Agee & Holisky, 2003). When working with his/her various constituencies, it is more important for the CIO to focus on user needs and processes than on particular technologies (Brooks, 2003).

For successful collaborative relationships, clear, open, and regular communication is essential. Open communication channels provide the groundwork. Regularized communications including feedback mechanisms are critical for successful collaborative activities. Planned, strategic communications support long run successful collaboration (Agee & Holisky, 2003).

#### *Committee Member/Leader*

CIOs often serve on and/or lead committees. These may include institution strategic planning committees, educational committees, advisory committees, governance committees or others. It is important for the CIO to know how to develop and lead committees including what the role of the group should be and what types of tasks are best undertaken within a committee structure. Furthermore, the CIO must understand his/her role on the committee and contribute accordingly (Penrod, 2001; Weill & Ross, 2004).

#### *Communicator*

To succeed as a chief information officer, effective communication skills are necessary (Pernod, 2001; Hawkins, 2006). The CIO must plan for communication by thinking explicitly about who needs to be involved in the communication network, how frequent communication needs to be, and which activities are going to be the most effective. Strategically planned communication supports successful long run collaborations and therefore chief information officer success (Agee & Holisky, 2003).

Although the literature states CIOs must be adept communicators, some senior executives believe CIOs are the most lacking communicators of all administrators (DeLisi, 1998; Christenberry, 2001; Pernod, 2001; Ayaiti & Curzon, 2003; Brown, 2004). The literature documents a communication gap between technology departments and executive

leadership (Brown, 2004). It is important that the CIO bridge this gap and communicate effectively (White, 2001; Agee & Holisky, 2003; Brown 2004).

The CIO must be comfortable communicating using business and higher education vocabularies. CIOs must be fluent in both of these areas as well as able to clearly communicate without technical terms. (Wang, 1997; Agee & Holisky, 2003; Brown, 2006). Without adequate communication, relationships between the technology department and others in the academic environment can suffer (Agee & Holisky, 2003; Brown, 2004; Brown, 2006). Successful communication requires planning and follow-through. Without someone specifically responsible for maintaining communication, IT departments may easily return to an isolated method of operation (Agee & Holisky, 2003).

Not all communication is one-way information dissemination. It is also important for the CIO to understand the perceptions and requirements of her constituencies. When meeting with constituencies it is important that the CIO spend time listening to and asking about their needs. Having a short consistent “sound bite” that describes technology goals and plans is helpful. It is also important for the CIO to encourage partnership, communication, and collaboration (Bucher, et al., 2001).

CIOs must determine “which people or groups should be communicating on an ongoing basis to ensure smooth operations. They also need to decide explicitly the forms that communication should take” (Agee & Holisky, 2003, p.78).

#### *Contract Overseer/Negotiator*

As a contract negotiator, the CIO is responsible for vendor relationship management and contract negotiation, supervision, and evaluation (Brown, 2006). More recently this role has expanded to include national and international negotiations (Jackson, 2004).



### *Decision Maker*

The CIO is a decision maker. It is the IT Leader's role to:

*Listen, encourage, coach, and foster ongoing dialogue with all constituencies, describe the range of possible implementation strategies, articulate the campus vision and plan, and make final implementation decisions based upon a combination of what people want and what will be technically feasible (Drabier, 2003, p. 9).*

A CIO's decision making process should examine whether the outcomes will support the university's mission (Brooks, 2003).

In making decisions, it is important that the CIO be well informed. This means that s/he must depend on and trust the capabilities and advice of other specialists. These advisors may be IT staff, faculty, colleagues at other institutions, members of professional organizations, or others. Furthermore, academic evidence should be consulted. By drawing on these resources, a CIO is able to make decisions based on a more extensive base of knowledge (Hawkins, 2004). Making sound information technology decisions and effectively communicating and explaining them to executive leaders are chief CIO responsibilities in academia (Kelly & Sharif, 2005).

### *Educator/Advocate/Salesperson*

The CIO must educate others about the ways in which new technologies and information flows are affecting information-based environments such as higher education (Hawkins, 2006). S/he must promote strategic technology use and educate others on how IT adds organizational value (Brown, 2006). The chief information officer also has a responsibility to educate others on technology limitations (Hawkins et al., 2003; Brown, 2004). The CIO must also be an advocate. S/he must advocate to both internal and external constituencies on behalf of information technology and the institution (Jackson, 2004).

### *Enabler*

All CIOs are in the “service” business since they assist students, faculty, and staff in achieving their goals. As a service partner, the IT leader must help the campus community determine how information technology can assist them in achieving the goals of their units and the campus at large. The CIO must communicate effectively, listen, and establish trust in order to be perceived as acting in partnership with end users as well as be careful not to overstep the boundaries of his/her local expertise (Hawkins, 2006).

### *Entrepreneur*

The CIO must often function as an entrepreneur in that s/he identifies organizational needs and develops innovative solutions. “A major responsibility of the IS manager is to ensure that rapidly evolving technical opportunities are understood, planned, implemented, and strategically exploited in the organization” (Lineman, 2005, p. 81).

### *Evaluator*

CIOs agree that there is a need to assess and evaluate IT efforts including identifying the benefits of IT investments, understanding student and faculty IT concerns, evaluating employee and project team performance, and calculating return on investment. There is a gap between the number of CIOs who believe this to be important and the actual level of current assessment and evaluation taking place (Green, 2007).

Project-based work highlights “individual contributions, innovation, and leadership potential” (Renaud & Murray, 2003, P. 175). Although Renaud and Murray wrote about evaluating and finding leadership potential in higher education librarians, it can be assumed that the chief information officer as well must find internal leaders and may do so by defining and evaluating successful individuals, groups, and projects based on clearly stated metrics.

In order to do so, s/he must be able to determine project “objectives, measures of success, deliverables, and a specific beginning and end” (Renaud & Murray, 2003, p. 176).

*Financial Manager/Resource Allocator*

“Successful IT leaders need to understand the financial environment in which the institution operates in order to best plan and implement supporting information technologies” (Goldstein, 2007, p. 63). To do so, the CIO must understand higher education financial reports. S/he should track key numbers, understand the financial strength of the organization, and know the financial resources necessary for success (Zastrocky & Schlier, 2000). The constantly increasing gap between funding and expectation requires that the chief information officer make strategic choices for how to use technology resources effectively (Brooks, 2003).

*The typical college or university spends 5 percent to 10 percent of its operating budget on information technology... Particularly as funds become scarcer, deciding how much to invest in information technology, through what mechanisms, and for what purposes becomes a difficult university wide challenge.... Such negotiations must reflect a consistent, strategic view of information technology and its institutional role. Developing and espousing that view is the ... most rapidly evolving element of a CIO's role (Jackson, 2004, p. 23).*

Deciding how to allocate funds should come directly from strategic discussions.

Unfortunately, Ross and Weill find this is often not the case. Instead, IT resources are often given out across constituencies “satisfying everyone a little and no one completely.”

Allocating funds in this “political” manner is not strategic (Ross & Weill, 2002; Ward & Hawkins, 2003, p.42). In addition to financial resources, the CIO must also allocate human and information resources (Gottschalk, 2002; Lineman, 2007).

### *Fundraiser/Politician*

According to Ann Field, CIOs must manage in all directions to obtain the money and influence they need. The position has moved from technical to political (Field, 2001; Penrod, 2001). The technology leader must have the ability to secure IT resources (Penrod, 2001).

The chief information officer should also be familiar with higher education issues and legislation. S/he must know the key political figures and donors as well as their positions on important issues. In addition, the CIO must know who the organization's supporters are as well as its adversaries. Finally, the CIO should be familiar with relevant higher education media reports (Zastrocky & Schlier, 2000).

### *Informaticist/Information Manager/Information Security Provider*

As an informationist and technology strategist, the CIO must secure the institution's data assets and align IT and institutional goals (Brown, 2006).

*CIOs are being asked to do more than simply manage information technology – they are being asked to archive and preserve not just the assets themselves but also the historic applications and data formats that will someday be required to decode these archives (Hawkins & Oblinger, 2007, p. 10).*

The CIO must know what information is needed and make it accessible. S/he also should ensure that data is presented in a way that results in value and information creation (Hawkins & Oblinger, 2007).

Security and privacy issues are also key concerns for the CIO.

*Privacy and academic freedom are critical components of campus culture; it is vital that decisions on policies and practices regarding security and related issues be carefully vetted, understood, and authorized by both the highest levels of the campus leadership and the representatives of the campus community (Ward & Hawkins, 2003, p.45).*

CIOs are in a position to address institutional data demands as well as security and privacy issues and this role is becoming increasingly important (Hawkins & Oblinger, 2007).

### *Innovator*

Centralized higher education IT departments, overall, are not perceived as overly supportive of technology innovation. Data shows it likely that IT leaders who foster and support innovative environments positively impact their institution. IT professionals who feel that they work in innovative environments agree more that their department is influential, that IT is an important part of institutional strategic plans, that IT contributions are valued, that IT facilitates positive cultural change, and that the institution is technologically forward thinking (Katz et al., 2004). This seems to indicate that CIOs may be more successful if they are able communicate the importance of technology innovation and create an innovative environment.

### *Leader*

A term “leader” is not the same as the term “manager” although managers can be leaders and vice versa. Leaders have a vision and are able to get others to want to strive toward it. They are able to bring people together for a shared goal (Hawkins, 2004). Direction is set by the leader, while a manager creates systems and structure to pursue set directions (Kotter, 1990; Renaud & Murray, 2003).

In 2003, Ware found that IT and business alignment was a top CIO issue (Brown, 2004). As the technology leader, the CIO must be able to align these to meet the institution’s goals (Feldman, 2003; Brown, 2004). According to Poley, effective communication is critical to alignment success (Poley, 2001; Brown, 2004).

*Proper alignment ensures that institutional and IT leaders agree on the optimal use of IT resources – and recognize technology’s intrinsic value to the institution... The heart of IT’s alignment with an institution is a common understanding of that institution’s priorities, which is derived from an inter-connected web of strategic leadership activities – IT strategic planning, IT governance, communications, and measurement/assessment (Pirani, 2004, p. 1).*

In order to overcome the cultural differences and problems often seen between the technology and academic departments of an institution, Agee and Holisky suggest using collaboration as a leadership strategy. Collaborative leadership is an effective strategy for overcoming this cultural divide since:

*Collaborative activities improve mutual understanding, increase respect for the expertise embodied in each organization, open up the possibility of commonly-agreed-upon solutions, enable more effective use of resources, and, as a result of all these, build trust relationships that foster further collaboration (Agee & Holisky, 2003, p.70).*

Katz found that the majority of senior IT leaders that responded to the 2004 EDUCAUSE ECAR survey had high transformational leadership scores which have been associated with organizational effectiveness (Burns, 1978; Katz et al., 2004).

“Transformational leaders are good role models: they inspire, empower, and motivate staff; encourage creativity; and effectively communicate a shared mission and vision” (Katz et al., 2004, p. 5).

As leaders, CIOs should focus on creating value for their institution. “Our goal as CIO leaders must be to take this mass of commoditized technology and apply it to today’s problems in creative and fundamentally different ways. That’s where IT remains strategic, and it’s how we can provide value as CIO leaders” (Chester, 2006, p. 57). Hogue and Dodd state, “flexibility, adaptability, vision, innovation, and creativity will play very important roles in helping the next generation of leaders think beyond current paradigms and move toward fundamental transformation” (2006, p. 50).

John C. Hitt – fourth president of the University of Central Florida (UCF) states that as a leader:

*If you can formulate a plan, as set of activities, a list of goals that people who are involved in the institution can remember, can understand, and can trust will take them in the direction that they want to go and that the institution needs to go, then you have a powerful vehicle for building something that is going to serve the needs of students, faculty, and staff—and the larger society—in ways that will make all participants proud (Barone, 2005, p. 32).*

CIOs are the technology leaders of an institution and it is in this role that they are able to create value and ensure business alignment.

### *Liaison*

The CIO must communicate with many different groups both internal and external to the college or university. Often s/he must act as a liaison between these groups and the IT organization, college, or university. These groups include the constituencies discussed earlier (Gottschalk, 2002; Lineman, 2007, p. 81).

### *Manager/Administrator*

As a manager, the CIO should clearly communicate his/her management philosophy including which management theories s/he respects and what transformation strategies s/he believes are best for the organization. Once the CIO defines his/her strategy, it is important that it is communicated widely. It is also imperative that the CIO understand the latest in organizational development strategies and have the ability to build and retain a talented staff and management team (Penrod, 2001). The CIO should define the roles of the organization and communicate those to his/her staff. It is in this way that staff members understand how their jobs are relevant (Brooks, 2003).

Additionally, the CIO must build and/or sustain a viable governance structure. Peter Weill and Jeanne Ross define IT governance as:

*Specifying the decision rights and accountability framework to encourage desirable behavior in using IT. It governance is not about making specific decisions—*

*management does that—but rather determines who systematically makes and contributes to those decisions (Weill & Ross, 2004, p.2).*

IT alone should not be responsible for all technology decisions. A governance structure outlines those with input as well as those with decision rights and defines IT accountability (Clark, 2005).

### *Marketer*

Zastrocky and Schlier state that the chief information officer should be familiar with the school's competition as well as the key figures associated with successful marketing of the organization. They also note that the CIO should understand the institution's critical success factors as well as its strengths and weaknesses (Zastrocky & Schlier, 2000).

Brooks touches on the idea of integrated marketing when discussing the importance of defining what each area of the technology organization does so that a common message can be given to staff, clients, and the institution about what can be expected from the IT department. A clear, constant message, if well communicated and understood, enables everyone to accurately represent what the organization does (Brooks, 2003).

The IT organization must also be aware of possible marketing pitfalls. According to a recent CIO magazine article, marketing efforts will be unsuccessful when IT's credibility is low and if constituent experiences are counter to what is communicated. It is important to identify those who make information technology decisions and those who influence them as primary marketing targets. Effective marketing requires understanding how each customer defines value and ensuring "that IT is both delivering against their tangible expectations and over-delivering on the intangibles" (Cramm, 2005, p.2).



### *Monitor*

It is important that the technology leader stay on top of technical changes and competition. To this end, it is necessary for him or her to periodically scan the external environment for new innovations.

*In acting as the firm's technical innovator, the IS manager identifies new ideas from sources outside of the organization. To accomplish this, the IS manager uses many sources including vendor contacts, professional relationships, and a network of personal contacts (Lineman, 2005, p. 81).*

### *Policy Maker/Standards Developer*

CIOs often have institutional policy development responsibility (Penrod, 2003). Additionally, the chief information officer must be involved in technology policy issues. S/he must be able to align campus policy with federal policy, regulatory demands, and campus operations. It is imperative that the CIO be aware of relevant policy issues (Hawkins, 2004).

The CIO, for “reasons of policy and efficiency and because of legal constraints” must work with institution leaders to develop information technology policies, standards, and procedures (Jackson, 2004, p. 23). The CIO should also ensure that peoples’ technology use does not negatively impact others or compromise security (Jackson, 2004). It is important that CIOs work with campus leaders to set a reasonable standard of service in line with available resources.

*Before making a decision that a given level of service should be maximized, leaders should examine the service in light of the trade-offs between costs and goals... with the consensus nature of campuses, it is often easier to make a decision that will result in the least amount of criticism and complaint. Faculty advisory committees sometimes will shoulder a portion of this responsibility, but often they are not concerned with—or even charged with—the economic consequences of their decisions (Ward & Hawkins, 2003, p. 44).*

Therefore, it is important that the CIO provide appropriate campus leaders with the options, costs, and the trade-offs involved in making service level decisions so that the group can work together to implement standards.

*This consultation cannot be relegated to the loudest or the most cantankerous member of the community but needs to fit with broad institutional objectives and be backed up with the authority of the academic leadership, not just the perceived arbitrariness and capriciousness of the CIO. The trade-offs regarding reliability, customization, and responsiveness on IT matters must become campus decisions (Ward & Hawkins, 2003, p. 44).*

#### *Project Manager*

Technology leaders should have project management skills (Haggerty, 2000; Smaltz, 2000; Brown, 2004). Since 2001 upgrading and/or replacing enterprise resource planning (ERP) systems has been a top issue for higher education institutions (Green, 2007). The CIO, who is responsible for critical and complex institutional projects such as ERP implementations, has to be a project manager capable of successfully completing large, complicated, costly, impactful initiatives (Haggerty, 2000; Brown, 2004).

#### *Public Speaker/Presenter/Public and Media Relations Manager/Spokesperson*

The chief information officer must be a skilled public speaker, since the position often involves communicating future plans in a persuasive manner. Success as a public speaker ultimately depends on the individual's credibility (Hawkins, 2004). Due to the increasing dependency of colleges and universities on information technology, there is more and more public interest in regard to what schools are doing with IT. It is therefore also critical that the CIO know how to communicate effectively with the media (Hawkins, 2006).

#### *Student*

Technology and higher education fields are always changing and a successful chief technology officer in a college or university environment must stay up-to-date on the fields

of management, leadership, higher education, and technology. What leaders read contributes to shaping their views on issues and this continuous learning is essential to developing a strategic broader view of the factors affecting technology, the campus, and the field of higher education (Hawkins, 2006).

### *Strategic Planner/Consensus Builder*

Strategic planning is an important CIO responsibility (Brown, 2006). Seventy-three percent of campuses participating in the 2007 Campus Computing Project have an institutional IT strategic plan (Green, 2007). As campuses continue to expand IT uses and expectations, strategic planning is necessary to avoid wasting scarce resources and initiatives that fail to make meaningful progress (Maughan, 2001).

According to Drabier, strategic planning is about communication and building consensus among the constituencies of the institution (2003). It is important in higher education due to rising costs and productivity and accountability demands as well as increasing pressure from the economy, competition, and government regulation (Drabier, 2003; Brown, 2004).

*In higher education being strategic means being closely aligned with both the academic and business missions of the institution...Technology projects that don't support strategic goals have declining value for the institution (Chester, 2006, p. 57).*

To be a respected member of the executive team, the CIO must contribute more than information technology specific initiatives. S/he must also understand institution-wide issues and participate in strategizing solutions for them. CIOs should suggest potential technology based solutions when appropriate and manage the technology department as a profit-center (Zastrocky & Schlier, 2000). According to Hogue and Dodd, the CIO must transform campus IT into "strategic organizations" poised to meet current and future needs (p. 49).

### *Support Provider/Secure Service Provider*

This role involves maintaining overall technology support, responsiveness, and security (Brown, 2006). As technology continues to pervade the academic environment, IT departments will be valued for the achievements they make possible rather than the difficulty of their tasks or quantitative efficiency measures. This means the CIO must be able to demonstrate and communicate that resources are appropriately targeted and contribute to programmatic achievements (Brooks, 2003).

Many institutions are moving to a more flexible multi-tiered support structure. In this type of environment, there are both centralized and distributed support services. The CIO must make sure that the core centralized services are “stable, well supported, and cleanly delivered” (Brooks, 2003, p.52). Additionally, s/he must make sure that initiatives undertaken outside of the central IT organization work with the campus infrastructure (Drabier, 2003). In this type of environment, it is important to focus on achieving goals by collaborating across organization boundaries (Brooks, 2003).

### *Team Builder*

The CIO must be able to strategically design teams by identifying their type and goals and developing their structure and capabilities. Once in place, it is important to build a team’s effectiveness by providing conflict resolution and interpersonal communication trainings, building group trust, engendering mutual respect, and developing commitment and cohesiveness (Penrod, 2001).

### *Visionary*

The CIO must have a visionary capacity as well as the ability to generate a shared vision for the organization’s future (Synnott & Gruber, 1981; Penrod, 2001). Building a

campus-wide vision for information technology is essentially a consensus-building task which requires the CIO to have developed trust with the many campus constituencies. The trust needed is “founded upon good communication within the campus concerning IT issues, concerns, and developments, the existence of a true service attitude toward the delivery of technical support and services, and a history of acting in a collaborative manner” (Drabier, 2003, p.6).

In summary, the CIO position is a difficult and demanding one comprised of many roles. The roles suggested in the higher education literature for college and university CIOs are recapped in Table 5.

<b>Table 5: Summary- The Roles Identified for the Chief Information Officer in Higher Education</b>	
Academic	Leader
Administrator	Liaison
Advocate	Manager
Author	Marketer
Business Partner	Mentee
Central System Provider	Mentor
Change Agent	Monitor
Coach	Motivator
Coalition Builder	Negotiator
Collaborator	Policy Maker
Committee Leader	Politician
Committee Member	Presenter
Communicator	Project Manager
Consensus Builder	Public and Media Relations Manager
Contract Overseer	Public Speaker
Decision Maker	Researcher
Educator	Resource Allocator
Enabler	Salesperson
Entrepreneur	Secure Service Provider
Evaluator	Security Provider
Facilitator	Spokesperson
Financial Manager	Standards Developer
Fundraiser	Strategic Planner
Informaticist	Student
Information Manager	Support Provider
Infrastructure Provider	Team Builder
Innovator	Visionary

*Challenges Surrounding the Position of CIO in Higher Education*

*A Complex and Difficult Position*

The CIO position as described above with its numerous roles and large number of constituencies is a complex and highly visible position. The role is further complicated by a

rapidly changing technology environment, as well as often times by a lack of understanding and support by upper management, lack of strategic funding, lack of technology standards, aging technology systems, high expectations, and inadequate IT management approaches (Moberg et al., 2000). Higher education environments can create an additional challenge for the CIO in that they are typically slow to change, have unique organizational cultures, are comprised of differing administrative structures, and maintain traditional approaches to governance and decision making (Lineman, 2007).

In addition to the numerous roles and responsibilities, there are other challenges that make the CIO position difficult such as, “changing priorities in the institution, expensive and visible initiatives, and increasing expectations for ubiquitous and seamless service” (Brooks, 2003, p.42). Higher education’s shared governance approach to decision making also makes the role increasingly complex (Clark, 2005). Hogue and Dodd note:

*Diminishing financial support, greater user expectations and functional requirements, increased public and constituent accountability, economic globalization, deeper concerns over privacy and security, digital content and intellectual property conflicts, changing political climates, and escalating competition from both traditional and nontraditional education “franchisees” can be viewed as threats and pressures (2006, p. 49).*

It is clear that the CIO position is indeed complex.

### *Turnover*

Turnover is high in CIO positions. In 2000, Moberg et al. reported that 52.9 percent of CIOs surveyed had been in their position less than three years. Zastrocky and Schlier also note the lack of longevity in the CIO role as compared to other executive academic positions (2000). In industry, it is relatively well known that the title CIO not only stands for “chief information officer,” it also, unfortunately, “is said to stand for Career Is Over” (Rothfeder & Driscoll, 1990; Lin, 2004, p. 51).

### *Lack of Career Progression*

Little was found in the higher education literature surrounding career paths beyond the CIO role. In industry literature, Applegate and Elam found senior IT executives rarely leave positions for promotion (Applegate & Elam, 1992).

### *Confusion Regarding Proper Training/Background*

There is little clarity surrounding the proper preparation for the role of CIO. There is much debate surrounding what educational background a CIO should possess and there is also a lack of clear career progression to the role (Hawkins, 2004).

*The selection of a CIO may be hampered... by the lack of a systematic identification of the important educational and career experiences this individual should possess in order to be successful in leading this important function in the higher education environment. A review of the literature revealing a list of standardized qualifications that a CIO needs to possess in order to be successful has not been identified. There is a lack of research that clearly identifies the importance of formal education and career experiences that current CIOs have identified important in aiding his or her success (Schaffer, 2004, pp. 50-51).*

Schaffer found that CIOs believed beneficial educational fields included business, information systems, and educational leadership. CIOs also noted that other important competencies for success in the position included understanding school politics, networking with others in the CIO role, strategic partnerships, and planning, leadership, and strategy development skills. Schaffer concludes that “additional research should be conducted to investigate the relationship between the formal fields of education deemed important for the success of a CIO and the educational preparation for CIO candidates” (2004, p. 128). Currently certificate programs, business schools, computer science programs, and schools of information are often part of the CIO’s educational background (Katz et al., 2004).

### *Selecting a CIO is Difficult*

Due to the complexity of the CIO role, lack of role definition, and a diverse set of



expectations, selecting a CIO is a difficult task. A framework is needed to determine what makes a CIO successful for those in the position looking to improve and for those in the process of selecting their next technology leader (Hawkins, 2004).

### *Chief Information Officer Success Definition is Unclear*

#### Lack of Clear Definition and Metrics

There is not a clear definition of what constitutes CIO success and how it should be measured. “Only one-third of institutions include metrics for assessment at the time IT initiatives are approved... Only a few institutions use full methodologies such as the Malcolm Baldrige process or Balanced Scorecard” (Albrecht et al., 2004, p. 103). Many past CIOs and industry experts offer advice and insight on what makes a CIO successful, but their suggestions are broad and varied and a standard method of CIO evaluation could not be found in the higher education literature. Perhaps the most commonly cited success measure was how well technology enables the institution to reach its goals or individuals within the organization to reach theirs (Brooks, 2003; Jackson, 2004; Chester, 2006). “Potential CIO leaders should understand that the value of IT comes from the benefits realized by those outside the IT organization. Success is best understood from their perspective” (Chester, 2006, p. 58). Others noted communication that enables long run collaborations leads to CIO success (Agee & Holisky, 2003). Still another wrote that technology invisibly is a sign of success. “For information technology, at least in higher education, invisibility constitutes success. As an instrument rather than a goal, IT succeeds by advancing other goals like research, teaching, and service” (Jackson, 2004, p. 22). A 2003 study found that that success for IT in higher education was usually evaluated in terms of user satisfaction, technology

reliability, and budget control (Griffiths, 2003). Although technology reliability and budget control are somewhat easily quantifiable for evaluation, user satisfaction is more difficult. Although these may very well be identified as keys to CIO success, how these goals are best achieved, measured, and evaluated is an area in need of further study. Additional advice and research on how to be a successful CIO in higher education will be explored next.

#### How to be a Successful CIO in Higher Education – Advice from Experts/Past CIOs

Many studies offer advice based on the experiences of past CIOs or other industry experts on how to be successful as a CIO (Moberg et al., 2000; Bucher et al., 2001; Agee & Holisky, 2003; Ayati & Curzon, 2003; Brooks, 2003; Drabier, 2003; Hawkins, 2004; Hawkins, 2006). Hawkins states that strong communication skills, boundary-spanning ability, leadership ability, familiarity with the academic environment, coalition building ability, change management ability, technological skills and understanding, and management experience are necessary qualities in a CIO (Hawkins, 2004). Ayati and Curzon state that a CIO's success depends on, the "ability to understand the environment, manage effectively, communicate skillfully, know the technology, align with the mission, establish priorities, set clear directions, and support users" (Ayati & Curzon, 2003, p. 23). Bucher et al. agree with EDUCAUSE President Brian Hawkin's recommendation that a CIO must have excellent communication and alliance building skills as well as possess the ability to collaborate. They break these into five key skills: flexibility, pragmatism, relationship management, budget management, and expectation management (Bucher et al., 2001). Pete DeLisi, academic dean of the Information Technology Leadership Program at Santa Clara University states, "The ideal CIO needs to be a marketer, a strategist, a technologist, a leader, an organizational behaviorist – all these things" (Kwak, 2001, p.16; Schubert, 2004, p. 65). Ward and Hawkins

note that the CIO “must articulate goals that integrate information technology within the institutional strategic plan, align planning and assessment at all levels, and focus on outcomes” (Ward & Hawkins, 2003, p.40)

More recent advice on how to be a successful CIO includes that from Goldstein, Chester, Hogue, and Dodd. “Today’s leaders in higher education information technology (IT) know that a significant factor in their success is a solid understanding and skillful management of finances related to IT” (Goldstein, 2007, p. 61). Chester advises:

*Accept the commoditization of IT and use it to your institution’s advantage by shrinking costs. Become strategic by changing the culture of your organization and linking its success to the success of others outside the group...Take advantage of strategic sourcing... measure and report the performance of your organization* (2006, p. 60).

Hogue and Dodd state that the “transformation of IT [into strategic organizations capable of meeting current needs and future positioning requirements] is the minimum achievement for a CIO’s performance to be considered acceptable” (2006, p. 49). It is easy to see how such advice may be helpful and overwhelming at the same time. There is little evidence that any of this advice has been empirically proven to lead to CIO success, especially given the fact that the CIO “success” definition is unclear, and there is little written on how to translate much of this advice into action.

#### How to be a Successful CIO in Higher Education – Research Studies

There were a few empirical studies found that offered data on how to be a successful CIO in higher education. Pirani found that “higher levels of perceived effectiveness in the core activities of planning, governance, and communication do indeed result in higher levels of perceived alignment between IT and the institutional purpose” (Pirani, 2004, p.1). He

established that IT departments that do the following are perceived to be more closely aligned with organizational goals:

- *Clearly articulate campus vision and/or priorities*
- *Consider planning important and closely linked to the institutional budget*
- *Publish an institution or a campus IT plan or engage in planning activities continuously*
- *Report dynamic or stable environmental climates*
- *Perceive their IT governance process to be effective*
- *Perceive their it strategic planning process to be effective*
- *Have greater communication with and involvement of key constituents, especially faculty and deans*
- *Clearly document objectives at the time IT initiatives are approved* (Pirani, 2004, p.2).

Perhaps the organization that contributes the most empirical research for the higher education technology community is The EDUCAUSE Center for Applied Research (ECAR). It was started in 2002 “to create a body of research and analysis on important issues at the intersection of higher education and information technology” (Albrecht et al., 2004, p. 5; Katz et al., 2004, p. 5). A 2004 ECAR study found that that mentoring may contribute to CIO success. An association between mentoring and improved transformational leadership abilities, higher salaries, and industry commitment was found in their 2004 higher education study (Katz et al., 2004). The study found that IT leaders have high transformational leadership scores which are often associated with higher organizational effectiveness.

*These leaders are good role models who empower staff members to achieve higher standards and engender trust in others. They are change agents who articulate a clear, shared vision of organization and establish meaning in organizational life* (Katz et al., 2004, p. 64).

The study also found that CIOs who fostered more innovative climates had organizations whose members perceived the IT department to be more influential. IT effectiveness markers were put forward based on a study conducted in 2003 by Nelson and Green which surveyed CIOs to find that business, human relations, and technology expertise were

perceived as critical for success. The markers developed were based on the need for the CIO to understand institutional culture, perceived needs, politics, technology impact, IT staff, influential groups, and executives (Nelson & Green, 2003; Katz et al., 2004). A 2003 ECAR study found that “leadership style appears to play an important role in CIO effectiveness” (Nelson, 2003, p. 10). Again, however, the idea that CIO success can come from a proficiency in these areas is based primarily on the perceptions of CIOs or IT staff members and not empirical evidence that ties this expertise to actual success measurements by those outside the IT organization.

Finally, Sabherwal and Kirs found that IT alignment with a school’s strategic needs improves perceived performance and technology success (Sabherwal & Kirs, 1992; Katz et al., 2004). Institutions with higher perceived alignment with organizational goals also have greater perceived effectiveness in planning, governance, and communication (Albrecht et al., 2004).

### *Challenges Summary*

In summary, the CIO position is a complex and challenging one. High expectations, a rapidly changing environment, lack of management support, high visibility, lack of funding, differing administrative structures, lack of standards, aging systems, inadequate IT management approaches, unique higher education cultures, challenging or non-existent governance structures, increasing privacy and security demands, high turnover, uncertain career progression, increasing responsibility, unclear training, lack of success definition, and unclear evaluation metrics all contribute to creating a difficult position in need of a framework for success. The skills, abilities, attributes, and knowledge requirements

suggested in the higher education literature for college and university CIOs are recapped in Table 6.

<b>Table 6: Summary- Skills, Abilities, Attributes, and Knowledge Requirements Identified for the Chief Information Officer in Higher Education</b>	
Ability to Align IT and University Goals	Innovation
Ability to Align IT and Individual Goals	Institutional Commitment
Ability to Align Planning and Assessment	Interpersonal Skills
Ability to Build Alliances, Coalitions, and Strategic Partnerships	Knowledge of Academia
Ability to Build and Retain Talented Staff	Knowledge of Marketing
Ability to Enable the Success of Others	Knowledge of Organizational Culture
Ability to Engender Trust in Others	Leadership Skills
Ability to Focus on Outcomes	Listening Skills
Ability to Prioritize	Management Skills
Ability to Secure Financial Resources	Networking Skills
Ability to Set Direction	Organizational Behavior Skills
Ability to Sustain a Viable Governance Structure	Organizational Skills
Adaptability	Planning Ability
Alliance Building Skills	Political Savvy
Boundary-Spanning Ability	Pragmatism
Business Acumen	Relationship Management Skills
Change Management Ability	Respect for Colleagues
Collaboration Skills	Self Confidence
Communication Skills	Strategy Development Skills
Creativity	Strong Work Ethic
Credibility	Technical Knowledge
Decisiveness	Trustworthiness
Evaluation Skills	Understanding of CEO's Outlook and Direction
Expectation Management Skills	Understanding of Fellow Executives
Financial Management Skills	Vision
Flexibility	

*Top Concerns for CIOs in Higher Education*

Since 1990, Kenneth Green has conducted a yearly study, *The Campus Computing Project*, of computing and information technology in American higher education. Each year senior technology officers across the country (a representative sample of 1200 two- and four-year public and private colleges and universities) participate in the study and answer many IT questions including what their top concerns are. In 2007, 555 two- and four- year public and private institution IT leaders participated in the study and identified their top concerns as network and data security (25.5%), upgrade/replace ERP (13.0%), and hiring/retaining IT staff (12.3%). The reemergence of the “hiring/retaining IT staff” issue as a major concern reflects a recent increase in competition for IT talent. This concern was also elevated during the dot.com era around 2001. CIOs in public research universities and public four-year colleges see hiring/retaining IT staff as an even greater concern (Green, 2007).

<b>Table 7: Top Concerns for CIOs in Higher Education in 2007</b>			
<i>The Campus Computing Project</i>			
<i>Public Research Universities</i>	<i>Private Research Universities</i>	<i>Public 4-Year Colleges</i>	<i>Private 4-Year Colleges</i>
Upgrade/replace ERP (21.8%)	Network and data security (28.9%)	Network and data security (25.0%)	Network and data security (24.9%)
Network and data security (20.5%)	Upgrade/replace ERP (15.6%)	Hiring/retaining IT staff (16.7%)	Instructional integration of IT (14.5%)
Hiring/retaining IT staff (18.0%)	Hiring/retaining IT staff (13.3%)	Upgrade/replace ERP (11.7%)	Financing IT and IT user support (11.4%)

(Green, 2007, p. 4)

Since 1999, EDUCAUSE has sent out an annual survey that asks campus IT leaders to identify their top IT challenges. One criticism worth noting about the EDUCAUSE annual survey is that it is not taken by a representative sample of the higher education population but rather by EDUCAUSE members. For 2007, 591 of 1,785 recipients responded (39.7% from private institutions, 53.2% from public institutions) that their top concerns were funding IT and security (Camp et al, 2007).

<b>Table 8: Top Concerns for CIOs in Higher Education Historically</b>				
<b>The Campus Computing Project</b>				
<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
Instructional integration	Network and data security	Network and data security	Network and data security	Network and data security
Upgrade/replace ERP	Instructional integration	Instructional integration	Instructional integration	Upgrade/replace ERP
Financing IT	Upgrade/replace ERP	Upgrade/replace ERP	Upgrade/replace ERP	Hiring/retaining IT staff
<b>EDUCAUSE</b>				
<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
Funding IT	Funding IT	Funding IT	Security and identity management	Funding IT
Administrative/ERP/information systems	Administrative/ERP/information systems	Security and identity management	Funding IT	Security

(Crawford et al, 2003; Maltz et al 2005; Dewey et al, 2006; Camp et al, 2007; Green, 2007, p. 3)



It is clear from the historical information above that over time funding, security, and enterprise information systems have been ongoing concerns for CIOs. Other issues include instructional integration and more recently hiring and retaining IT staff, particularly in public institutions. In 2004, Schaffer notes a difference between retention issues in higher education versus that in industry:

*The biggest difference noted was in the retention of the IT staff and the culture of these two environments. The corporate world can usually recruit and afford to pay for the technical expertise required for the environment, whereas, a CIO in higher education needs to work at recruiting and retaining qualified staff with rewards other than money (p. 49).*

As staffing in higher education becomes a more pressing issue, CIOs will be challenged to look at human resource practices in an effort to recruit and retain top talent.

### Summary of the CIO in Higher Education Literature

The chief information officer position in higher education is a complex and challenging senior level technology role. The higher education literature clearly highlights this complexity in the number of constituencies the CIO serves, roles s/he plays, ongoing challenges the position faces, and the skills, abilities, attributes, and knowledge suggested that a CIO have.

Although there are numerous articles written about CIOs in higher education, most are based on advice from past CIOs and relatively few are empirical research studies. As the role of the chief information officer continues to elevate in importance and escalate in responsibility and scope, it is imperative that empirical research be conducted to, as Hawkins in 2004 notes, provide a framework for CIO success.

### ***The CIO Outside Higher Education***

To get a comprehensive understanding of the chief information officer position, it is also necessary to review industry CIO literature. Similar to that of higher education literature found, the CIO literature in industry is comprised mostly of advice from past CIOs and other industry experts. In examining the CIO literature outside higher education it is important to look at current trends, success measures, successful CIO practices and characteristics, and top concerns for industry CIOs.

### ***Current Trends in the Position***

The chief information officer role in industry is becoming one of senior level strategic businessperson even over that of technologist (Schubert, 2004). Schubert states:

*There remains an assumption that the CIO is technically savvy, but trends demonstrate an even greater assumption that the CIO is business savvy – specifically in terms of the business of the company and how the IT function contributes to the overall value of the company* (Schubert, 2004, p. 50).

In addition to meeting technological needs, implementing technology strategy, and managing human resources, one of the chief information officer's top responsibilities is "building a reputation as a knowledgeable business executive" (Beatty et al., 2005, p.2). As trusted a senior management team member, the CIO is assuming an increasingly strategic role (Robbins & Pappas, 2004).

Another important and often mentioned trend is that toward business and technology alignment and the importance of value creation. High-performance companies are increasingly recognizing the value derived from strategic IT and business alignment (Schubert, 2004). Reich and Nelson note:

*According to CIOs, their virtual, global IT organizations need to move even closer towards the strategic centre of the company, requiring increased business knowledge, improved ability to influence and negotiate, and a renewed focus on standardized architectures, metrics, and value creation (2003, p.28).*

The CIO serves as the liaison between business and technology. S/he designs and delivers IT solutions that meet business goals. Technology is a critical component of today's business strategies and IT leaders are responsible for ensuring business value is derived from IT investments (Robbins & Pappas, 2004; Hugos, 2007).

A recent Gartner survey found that the CIO and technology organizations are becoming more and more involved in overall business growth and competitiveness. Marcus Blosch, VP and Research Director, states "The survey results make it evident that business expectations of IT have changed dramatically, and CIOs are expected to move beyond concerns about cost, security and quality to help grow the business" (CXOToday Staff, 2006, p.1).

Today's industry CIO role extends beyond traditional technology management and internal business reach. Often the IT leader must delegate internal issues to subordinates while s/he focuses on external constituencies such as customers, businesses, suppliers, venture capital firms, analysts, media, and others. Top external concerns "include supply chain integration and data flow, network distribution and globalization, corporate intellectual asset management, and strategic alliances (Robbins & Pappas, 2004, p. 5).

The final trend identified is that toward software-based services economies. Technology is increasingly being used in customer relationship and distribution management. The IT leader is also expected to find new avenues for revenue growth and to sustain productivity (McKenna, 2004). This trend necessitates a new kind of CIO:

*The extent to which the modern enterprise has become, in effect, an information resource broker points to the emergence of the information professional and new kind of leadership. This new leadership has both the general business and relationship skills and the specialized expertise needed to make informed choices and judgments concerning the management of the enterprise's core asset – information... The new IT-smart leadership understands that the creative application of information technology is essential for coordinating all the various elements of the business: operations, investment, and innovation, as well as sustaining competitive market positions and customer loyalty (McKenna, 2004, p. xxi).*

Information technology leaders are increasingly expected to be senior level strategic partners that not only understand technology but also business. Aligning the two and creating business value through the use of technology is a relatively recent and extremely important trend in the position of the chief information officer in industry. This coupled with increasing responsibility to the company's external audiences make the corporate CIO position a challenging one.

#### *CIO and/or IT Department Success Measures*

CIOs must be able to quantify performance; therefore metrics, monitoring, and measuring are of utmost importance to a CIO's survival (Waggener & Zoppi, 2004). The CIO should work with the executive team to “develop IT-related measures of strategic success that apply to technical and non-technical employee group performance” (Schubert, 2004, pp. 158). There are many evaluation metrics and performance management approaches used for evaluating IT value and technology success noted in the industry literature.

Often accounting measures are used to determine the value of technology. Return on investment and total cost of ownership are two commonly mentioned metrics (Schubert, 2004; Smith, 2006; Hugos & Stenzel, 2007). A CIO magazine poll in 2004 found that they

were the metrics used 70 percent of the time (Schubert, 2004). Other accounting type tools used by CIOs include net present value, return on value, return on assets, and internal rate of return (Schubert, 2004; Smith, 2006; Hugos & Stenzel, 2007).

*As a rule, a system should pay for itself and return an appropriate profit within one to three years... CIOs who accept more than a three-year payback period are probably using the analysis to justify what is really an emotional decision (Hugos & Stenzel, 2007, p. 323).*

Schubert, however, seems to indicate that relying on these metrics may not be the best way to ensure value creation. He states, “the traditional accounting-based means of measurements for product-based companies and technology-based groups fall significantly short in enabling value creation” (2004, p 177).

Other techniques being used to measure technology effectiveness and IT strategic goals include: balanced scorecard, benchmarking, periodic initiative review, gap analysis, regular customer analysis, formal reviews, business intelligence, hypotheses testing, management analysis, and six sigma (Kaplan & Norton, 1996; Schubert, 2004; Smith, 2006; Niven, 2007). Niven states:

*Many IT groups are discovering the power of performance management, and particularly the Balanced Scorecard concept, as a means of demonstrating IT's alignment with overall firm strategy and clearly communicating the value of information technology in delivering the company's value proposition to all stakeholders, including customers, employees, boards, and regulators alike (Niven, 2007, p. 186).*

Beyond the tools and metrics above, others promote more unique evaluation methods.

Dr. Bruce Kavan, for example, states:

*All levels and responsibility types within the IT function can have goals and objectives and can be measured across three distinct levels: the strategic level, the application development level, and the operational level...Infrastructure and architecture are at the strategic level...At the application development level is the set of individual applications that together provide the solutions that fulfill the strategy; and at the operational level is the set of measurements everyone always hears about:*

*service-level agreements, response time, performance, uptime/downtime, 'five nines' or less, and other typical reporting metrics from an operations point of view* (Schubert, 2004, p. 161).

The CIO should determine performance measures for each level that align with each other and with business strategy thereby enabling organizational success. Additionally, to be seen as a value center, CIOs should meet with peers and partners to determine measurements that they need done well to accomplish their goals. To this end, CIOs mentioned that they consider the following in their value creation equation: number of transactions, costs/expenses, external customer satisfaction, productivity, profit, response time of internet, revenue, service-level agreements, soft benefits, uptime, visitors to web site, and non-it web costs such as public relations and marketing (Schubert, 2004).

Paul A. Strassman, who held CIO positions with Xerox and NASA found, “Ultimately, the value of any action involving IT is the difference between a company’s cash plans with our without a change in IT” (Caldwell, 1990, p. 37; Schubert, 2004, p. 188). His research found no real correlation between technology spending and profits or success so he concluded that technology success should be evaluated based on return on management (Schubert, 2004).

Effective governance is yet another way of determining information technology value; in fact, Weill and Woodham state that it is the most important predictor (2002). To evaluate effective IT governance, Weill and Ross “found empirically that the best predictor of IT governance performance is the percentage of managers in leadership positions who can accurately describe IT governance” (Weill & Ross, 2004; Clark, 2005, p. 3).

There are four categories that may provide data for evaluating technology:

- *Cost efficiency, in terms of IT infrastructure, IT operations, and IT R&D investment*

- *Service to the business, in terms of customer satisfaction with IT products and customer satisfaction with IT service*
- *Business improvements, in terms of IT support effectiveness*
- *Direct revenue/profit generation, in terms of IT profit generation and competitive edge* (Seddon et al., 2002; Schubert, 2004, p. 190)

Finally, evaluating only the areas in which technology differentiates a company has been proposed. “In order to run a world-class IT shop (one whose specific solutions truly enable the business’s success), CIOs must focus on measuring and managing only those things [which differentiates a company from its competitors]” (Waggener & Zoppi, 2004, p. 360).

It is easy to see that there are many methods, tools, metrics, and approaches being used to measure technology value and IT success in industry. Which are the best to use, is still undetermined. “Based on available research, publications, and the trade press, it is clear that the search is still on for the silver bullet for measuring IT effectiveness” (Schubert, 2004, p. 190).

<b>Table 9: Evaluation Methods, Tools, Metrics, and Approaches Used by Industry CIOs</b>	
"Five Nines" or Less	Management Analysis
Balanced Scorecard	Net Present Value
Benchmarking	Number of Transactions
Business Improvements	Performance
Business Intelligence	Periodic Initiative Review
Commitment	Productivity
Costs/Expenses	Profit
Customer Satisfaction with IT Products	Public Relations and Marketing
Customer Satisfaction with IT Services	Regular Customer Analysis
Differentiation Evaluation	Response Time
Downtime	Return on Assets
Executive Clarity	Return on Investment
External Customer Satisfaction	Return on Management
Formal Reviews	Return on Value
Gap Analysis	Revenue
Governance Effectiveness	Service-Level Agreements
Hypotheses Testing	Six Sigma
Infrastructure Cost Efficiency	Soft Benefits
Internal Rate of Return	Total Cost of Ownership
IT Operations Cost Efficiency	Uptime
IT Profit Generation	Visitors to Web Site
IT Research and Development Cost Efficiency	

*How to be a Successful CIO in Industry*

The Industry CIO literature, similar to the higher education CIO literature, is filled with advice on how to become a successful technology leader based on the experiences of past CIOs or other industry experts. Many state that it is imperative for CIO success that s/he align IT with business strategy, be involved in company-wide strategic planning, build value through technology use, and enable the success of others (Fox, 2004; Meester, 2004; Robbins



& Pappas, 2004; Schubert, 2004; Vavra & Lane, 2004; Webb, 2004; Hill, 2007; Hugos, 2007).

To be successful, the CIO must be involved in organizational strategic planning, understand the company's and CEO's objectives, and properly align the technology organization (Luftman, et al., 1999; Schubert, 2004; Hugos, 2007).

*The CIO must keep in mind that strategic planning with the CEO is about the corporate strategic plan, the IT strategic plan, and the CEO's strategic plans: business and strategic alignment. The CIO's responsibilities are to enable the success of the other two strategic plans by implementation of a well-aligned IT strategic plan. When these plans are in alignment, the CEO's success is enabled, and in a closed-loop system, the CEO's success is the CIO's success (Schubert, 2004, p 230).*

IT strategy must support and enable current and future business operations and be carried out systematically using a series of steps toward a larger goal (Hugos, 2007). The IT leader should develop an adaptable technology organization that strives to eliminate the gap between what the current IT department can accomplish and what the ideal one would be able to facilitate in terms of reaching company goals (Hill, 2007). S/he "guides organizational behaviors, decision making, and capital budgeting to lead the organization to the destination" (Hill, 2007, p.46). CIOs that use IT to realize business goals are in demand (Hill, 2007). If executives outside the technology department do not remain involved in an important IT project, either in an oversight or advisory role, it is likely that the project is misaligned (Hugos, 2007). Successful CIOs are leaders who ensure technology and business remain closely aligned (Meester, 2004; Robbins & Pappas, 2004; Webb, 2004) and "have a unique ability to integrate strategic planning with other key skills, such as project management and leadership" (Vavra & Lane, 2004, p.223).

It is important that the CIO focus on real value creation and return on investment (Egan, 2004) as well as use technology to enable others throughout the organization.

*Enabling activities make up the greatest portion of the CIO's responsibilities, so successful CIOs draw a significant amount of satisfaction from what they accomplish by enabling others to perform more successfully (Schubert, 2004, p. 25).*

Good governance leads to higher value generation.

*Mindful of competing internal forces, the top performers designed governance structures linked to the performance measure on which they excelled... thereby harmonizing business objectives, governance approach, governance mechanisms, and performance goals and metrics (Weill & Ross, 2004, p.3).*

In addition to those mentioned above, there are many skills, attributes, knowledge areas, and characteristics suggested that industry CIO possess to be successful. These include a broad business background (strategy, management, and operations), effectiveness in diverse and global teams, information systems experience, emotional intelligence, listening skills, public speaking ability, motivation skills, communication skills, ability to influence others, truthfulness, self-awareness, leadership skills, technical experience, social-awareness, networking skills, and business knowledge (Applegate & Elam, 1992; Earl & Feeny, 1995; Berkman, 2002; Hallet & Mott, 2003; Reich & Nelson, 2003; Fox, 2004; Schubert, 2004; Broadbent & Kitzis, 2005; Smith, 2006). “Understanding the business is a proven CIO success factor in the eyes of fellow IT professionals and in the eyes of IT’s customers” (Schubert, 2004, p. 178). Robbins and Pappas add even more requirements:

*The new CIO must be an entrepreneur, a matrix manager of teams that do not report into IT and may not even belong to the company, an architect and e-business visionary, an evangelist, a relentless recruiter, a mentor, and an expert in the psychology as well as the implementation of (constant) change management (Robbins & Pappas, 2004, p.7).*

Other success suggestions for CIOs include getting to know their supervisor better to improve communication, possessing an extensive vocabulary (strategic, operational,

financial, technical), being collaborative, having credibility, managing the day-to-day operation well, being a good project manager, exemplifying integrity, having a compelling vision, being service oriented, having a customer relationship strategy, and effectively managing resources (Earl & Feeny, 1995; Egan, 2004; Lane, 2004; Schubert, 2004; Webb, 2004).

*Understanding which and how many resources are needed and how much time is required to accomplish your goals and meet your commitments to your peers and partners is key to a CIO's success and to the success of the IT organization...As the senior IT executive, it is the CIO's responsibility to prevent his or her teams from using any significant resources or participating in any significant project without proper provisioning – without identifying and securing the necessary resources and, especially, without developing a plan for resource utilization according to a project plan with milestones along the way (Schubert, 2004, pp. 193-194).*

Hugos adds illustrating and quantifying the IT strategy, communicating constantly, training and developing others, implementing participatory decision-making, maximizing return on resources available, and bold (not reckless) decision-making to the CIO needed repertoire (Hugos, 2007, p. 23). Schubert also notes a CIO should take notice of how often s/he says “no.” Leaders who say “yes” more often are held in higher regard (Schubert, 2004).

Finally, it has also been suggested that an external view, evaluation skills, technical understanding, negotiation ability, and human resource management skills are necessary for CIO success (Meester, 2004; Vavra & Lane, 2004; Smith, 2006). The CIO must manage both internal and external activities and collect metrics to support decision-making (Meester, 2004). Smith notes that the CIO should understand four key technical areas: applications and architecture, database management, networking, and security (Smith, 2006). S/he must also have “great contract negotiation skills” (Smith, 2006, p. 177). Finally, technology alone does not create competitive advantage; people do. As technology continues to commoditize its return on investment depends largely on people and processes (Hill, 2007). Therefore, “the

successful CIO must assemble the right people with the right technical and soft skills”  
(Meester, 2004, p.119).

Due to the position’s enormous responsibilities, it has recently been recommended that the CIO’s role be split to create two positions the chief information officer (CIO) and the chief technology officer (CTO). This would alleviate some of the pressure on the CIO by passing the majority of technical responsibility to the CTO (Beatty et al., 2005). Hugos notes:

*Successful CIOs figure out ways to delegate systems operations tasks to others so that they can devote most of their time to... the high-risk task of alignment and use of systems infrastructure to drive enterprise strategy. This is where successful CIOs bring the most value to the enterprises that employ them. High risk also means the potential for great rewards, and the CIOs who effectively collaborate with other executives to reap those rewards for their enterprises are indispensable players on any senior management team (2007, p. 1).*

By delegating technical responsibilities to a chief technology officer, the CIO has more time for higher-risk tasks. CIOs must be adept at managing risk and developing risk profiles and strategy (Schubert, 2004).

Smith, Prewitt, Broadbent and Kitzis provide detailed lists of what CIOs should do to be successful. Smith and Prewitt state that they must:

1. Drive innovation and growth while managing costs
2. Prove the strategic value of IT
3. Run IT efficiently and effectively
4. Develop the next generation of IT leaders
5. Manage CXO expectations (Prewitt, 2005; Smith, 2006, pp. 218-219).

Broadbent and Kitzis state that to be successful, CIOs should follow these top ten recommendations:

*(1) lead don’t just manage, (2) understand the fundamentals of your environment, (3) create a vision for IT, (4) shape and inform expectations, (5) create clear and appropriate IT governance, (6) weave business and IT strategy together, (7) build a new IS organization [process-based work, strategic sourcing, solid financial foundation], (8) develop and nurture a high-performance team, (9) manage the new*

*enterprise and IT risk [risk, security, data privacy, cyber-terrorism, compliance], (10) communicate IS performance in business-relevant language (pp. 7-9).*

It is clear that much like the higher education literature; industry literature provides many suggestions for a CIO to follow. Once again, however, there are few studies that provide solutions for how to best implement any of these recommendations (Beatty et al. 2005) or that empirically validate them. Therefore it is unclear where the CIO's time and attention are best spent.

**Table 10:  
Summary- Suggested Skills, Abilities, Attributes, and Knowledge Requirements  
Identified for a Successful Chief Information Officer in Industry**

"Yes" Manager	External View
Ability to Align IT with Business Strategy	Human Resource Management Ability
Ability to Create Proper Governance Structure	Information Systems Experience
Ability to Create Value Through IT	Knowledge of Database Systems
Ability to Determine Metrics	Innovator
Ability to Develop Adaptable Technology Organization	Integrity
Ability to Enable the Success of Others	Knowledge of Applications and Architecture
Ability to Guide Capital Budgeting	Knowledge of Computer Networking
Ability to Guide Decision Making	Knowledge of Security
Ability to Guide Organization Behaviors	Knowledge of the Business
Ability to Influence Others	Leadership
Ability to Maximize Return on Investment	Listening Skills
Adept at Communicating with CEO	Matrix Manager of Teams
Adept at Managing Day-to-Day Operation	Mentor
Architect	Motivation Skills
Broad Business Background	Negotiation Skills
Business Knowledge	Networking Skills
Change Manager	Project Management Expertise
Collaborative	Promoter
Communication Skills	Public Speaker
Cost Manager	Recruiter
Credible	Resource Manager
Customer Relationship Strategist	Return on Investment Focus
Decision Maker	Risk Manager
Delegation Skills	Self-aware
Developer of High-Performance Teams	Service Oriented
E-Business Visionary	Social-awareness
Effective in Diverse and Global Teams	Strategic Planning Expertise
Efficient Operational Manager	Strategic Planning Involvement
Emotional Intelligence Skills	Support and Enable Current and Future Business
Entrepreneur	Technical Expertise
Evaluator	Truthfulness
Evangelist	Understand CEO Objectives
Expectation Manager	Understand Company Objectives
Extensive Vocabulary	Vision

### Top Concerns for CIOs Outside Higher Education

CIOs outside higher education have many concerns. Top among them in 2006 and 2007 are IT and business alignment, IT recruitment and related human resource issues, and IT security and privacy (Gross, 2006; McGee, 2006; Hoffman, 2007). Human resource concerns include attracting, developing, and retaining a talented IT staff, availability of technology skills, and developing business skills among technology workers (McGee, 2006; Bernard, 2007; Hoffman, 2007). Other issues expressed include the speed and agility of technology departments and solutions, information quality, strategic planning, project management, business process improvement, standardizing and consolidating infrastructure, return on investment, technology governance, managed services, and value measurement (CXOToday Staff, 2006; Gross, 2006; McGee, 2006; Hoffman, 2007).

In 2007, CIO Magazine reported a top ten CIO concern list which included additional issues such as people leadership, budget management, infrastructure refresh, compliance, resource management, customer management, change management, and board politics (CIO Magazine Staff, 2007). Finally, a 2007 study conducted by Jerry Luftman, distinguished professor at the Howe School of Technology Management, found, like several others previously mentioned, a lack of IT skills and IT and business alignment to be top concerns. He also published additional concerns including reducing the cost of doing business, improving IT quality, making better use of information, and evolving the CIO leadership role (Bernard, 2007; CIO Canada staff, 2007). This study, conducted for the Society for Information Management (SIM), supports the trend of the CIO moving from a technical to a strategic business position. Luftman states,

*This is the first time it [evolving CIO leadership] has finished in the top ten. CIOs*

are recognizing that they are going through a major transition from one of a more technical role to one that is more of a business management role, and the study substantiates that (CIO Canada staff, 2007, p.1).

<b>Table 11: Summary- Top Concerns for CIOs Outside Higher Education</b>	
<b>2006</b>	<b>2007</b>
Alignment of IT and Business	Board Politics
Attracting, Developing, and Retaining IT Talent	Business Alignment
Business Process Improvement	Compliance
Examining Ways to Use Managed Services	Evolving the CIO Leadership Role
Helping Grow Customer Relationships	Improving the Quality and Integrity of Information
Improving Competitiveness and Increasing Efficiency	Infrastructure Refresh
Introducing Rapid Business Solutions	IT Governance
IT Governance	IT Recruitment and Related Issues
IT Security and Privacy	Making Better Use of Information
IT Strategic Planning	Managing Budgets
Measuring the Value of IT Investments	Managing Change
Project Management Capability	Managing Customers
Speed and Agility	Building better Business Skills Among IT Workers
Standardizing and Consolidating IT Infrastructure	People Leadership
	Reducing the Cost of Doing Business
	Resource Management
	Security and Privacy
	Strategic Planning

Summary of the CIO Outside Higher Education Literature

The chief information officer position in industry is a challenging role. It is increasingly becoming one of a strategic senior level business executive. CIOs in industry



are expected to build value for their companies and use numerous measures and metrics to quantify their performance. Due to the wide-ranging evaluation metrics, research aimed at determining which are best suited for the technology organization and its leader would be beneficial. The advice on how to be a successful CIO is plentiful and arguably overwhelming. Most is based on past CIO experience or other expert opinion. To pare this down, there is a need for empirically derived data to highlight where CIO efforts should be directed. Finally, current CIOs have many concerns. Chief among them are the alignment of technology and business, human resource concerns, and security and privacy issues. Just as in higher education, the position of chief information officer in industry continues to escalate in complexity and responsibility.

## **Evidence-Based Management (EBM) Literature**

### ***Definition and Basic Principles of Evidence-Based Management***

There is a research-practice gap in business today as evidenced by the continued use of management practices known to be ineffective (Rousseau, 2006). The evidence-based management movement is working toward eliminating this gap by making “organizational decisions informed by social science and organizational research” (Rousseau, 2006, p. 256). Managers committed to evidence-based management seek out the best scientific evidence available and translate findings into organizational problem solving practices (Rousseau, 2006; Rousseau, 2007).

There are five principles of evidence-based management:

1. *Face the hard facts, and build a culture in which people are encouraged to tell the truth, even if it is unpleasant*
2. *Be committed to "fact based" decision making -- which means being committed to getting the best evidence and using it to guide actions*
3. *Treat your organization as an unfinished prototype -- encourage experimentation and learning by doing*
4. *Look for the risks and drawbacks in what people recommend -- even the best medicine has side effects*
5. *Avoid basing decisions on untested but strongly held beliefs, what you have done in the past, or on uncritical "benchmarking" of what winners do (Pfeffer & Sutton, 2008a)*

## ***History of Evidence-Based Management***

### *Evidence-Based Medicine*

Evidence-based management is based upon the concepts found in evidence-based medicine. Dr. David Sackett, a leader in the evidence-based medical field, defines evidence-based medicine as “the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients.” Physicians who practice evidence-based medicine identify, disseminate, and apply sound and relevant medical research in their medical positions (Pfeffer & Sutton, 2006a, p. 63).

Medicine was the first field to institutionalize evidence-based practice by integrating clinical expertise and rigorous external evidence. According to Rousseau, the evidence-based medicine concept was first seen in 1847, when Ignaz Semmelweis “discovered the role infection played in childbirth fever” (Rousseau, 2006, p. 258).

Today, despite the numerous medical studies available, only approximately 15% of physicians use relevant research for evidence-based decision making. Instead, most rely on outdated school knowledge, unproven traditions, what they have done in the past, methods with which they are most comfortable, and/or information from vendors (Pfeffer & Sutton, 2006a).

Critics of evidence-based medicine express concern that its use will devalue or replace clinical judgment and that it may cause HMOs to refuse experimental or costly techniques. Studies have found, however, that patients experience better outcomes as a result of evidence-based medical practice and doctors who use it are better informed (Pfeffer & Sutton, 2006a).

### *Early Evidence-Based Management*

The idea of evidence-based management may be traced back to Chester Barnard in 1938 who “promoted the development of a natural science of organization to better understand the unanticipated problems associated with authority and consent” (Rousseau, 2006, p. 60). Although the idea has existed for almost a century it was only recently labeled “evidence-based management” and little has been done to close the research-practice gap. Implementing Pfeffer and Sutton’s evidence-based management model (the five principles of evidence-based management stated earlier) may facilitate the necessary connection between management science and business practice (Rousseau, 2006).

### Other Areas of Evidence-Based Practice

In addition to management and medicine, other areas of evidence-based practice include conservation, criminology, education, policing, librarianship, social work, software engineering, and sports (Pfeffer & Sutton, 2008b; Rousseau, 2006).

According to Rosseau, evidence-based practice should include:

1. *learning about cause-effect connections in professional practices*
2. *isolating the variations that measurably affect desired outcomes*
3. *creating a culture of evidence-based decision making and research participation*
4. *using information-sharing communities to reduce overuse, underuse, and misuse of specific practices*
5. *building decision supports to promote practices the evidence validates, along with techniques and artifacts that make the decision easier to execute or perform (e.g., checklists, protocols, or standing orders)*
6. *having individual, organizational, and institutional factors promote access to knowledge and its use (2006, pp. 259-260)*

### ***Evidence-Based Management***

Evidence-based management is based on the belief that managers who seek out and act on evidence when making decisions will outperform those who do not. Pfeffer and Sutton, leaders in the field, believe that managers will be more effective if “they are routinely guided by the best logic and evidence – and if they relentlessly seek new knowledge and insight, from both inside and outside their companies, to keep updating their assumptions, knowledge, and skills” (Pfeffer & Sutton, 2006a, p. 64).

### *Differences Between Evidence-Based Management and Other Areas of Evidence-Based Practice*

Evidence-based management differs from other areas of evidence-based practice in several ways. First, feedback from management decisions may be scarce, hard to attribute to a specific practice, and take years to receive. Second, managers are regularly influenced by a wide range of stakeholders and therefore often must compromise during decision making for political reasons. Third, management interactions are almost constant which may cloud the recognition that a decision is being made that will result in consequences that should be considered in light of available evidence. Fourth, management in itself is not a profession. Those in management positions have diverse backgrounds, lack a body of shared knowledge, and often times have a limited understanding of the scientific method as opposed to those in other evidence-based practice fields such as the medical field. Finally, few organizations conduct management research or work in partnership with others who do. Expert communities of evidence-based management practitioners for the purpose of vetting management research findings currently do not exist (Rousseau, 2006).

### *Barriers to Evidence-Based Management*

Rather than seeking out and using the best evidence, managers often rely on personal experience or follow advice based on weak evidence. Additionally, managers and consultants typically are not aware of the best evidence and do not seek it out (Rousseau, 2006; Rousseau, 2007). Many people claim to be “management experts” which makes it difficult to determine what information is true evidence. Organizational makeup, goals, and culture also vary widely so one must be careful when presuming that a successful practice

when transferred to another company will produce a similar outcome (Pfeffer & Sutton, 2006a).

There are many substitutes that managers, like physicians, use instead of evidence when making decisions. These include “obsolete knowledge, personal experience, specialist skills, hype, dogma, and mindless mimicry [casual benchmarking] of top performers” (Pfeffer & Sutton, 2006a, p. 67). Additionally, managers often make decisions that take advantage of their own strengths and expertise (Pfeffer & Sutton, 2006a).

Pfeffer and Sutton point out several other reasons that make it challenging to make evidence-based decisions. First, there is “too much evidence,” magazines, journals, newspapers, books, websites etc., for anyone to consume. Second there is “not enough good evidence” meaning little study on the value of different management tools and techniques. Third, the “evidence does not quite apply;” therefore, it is only correct under certain conditions. Fourth, “people are trying to mislead you.” Consultants, for example, are “always rewarded for getting work, only sometimes rewarded for doing good work, and hardly ever rewarded for evaluating whether they have actually improved things.” Fifth, “you are trying to mislead you” by disregarding evidence that is against core beliefs, ideologies, perceptions, and self-fulfilling expectations. Sixth, “side effects outweigh the cure.” This happens when the side effects of a decision are not fully examined or realized. Lastly, it is sometimes difficult to stay committed to gathering evidence when one realizes that often “stories are more persuasive.” They too have their place in evidence-based management, “in suggesting hypotheses, augmenting other (often quantitative) research, and rallying people who will be affected by a change,” but they should not be used in lieu of quantitative evidence (Pfeffer & Sutton, 2006a, pp. 66-67).

### Evaluating Evidence

As stated above, there is an abundance of information available to managers and therefore Pfeffer and Sutton suggest “six standards for producing, evaluating, selling and applying business knowledge.” First, “stop treating old ideas as if they were brand-new” involves acknowledging and building upon past work. Second, “be suspicious of ‘breakthrough’ ideas and studies” which are usually based on the work of others and are not “magic remedies.” Third, “celebrate and develop collective brilliance” since the development and implementation of ideas require the coordinated efforts of many. Fourth, “emphasize drawbacks as well as virtues” so potential pitfalls and costs are understood and managers do not “abandon a valuable program or practice when known setbacks occur.” Fifth, “use success (and failure) stories to illustrate sound practices, but not in place of a valid research method” since research that relies on recollection is often problematic. Finally, “adopt a neutral stance toward ideologies and theories” so that they do not interfere with one’s ability to be open to learning from new evidence (Pfeffer & Sutton, 2006a, p. 71; Pfeffer & Sutton, 2006e; Pfeffer & Sutton, 2006h).

In 2003, Christensen and Raynor wrote a Harvard Business Review article outlining how to “become a discerning consumer of managerial theory” (p. 1). To identify unsound theories they suggest avoiding those that urge revolutionary change of everything since management theories never uniformly apply, being wary of research that “classifies phenomena into categories based solely on attributes or characteristics,” and watching out for correlation being presented as causation. It is important to remember that “sound theories describe how something works” (Christensen & Raynor, 2003, p. 1).

### *Implementing Evidence-Based Management*

An evidence-based management decision-making process should start with an answerable question that can be solved by gathering relevant evidence. Practices from other companies should only be copied if the organizations are so similar that implementation would be successful. Assumptions underlying new directions must be flushed out and examined to ensure that they will in fact produce desired results. Evidence must be weighed in terms of both potential positive and negative effects. It is also important that studies used in evidence-based decision making not violate the condition of causality. The cause must precede the effect or the evidence is not valid and it is important to remember that correlation is not the same as causation (Pfeffer & Sutton, 2006a; Pfeffer & Sutton, 2006e). Finally, evidence-based management is not only for senior executives. Throughout the organization there should be a responsibility to gather and act on evidence as well as help others learn what is known (Pfeffer & Sutton, 2006b).

For evidence-based management to work, managers must be willing to put aside their conventional beliefs and commit to seeking out the facts to make better decisions. As a leader one must ask for evidence when a change is proposed. Additionally leaders should “treat the organization as an unfinished prototype and encourage trial programs, pilot studies, and experimentation – and reward learning from these activities, even when something fails” (Pfeffer & Sutton, 2006a, p.70). Pfeffer and Sutton propose the following keys to implementing evidence-based management: (1) demand evidence, (2) examine logic, (3) treat the organization as an unfinished prototype, and (4) embrace the attitude of wisdom (Pfeffer & Sutton, 2006a; Pfeffer & Sutton, 2006b; Pfeffer & Sutton, 2006c; Pfeffer & Sutton, 2006d; Pfeffer & Sutton, 2006e).



In demanding evidence it is important to build systems that let people know how they are doing. To do this one must understand relevant metrics and find a way to measure them. It is also important to develop a culture that encourages people to speak the truth (Pfeffer & Sutton, 2006a; Pfeffer & Sutton, 2006e).

Examining logic entails more than finding supportive research; it includes making sure that research is sound by examining gaps in exposition, reasoning, and inference. Non-experimental findings of correlation between practices and performance are common in management studies and must be carefully examined for alternative explanations and limitations. The assumptions underlying a proposed idea must be examined to see if they are sensible and transferable to one's organization. Pfeffer and Sutton propose this can be done by answering two questions, "What would have to be true about people and organizations if this idea or practice were going to be effective? Does that feel true to us?" (Pfeffer & Sutton, 2006a, p.72).

To treat the organization as an unfinished prototype, one must find evidence in the organization's own data and experience by getting "in the habit of running trial programs, pilot studies, and small experiments, and thinking about the inferences that can be drawn from them" (Pfeffer & Sutton, 2006a, p.72). Doing such experiments on a small scale rather than an all or nothing approach will give organizations a chance to gather evidence for better decision making, use a control group, and learn before embarking on a company-wide decision (Pfeffer & Sutton, 2006a). In order to do this effectively, the organization must realize and tolerate failure and errors since, when handled correctly, both lead to learning. Punishment and blame in these circumstances create a culture of fear that will severely hamper the creation of an evidence-based management environment. Purposely building in

time to review and reflect is important for future improvement and learning. Having the courage to speak the truth and creating a culture in which this is possible is tremendously important. Otherwise “opportunities for improvement are lost” (Pfeffer & Sutton, 2006b; Pfeffer & Sutton, 2006c, p. 29).

Finally, embracing an attitude of wisdom, “a healthy respect for and curiosity about the vast realms of knowledge still unconquered,” is perhaps the most important guideline (Pfeffer & Sutton, 2006a, p.73). The best evidence-based managers appreciate what they do not know, act on the best knowledge they are able to gather, and question what they know. Identifying and applying life long learning strategies is crucial for success (Pfeffer & Sutton, 2006a). Pfeffer and Sutton note:

*Having people who know the limits of their knowledge, who ask for help when they need it, and are tenacious about teaching and helping colleagues is probably more important [than IQ] for making constant improvements in an organization, technical system, or body of knowledge (2006h, p.103).*

As stated earlier, it is also important that practices from other companies not be imitated as a strategy without thorough investigation. Before embarking on any benchmarking activity, there are several key questions that should be asked:

- 1. Do sound logic and evidence indicate that the benchmarking target’s success is attributable to the practice we seek to emulate?*
- 2. Are the conditions at our company – strategy, business model, workforce – similar enough to those at the benchmarked company to make the learning useful?*
- 3. Why does a given practice enhance performance? And what is the logic that links it to bottom-line results?*
- 4. What are the downsides of implementing the practice even if it is a good idea overall? (Pfeffer & Sutton, 2006a, p. 69)*

It is important not to take part in “casual benchmarking” in which “people mimic the most visible, the most obvious, and frequently, the least important practices” (Pfeffer & Sutton, 2006a, p. 69). When this is done, the logic behind the visible attributes is often not examined and therefore what is imitated does not produce the expected outcome (Pfeffer & Sutton, 2006a; Pfeffer & Sutton, 2006d).

### *Evidence-Based Management Summary*

It is argued that practicing evidence-based management will lead to improved decision-making and organizational success. Studies by experienced researchers offer sound insight for managers. Pfeffer and Sutton contend that using the information found in these studies in a way consistent with the principles of evidence-based management will improve organizational performance. There are other implications of practicing evidence-based management that leaders should be aware of including that when done correctly, it changes organizational power dynamics by valuing data over formal authority, reputation, and intuition. In sum, evidence-based management forces managers to view their role as a craft in which examining logic and demanding facts in order to make decisions improves their effectiveness (Pfeffer & Sutton, 2006a).

### ***Evidence-Based Management In Practice***

#### *What Does Evidence-Based Management Literature State About Building a High-Performance Culture?*

During Jeffery Pfeffer’s testimony for the United States House of Representatives Committee on Oversight and Government Reform Subcommittee on Federal Workforce,

Postal Service, and the District of Columbia, he stated that “the best way to encourage performance is to build a high-performance culture. We know the components of such a system, and we ought to pay attention to this research and implement its findings” (2007a, p. 3).

The components of such a system are not isolated interventions but systemic, complimentary management practices “to provide an environment that produces innovation, discretionary effort, and high levels of performance and service” (Pfeffer, 2007a, p. 15).

High-performance components usually include:

1. *Sustained investment in training and development, including job rotation, both formal and on-the-job training, and a tendency to promote from within as a consequence of the successful internal development of skill and people*
2. *An egalitarian culture in which formal status distinctions are downplayed, salary differences across levels are less than in the general economy, and in which people feel as if their contributions are important and valued*
3. *Delegation of decision making responsibility so that skilled and developed people can actually use their gifts and skills to make real decisions*
4. *High pay to reduce turnover and attract the best people, coupled with rewards that share organizational success with its members*
5. *Employment security and a policy of mutual commitment, so that the workforce does not fear for the outcomes of events over which it has no control and instead, feels reciprocally committed to the employer (Pfeffer, 2007a, p. 15)*

Pfeffer further states that an organization must respect and value its employees, treat them with dignity, ensure jobs are meaningful, and let staff know their contributions are essential (2007a).

*What Does Evidence-Based Management Literature State About Human Resource (HR) Management?*

“There is compelling evidence that when companies use human resource practices based on the best research, they trump the competition. These findings are replicated in industry after industry” (Pfeffer & Sutton, 2006h, p. 217). Unfortunately, many human resource managers do not practice evidence-based HR management (Lawler III, 2007). There are a couple of reasons noted in the literature as to why this may be so. First is that academic human resource management research is not covered by many practitioner publications and, therefore, those practicing HR management are often not aware of it (Lawler III, 2007). Second, many human resource managers do not have formal education in business or human resource management (Lawler III, 2007).

Human Resources activities such as recruitment, recognition, compensation, and development are increasingly important in today’s competitive environment for talent (Pfeffer & Sutton, 2006c). Making sure compensation packages and rewards encourage appropriate behaviors and do not harm organizations should be a top concern. Human resource managers can add significant organizational value by adopting evidence-based management practices particularly in the areas of compensation system development, recruiting, and training (Pfeffer & Sutton, 2006c).

Before making any human resource decisions, it is important to determine the greatest opportunities for improvement and what the underlying causes for issues are. This must be done through a careful analysis rather than assumption based on a few peoples’ beliefs.

Pfeffer and Sutton state that it is not uncommon that:

*Companies don’t know how they are doing in people management or the source of those problems. Some companies do surveys. Some have HR information systems. Some do exit interviews. Some have feedback sessions with senior leaders. All*

*companies have people with ideas and opinions about what the issues are and the causes of those issues. But relatively few companies pull this information together in a systematic way to formulate ideas about what is going on and then test their hunches with the facts (2006c, p. 30).*

By reading, understanding, and adopting human resource practices based on the best evidence and using experiments to test assumptions and ideas, managers can begin to improve critical human resource management practices such as recruiting, retention, compensation system development, and training (Pfeffer & Sutton, 2006c).

Evidence shows that a common assumption is talent is a relatively fixed characteristic that must be identified during recruitment and retained. This often leads to hiring based on skills rather than aptitude and attitude and targeted professional development investments toward select, usually higher level, employees or those deemed to have greater potential. These assumptions, that ability is fixed and the organizations “with the best people do the best,” are often not correct and should not be relied upon for several reasons including the fact that identifying the best individuals is not easy since performance varies over time. It has also been shown that evaluating individuals with precision is difficult. Evidence shows that “talent is at least as much ‘created’ as inherent” (Pfeffer & Sutton, 2006f, pp. 28-30).

*Decades of research by Anders Ericsson, professor of psychology at Florida State University, show that exceptional performance doesn't happen without around 10 years of nearly daily, deliberate practice for about four hours a day, by people who somehow - through coaching, skilled peers or competitors, or books - have access to the best techniques. Once achieved, exceptional performance can't be maintained without relentless effort (Pfeffer & Sutton, 2006f, p. 30).*

Since training and effort can impact performance, how people are managed matters in addition to who is selected. Stanford psychology professor Carol Dweck found that employees with learning goals (to build knowledge and abilities) rather than performance goals (to validate ability) perform better. Therefore, those who believe in fixed ability assess

performance based on where they are rather than what they need to do to enhance performance. The view then becomes a self-fulfilling prophecy where those who see intelligence and ability as fixed, do not improve (Pfeffer & Sutton, 2006f, p. 30). Talent should be looked upon as something anyone can develop since evidence shows that those who “believe in themselves, try hard, and learn constantly” perform better (Pfeffer & Sutton, 2006h, p. 100). It is also important to realize that performance depends on one’s work environment including the systems in place, support of colleagues, available resources, and infrastructure (Pfeffer & Sutton, 2006h).

Few human resource professionals, unfortunately, are aware of the “research literature on genius; issues in measuring performance and ability; and theories of intelligence, achievement goals, mastery and learning behavior” (Pfeffer & Sutton, 2006f, p. 30). Human resources is an area where evidence-based management could improve organizational success.

The evidence-based management literature points out several other human resources pitfalls to avoid. First, one should not hire those whose main priority is money. Those “who actually have some interest in the company, its customers, its products and services, and its values” tend to stay longer and perform better (Pfeffer & Sutton, 2006h, p.125). Second, one should avoid using individual reward or incentive systems (in environments where work is interdependent with others) that often lead to inequality rather than team based recognition (Pfeffer & Sutton, 2006h, p.125). Third, it is important not to jump to financial rewards in order to motivate staff. Focusing on other work-related benefits “such as being a part of a supportive community and doing work that helps benefit others” is often a better choice (Pfeffer & Sutton, 2006h, p.130). Fourth, failing to build trust with employees and not

treating them as trusted individuals will negatively impact performance (Pfeffer, 2007b).

Finally, “when creative, independent people don’t get much say in what their organization does, job satisfaction and disengagement are high” (Pfeffer, 2007b, p.67).

### *What Does Evidence-Based Management Literature State About Leadership?*

There is an assumption that what leaders do greatly impacts their organizations. It is interesting to note that the evidence does not support this assumption. “Leaders and managers often have far less influence over performance than most people think” (Pfeffer & Sutton, 2006h, p.192).

*Although leaders do have some impact, their actions rarely explain more than 10 percent of the differences in performance between the best and the worst organizations and teams. Scores of more recent studies confirm that the link between leadership and performance is modest (Pfeffer & Sutton, 2006h, p.192).*

The evidence shows that organizational and group performance is where leaders may have the most positive impact and make an important difference (Pfeffer & Sutton, 2006h).

Not only is there the assumption that leaders have more impact than they do, many believe this is as it should be.

*It is not just that people believe leaders have almost total control of their organizations. Many people believe that leaders should have complete control... Most people believe that leaders in more senior positions – those higher up the chain of command – not only have the right, but also have the responsibility, to make important decisions about and for those serving under them. People in higher positions are presumed to know what should be done and how to do it better than their underlings (Pfeffer & Sutton, 2006h, p.186).*

Although there are positive outcomes from the belief that what leaders do greatly impacts their organization, such as the fact that it produces a sense of security and control, giving too much credence to this belief can actually have negative consequences since it “affects what people in leadership roles do, the decisions they make, and their effects on



others” (Pfeffer & Sutton, 2006g, p. 14). The evidence indicates that organizations are not always better off with “excessive centralization and too much influence and control on the part of the leader” (Pfeffer & Sutton, 2006h, p.189).

*It seems clear that leaders have some chance of making things better, but they can also make things much worse by taking actions that increase employee turnover and diminish employee motivation, as well as encourage lying and stealing, and causing numerous other organizational problems. This all suggests that avoiding bad leaders may be a crucial goal, perhaps more important than getting great leaders (Pfeffer & Sutton, 2006h, p.194).*

Pfeffer and Sutton point out potential harmful consequences of placing too much faith in leaders.

- 1. Overcontrol and monitoring – leadership stereotypes often produce leaders who give too much feedback, guidance, and surveillance which makes people nervous, saps initiative, and undermines motivation*
- 2. Bullying and self-centered behavior – leaders given positions of power sometimes develop a lack of sensitivity toward others (teasing, stereotyping, self-interested behavior)*
- 3. Inhibiting others from taking responsibility – everyone pays attention to the leader and stop listening as closely to each other. Employees ignore suggestions that don't come from the top and in doing so lose information and wisdom from colleges. They cede control and responsibility to leaders which in turn lessens their learning, knowledge, practice, and experience (2006g, p. 14)*

To be an effective leader and avoid the pitfalls above, one should project confidence about the future, act as if s/he is in control, tell the truth, accept responsibility, admit mistakes, acknowledge organizational realities, let people know issues will be resolved, realize personal limitations, get out of the way of their employees, maintain an attitude of wisdom, avoid power trips, stay modest, and focus on facilitating the success of others (Pfeffer & Sutton, 2006g; Pfeffer & Sutton, 2006h).

*Leaders often have the most positive impact when they help build systems where the actions of a few powerful and magnificently skilled people matter least. Perhaps the*

*best way to view leadership is as the task of architecting organizational systems, teams, and cultures – as establishing the conditions and preconditions for others to succeed (Pfeffer & Sutton, 2006h, p.200).*

According to the evidence, leaders should also focus on customers' expectations, employee views, and execution (Pfeffer & Sutton, 2006h).

*What actually provides competitive success and what is difficult to copy is not so much knowing what to do – deciding on the right strategy – but the ability to do it. That is why Richard Bank, has repeatedly argued that organizational culture and the ability to operate effectively – successful implementation – is much more important to organizational success than having the right strategy (Pfeffer & Sutton, 2006h, p.145).*

Additionally, when problems arise, it is important not to confuse improper strategy with ineffective execution. A leader should not reject or reconsider a strategy decision that is not working without first looking at implementation complications as the cause of failure. “This problem of confusing strategy problems with implementation problems seems particularly common in service industries” (Pfeffer & Sutton, 2006h, p.152). Strategies should be agreed upon, understood, and simple. “Complicated, difficult-to-explain strategies may or may not confuse your competitors, but they will almost certainly confuse your organization” (Pfeffer & Sutton, 2006h, p.153).

Finally it is noted that leaders can positively impact organizational and group performance by displaying and promoting curiosity so that:

*They and their followers will keep learning new skills, coming to grips with the best logic and evidence and applying what they know (for now) to change their organizations for the better. Leaders breed such curiosity by having both the humility to be students and the confidence to be teachers. And the best leaders know when and how to switch between these roles (Pfeffer & Sutton, 2006h, p.234).*

Leadership matters but not in the way most believe. Rather than having tremendous influence, the best leaders positively impact organizational and group performance and develop systems that enable others to succeed (Pfeffer & Sutton, 2006h).

### ***Evidence-Based Management Studies That Inform This Dissertation Study***

In 2006, Leslie, Loch, and Schaninger published a study in the McKinsey Quarterly which proposed that a combination of management practices carefully selected can be more effective than single interventions. This is consistent with Pfeffer's testimony about building a high-performance culture. They found that companies that maintained a basic proficiency in all 34 of the management practices identified in the study and also exhibited superiority in a much smaller complimentary subset had better financial results (Leslie et al., 2006). These 34 practices fall under nine key areas used to define organizational quality (accountability, capabilities, coordination and control, direction, environment and values, external orientation, innovation, leadership, and motivation) that the authors believe "underpin organizational excellence" (Smet et al., 2007, p. 6). Companies with a straight average of performance in the nine areas in the top quartile "were more than twice as likely as those in the bottom quartile to have above-average margins for their industry" (Smet et al., 2007, p. 6). Further, after analyzing 230 global businesses, the authors found that companies which made employees accountable, set goals and priorities, and established a performance culture outperformed their peers. "Senior executives must provide for clear roles within a structure matched to the needs of the business (accountability), articulate a compelling vision of the future (direction), and develop an environment that encourages openness, trust, and challenge (culture)" (Leslie et al., 2006, p. 69). They believe this "base case" should be applied by at

least 50 percent of companies and that all companies would benefit more from excelling in a few complimentary practice areas than they would from being distinctive in just one (Leslie et al., 2006, p. 72). In 2007, Smet, Palmer, and Schaninger further state that the companies “in the top quartile in five outcomes: environment and values, accountability, coordination and control, motivation, and external orientation” had an 83% chance of beating the median earnings before interest, taxes, depreciation and amortization (EBITDA) margin (2007, pp. 7-8).

Smet, Palmer, and Schaninger suggest that improving any of the 34 practices in the 2006 McKinsey Quarterly study will benefit an organization. To start with, however, they recommend focusing on vision (direction), structure/role design (accountability), and open and trusting (environment) as universally beneficial practices to enhance performance while being sure that none of the 34 practice areas are below average. They further state:

*With minimum competencies in place, companies can focus on driving a few practices to distinctiveness (i.e., the top quartile). Achieving distinctiveness in even a single practice can have a measurable effect on overall organizational effectiveness, pushing the likelihood of top-quartile organizational performance from 25% to nearly 50%. Driving a second practice to distinctiveness increases this likelihood to more than 50%. Once a company has achieved top-quartile performance in four or five practices, the likelihood that all outcomes are distinctive plateaus at approximately 80%. For most companies, the effort of achieving distinctiveness in a sixth or seventh practice may not be worth it, as a point of diminishing returns is reached. Companies should focus on being truly distinctive in four or five practices and being good enough (about average) in the remaining practices) (2007, p.8).*

When deciding which competencies in which to excel, it is important to make sure they complement each other, fit within the corporate strategy, and do not disrupt an area in which the organization already excels (Smet et al., 2007).

In 1999, 2006, and 2007, works by Pfeffer and Sutton outline the keys to creating high-performance cultures (Pfeffer, 1999a; 1999b; Pfeffer & Sutton 2006h; Pfeffer, 2007a).

Before Pfeffer specifically began writing about an “evidence-based management” movement, he published two articles based on extensive research that outline seven practices of successful organizations and keys to creating high-performance management systems. These are: employment security, selective hiring, self-managed teams, high compensation, training investment, reduction in status differences, and not keeping secrets (Pfeffer, 1999a; Pfeffer, 1999b). Employment security builds employee trust, improves cooperation, encourages workers to take a longer term perspective, causes companies to pay more attention to hiring, decreases costly premature layoffs, and encourages companies to invest in training, share information, and delegate responsibilities. Hiring the right people is important and can be accomplished by ensuring a large applicant pool, having clarity about critical skills needed, emphasizing attributes which are difficult to change with training, and looking for a cultural fit. Using self-managed teams has been shown to create “greater autonomy and discretion [among employees] which translates into intrinsic rewards and job satisfaction. Teams outperform traditionally supervised groups” (Pfeffer, 1999a, p. 26). There is a relationship between salary paid and quality of employee. Level of salary also sends a value message to staff. Pfeffer further states:

*By coupling employment security with some form of group-based incentive, such as profit or gain sharing or share ownership, the organization unleashes the power of the team, whose economic interests are aligned with high levels of economic performance (1999a, p. 27).*

Training is tremendously important and is a source of competitive advantage across industries. Reducing status differences “symbolically, through the use of language and labels, physical space and dress and substantively, in the reduction of the organization’s degree of wage inequality, particularly across levels” helps build high-performance management systems where employees feel valued (Pfeffer, 1999b, p. 56). Finally,

information sharing conveys trust and allows people to contribute to organizational success by providing them needed “information on important dimensions of performance and, in addition, training on how to use and interpret that information” (Pfeffer, 1999b, p. 57). A strategy toward achieving profits through people is key to enhancing organizational performance (Pfeffer, 1999b). Research points to a direct relationship between management practices that value employees and put them first and organizational success (Pfeffer & Veiga, 1999).

During Jeffery Pfeffer’s testimony for the United States House of Representatives Committee on Oversight and Government Reform Subcommittee on Federal Workforce, Postal Service, and the District of Columbia, he stated that “the best way to encourage performance is to build a high-performance culture” (Pfeffer, 2007a, p. 3). High-performance components usually include an investment in training and development, egalitarian culture, delegation of decision-making responsibility, high pay, and employment security. Pfeffer further states that an organization must respect and value its employees, treat them with dignity, ensure jobs are meaningful, and let staff know their contributions are essential (2006h; 2007a).

### ***Summary of the Evidence-Based Management Literature***

Too often despite scientific evidence, organizations continue to use ineffective management practices. To address this issue, those who practice evidence-based management use academic research to inform organizational business decisions. Doing so effectively requires that managers identify good evidence, examine logic, conduct

experiments, learn from failures, and embrace an attitude of wisdom (Pfeffer & Sutton, 2006a; Pfeffer & Sutton, 2006g; Pfeffer & Sutton, 2006h; Rousseau, 2006; Rousseau, 2007).

Evidence-based management literature indicates that leaders have less influence than many assume. Studies show that where leaders can be most effective is in building high-performance organizations that value, respect, and develop their employees. Creating environments that promote learning, building quality systems, developing community, downplaying status differences, rewarding group performance, creating a trusting environment, delegating decision authority, and helping others to succeed have been shown to be ways in which a leader can positively impact his or her organization (Pfeffer & Sutton, 2006g; Pfeffer & Sutton, 2006h; Pfeffer, 2007).

Evidence-based management studies in 2006 and 2007 by Leslie, Loch, Palmer, Schaninger, and Smet linked combinations of management practices with superior financial results in 230 global businesses (Leslie et al., 2006; Smet et al., 2007). Additionally in 1999, 2006, and 2007, works by Pfeffer and Sutton outline the keys to creating high-performance cultures (Pfeffer, 1999a; 1999b; Pfeffer & Sutton 2006h; Pfeffer, 2007a). These research findings inform this dissertation study.

### **Research Questions Revisited and Contribution this Study Makes to the Field**

The higher education chief information officer position is an important, complex, and challenging senior level technology role that serves many constituencies, takes on a large number of job roles, requires a variety of skills, abilities, attributes, and knowledge, and faces tremendous obstacles as it continues to elevate in importance and escalate in responsibility. Although there are numerous articles written about college and university CIOs, most are

based on advice from past CIOs and relatively few are empirical research studies.

Additionally, the definition of “CIO success” is unclear and there are few consistent metrics or methodologies used to evaluate higher education technology organizations or those in the position of CIO. Since chief information officers enable the success of others throughout the institution, it is imperative that quantitative research be conducted in order to begin to develop a framework for CIO success. Such a framework will allow those in the position to improve performance, positively impact the institution and its members, and position the higher education organization for the future (Hawkins, 2004).

Evidence-based management literature indicates that leaders have less influence than many assume and often use ineffective management practices. To address this issue, those who practice evidence-based management use academic research to inform organizational business decisions. Studies show that where leaders can be most effective is in building high-performance organizations that value, respect, and develop their employees (Pfeffer & Sutton, 2006g; Pfeffer & Sutton, 2006h; Pfeffer, 2007).

Evidence-based management studies in 2006 and 2007 linked combinations of management practices with superior financial results in 230 global businesses (Leslie et al., 2006; Smet et al., 2007). Additionally in 1999, 2006, and 2007, works by Pfeffer and Sutton outline the keys to creating high-performance cultures (Pfeffer, 1999a; 1999b; Pfeffer & Sutton 2006h; Pfeffer, 2007a). This research provides a theoretical framework and basis for the dissertation study. The study begins to investigate if combinations of management practices within the centralized academic technology organization correlate with higher perceptions of CIO and technology organization performance. Further, it investigates if there is a correlation between high-performance culture and overall satisfaction with CIO and IT



department. Finally, it identifies what constitutes user satisfaction in the eyes of internal college and university constituencies. The following research questions are investigated:

1. *Which factors are most associated with user satisfaction with the centralized technology organization (Table 1)? Which factors are most associated with satisfaction with the CIO?*
2. *Are technology organizations with a higher straight average of performance in the nine areas used to define organizational quality (Table 2) viewed as performing better than those which do not?*
3. *Are technology organizations with a higher performance in certain combinations of the nine areas used to define organizational quality (Table 2) viewed as performing better than those which do not?*
4. *Are current higher education technology leaders building high-performance organizations that value, respect, and develop their employees (Table 3)? Is there a correlation between the degree to which this is done and perceptions of CIO and technology organization performance? Are technology organizations with a higher performance in certain combinations of high-performance categories viewed as performing better than those which do not?*
5. *What do CIOs believe is important for the success of the centralized information technology organization?*
6. *Do CIOs have an accurate understanding of how satisfied their campus users are? Do centralized information technology employees?*
7. *Do centralized information technology employees believe the elements tied to their success are the same as those tied to the centralized technology organization's success?*
8. *Do CIOs have a clear understanding of what metrics will be used to evaluate their performance? Which elements do CIOs believe are most heavily factored into their performance reviews? Do CIOs believe that those conducting their performance reviews have adequate guidelines and information to carry out meaningful evaluations?*
9. *How important do users believe the centralized information technology department is to their success and that of their institution?*

This study is valuable to the field in that it enables current CIOs to begin to focus effort on areas likely to improve their success, it suggests CIO hiring and evaluation criteria, it recommends where those aspiring to the position should focus professional development efforts, and it begins to develop a much needed framework for CIO success. As a result it is hoped that this study will improve CIO performance, aid in reducing CIO turnover, and create a more appealing job to which more aspire. Chief information officers and their staff members facilitate the success of many throughout the higher education community and therefore their success improves education, scholarship, and service and better positions the higher education organization for the future.

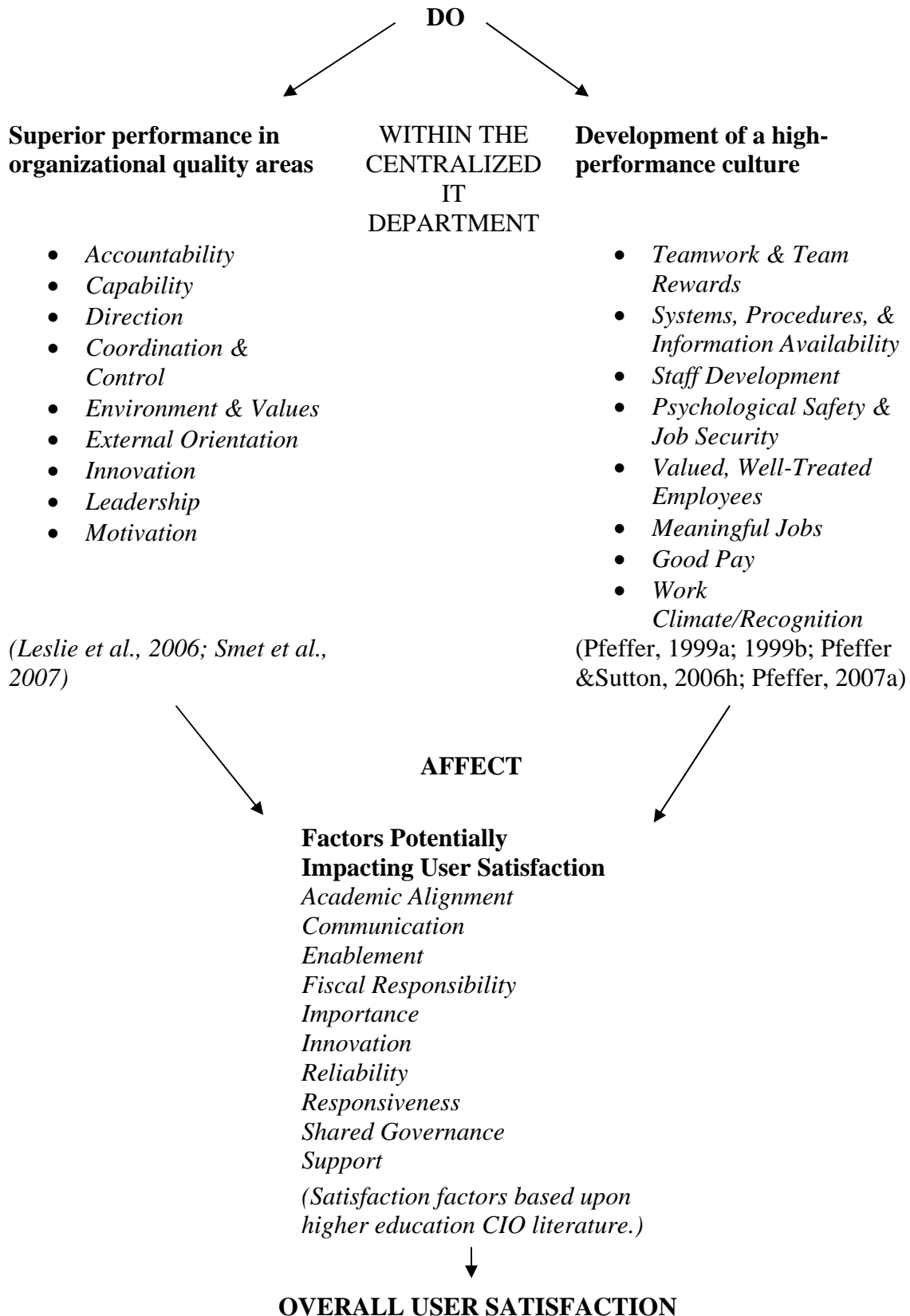
## **METHODOLOGY**

### **Theoretical Framework**

This study is based upon both the results and the methods of evidence-based management studies in 2006 and 2007 by Leslie, Loch, Palmer, Schaninger, and Smet. They found correlations between combinations of management practices and superior financial results in 230 global businesses (Leslie et al., 2006; Smet et al., 2007). Additionally, this study is based upon 1999, 2006, and 2007 works by Pfeffer and Sutton who outline the keys to creating high-performance cultures (Pfeffer, 1999a; 1999b; Pfeffer & Sutton 2006h; Pfeffer, 2007a).

This study investigates if superior performance in the nine areas used to define organizational quality correlate with higher perceptions of CIO and technology organization performance in terms of overall user satisfaction. Further, it examines if there is a correlation between high-performance culture creation and CIO and IT department performance in terms of overall user satisfaction. Finally, it identifies what constitutes overall satisfaction in the eyes of internal college and university constituencies (Figure 1).

**Figure 1:  
Overall User Satisfaction**



## **Operationalization of Variables**

### ***Organizational Quality Areas***

In 2006, Leslie, Loch, and Schaninger published a study in the McKinsey Quarterly which proposed that a combination of management practices carefully selected can be more effective than single interventions. They found that companies that maintained a basic proficiency in all 34 of the management practices identified in the study and also exhibited superiority in a much smaller complimentary subset had better financial results (Leslie et al., 2006). These 34 practices fall under nine key areas used to define organizational quality (accountability, capabilities, coordination and control, direction, environment and values, external orientation, innovation, leadership, and motivation) that the authors believe “underpin organizational excellence” (Smet et al., 2007, p. 6). Companies with a straight average of performance in the nine areas in the top quartile “were more than twice as likely as those in the bottom quartile to have above-average margins for their industry” (Smet et al., 2007, p. 6).

This study looked at these same organizational quality areas to see if there was a correlation between overall user satisfaction with the IT organization and CIOs and a similar straight average of performance in these nine areas. The surveys that were used in these McKinsey Quarterly studies were not publicly available but Schaninger, one of the McKinsey Quarterly study authors, was very helpful in providing general information about how the surveys were written. The operational definitions below (Table 12) are based upon this discussion with Schaninger as well as the 2006 and 2007 articles. Centralized IT organization employees were asked to respond to each operational definition using a six-point Likert scale (used to allow no neutral position).

**Table 12:  
Operationalization of Variables: Nine Areas Used to Define Organizational Quality**

Variables	Operational Definitions
Accountability	<ul style="list-style-type: none"> <li>• I feel accountable for the results I must deliver (Q49).</li> <li>• I believe people throughout the centralized IT organization are accountable for the results they must deliver (Q50).</li> </ul>
Capability	<ul style="list-style-type: none"> <li>• I have the skills I need to support the centralized IT organization's technology initiatives (Q51).</li> <li>• I believe people throughout the centralized IT organization have the skills they need to support the centralized IT organization's technology initiatives (Q52).</li> </ul>
Coordination and Control	<ul style="list-style-type: none"> <li>• Our centralized IT organization's performance is measured regularly (Q53).</li> <li>• Our centralized IT organization's performance is reported regularly (Q54).</li> <li>• Technology risks are measured regularly (Q55).</li> <li>• Technology risks are reported regularly (Q56).</li> </ul>
Direction	<ul style="list-style-type: none"> <li>• I know the goals of the centralized IT organization (Q57).</li> <li>• I know how my job supports the goals of the centralized IT organization (Q58).</li> <li>• I believe in the goals of the centralized IT organization (Q59).</li> </ul>
Environment and Values	<ul style="list-style-type: none"> <li>• The centralized IT organization has a strong culture of shared values (Q60).</li> <li>• I fit well with the centralized IT organization's culture (Q61).</li> </ul>
External Orientation	<ul style="list-style-type: none"> <li>• I have consistent two-way communication with campus users to ensure their satisfaction (Q62).</li> <li>• I believe people throughout the centralized IT organization have consistent two-way communication with campus users to ensure their satisfaction (Q63).</li> </ul>
Innovation	<ul style="list-style-type: none"> <li>• I am encouraged to be innovative (Q64).</li> <li>• The centralized IT organization is innovative (Q65).</li> <li>• I am encouraged to generate new ideas to improve the centralized IT organization (Q66).</li> </ul>
Leadership	<ul style="list-style-type: none"> <li>• I am a leader among my peers (Q67).</li> <li>• I inspire employees to perform better (Q68).</li> <li>• I am inspired to perform better by individuals at all levels throughout the centralized IT organization (Q69).</li> <li>• I am inspired to perform better by my supervisor (Q70).</li> <li>• I am inspired to perform better by the senior most technology leader on our campus (chief information officer, vice president, etc.) (Q71).</li> </ul>
Motivation	<ul style="list-style-type: none"> <li>• I am encouraged to stay with the centralized IT organization (continue working for the centralized IT organization) (Q72).</li> <li>• I believe people throughout the centralized IT organization are encouraged to stay with the organization (continue working for the centralized IT organization) (Q73).</li> </ul>

Since this is an experimental design and a first attempt to define these organizational quality variables within IT organizations, it is the author's point of view that for the purposes of this study, each organizational quality variable's operational definitions specifically define the variable. The components are not necessarily trying to measure the same thing but together comprise the variable's score. Appendix T provides internal consistency information using Cronbach's Alpha for that may be useful for further research. A brief overview of the consistency findings will be discussed.

- Accountability – A high inter-item correlation (above .7) was found – Cronbach's alpha was .84.
- Capability – An interesting negative inter-item correlation was found - Cronbach's alpha was -1.9. This is an extremely interesting finding (one that seems to indicate that responders believe there is a difference between their capabilities and those of their peers) and is an area for further research.
- Coordination and Control – A high inter-item correlation (above .7) was found - Cronbach's alpha was .94. All items are highly correlated with the total with the weakest being “technology risks are measured regularly” at .81.
- Direction – A high inter-item correlation (above .7) was found - Cronbach's alpha was .89. All items are highly correlated with the total with the weakest being “I know how my job supports the goals of the centralized IT organization” at .70.
- Environment and Values – A high inter-item correlation (above .7) was found - Cronbach's alpha was .90.
- External Orientation – A very slight negative inter-item correlation was found - Cronbach's alpha was -.02. This is an extremely interesting finding (one that seems

to indicate that responders believe there is a difference between their external orientation and that of their peers) and is an area for further research.

- Innovation – A high inter-item correlation (above .7) was found - Cronbach's alpha .93. All items are highly correlated with the total with the weakest being "I am encouraged to be innovative" at .87.
- Leadership – An inter-item correlation was found - Cronbach's alpha .67. Item correlations with the total varied from the strongest being "I am inspired to perform better by individuals at all levels throughout the centralized IT organization" at (.64) to the weakest being "I inspire employees to perform better" at .22. Separating questions 67 and 68 into a separate category would increase the Cronbach's alpha and is an area for further study.
- Motivation – A high inter-item correlation (above .7) was found - Cronbach's alpha .97.

In this study, the score for each organizational quality variable was calculated by taking an average of each variable's operational definitions (Table 12).

### ***High-Performance Areas***

Based on 1999, 2006, and 2007 works by Pfeffer and Sutton who outline the keys to creating high-performance cultures, eight high-performance culture categories were identified (Pfeffer, 1999a; 1999b; Pfeffer & Sutton, 2006h; Pfeffer, 2007a). Each category was then defined by one or more statements (operational definitions) which were also developed based on these works (Table 13). Centralized IT staff members were asked to respond to each operational definition using a six-point Likert scale (used to allow no neutral position).



**Table 13:  
Operationalization of Variables: High-Performance Culture Categories**

Categories (Variables)	Operational Definitions
Meaningful Jobs	<ul style="list-style-type: none"> <li>• I am motivated by my current level of job autonomy (freedom and discretion allowed in my job role) (Q86).</li> <li>• I have decision authority (Q87).</li> <li>• I have meaningful responsibilities (Q88).</li> <li>• I am respected within the IT organization (Q89).</li> <li>• My contributions are important (Q90).</li> <li>• My job is meaningful (Q91).</li> </ul>
Valued, Well-Treated Employees	<ul style="list-style-type: none"> <li>• I am valued (Q84).</li> <li>• I am treated well (Q85).</li> </ul>
Psychological Safety and Job Security	<ul style="list-style-type: none"> <li>• I feel safe voicing my opinion (Q82).</li> <li>• I feel secure in my position (have employment security) (Q83).</li> </ul>
Work Climate/Recognition	<ul style="list-style-type: none"> <li>• The centralized IT organization is very selective about its new hires (Q94).</li> <li>• The climate within the centralized IT organization is open and trusting (Q95).</li> <li>• Employees at all levels of the centralized IT organization want to help others succeed (Q96).</li> <li>• Status differences throughout the centralized IT organization are minimal (Q97).</li> <li>• The senior most executive centralized IT organization (i.e. Chief Information Officer, Vice President for IT) creates a community (friendly, supportive, open) environment (Q98).</li> <li>• My supervisor creates a community (friendly, supportive, open) environment (Q99).</li> <li>• Salary differences across levels within the centralized IT organization are fair (i.e. management salaries are higher than employee salaries but not tremendously higher) (Q100).</li> <li>• Recognition for centralized IT organization success is shared with employees (Q101).</li> <li>• The centralized IT organization culture is collaborative (Q102).</li> </ul>
Good Pay	<ul style="list-style-type: none"> <li>• I am well paid (Q92).</li> </ul>
Staff Development	<ul style="list-style-type: none"> <li>• The IT organization invests in my staff development (Q79).</li> <li>• I have sufficient job training to grow my abilities (Q80).</li> <li>• I am encouraged to develop my skills (Q81).</li> </ul>
Teamwork and Team Rewards	<ul style="list-style-type: none"> <li>• Centralized IT organization employees work in self-managed teams rather than traditionally supervised groups (Q74).</li> <li>• Teams are rewarded for group performance (Q75).</li> </ul>
Systems, Procedures, and Information Availability	<ul style="list-style-type: none"> <li>• The centralized IT organization has quality systems in place that help me succeed (Q76).</li> <li>• Centralized IT organization has well-documented procedures in place that help me succeed (Q77).</li> <li>• The information that I need to succeed in my job is readily shared with me (Q78).</li> </ul>

Once again, since this is an experimental design and a first attempt to define these high-performance categories, it is the author's point of view that for the purposes of this study, each category's questions specifically define the category. The components are not necessarily trying to measure the same thing but together comprise the category's score. Appendix T provides internal consistency information using Cronbach's Alpha for that may be useful for further research. A brief overview of the consistency findings will be discussed.

- Meaningful Jobs – A high inter-item correlation (above .7) was found - Cronbach's alpha .93. All items are highly correlated with the total with the weakest being "I have decision authority" at .74.
- Valued, Well-Treated Employees – A high inter-item correlation (above .7) was found - Cronbach's alpha .93.
- Psychological Safety and Job Security – A high inter-item correlation (above .7) was found - Cronbach's alpha .89.
- Work Climate/Recognition – A high inter-item correlation (above .7) was found - Cronbach's alpha .96. Items are highly correlated with the total with the weakest being "My supervisor creates a community (friendly, supportive, open) environment" at .66.
- Staff Development – A high inter-item correlation (above .7) was found - Cronbach's alpha .95. Items are highly correlated with the total with the weakest being "I am encouraged to develop my skills" at .84.
- Teamwork and Team Rewards – Cronbach's alpha was .49. This is an area for further study.

- Systems, Procedures, and Information Availability – A high inter-item correlation (above .7) was found - Cronbach’s alpha .92. Items are highly correlated with the total with the weakest being “The centralized IT organization has well-documented procedures in place that help me succeed” at .82.

In this study, the score for each high performance culture variable were calculated by taking an average of each variable’s operational definitions (Table 13).

### ***Factors Potentially Impacting User Satisfaction***

Based on the higher education chief information officer literature, ten factors were identified as potential drivers of user satisfaction (academic alignment, communication, enablement, fiscal responsibility, importance, innovation, reliability, responsiveness, shared governance, and support). Each factor was then defined by one or more statements (operational definitions) which were also developed based on available literature (Table 14). Faculty, non-centralized IT staff, and students were asked to respond to each operational definition using a six-point Likert scale (used to allow no neutral position).

**Table 14:  
Operationalization of Variables: Factors Potentially Impacting User Satisfaction**

Variables	Operational Definitions
Academic Alignment	<ul style="list-style-type: none"> <li>• The centralized IT organization understands the academic environment (Q210a).</li> <li>• The centralized IT organization’s priorities seem to be aligned with the institution’s priorities (Q210b).</li> <li>• The centralized IT organization’s priorities seem to be aligned with the institution’s purpose (Q210c).</li> <li>• The centralized IT organization’s priorities seem to be aligned with my priorities (Q210d).</li> </ul>
Communication	<ul style="list-style-type: none"> <li>• The centralized IT organization communicates effectively with me (Q25a).</li> <li>• I am aware of the priorities of the centralized IT organization (Q25b).</li> <li>• I am aware of the goals of the centralized IT organization (Q25c).</li> <li>• The centralized IT organization communicates effectively (Q25d).</li> <li>• The centralized IT organization communicates proactively (Q25e).</li> <li>• I am aware of our campus vision for technology (Q25f).</li> <li>• I am aware of how the centralized IT organization works toward supporting our campus vision (Q25g).</li> <li>• The centralized IT organization manages change well (Q25h).</li> </ul>
Enablement	<ul style="list-style-type: none"> <li>• The centralized IT organization assists me in achieving my goals (Q11a).</li> <li>• The centralized IT organization understands my needs (Q11b).</li> <li>• The centralized IT organization focuses on initiatives that matter to me (Q11c).</li> </ul>
Fiscal Responsibility	<ul style="list-style-type: none"> <li>• The centralized IT organization seems to manage its resources well (Q23a).</li> <li>• The centralized IT organization seems to fund initiatives that assist me in achieving my goals (Q23b).</li> <li>• The centralized IT organization seems to be fiscally responsible (Q23c).</li> </ul>
Importance	<ul style="list-style-type: none"> <li>• An effective centralized IT organization is critical to the success of our institution (Q29a).</li> <li>• An effective centralized IT organization is critical to my success (Q29b).</li> </ul>
Innovation	<ul style="list-style-type: none"> <li>• The centralized IT organization is innovative (Q27).</li> </ul>
Reliability	<ul style="list-style-type: none"> <li>• I can rely on centralized IT organization employees (Q15a).</li> <li>• The services provided to me by the centralized IT organization are stable (Q15b).</li> <li>• The services provided to me by the centralized IT organization are reliable (Q15c).</li> </ul>
Responsiveness	<ul style="list-style-type: none"> <li>• The centralized IT organization is flexible (Q17a).</li> <li>• The centralized IT organization is responsive (Q17b).</li> </ul>
Shared Governance	<ul style="list-style-type: none"> <li>• Centralized IT organization employees collaborate with members of the campus community to solve problems (Q19a).</li> <li>• Centralized IT organization employees collaborate with members of the campus community to establish priorities (Q19b).</li> <li>• Responsibility for major technology initiatives are shared between the centralized IT organization and campus stakeholders (others on campus who have an interest in the project’s outcome) (Q19c).</li> <li>• The centralized IT organization is effective at gathering support for initiatives (Q19d).</li> <li>• I currently have adequate input into campus decision making (Q19e).</li> <li>• I currently have adequate involvement with campus IT decision making (Q19f).</li> </ul>
Support	<ul style="list-style-type: none"> <li>• The centralized IT organization provides me the services I need (Q13a).</li> <li>• The centralized IT organization provides me the technology training I need (Q13b).</li> <li>• The centralized IT organization provides me good customer service (Q13c).</li> <li>• The centralized IT organization supports my needs (Q13d).</li> </ul>

Since this is an experimental design and a first attempt to identify and define these factors, it is the author's point of view that for the purposes of this study, each factor's components specifically define the factor. The components are not necessarily trying to measure the same thing but together comprise the factor's score. Appendix T provides internal consistency information using Cronbach's Alpha for that may be useful for further research. A brief overview of the consistency findings will be discussed.

- Academic Alignment – A high inter-item correlation (above .7) was found - Cronbach's alpha .95. All items are highly correlated with the total with the weakest being “the centralized IT organization's priorities seem to be aligned with my priorities” at .84.
- Communication – A high inter-item correlation (above .7) was found - Cronbach's alpha .96. All items are highly correlated with the total with the weakest being “the centralized IT organization communicates effectively with me” at .80.
- Enablement – A high inter-item correlation (above .7) was found - Cronbach's alpha .92. All items are highly correlated with the total with the weakest being “the centralized IT organization assists me in achieving my goals” at .82.
- Fiscal Responsibility – A high inter-item correlation (above .7) was found - Cronbach's alpha .94. All items are highly correlated with the total with the weakest being “the centralized IT organization seems to fund initiatives that assist me in achieving my goals” at .85.
- Importance – A high inter-item correlation (above .7) was found - Cronbach's alpha .81.
- Innovation – Innovation was only comprised of one question so no analysis is needed.

- Reliability – A high inter-item correlation (above .7) was found - Cronbach’s alpha .93. All items are highly correlated with the total with the weakest being “I can rely on centralized information technology (IT) organization employees” at .79.
- Responsiveness – A high inter-item correlation (above .7) was found - Cronbach’s alpha .88.
- Shared Governance – A high inter-item correlation (above .7) was found - Cronbach’s alpha .95. All items are highly correlated with the total with the weakest being “I currently have adequate involvement with campus IT decision making” at .80.
- Support – A high inter-item correlation (above .7) was found - Cronbach’s alpha .90. All items are highly correlated with the total with the weakest being “The centralized IT organization provides me the technology training I need” at .67.

In this study, the total scores for each factor (academic alignment, communication, enablement, fiscal responsibility, importance, innovation, reliability, responsiveness, shared governance, and support) were calculated by taking an average of each factor’s operational definitions (Table 14). Respondents who answered “Not Sure” to all sub-questions for a given factor were eliminated from the correlation analysis for that factor.

### ***Overall Satisfaction***

Based on the higher education chief information officer literature, questions were developed to measure overall IT organization and CIO satisfaction (Table 15). Faculty, non-centralized IT staff, and students were asked to respond to each operational definition using a six-point Likert scale (used to allow no neutral position). Respondents who responded “Not

Sure” to CIO satisfaction questions 36-38 (Appendix B) were omitted from the CIO satisfaction correlation analysis.

<b>Table 15: Operationalization of Variables: Overall IT Organization and CIO Satisfaction</b>	
<b>Variables</b>	<b>Operational Definitions</b>
<b>Overall Satisfaction with IT Organization</b>	<ul style="list-style-type: none"> <li>• The centralized IT organization at our institution is effective (Q31).</li> <li>• I am satisfied with the performance of the central IT organization (Q232).</li> <li>• I believe the central IT organization is doing an outstanding job (Q33).</li> <li>• Overall my satisfaction with the central IT organization at our institution is high (Q34).</li> </ul>
<b>Overall Satisfaction with CIO</b>	<ul style="list-style-type: none"> <li>• The Chief Information Officer (senior most technology leader for the college or university) at our institution is effective (Q36).</li> <li>• I am satisfied with the performance of the Chief Information Officer (senior most technology leader for the college or university) (Q37).</li> <li>• I believe the Chief Information Officer (senior most technology leader for the college or university) is doing an outstanding job (Q38).</li> </ul>

Once again, since this is an experimental design and a first attempt to identify and define overall satisfaction, it is the author’s point of view that for the purposes of this study, each overall satisfaction score’s operational definitions specifically define overall satisfaction. Appendix T provides internal consistency information using Cronbach’s Alpha for that may be useful for further research. A brief overview of the consistency findings will be discussed.

- Satisfaction with the Centralized Information Technology Organization – A high inter-item correlation (above .7) was found - Cronbach’s alpha .97. All items are highly correlated with the total.

- Satisfaction with the Chief Information Officer – A high inter-item correlation (above .7) was found - Cronbach's alpha .98. All items are highly correlated with the total.

### **Inter-Institutional Differences in IT User Satisfaction**

The overall IT user satisfaction scores are a function of the university they come from (average score) and individual subject score (which accounts for error).

$$y_{IT} \sim U + S$$

Intraclass correlation coefficient (ICC) was used to assess the consistency of user satisfaction responses at the eleven institutions with institution-wide participation. The test hypothesis was that the between university variance is 0. The between institutions variance was 4.26 and the error variance between subjects within the institution was 21.06. The resulting p value of .0245 is small (<.05) therefore this hypothesis was rejected. There is a difference in the levels of satisfaction reported in different institutions (Appendix J).

The study found that 17% of the total variance was between universities which is large in the context of this study. Since in this study what is being measured (user satisfaction) and how it is being measured (individuals responding to Likert scale questions) should result in significant between subject error (people responding to Likert scales and perceive user satisfaction differently), the fact that results show such a large percentage of variance as institutional variance is significant and supports the conclusion that user satisfaction differs between institutions.

Information technology user satisfaction, which has now been shown to differ between universities, is an outcome that must be the function of something. In this study, it is being defined as a function of the IT organization's performance, the CIO's performance,



other intervening variables, and subject score (individual differences which account for error). Thus the overall model is:

$$Y_{\text{user satisfaction}} \sim X_{\text{IT}} + X_{\text{CIO}} + U_{\text{other}} + S$$

$U_{\text{other}}$  is the portion of the difference between universities that is not accounted for by IT organization and CIO performance. University effect is an unmeasured variable in the model.

### **Sampling Frame**

Chief information officers at institutions identified with doctoral level programs through The Carnegie Foundation for the Advancement of Teaching (DRU: Doctoral/Research Universities, RU/H: Research Universities – high research activity, RU/VH: Research Universities – very high research activity) were contacted to request their school's participation in the study which was conducted using an online survey tool (The Carnegie Foundation Staff, 2008). Doctoral level institutions were selected for this study rather than including all higher education institutions to keep the study size manageable.

Contact information was gathered for the CIO, the CIO's executive assistant, and two faculty members in Library and Information Science, Computer Science, or other closely related department at each of the 282 institutions listed in Appendix C. Contact information for all of these people was collected in order to provide numerous avenues in which to request overall institution participation. Potential participants at each institution included faculty, staff, and students.

### **Survey Distribution and Administration**

The data was collected using two online survey instruments loosely based upon those used in 2006 and 2007 evidenced-based management McKinsey Quarterly articles (Leslie et

al., 2006; Smet et al., 2007). The surveys that were used in these McKinsey Quarterly studies were not publicly available so I spoke with one of the authors of the articles, Schaninger, and he was very helpful in providing information about how the surveys were written. The surveys used in this study were developed based on those articles as well as conversations with the author. Additionally, high-performance questions were derived from 1999, 2006, and 2007 works by Pfeffer and Sutton which outline the keys to creating high-performance management systems (Pfeffer, 1999a; 1999b; Pfeffer & Sutton 2006h; Pfeffer, 2007a).

A giveaway (choice of \$200 or a Nintendo Wii) was used as an incentive for survey participation. One winner was randomly selected among all participants.

CIOs were asked to take the online “Chief Information Officer (CIO) Survey” (Appendix A) and send out a prewritten recruitment email (Appendix G) to all faculty, students, and staff at their institution to take the “Campus Technology Survey” (Appendix B). Qualtrics survey software (provided through University of North Carolina’s Odum Institute for Research in Social Science) was used to gather the data.

In the McKinsey Quarterly study, employees from all levels of an organization took a survey that measured performance based on outcomes and practices. The study looked at the nine outcomes listed previously in Table 2. The survey in that study asked employees to rate their company’s effectiveness in these nine outcome areas using a Likert scale. This dissertation study conducted a similar survey. Additionally, the Campus Technology Survey included high-performance culture category questions (Table 3) that were answered by the centralized information technology department employees.

Before sending out surveys to the institutions, the surveys were reviewed by consultants at the Odum Institute and my dissertation committee. They were then tested by a group of SILS Ph.D. students. The surveys were then further tested at one of the 282 doctoral institutions. Only one change was made to the campus technology survey (Appendix B). Originally, there were three surveys: one for CIOs, one for centralized IT employees, and a third for campus users. This made the distribution directions for the CIO too complicated. Therefore, the centralized IT employee survey was combined into the campus technology survey and survey logic was used to direct respondents to answer relevant questions based on their role. All groups completed introductory questions and then campus users continued the survey until they completed question 41. Centralized IT employees completed questions 43-116.

I then began my recruitment plan. First, I sent out a promotional and recruitment email (Appendix H) about my survey to the EDUCAUSE CIO Constituent Group Listserv (CIO@LISTSERV.EDUCAUSE.EDU). Second, I used the contact information I gathered for each of the 282 CIOs to send a personalized email (Appendix D) requesting their participation in the study and attaching participation instructions (Appendix G). Third, I thanked those that agreed to take part in the study and sent participation instructions once again. Fourth, after approximately two weeks, I followed up with the CIOs that I had not heard back from with a second email (Appendix F). Fifth, after waiting another week, I contacted the CIOs assistant and/or faculty members at institutions that had not responded requesting their assistance in obtaining their institution's participation (Appendices E & I). Finally, after I sent the email to the EDUCAUSE CIO Constituent Group Listserv there were a few requests to participate from those not at doctoral institutions. I modified my

institutional review board (IRB) submission and received approval to include these institutions in the study as well since the study sample size was small. Select results below include analysis with and without these institutions included.

## ANALYSIS AND STUDY FINDINGS

### Participation Overview

Twenty-eight institutions participated in the study. Twenty-two are classified as either DRU, RU/H, or RU/VH and six of the 28 are private. An overview of institutional participation is in Table 16 and individual participation is in Table 17. Incomplete surveys, as well as responses from students under 18 years of age and from those who worked at the institution less than three months, were not included in the data analysis. Institution-wide participation is defined as any institution where participation requests were sent to all groups regardless of response rate (Table 16).

<b>Table 16: Institution Participation Overview</b>					
	<b>DRU, RU/H, or RU/VH</b>	<b>NON DRU, RU/H, or RU/VH</b>	<b>Public</b>	<b>Private</b>	<b>TOTAL</b>
Institution-Wide Participation (all groups responding)	8	1	8	1	9
Institution-Wide Participation (incomplete CIO survey)	1	0	1	0	1
Institution-Wide Participation (but no student responses)	0	1	1	0	1
CIO Participation Only	12	4	11	5	16
CIO and IT Staff Only Participation	1	0	1	0	1
<b>TOTALS</b>	<b>22</b>	<b>6</b>	<b>22</b>	<b>6</b>	<b>28</b>

<b>Table 17: Individual Participation Overview</b>					
	<b>DRU, RU/H, or RU/VH</b>	<b>NON DRU, RU/H, or RU/VH</b>	<b>Public</b>	<b>Private</b>	<b>TOTAL</b>
CIOs	<b>21</b>	<b>6</b>	<b>21</b>	<b>6</b>	<b>27</b>
Centralized IT Department Staff	<b>163</b>	<b>39</b>	<b>163</b>	<b>39</b>	<b>202</b>
Decentralized IT Department Staff	<b>176</b>	<b>1</b>	<b>176</b>	<b>1</b>	<b>177</b>
Non-IT Staff	<b>979</b>	<b>132</b>	<b>979</b>	<b>132</b>	<b>1111</b>
Faculty	<b>487</b>	<b>13</b>	<b>487</b>	<b>13</b>	<b>500</b>
Students	<b>1304</b>	<b>1</b>	<b>1304</b>	<b>1</b>	<b>1305</b>
<b>TOTALS</b>	<b>3130</b>	<b>192</b>	<b>3130</b>	<b>192</b>	<b>3322</b>

### **Descriptive Survey Data**

The total number of students enrolled at the participating intuitions ranged from under 5,000 to 35,000 with the average being between 10,000 and 20,000. CIOs responding to this survey, on average, have held their current position for three to five years. Two CIOs have been in the position less than six months and two held their current role for eleven or more years. Not including student workers, the average CIO oversaw centralized IT organizations consisting of between 51 and 100 employees and the majority of responders had organizations ranging from 51 to 200 employees. Three CIOs had less than 25 employees and two had greater than 300. The average recurring centralized IT budget was reported by CIOs to be between \$5,000,000 and \$10,000,000. Two IT leaders reported centralized budgets less than \$1,000,000 and two reported ones greater than \$50,000,000. Twenty-one

of the 27 CIOs responding stated that information technology management and responsibility at their institution was either mostly or very centralized. Four believed it to be equally divided and two stated it was mostly decentralized.

## **Research Questions**

### ***Research Question 1 – Factors Associated with User Satisfaction***

*Which factors are most associated with user satisfaction with the centralized technology organization (Table 1)? Which factors are most associated with satisfaction with the CIO?*

Data for this question was captured from all faculty, student, non-centralized IT staff, and non-IT staff using questions 11, 13, 15, 17, 19, 21 (labeled 210), 23, 25, 27, 29 on the Campus Technology Survey (Appendix B). Based on the literature, ten factors were identified as potential drivers of user satisfaction (academic alignment, communication, enablement, fiscal responsibility, importance, innovation, reliability, responsiveness, shared governance, and support). Each factor was then operationalized using one or more statements (Table 12) which were developed based on available literature. Respondents were asked to agree or disagree with each statement using a six point Likert scale and those who responded “Not Sure” to questions 36-38 were omitted from the CIO satisfaction correlation analysis. Data is reported for all participating institutions and then additionally for research institutions (DRU, RU/H, RU/VH) only.

All factors were found to be correlated with centralized IT organization and CIO satisfaction. Most were highly correlated (Tables 18 & 20). Overall, academic alignment, fiscal responsibility, communication, innovation, and support appear most often (six, six, five, four, and four times respectively) as one of the top associated across all respondents with both IT organization and CIO satisfaction. The importance of IT, reliability, shared

governance, and responsiveness appear most often (eight, five, five, and four times respectively) as one of the bottom associated across all respondents.

The factors most highly correlated with satisfaction with the centralized IT organization are academic alignment, support, fiscal responsibility, reliability, and enablement. The factors most highly correlated with satisfaction with the CIO are fiscal responsibility, communication, innovation, and academic alignment. The factors least associated with satisfaction with the centralized IT organization are the importance of information technology, shared governance, and communication. The ones least associated with satisfaction with the CIO are importance of information technology, reliability, and responsiveness (Tables 18 & 20).

Tables 19 and 21 report correlations for research institutions (DRU, RU/H, RU/VH) only. Only slight differences were found and are highlighted in the tables below. When examining satisfaction with the centralized IT organization in research universities only, shared governance was slightly (.00708) more correlated than communication (faculty), enablement was slightly (.00091) more correlated than reliability (non-IT staff), and innovation was slightly (.00324) more correlated than responsiveness (non-IT staff). When examining satisfaction with the CIO in research universities only, responsiveness was slightly (.00007) more correlated than reliability (non-IT staff).



<b>Table 18: Factors Correlated with Satisfaction with the Centralized IT Organization</b>				
	<b>Faculty</b>	<b>Students</b>	<b>Non-Centralized IT Staff</b>	<b>Non-IT Staff</b>
Very Highly Correlated	Academic Alignment 0.87207 <.0001	Fiscal Responsibility 0.79713 <.0001	Responsiveness 0.86908 <.0001	Academic Alignment 0.80278 <.0001
	Innovation 0.85849 <.0001	Support 0.78354 <.0001	Communication 0.84035 <.0001	Support 0.79378 <.0001
	Enablement 0.85003 <.0001	Academic Alignment 0.78089 <.0001	Enablement 0.83906 <.0001	Fiscal Responsibility 0.78897 <.0001
	Support 0.84344 <.0001	Reliability 0.77027 <.0001	Academic Alignment 0.82526 <.0001	Reliability 0.77734 <.0001
	Responsiveness 0.83041 <.0001	Enablement 0.75947 <.0001	Fiscal Responsibility 0.81767 <.0001	Enablement 0.77132 <.0001
	Fiscal Responsibility 0.82265 <.0001	Innovation 0.75350 <.0001	Support 0.81444 <.0001	Responsiveness 0.76581 <.0001
	Reliability 0.80658 <.0001	Responsiveness 0.72083 <.0001	Shared Governance 0.78779 <.0001	Innovation 0.76213 <.0001
	Communication 0.75694 <.0001	Communication 0.65985 <.0001	Reliability 0.75743 <.0001	Communication 0.70873 <.0001
	Shared Governance 0.75452 <.0001	Shared Governance 0.56786 <.0001	Innovation 0.74491 <.0001	Shared Governance 0.61398 <.0001
	Highly Correlated	Importance of IT 0.25303 <.0001	Importance of IT 0.40907 <.0001	Importance of IT 0.28367 0.0001

**Table 19:  
Factors Correlated with Satisfaction with the Centralized IT Organization  
(Research Universities Only)**

	<b>Faculty</b>	<b>Students</b>	<b>Non-Centralized IT Staff</b>	<b>Non-IT Staff</b>
Very Highly Correlated	Academic Alignment 0.87155 <.0001	Fiscal Responsibility 0.79721 <.0001	Responsiveness 0.86833 <.0001	Academic Alignment 0.80283 <.0001
	Innovation 0.85489 <.0001	Support 0.78356 <.0001	Communication 0.83908 <.0001	Support 0.78898 <.0001
	Enablement 0.84661 <.0001	Academic Alignment 0.78090 <.0001	Enablement 0.83837 <.0001	Fiscal Responsibility 0.78664 <.0001
	Support 0.84085 <.0001	Reliability 0.77057 <.0001	Academic Alignment 0.82381 <.0001	Enablement 0.77101 <.0001
	Responsiveness 0.82598 <.0001	Enablement 0.75946 <.0001	Fiscal Responsibility 0.81641 <.0001	Reliability 0.77010 <.0001
	Fiscal Responsibility 0.82027 <.0001	Innovation 0.75352 <.0001	Support 0.81309 <.0001	Innovation 0.76604 <.0001
	Reliability 0.80266 <.0001	Responsiveness 0.72082 <.0001	Shared Governance 0.78645 <.0001	Responsiveness 0.76280 <.0001
	Shared Governance 0.75667 <.0001	Communication 0.65983 <.0001	Reliability 0.75740 <.0001	Communication 0.70123 <.0001
	Communication 0.74959 <.0001	Shared Governance 0.56785 <.0001	Innovation 0.74305 <.0001	Shared Governance 0.60169
	Highly Correlated	Importance of IT 0.24679 <.0001	Importance of IT 0.40528 <.0001	Importance of IT 0.23690 0.0015

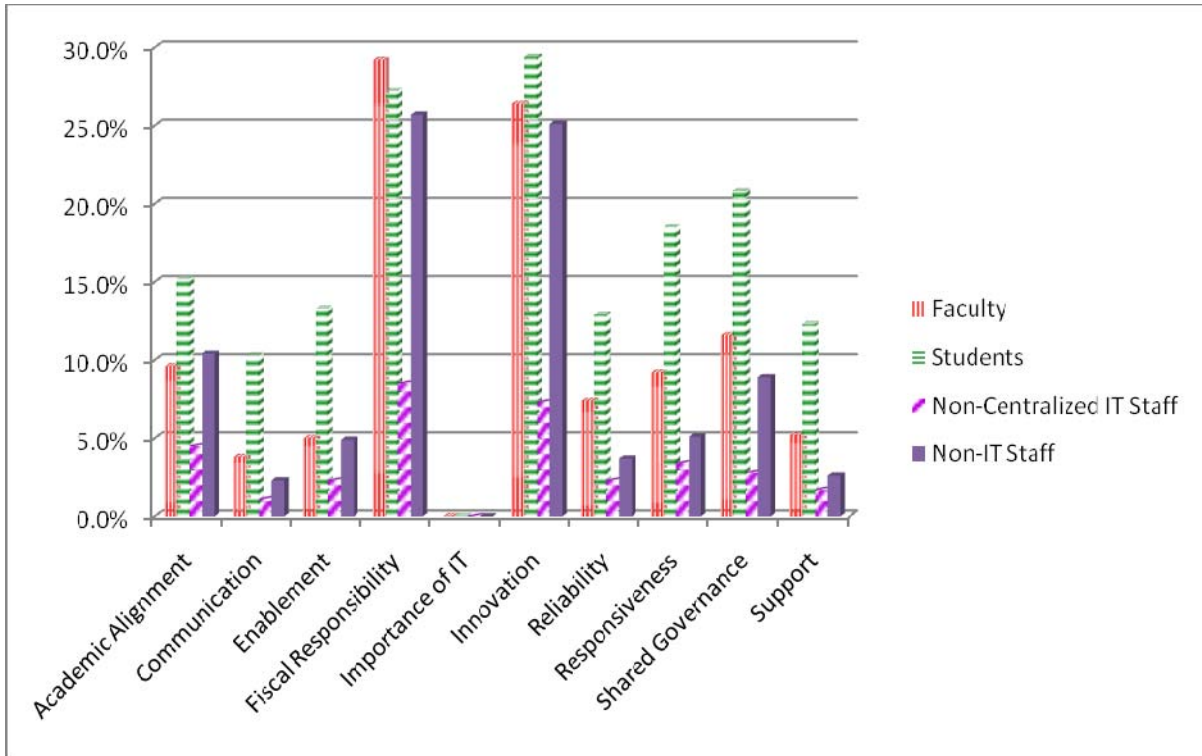
**Table 20:  
Factors Correlated with Satisfaction with the CIO**

	<b>Faculty</b>	<b>Students</b>	<b>Non-Centralized IT Staff</b>	<b>Non-IT Staff</b>
Highly Correlated	Academic Alignment 0.72256 <.0001	Fiscal Responsibility 0.65191 <.0001	Responsiveness 0.68457 <.0001	Fiscal Responsibility 0.62750 <.0001
	Fiscal Responsibility 0.69795 <.0001	Communication 0.63113 <.0001	Communication 0.68057 <.0001	Communication 0.59617 <.0001
	Innovation 0.69329 <.0001	Innovation 0.62096 <.0001	Shared Governance 0.66334 <.0001	Academic Alignment 0.59312 <.0001
	Communication 0.68905 <.0001	Support 0.60866 <.0001	Fiscal Responsibility 0.66064 <.0001	Innovation 0.55192 <.0001
	Shared Governance 0.63235 <.0001	Academic Alignment 0.58579 <.0001	Innovation 0.64126 <.0001	Support 0.52776 <.0001
	Enablement 0.63112 <.0001	Reliability 0.57680 <.0001	Enablement 0.61004 <.0001	Shared Governance 0.52464 <.0001
	Responsiveness 0.62193 <.0001	Shared Governance 0.57059 <.0001	Academic Alignment 0.60167 <.0001	Enablement 0.50798 <.0001
	Support 0.61725 <.0001	Responsiveness 0.56112 <.0001	Support 0.57667 <.0001	Reliability 0.49755 <.0001
	Reliability 0.54548 <.0001	Enablement 0.55900 <.0001	Reliability 0.50934 <.0001	Responsiveness 0.48775 <.0001
	Correlated	Importance of IT 0.27383 <.0001	Importance of IT 0.36398 <.0001	Importance of IT 0.29108 0.0005

<b>Table 21: Factors Correlated with Satisfaction with the CIO (Research Universities Only)</b>				
	<b>Faculty</b>	<b>Students</b>	<b>Non-Centralized IT Staff</b>	<b>Non-IT Staff</b>
Highly Correlated	Academic Alignment 0.71666 <.0001	Fiscal Responsibility 0.65278 <.0001	Responsiveness 0.68336 <.0001	Fiscal Responsibility 0.60665 <.0001
	Fiscal Responsibility 0.69262 <.0001	Communication 0.63134 <.0001	Communication 0.67869 <.0001	Communication 0.57858 <.0001
	Innovation 0.68775 <.0001	Innovation 0.62086 <.0001	Shared Governance 0.66128 <.0001	Academic Alignment 0.57537 <.0001
	Communication 0.68027 <.0001	Support 0.60911 <.0001	Fiscal Responsibility 0.65857 <.0001	Innovation 0.52309 <.0001
	Shared Governance 0.62895 <.0001	Academic Alignment 0.58617 <.0001	Innovation 0.63912 <.0001	Support 0.51545 <.0001
	Enablement 0.62331 <.0001	Reliability 0.57834 <.0001	Enablement 0.60784 <.0001	Shared Governance 0.50564 <.0001
	Responsiveness 0.61158 <.0001	Shared Governance 0.57108 <.0001	Academic Alignment 0.59890 <.0001	Enablement 0.50558 <.0001
	Support 0.60722 <.0001	Responsiveness 0.56110 <.0001	Support 0.57390 <.0001	Responsiveness 0.52122 <.0001
	Reliability 0.53565 <.0001	Enablement 0.55897 <.0001	Reliability 0.50762 <.0001	Reliability 0.52115 <.0001
Correlated	Importance of IT 0.26951 <.0001	Importance of IT 0.36334 <.0001	Importance of IT 0.28802 0.0006	Importance of IT 0.21519 <.0001

Factors about which users reported most uncertainty included fiscal responsibility, innovation, shared governance, and academic alignment. Users were not unsure about the importance of information technology (Figure 2 & Table 22).

**Figure 2:**  
**Percentage of Participants Who Responded Not Sure About Factors**

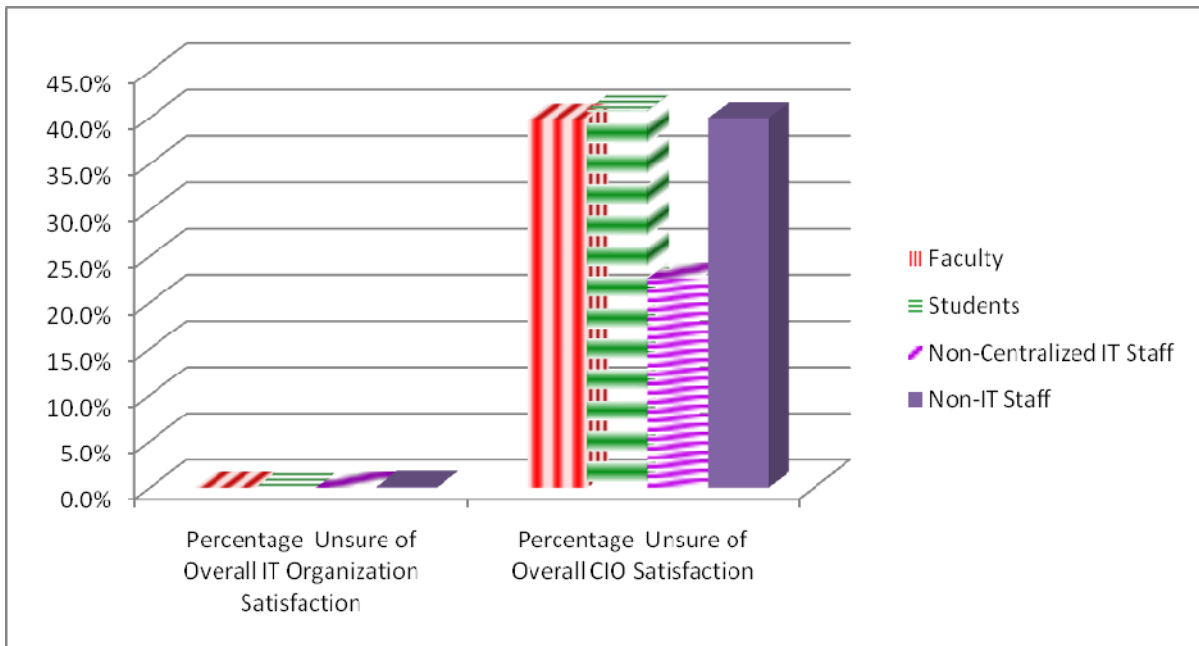


**Table 22:**  
**Percentage of Participants Who Responded Not Sure About Factors**

	Faculty	Students	Non-Centralized IT Staff	Non-IT Staff
Academic Alignment	9.6%	15.2%	4.5%	10.4%
Communication	3.8%	10.3%	1.1%	2.3%
Enablement	5.0%	13.3%	2.3%	4.9%
Fiscal Responsibility	29.2%	27.2%	8.5%	25.7%
Importance of IT	0.0%	0.0%	0.0%	0.0%
Innovation	26.4%	29.4%	7.3%	25.1%
Reliability	7.4%	12.9%	2.3%	3.7%
Responsiveness	9.2%	18.5%	3.4%	5.1%
Shared Governance	11.6%	20.8%	2.8%	8.9%
Support	5.2%	12.3%	1.7%	2.6%

Although responders were not unsure of overall satisfaction with the information technology organization, many were unsure of CIO performance. Approximately 40% of faculty, students, and non-IT staff were unsure and 23% of decentralized IT employees were uncertain as well (Figure 3 & Table 23).

**Figure 3:**  
**Percentage of Participants Who Responded Not Sure About Overall Satisfaction**



**Table 23:**  
**Percentage of Respondents Who Responded Not Sure About Overall Satisfaction**

	Faculty	Students	Non-Centralized IT Staff	Non-IT Staff
Percentage Unsure of Overall IT Organization Satisfaction	0.0%	0.0%	0.0%	0.1%
Percentage Unsure of Overall CIO Satisfaction	39.8%	40.8%	22.6%	40.0%

### *Faculty Data*

Faculty results indicate that all ten factors (academic alignment, communication, enablement, fiscal responsibility, importance, innovation, reliability, responsiveness, shared governance, and support) are highly correlated with IT organization satisfaction. The most strongly correlated are academic alignment, innovation, enablement, and support. The weakest are reliability, communication, shared governance, and the importance of information technology (Table 24).

All ten factors are also correlated (although not as strongly) with CIO satisfaction. The most strongly correlated are academic alignment, fiscal responsibility, innovation, and communication. The weakest are responsiveness, support, reliability, and the importance of information technology (Table 24).

Both academic alignment and innovation are highly correlated with both centralized IT organization and CIO satisfaction. Reliability and the importance of IT are least correlated with both centralized IT organization and CIO satisfaction.

<b>Table 24: Faculty Satisfaction Correlation Comparison</b>	
<b>Centralized IT Organization</b>	<b>CIO</b>
Academic Alignment 0.87207 <.0001	Academic Alignment 0.72256 <.0001
Innovation 0.85849 <.0001	Fiscal Responsibility 0.69795 <.0001
Enablement 0.85003 <.0001	Innovation 0.69329 <.0001
Support 0.84344 <.0001	Communication 0.68905 <.0001
Responsiveness 0.83041 <.0001	Shared Governance 0.63235 <.0001
Fiscal Responsibility 0.82265 <.0001	Enablement 0.63112 <.0001
Reliability 0.80658 <.0001	Responsiveness 0.62193 <.0001
Communication 0.75694 <.0001	Support 0.61725 <.0001
Shared Governance 0.75452 <.0001	Reliability 0.54548 <.0001
Importance of IT 0.25303 <.0001	Importance of IT 0.27383 <.0001



### *Student Data*

Student results indicate that all ten factors (academic alignment, communication, enablement, fiscal responsibility, importance, innovation, reliability, responsiveness, shared governance, and support) are highly correlated with IT organization satisfaction. The most correlated are fiscal responsibility, support, academic alignment, and reliability. The least are responsiveness, communication, shared governance, and the importance of information technology (Table 25).

All ten factors are also correlated (although not as strongly) with CIO satisfaction. The most correlated are fiscal responsibility, communication, innovation, and support. The least are shared governance, responsiveness, enablement, and the importance of information technology (Table 25).

Fiscal responsibility and support are both highly correlated with both centralized IT organization and CIO satisfaction. Responsiveness, shared governance, and the importance of IT are least correlated with both centralized IT organization and CIO satisfaction.

<b>Table 25: Student Satisfaction Correlation Comparison</b>	
<b>Centralized IT Organization</b>	<b>CIO</b>
Fiscal Responsibility 0.79713 <.0001	Fiscal Responsibility 0.65191 <.0001
Support 0.78354 <.0001	Communication 0.63113 <.0001
Academic Alignment 0.78089 <.0001	Innovation 0.62096 <.0001
Reliability 0.77027 <.0001	Support 0.60866 <.0001
Enablement 0.75947 <.0001	Academic Alignment 0.58579 <.0001
Innovation 0.75350 <.0001	Reliability 0.57680 <.0001
Responsiveness 0.72083 <.0001	Shared Governance 0.57059 <.0001
Communication 0.65985 <.0001	Responsiveness 0.56112 <.0001
Shared Governance 0.56786 <.0001	Enablement 0.55900 <.0001
Importance of IT 0.40907 <.0001	Importance of IT 0.36398 <.0001

### *Non-Centralized IT Staff Data*

Non-centralized IT staff results indicate that all ten factors (academic alignment, communication, enablement, fiscal responsibility, importance, innovation, reliability, responsiveness, shared governance, and support) are highly correlated with IT organization satisfaction. The most correlated are responsiveness, communication, enablement, and academic alignment. The least are shared governance, reliability, innovation, and the importance of information technology (Table 26).

All ten factors are also correlated (although not as strongly) with CIO satisfaction. The most correlated are responsiveness, communication, shared governance, and fiscal responsibility. The least are academic alignment, support, reliability, and the importance of information technology (Table 26).

Both responsiveness and communication are highly correlated with both centralized IT organization and CIO satisfaction. Reliability and the importance of IT are least correlated with both centralized IT organization and CIO satisfaction.

<b>Table 26: Non-Centralized IT Staff Satisfaction Correlation Comparison</b>	
<b>Centralized IT Organization</b>	<b>CIO</b>
Responsiveness 0.86908 <.0001	Responsiveness 0.68457 <.0001
Communication 0.84035 <.0001	Communication 0.68057 <.0001
Enablement 0.83906 <.0001	Shared Governance 0.66334 <.0001
Academic Alignment 0.82526 <.0001	Fiscal Responsibility 0.66064 <.0001
Fiscal Responsibility 0.81767 <.0001	Innovation 0.64126 <.0001
Support 0.81444 <.0001	Enablement 0.61004 <.0001
Shared Governance 0.78779 <.0001	Academic Alignment 0.60167 <.0001
Reliability 0.75743 <.0001	Support 0.57667 <.0001
Innovation 0.74491 <.0001	Reliability 0.50934 <.0001
Importance of IT 0.28367 0.0001	Importance of IT 0.29108 0.0005

### *Non-IT Staff Data*

Non-IT staff results indicate that all ten factors (academic alignment, communication, enablement, fiscal responsibility, importance, innovation, reliability, responsiveness, shared governance, and support) are highly correlated with IT organization satisfaction. The most correlated are academic alignment, support, fiscal responsibility, and reliability. The least are innovation, communication, shared governance, and the importance of information technology (Table 27).

All ten factors are also correlated (although not as strongly) with CIO satisfaction. The most correlated are fiscal responsibility, communication, academic alignment, and innovation. The least are enablement, reliability, responsiveness, and the importance of information technology (Table 27).

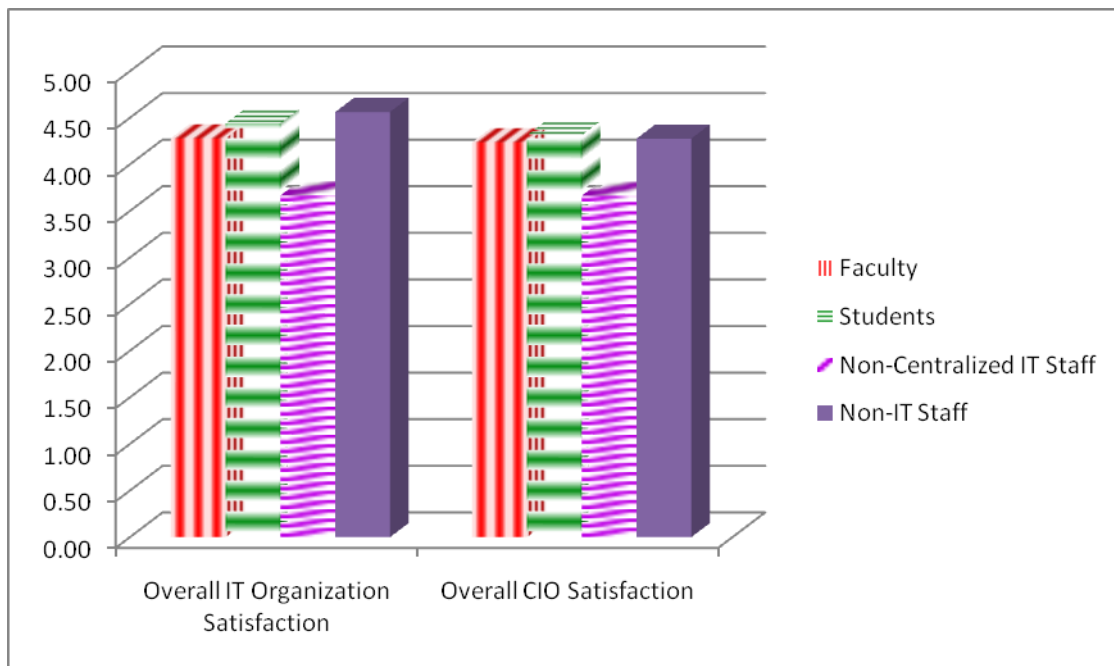
Academic alignment and fiscal responsibility are both highly correlated with both centralized IT organization and CIO satisfaction. The importance of information technology is least correlated with both centralized IT organization and CIO satisfaction

<b>Table 27: Non-IT Staff Satisfaction Correlation Comparison</b>	
<b>Centralized IT Organization</b>	<b>CIO</b>
Academic Alignment 0.80278 <.0001	Fiscal Responsibility 0.62750 <.0001
Support 0.79378 <.0001	Communication 0.59617 <.0001
Fiscal Responsibility 0.78897 <.0001	Academic Alignment 0.59312 <.0001
Reliability 0.77734 <.0001	Innovation 0.55192 <.0001
Enablement 0.77132 <.0001	Support 0.52776 <.0001
Responsiveness 0.76581 <.0001	Shared Governance 0.52464 <.0001
Innovation 0.76213 <.0001	Enablement 0.50798 <.0001
Communication 0.70873 <.0001	Reliability 0.49755 <.0001
Shared Governance 0.61398 <.0001	Responsiveness 0.48775 <.0001
Importance of IT 0.23227 <.0001	Importance of IT 0.22526 <.0001

Mean overall satisfaction scores for the different groups of respondents are reported below (Table 28 & Figure 4). Overall satisfaction with the centralized Information Technology (IT) organization is an average of questions 31, 32 (labeled 232), 33, and 34 (per respondent) (Appendix B) and with the chief information officer is an average of questions 36, 37 and 38 (per respondent) (Appendix B). A full list of means is reported in Appendix K. Non-IT staff and students are most satisfied while non-centralized IT staff members are the least satisfied.

<b>Table 28: Mean Overall Satisfaction Scores</b>				
	<b>Faculty</b>	<b>Students</b>	<b>Non-Centralized IT Staff</b>	<b>Non-IT Staff</b>
<b>Overall IT Organization Satisfaction</b>	4.28	4.44	3.67	4.56
<b>Overall CIO Satisfaction</b>	4.24	4.31	3.66	4.28

**Figure 4:  
Mean Overall Satisfaction Scores**



**Research Question 2 – Organizational Quality**

*Are technology organizations with a higher straight average of performance in the nine areas used to define organizational quality (Table 2) viewed as performing better than those which do not?*

Data from the eleven institutions with responses from both campus users and the centralized IT department was used to answer this question. Centralized IT employees responded to these questions. First, the scores for each set of questions in each of the nine organizational quality areas were averaged for each person responding to get an average score per respondent in each of the nine areas (Table 29).

<b>Table 29: Organizational Quality Questions</b>	
<b>Nine Organizational Quality Areas</b>	<b>Campus Technology Survey</b>
Accountability	Questions 49-50
Capability	Questions 51- 52
Coordination and Control	Questions 53-56
Direction	Questions 57-59
Environment and Values	Questions 60-61
External Orientation	Questions 62-63
Innovation	Questions 64-66
Leadership	Questions 67-71
Motivation	Questions 72-73

Second, an institutional score for each organizational quality area was created by averaging the per-person scores within each institution. Finally, the organizational quality area scores for each institution were averaged to get a single mean score in each area across all institutions. Means of each organizational quality area show that centralized IT employees scored their organizations highest in accountability (5.13), capability (4.76), and direction (4.68). They scored their organizations lowest in motivation (4.29), environment and values (4.25), and coordination and control (3.71). A table of means is reported in Appendix L.



Next, the nine organizational quality area scores at each institution were averaged to obtain a single organizational quality score for each institution, similar to the McKinsey Quarterly studies this methodology is based upon. Whether or not the nine areas should be equally weighted to determine the organizational quality score or whether certain items should be weighted more heavily than others is an area for further study. Finally, correlations were computed between each institution's organizational quality score (generated from centralized IT employee responses) and that institution's overall satisfaction with the centralized Information Technology (IT) organization and the belief that the chief information officer is doing an outstanding job (generated from user responses, as defined above in question one). Correlations are listed in Appendix L.

Since this sample size was very small (only 11 institutions), there is not enough power to reasonably expect to reject a null hypothesis of no association. Instead, what this study does is obtain and report an estimate of that association and make an assessment as to whether that association may be large enough for further exploration. If, in fact, the association in the population is the same size as that found in this exploratory study (.2), it is a small to moderate correlation and one worth further exploration (Cohen, 1988). The correlation found in this study between the organizational quality score and overall satisfaction with the centralized Information Technology (IT) organization (.21), as well as with the belief that the chief information officer is doing an outstanding job (.25) (Appendix L), is consistent with the hypothesis that CIOs whose centralized information technology (IT) organizations perform well in the nine areas used to define organizational quality are viewed as having more successful IT organizations and as being more successful CIOs. The p-values are high since there were only eleven institutions. According to Hoyle,

*quite commonly, small samples will lead to results that do not reach the conventional level of significance—p values of less than .05, which might mistakenly lead the researcher to accept the null hypothesis of no relationship. Yet, by considering the effect size, the researcher might uncover a potentially interesting and valuable relationship that might have yielded more significant results if only more subjects were added to the study (Hoyle, 1999, p. 64).*

The results of this research question as well as those to be discussed in question four, particularly when taken together, are consistent with the hypothesis that CIOs whose centralized information technology (IT) organizations perform well in the nine areas used to define organizational quality and who create high-performance IT cultures are viewed as having more successful IT organizations and as being more successful CIOs. Both are positively correlated with small to moderate effect sizes (Cohen, 1988). Hoyle illustrates that results that are far from significant in a small study with a small to moderate associated effect size can have the same effect size in a larger more significant study (Hoyle, 1999). This is an area for further research.

### ***Research Question 3 – Organizational Quality Area Combinations***

*Are technology organizations with a higher performance in certain combinations of the nine areas used to define organizational quality (Table 2) viewed as performing better than those which do not?*

Data from the eleven institutions with responses from both campus users and the centralized IT department was used to answer this question. Centralized IT employees responded to organizational quality questions. First, the scores for each set of questions in each of the nine organizational quality areas were averaged for each person responding to get an average score per respondent in each of the nine areas (Table 29). Second, an institutional score for each organizational quality area was created by averaging the per-person scores

within each institution. Third, the organizational quality area scores for each institution were averaged to get a single mean score in each area across all institutions. Linear regression was used to choose the optimal model of three of the nine organizational quality factors that were most associated with overall satisfaction with the centralized Information Technology (IT) organization and the belief that the chief information officer is doing an outstanding job (as defined above in question one). Correlations are listed in Appendix M.

In 2006, Leslie, Loch, and Schaninger published a study in the McKinsey Quarterly which proposed that a combination of management practices carefully selected can be more effective than single interventions. In this study, similar to the McKinsey Quarterly studies this methodology is based on, correlations for an optimal model of three organizational quality factors were calculated. Whether or not three is the optimal combination of factors to examine (as opposed to two or four, for example) is an area for further study. This data is provided for informational purposes as potential first areas in which to focus efforts as discussed below.

The largest set of correlations with IT satisfaction includes coordination and control, direction, and motivation (.78). The largest set of correlations with CIO satisfaction includes coordination and control, direction, and external orientation (.79) (Appendix M). It is likely, although large correlations are to be expected with a small dataset, that the combinations with the highest correlations are probably valid, although a bigger sample is needed to confirm this, and therefore should be the first to be explored in a larger analysis.

#### ***Research Question 4 – High-Performance***

*Are current higher education technology leaders building high-performance organizations that value, respect, and develop their employees (Table 3)? Is there a correlation between*

*the degree to which this is done and perceptions of CIO and technology organization performance? Are technology organizations with a higher performance in certain combinations of high-performance categories viewed as performing better than those which do not?*

Results for each of these research questions will be reported here.

*Are current higher education technology leaders building high-performance organizations that value, respect, and develop their employees (Table 3)?*

Data from the twelve institutions with responses from centralized information technology department staff (202 respondents) was used to answer this question. Centralized IT employees responded to the high-performance questions. First, the scores for each set of questions in each of the high-performance category areas was averaged for each person responding to get an average score per respondent for each of the high-performance categories (Table 13). Second, an institutional score for each high-performance category was created by averaging the per-person scores within each institution. Finally, the high-performance category scores for each institution were averaged to get a single mean score in each category across all institutions. The categories were then sorted from highest to lowest mean (Table 30).

According to employees, centralized IT organizations are doing well at creating meaningful jobs, valuing and treating employees well, and creating an environment of psychological safety and job security. Areas in which to focus additional efforts include teamwork and team rewards, creating systems and procedures, and sharing information (Table 30).

<b>Table 30: High-Performance Culture Results By Category</b>	<b>Mean</b>
Meaningful Jobs (Mean Q86-91)	4.87
Valued, Well-Treated Employees (Mean Q84+85)	4.83
Psychological Safety and Job Security (Mean Q82+83)	4.51
Work Climate/Recognition (Mean Q94-102)	4.23
Good Pay (Mean Q92)	4.20
Staff Development (Mean Q79-81)	4.15
Teamwork and Team Rewards (Mean Q74+75)	3.68
Systems, Procedures, and Information Availability (Mean Q76-78)	3.52
Overall Mean (mean of category means above)	4.25

*Is there a correlation between the degree to which this is done and perceptions of CIO and technology organization performance?*

Data from the eleven institutions with responses from both campus users and the centralized IT department was used to answer this question. Centralized IT employees responded to the high-performance questions. First, the scores for each set of questions in each of the high-performance category areas was averaged for each person responding to get an average score per respondent for each of the high-performance categories (Table 13). Second, an institutional score for each high-performance category was created by averaging the per-person scores within each institution. Third, the high-performance category scores at each institution were averaged to obtain a single high-performance score for each institution. Whether or not the category areas should be equally weighted to determine the organizational high-performance score or whether certain items should be weighted more heavily than

others is an area for further study. Finally, correlations were computed between each institution's high-performance score (generated from centralized IT employee responses) and that institution's overall satisfaction with the centralized Information Technology (IT) organization and the belief that the chief information officer is doing an outstanding job (generated from user responses, as defined above in question one).

The correlation found in this study between institutional high-performance culture scores and overall satisfaction with the centralized Information Technology (IT) organization ( $r = 0.14$ ) and the belief that the chief information officer is doing an outstanding job ( $r = 0.19$ ) (Appendix N) is consistent with the hypothesis that CIOs who create high-performance IT cultures are viewed as having more successful IT organizations and as being more successful CIOs. However, the p-values are high since there were only eleven institutions. Since this sample size was very small (only 11 institutions), there is not enough power to reasonably expect to reject a null hypothesis of no association. Instead, what this study does is obtain and report an estimate of that association and make an assessment as to whether that association may be large enough for further exploration. If, in fact, the association in the population is the same size as that found in this exploratory study (.14 - .19), it is a small to moderate correlation and one worth further exploration (Cohen, 1988).

The results of this research question as well as those discussed in question two, particularly when taken together, are consistent with the hypothesis that CIOs whose centralized information technology (IT) organizations perform well in the nine areas used to define organizational quality and who create high-performance IT cultures are viewed as having more successful IT organizations and as being more successful CIOs. Both are positively correlated with small to moderate effect sizes. Hoyle illustrates that results that

are far from significant in a small study with a small to moderate associated effect size can have the same effect size in a larger more significant study (Hoyle, 1999). This is an area for further research.

*Are technology organizations with a higher performance in certain combinations of high-performance categories (Table 3) viewed as performing better than those which do not?*

Data from the eleven institutions with responses from both campus users and the centralized IT department was used to answer this question. Centralized IT employees responded to the high-performance questions. First, the scores for each set of questions in each of the high-performance category areas was averaged for each person responding to get an average score per respondent for each of the high-performance categories (Table 13). Second, an institutional score for each high-performance category was created by averaging the per-person scores within each institution. Third, the high-performance category scores at each institution were averaged to obtain a single high-performance score for each institution. Linear regression was used to choose the optimal model of three high-performance categories that were most associated with overall satisfaction with the centralized Information Technology (IT) organization and the belief that the chief information officer is doing an outstanding job (as defined above in question one). Correlations are listed in Appendix N.

In this study, similar to the McKinsey Quarterly studies this methodology is based on, correlations for an optimal model of three were calculated. The components necessary to develop a high-performance culture are not isolated interventions but systemic, complimentary management practices “to provide an environment that produces innovation, discretionary effort, and high levels of performance and service” (Pfeffer, 2007a, p. 15).

Whether or not three is the optimal combination of categories to examine (as opposed to two or four, for example) is an area for further study. This data is provided for informational purposes as potential first areas in which to focus efforts as discussed below.

The largest correlation with overall IT organization satisfaction using a combination of three high-performance categories is .89 (staff development, psychological safety and job security, meaningful jobs). The largest correlation with overall CIO satisfaction is .89 (systems, procedures, and information availability; psychological safety and job security; meaningful jobs). It is likely, although large correlations are to be expected with a small dataset, that the combinations with the highest correlation are probably significant, although a bigger sample is needed to confirm this, and should be the first to be explored in a larger analysis.

### ***Research Question 5 – Important to IT Organization Success***

*What do CIOs believe is important for the success of the centralized information technology organization?*

The components of question 14 on the CIO survey (Appendix A) were averaged across all CIO responders to get a single score for each sub question. These questions were then sorted by mean. Data is reported for all participating institutions and then additionally for research institutions (DRU, RU/H, RU/VH) only.

Reliability, satisfaction, communication, support, and responsiveness were perceived to be most important to the success of the centralized IT organization. Budget management and innovation were perceived to be least important. Means with and without non-research universities varied only slightly and are highlighted below in bold (Table 31).



<b>Table 31: CIO Perceptions of Centralized IT Organization Success Factors</b>		
<b>How important are the following to the success of the IT organization?</b>	<b>Mean All Institutions</b>	<b>Mean Research Institutions Only</b>
Reliability of technology services	<b>4.6</b>	<b>4.5</b>
End user satisfaction	4.6	4.6
Proactive communication	4.5	4.5
End user support	4.5	4.5
Responsiveness of the technology organization	4.5	4.5
Effective communication	<b>4.5</b>	<b>4.4</b>
High-performance IT employee teams (employees are respected, well trained, and valued)	4.4	4.4
Technology alignment with campus goals	<b>4.4</b>	<b>4.3</b>
Technology alignment with campus priorities	4.3	4.3
End user enablement (IT allows users to accomplish their goals)	<b>4.2</b>	<b>4.3</b>
IT fiscal responsibility	4.1	4.1
Campus involvement in technology decisions	4.0	4.0
IT budget management	3.9	3.9
Innovation	3.6	3.6

***Research Question 6 – User Satisfaction Perceptions***

*Do CIOs have an accurate understanding of how satisfied their campus users are? Do centralized information technology employees?*

Data from the eleven institutions with responses from both campus users and the centralized IT department was used to answer this question. First, the scores for each set of questions in each of the areas of interest (Table 32) were averaged for each person responding to get an average score per respondent for each of the areas. Second, an institutional score for each area was created by averaging the per-person scores within each institution. Finally, the area scores for each institution were averaged to get a single mean score in each area across all institutions (Table 32). Results by institution are listed in Appendix P.

In most categories (enablement, support, reliability, responsiveness, academic alignment, and innovation) users at these institutions are more satisfied than CIOs and IT employees perceive them to be. Perceived satisfaction with shared governance and fiscal responsibility was slightly higher than actual satisfaction and perceived satisfaction with communication was higher than actual satisfaction. Actual overall satisfaction was slightly above perceived overall satisfaction. Interestingly, however, both the CIO and IT department believe that the centralized IT organization is more effective than campus users do with CIOs rating their organizations almost a point higher in effectiveness than campus users do. CIOs and IT employees also believe the centralized IT organization is doing an outstanding job more than campus users do. Finally, CIOs and IT employees believe the centralized IT organization does a better job than other centralized campus units but campus users are a little bit less likely to believe this.

<b>Table 32: CIO and IT Perception of Campus User Satisfaction</b>			
	<b>CIO Perception (CIO Survey)</b>	<b>Centralized IT Perception (Campus Survey)</b>	<b>Actual Campus User Satisfaction (Campus Survey)</b>
Enablement <i>Q16_3</i>   <i>Q108_3</i>   <i>Q11</i>	4.27	4.25	4.48
Support <i>Q16_2</i>   <i>Q108_2</i>   <i>Q13</i>	4.27	4.36	4.50
Reliability <i>Q16_4</i>   <i>Q108_4</i>   <i>Q15</i>	4.45	4.34	4.76
Responsiveness <i>Q16_5</i>   <i>Q108_5</i>   <i>Q17</i>	4.18	4.17	4.38
Shared Governance <i>Q16_6</i>   <i>Q108_6</i>   <i>Q19</i>	3.82	3.98	3.82
Academic Alignment <i>Q16_7&amp;8</i>   <i>Q108_7&amp;8</i>   <i>Q210</i>	4.27	4.16	4.52
Fiscal Responsibility <i>Q16_9&amp;10</i>   <i>Q108_9&amp;10</i>   <i>Q23</i>	4.41	4.11	4.34
Communication <i>Q16_11&amp;12</i>   <i>Q108_11&amp;12</i>   <i>Q25</i>	4.20	3.90	3.83
Innovation <i>Q16_13</i>   <i>Q108_13</i>   <i>Q27</i>	4.20	4.07	4.22
Overall satisfaction IT organization is high <i>Q29</i>   <i>Q114</i>   <i>Q34</i>	4.30	4.22	4.33

	<b>CIO Belief</b>	<b>IT Employee Belief</b>	<b>User Belief</b>			
Believe the centralized IT organization is effective <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; text-align: center;">Q27</td> <td style="width: 33%; text-align: center;">Q110</td> <td style="width: 33%; text-align: center;">Q31</td> </tr> </table>	Q27	Q110	Q31	5.40	4.64	4.51
Q27	Q110	Q31				
Believe the centralized IT organization is doing an outstanding job <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; text-align: center;">Q28</td> <td style="width: 33%; text-align: center;">Q111</td> <td style="width: 33%; text-align: center;">Q33</td> </tr> </table>	Q28	Q111	Q33	4.50	4.34	4.21
Q28	Q111	Q33				
Believe centralized IT organization does a better job than does other centralized campus units (i.e. finance and human resources) <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; text-align: center;">Q30</td> <td style="width: 33%; text-align: center;">Q115</td> <td style="width: 33%; text-align: center;">Q40</td> </tr> </table>	Q30	Q115	Q40	4.60	4.52	4.13
Q30	Q115	Q40				

***Research Question 7 – Elements Tied to Success***

*Do centralized information technology employees believe the elements tied to their success are the same as those tied to the centralized technology organization’s success?*

Data from the twelve institutions with responses from centralized information technology department staff (202 respondents) was used to answer this question. A table of means for each of the questions of interest (questions 104 and 106 Appendix B) was created below (Table 33). The difference between the two means was calculated.

Centralized information technology employees at these institutions believe that some of the elements tied to their success are almost equally tied to that of the IT organization (satisfaction, support, enablement, reliability, responsiveness, communication, high-performance teams) while others are less tied to their success (campus involvement in technology decisions, alignment with goals and priorities, budget management and fiscal

responsibility, and innovation) (Table 33). Differences between overall responses and research university responses alone were small and are noted below in Table 34.

<b>Table 33: Centralized IT Employee Success Perceptions</b>			
	<b>Important to Employee (“My”) Success</b>	<b>Important to Technology Organization’s Success</b>	<b>Difference</b>
End User Satisfaction	4.59	4.57	0.02
End User Support	4.45	4.47	-0.02
End User Enablement	4.44	4.42	0.02
Reliability of Technology Services	4.58	4.67	-0.09
Responsiveness of the Technology Organization	4.38	4.41	-0.03
Campus Involvement in Technology Decisions	3.80	4.01	-0.21
Technology Alignment with Campus Goals	4.16	4.31	-0.15
Technology Alignment with Campus Priorities	4.15	4.30	-0.14
IT Budget Management	4.00	4.34	-0.34
IT Fiscal Responsibility	4.07	4.31	-0.24
Proactive Communication	4.32	4.33	-0.01
Effective Communication	4.48	4.42	0.05
Innovation	3.94	4.04	-0.10
High-Performance IT Teams	4.17	4.18	-0.01

<b>Table 34: Centralized IT Employee Success Perceptions (Research Universities Only)</b>			
	<b>Important to Employee (“My”) Success</b>	<b>Important to Technology Organization’s Success</b>	<b>Difference</b>
End User Satisfaction	4.58	4.55	0.03
End User Support	4.45	4.45	-0.01
End User Enablement	4.45	4.41	0.04
Reliability of Technology Services	4.57	4.65	-0.07
Responsiveness of the Technology Organization	4.36	4.40	-0.04
Campus Involvement in Technology Decisions	3.84	4.03	-0.18
Technology Alignment with Campus Goals	4.16	4.31	-0.16
Technology Alignment with Campus Priorities	4.15	4.29	-0.14
IT Budget Management	4.01	4.34	-0.33
IT Fiscal Responsibility	4.08	4.32	-0.24
Proactive Communication	4.32	4.32	0.01
Effective Communication	4.48	4.41	0.07
Innovation	3.95	4.04	-0.09
High-Performance IT Teams	4.18	4.19	-0.01

***Research Question 8 – Performance Reviews***

*Do CIOs have a clear understanding of what metrics will be used to evaluate their performance? Which elements do CIOs believe are most heavily factored into their performance reviews? Do CIOs believe that those conducting their performance reviews have adequate guidelines and information to carry out meaningful evaluations?*

Results for each of these research questions are presented here.

*Do CIOs have a clear understanding of what metrics will be used to evaluate their performance?*

Responses were counted for question 18 on the CIO survey (Appendix A). The percentage of each response type was then calculated. Fifty-nine percent of CIOs responded yes, they have a clear understanding of what metrics will be used to evaluate their performance, twenty-six percent responded no, and fifteen percent responded somewhat.

*Which elements do CIOs believe are most heavily factored into their performance reviews?*

The components of question 21 on the CIO survey (Appendix A) were averaged across all CIO responders to get a single score for each sub question. These questions were then sorted by mean.

CIOs believe satisfaction, reliability, and responsiveness are most heavily factored into their performance reviews. Innovation, campus involvement in technology decisions, and high-performance teams were believed to be least heavily factored into CIO performance reviews (Table 35).

<b>Table 35: Elements CIOs Believe are Most Heavily Factored into their Performance Reviews</b>	
End User Satisfaction	4.37
Reliability of Technology Services	4.37
Responsiveness of the Technology Organization	4.19
IT Fiscal Responsibility	4.08
IT Budget Management	4.00
Technology Alignment with Campus Priorities	3.89
Technology Alignment with Campus Goals	3.78
End User Support	3.74
Effective Communication	3.69
End User Enablement	3.67
Proactive Communication	3.65
High-Performance IT Teams	3.58
Campus Involvement in Technology Decisions	3.41
Innovation	3.22

*Do CIOs believe that those conducting their performance reviews have adequate guidelines and information to carry out meaningful evaluations?*

Responses were counted for Questions 19 and 20 on the CIO survey (Appendix A). The percentage of each response type was then calculated. Seventy-four percent of CIOs responded yes, they believe that those conducting their performance reviews have adequate guidelines and information to carry out meaningful evaluations, nineteen percent responded no, and seven percent responded somewhat.

***Research Question 9 – Central IT Organization Importance***

*How important do users believe the centralized information technology department is to their success and that of their institution?*

Data from the components of question 29 on the Campus Technology Survey (Appendix B) were averaged by responder type (faculty, students, non-centralized IT staff, and non-IT staff) to get a single score for each sub question. Respondents all agree that technology is important to both their success and even more so to that of their institution.

<b>Table 36: Importance of the Centralized IT Department</b>				
	Number Responding	To Institution's Success	To My Success	Difference
Faculty	500	5.57	5.12	0.45
Students	1305	5.40	5.03	0.37
Non-Centralized IT Staff	177	5.54	5.01	0.53
Non-IT Staff	1111	5.70	5.30	0.40



## DISCUSSION

### Research Question 1 – Factors Associated with User Satisfaction

*Which factors are most associated with user satisfaction with the centralized technology organization (Table 1)? Which factors are most associated with satisfaction with the CIO?*

All factors were found to be correlated with centralized IT organization and CIO satisfaction. Most were highly correlated (Tables 18 & 20). Overall, academic alignment, fiscal responsibility, communication, innovation, and support appear most often (six, six, five, four, and four times respectively) as one of the top associated across all respondents. The importance of IT, reliability, shared governance, and responsiveness appear most often (eight, five, five, and four times respectively) as one of the bottom associated across all respondents.

This first research question examined what factors correlated with overall user satisfaction, which is used to evaluate IT success in higher education (Griffiths, 2003). Although further study is required across a larger dataset, this study provides CIOs with baseline information regarding areas in which to focus effort in order to improve user satisfaction. IT leaders can use this information to begin to structure services, develop communication strategies, determine committee goals, design evaluation metrics, and create employee job descriptions, reviews, and incentives with the goal of improving the factors above that correlate most with improved user satisfaction. In order to be most effective, it is important that IT leaders create an iterative process where changes that are implemented are

evaluated to determine their impact. In the event that new initiatives do not bring about the desired result, it is important to determine if the lack of result was due to implementation issues before determining the failure was due to a faulty strategy. Through an iterative process, changes in implementation (and/or strategy if necessary) should continue to be made and evaluated in order to improve user satisfaction thereby positively impacting CIO and IT organization success.

Finally, it is interesting to note that across institutions in this study, decentralized IT staff members were the least satisfied with centralized IT organization and CIO performance (Table 28). This highlights an additional area in which the CIO and IT team should focus. Satisfaction with this group, as noted earlier, correlated strongly with responsiveness, communication, enablement, and academic alignment (IT organization) and responsiveness, communication, shared governance, and fiscal responsibility (CIO) (Tables 18 and 20). Special strategies should be developed for this group in order to serve their needs and improve their satisfaction. Similarly, efforts should be made to raise campus awareness and build understanding surrounding the centralized IT organization's efforts to be fiscally responsible, innovative, and align with the academic mission and goals. Additionally, its governance structure should be well known. CIOs should also proactively communicate their goals and achievements to raise visibility of and understanding for their position. These are all areas in which respondents were unsure of satisfaction.

#### *Research Questions 2-4 – Organizational Quality and High-Performance*

*Are technology organizations with a higher straight average of performance in the nine areas used to define organizational quality (Table 2) viewed as performing better than those which do not?*

*Are technology organizations with a higher performance in certain combinations of the nine areas used to define organizational quality (Table 2) viewed as performing better than those which do not?*

*Are current higher education technology leaders building high-performance organizations that value, respect, and develop their employees (Table 3)? Is there a correlation between the degree to which this is done and perceptions of CIO and technology organization performance? Are technology organizations with a higher performance in certain combinations of high-performance categories viewed as performing better than those which do not?*

The results of this study are consistent with the hypothesis that CIOs who create high-performance IT cultures and whose centralized IT organizations perform well in the nine areas used to define organizational quality are viewed as having more successful IT organizations and as being more successful CIOs. Since this sample size was very small (only 11 institutions), there is not enough power to reasonably expect to reject a null hypothesis of no association. Instead, what this study does is obtain and report an estimate of that association and make an assessment as to whether that association may be large enough for further exploration. If, in fact, the association in the population is the same size as that found in this exploratory study, it is a small to moderate correlation and one worth further exploration (Cohen, 1988). Hoyle illustrates that results that are far from significant in a small study with a small to moderate associated effect size can have the same effect size in a larger more significant study (1999). This, therefore, is an area for further research.

Means in organizational quality areas show that centralized IT employees scored their organizations highest in accountability (5.13), capability (4.76), and direction (4.68). They scored their organizations lowest in motivation (4.29), environment and values (4.25), and coordination and control (3.71) which, therefore, may be areas for possible improvement.

Further, performance in combinations of the organizational quality areas such as coordination and control, direction, motivation (IT organization satisfaction) and coordination and control, direction, and external orientation (CIO satisfaction) correlate highly with satisfaction and may be areas in which to focus new initiatives first. One IT employee reports, “Although the need for greater collaboration among work groups has been voiced time and time again, we still work in ‘silos’ with lack of across the board communication and groups see themselves in competition with other units in the dept.” As mentioned earlier, when deciding which areas in which to excel, it is important to make sure they complement each other, fit within the department’s strategy, and do not disrupt an area in which the organization already excels (Smet et al., 2007b).

High-performance categories most associated with IT satisfaction are staff development, psychological safety and job security, and meaningful jobs. High-performance categories most associated with CIO satisfaction are systems, procedures, and information availability; psychological safety and job security; and meaningful jobs. According to one IT employee, “Much of the work I do is thankless. If it goes well we continue another day and little or nothing is ever noticed or valued. On the other hand if anything goes badly, it is front page news.” Another said, “I feel fortunate that my peers, supervisors, and managers place a lot of value on me as an individual.” Yet another answered, “Just once I would like to have a sense that my supervisor and department have value for what I do.”

Once again, although further study is required across a larger dataset, this study provides CIOs baseline information regarding areas in which they may want to consider focusing effort in order to improve performance. CIOs can use this information to begin to strategically improve the work environment for their employees, create a high-performance

culture, and thereby hopefully improve satisfaction. According to the results above, high-performance areas of opportunity for improvement include rewarding team performance, documenting procedures, improving systems, limiting status differences, investing in staff development, providing employees needed information, and creating an open and trusting environment. This aligns with the evidence-based management literature mentioned earlier which states that where organizational leaders may have the most positive impact is in improving organizational and group performance, valuing employees, and developing systems that enable others to succeed (Pfeffer & Sutton, 2006h). The comments of several IT employees note the need for improvement in these areas.

*Because of a lack of funding and sufficient FTE to support the needed central IT initiatives, employees at this institution are responsible for far too many widgets, have no time/funds for training, are unable to devote time to gain deep knowledge of the software and hardware they are responsible for and frequently suffer from burn out and low moral.*

*I enjoy my job, take what I do very seriously, and feel that I provide a very important support service. However, I do not feel particularly valued as an employee; this is not only because of my pay rate, but also because I feel that my professional development is not a priority*

*...the past decade... in the name of efficiency, which is not realized, the employees have been turned into drones, numbers instead of people. This is tremendously sad, since people gravitate to the university workplace specifically because they want to help people, on a very personal level. They want to be valued on a personal level. Unfortunately, my own work environment has now become sterile, impersonal, corporate, and devoid of meaningful dialogue. This was not always true. My job environment was once so incredibly supportive, so incredibly collaborative that I told a colleague that I loved my job here at the university so much that, even if I won the lottery, I would still come to work that same week!*

As stated earlier, employment security builds employee trust, improves cooperation, encourages workers to take a longer term perspective, causes companies to pay more attention to hiring, decreases costly premature layoffs, and encourages companies to invest in training, share information, and delegate responsibilities. Using self-managed teams has

been shown to create “greater autonomy and discretion [among employees] which translates into intrinsic rewards and job satisfaction. Teams out-perform traditionally supervised groups” (Pfeffer, 1999a, p. 26). There is a relationship between salary paid and quality of employee. Level of salary also sends a value message to staff. Pfeffer further states, “By coupling employment security with some form of group-based incentive... the organization unleashes the power of the team, whose economic interests are aligned with high levels of economic performance” (Pfeffer, 1999a, p. 27). Training is tremendously important and is a source of competitive advantage across industries. Reducing status differences “symbolically, through the use of language and labels, physical space and dress and substantively, in the reduction of the organization’s degree of wage inequality, particularly across levels” helps build high-performance management systems where employees feel valued (Pfeffer, 1999b, p. 56). Finally, information sharing conveys trust and allows people to contribute to organizational success by providing them needed “information on important dimensions of performance and, in addition, training on how to use and interpret that information” (Pfeffer, 1999b, p. 57). Research points to a direct relationship between management practices that value employees and put them first and organizational success (Pfeffer & Veiga, 1999).

The findings of this study are consistent with the hypothesis that IT leaders can benefit from creating a high-performance culture and improving performance in the organizational quality areas mentioned above. Additionally, a potential CIO’s ability to build a high-performance culture and develop systems should be one of the key decision making criteria, in addition to experience and education, when selecting a CIO. His/her success in doing so should similarly be a criterion used to evaluate performance.

As noted above, in order to be most effective, it is important that IT leaders create an iterative process where changes that are implemented are evaluated to determine their impact. In the event that new initiatives do not bring about the desired result, it is important to determine if the lack of result was due to implementation issues before determining the failure was due to a faulty strategy. Through an iterative process, changes in implementation (and/or strategy if necessary) should continue to be made and evaluated in order to improve.

Research Question 5 – Important to IT Organization Success

*What do CIOs believe is important for the success of the centralized information technology organization?*

CIOs believe reliability, satisfaction, communication, support, and responsiveness are most important to the success of the IT organization. One CIO noted,

*A service-oriented culture that: 1. Responds in a timely manner 2. Engages in active listening 3. Proactively communicates change 4. Demonstrates competency of subject 5. Sets realistic and appropriate expectations 6. Establishes service goals and monitors metrics 7. Respects individuals while serving the whole 8. and is passionate for others' success.*

They responded that innovation, budget management, and campus involvement in technology decisions are less important factors. High-performance IT teams, alignment, user enablement, and fiscal responsibility fell in the middle. Many of these CIO importance beliefs align with the factors found to be most highly correlated with user satisfaction with the IT organization (Table 18). “I believe that user satisfaction is closely tied to communications. It involves understanding what the users really want and then communicating on how you are meeting those needs.”

Academic alignment, fiscal responsibility, and innovation were among the factors most correlated with user satisfaction among all groups yet they were not rated as important by CIOs and perhaps therefore are areas in which to focus effort in order to improve satisfaction. Additionally, it can be argued that, in order for CIOs to excel in the areas most correlated with IT organization satisfaction, high-performance IT teams are critical and should be at the top rather than in the middle of this list. Possibly in agreement with that sentiment, one CIO wrote, “People are the most important asset any IT organization can possess. Working hard to eliminate or reduce unwanted turnover is a critical task for any CIO.”

*Research Question 6 – User Satisfaction Perceptions*

*Do CIOs have an accurate understanding of how satisfied their campus users are? Do centralized information technology employees?*

In most categories (enablement, support, reliability, responsiveness, academic alignment, and innovation) users are more satisfied than CIOs and IT employees perceive them to be. Perceived satisfaction with shared governance and fiscal responsibility was slightly higher than actual and perceived satisfaction with communication was higher than actual. Actual overall satisfaction was slightly above perceived overall satisfaction. Interestingly, however, both the CIO and IT department believe that the centralized IT organization is more effective than campus users do with CIOs rating their organizations almost a point higher in effectiveness than campus users do. CIOs and IT employees also believe the centralized IT organization is doing an outstanding job more than campus users



do. Finally, CIOs and IT employees believe the centralized IT organization does a better job than other centralized campus units but campus users are a little bit less likely to believe this.

One way a CIO might use this information is to proactively and strategically communicate the centralized IT organization's effectiveness and highlight achievements and success stories. It also seems to indicate that, according to users, satisfaction and effectiveness are two different measurements and therefore effectiveness may be a new measure in addition to user satisfaction, reliability, and budget control that might be best included in evaluating CIO and IT organization performance. This is an area for further study.

#### *Research Question 7 – Elements Tied to Success*

*Do centralized information technology employees believe the elements tied to their success are the same as those tied to the centralized technology organization's success?*

Centralized information technology employees believe that some of the elements tied to their success are almost equally tied to that of the IT organization (satisfaction, support, enablement, reliability, responsiveness, communication, high-performance teams) while others are less tied to their success (campus involvement in technology decisions, alignment with goals and priorities, budget management and fiscal responsibility, and innovation). This list highlights areas where job descriptions, rewards, incentives, and responsibilities could be written and implemented that draw a more direct connection between employee and organizational success. Since many of the areas listed above are highly correlated with CIO success, making the connection between employee success and organizational success in

these areas potentially benefits the CIO, IT employees, and the centralized technology organization.

#### Research Question 8 – Performance Reviews

*Do CIOs have a clear understanding of what metrics will be used to evaluate their performance? Which elements do CIOs believe are most heavily factored into their performance reviews? Do CIOs believe that those conducting their performance reviews have adequate guidelines and information to carry out meaningful evaluations?*

Results from this question were interesting. Seventy-four percent of CIOs believe that those conducting their performance reviews have adequate guidelines and information to carry out meaningful evaluations but only fifty-nine percent of CIOs responded that they have a clear understanding of what metrics will be used to evaluate their performance. This supports the fact that CIOs need to know how they will be evaluated and perhaps the best way for them to know is to proactively suggest metrics. The CIO usually reports to non-technical senior university executives who may not know how best to evaluate technology organizations and leaders.

CIOs believe user satisfaction and reliability of services to be most heavily factored into their performance reviews. This once again supports the need to study how users define user satisfaction, which was examined above in research question one. Other factors heavily factored in IT leader performance reviews were noted to be responsiveness, fiscal responsibility, and budget management. Alignment, support, communication, and enablement were perceived not to be factored as heavily and high-performance IT teams, governance, and innovation were perceived to be the least factored into performance reviews. This shows somewhat of a misalignment between what perhaps should be factored into

performance reviews and what is factored. Since IT success in higher education is usually evaluated in terms of user satisfaction, technology reliability, and budget control (Griffiths, 2003) and user satisfaction is largely a component of enablement, support, communication, reliability, fiscal responsibility, academic alignment, and innovation (Tables 18 and 20), communication, enablement, support, innovation, and alignment should be a clear component of a CIOs performance review. Additionally, according to the findings in research question six above, effectiveness may be a new measure in addition to user satisfaction, reliability, and budget control that might be best included in evaluating CIO and IT organization performance. Finally, if the effect size found in question four above exists in the population (an area for further study), CIO's success in creating high-performance teams should be toward the top rather than at the bottom of this list.

#### *Research Question 9 – Central IT Organization Importance*

*How important do users believe the centralized information technology department is to their success and that of their institution?*

Across all groups, academic community members mostly or completely agree that an effective centralized IT department is critical to the success of the institution and their individual success. One respondent noted, “Not a single workday goes by where I don't use the services provided by [centralized IT]. As [centralized IT] gets more effective, so do I.” Another stated, “Dependable technology is essential to academic work.” All groups responded that an effective centralized IT organization is slightly more critical to the institution's success than their own. As IT is a relative newcomer to the higher education scene, it is interesting to note that users believe in its importance and that the need to educate

the campus community on its importance is perhaps not as critical as it once was. Now, communication efforts must shift from importance to enablement, support, reliability, and alignment to bring added value and begin to improve user satisfaction through effectiveness advocacy.

### **Limitations**

One of the primary limitations of this exploratory study is that of sample size. Although 282 doctoral institutions (DRU, RU/H, or RU/VH) were contacted, 22 participated (six non DRU, RU/H, or RU/VH participated) and of those 22, only nine had full institution participation (two non DRU, RU/H, or RU/VH). Recruiting additional participants was challenging due to the number of requests CIOs receive for research participation. Further, gathering institution-wide data for this study was difficult in that several CIOs that who participated stated that they were unable to survey their entire institution for many reasons including: lack of mechanism, rules prohibiting user surveys, restrictions requiring prior approval for surveys (with a long lead time), limited number of permitted surveys per year, or recently completed surveys making the CIO reluctant to survey users again. Several of those that did send out institution-wide surveys had low response rates which is another study limitation. Due to the number of participants, this is a good exploratory study but not one that can be generalized to the entire higher education population without further research. Furthermore, this first study looks at correlation not causation. Even if correlation is confirmed across a larger study, further research must then build upon this early work to find causal relationships.

The CIO role is a difficult one for reasons both within and beyond the CIO's control. The environment is ever changing. Not all factors that impact an IT organization are within

the CIO's control. Although not all factors that impact an IT organization are within his/her control, this research aims to provide concrete areas in which CIOs may focus efforts to impact those that are and mitigate against those that are not. All IT organizations function in a complex and complicated environment and must respond to events outside the control of the CIO. The purpose of this study is to determine if high-performance IT teams and those IT organizations that excel in the organizational quality factors mentioned above are better able to succeed in this type of environment. To this end, the CIOs at each institution were asked if there have been any recent events that they believe might impact user satisfaction on a large scale either positively or negatively. Ten CIOs responded no, twelve responded yes (a positive impact) and seven responded yes (a negative impact). CIOs were able to respond in more than one category. Recent events that CIOs believe would positively impact users included: ERP implementations, new lower cost departmental service agreements, classroom technology renovations, Voice over Internet Protocol (VoIP) implementations, new application deployments, enhanced communication and alert system implementations, and new high-performance computing initiatives. Recent events that CIOs believe would negatively impact user satisfaction were a Web site data breach, a campus portal software bug, an ERP implementation, delays in application implementation, infrastructure reliability issues, a VoIP failure, and a data center unavailable temporarily due to weather.

A limitation of this study is that it cannot account how much or little impact these occurrences influenced current user satisfaction. Several of the CIOs noted, however, that despite these problems, their organizations responded quickly and in some cases the CIOs believed the setback helped them overall. "This turned into a good event because it

highlighted all the problems I mentioned in a report about disaster recovery. My solution was unfunded before the generator failure and funded afterwards.”

As stated above all CIOs operate in a complex and complicated environment and will have both successes and failures. Outside of a major catastrophe, it can be argued that over time these occurrences effect most organizations and therefore do not pose a major study limitation but one worth noting. Arguably, those with the best performing IT teams may have less frequent problematic occurrences and/or be able to respond to and recover more quickly from negative events. If true, this would support the hypothesis that high-performance cultures and organizations that excel in the organization quality factors positively impact user satisfaction. This is an area for further study.

Since this is an experimental design and a first attempt to operationalize many of the variables used in this study, it is the author’s point of view that for the purposes of this study, each factor’s components specifically defined the factor and, therefore, comprise a definition index rather than a scale. The components are not necessarily trying to measure the same thing but together comprise the factor’s score. For example, in this study academic alignment is being defined by the following statements:

- The centralized IT organization understands the academic environment.
- The centralized IT organization’s priorities seem to be aligned with the institution’s priorities.
- The centralized IT organization’s priorities seem to be aligned with the institution’s purpose.
- The centralized IT organization’s priorities seem to be aligned with my priorities.

The respondent may answer each differently but the scores together comprise the factor’s score in this study. The statements do not necessarily have to be correlated with each other

but together define the variable being examined. Appendix K provides internal consistency information using Cronbach's Alpha for informational purposes and further research.

Based on this internal consistency analysis, some of these operationalizations (e.g., the Capability and External Orientation categories of Organizational Quality) were found to be less reliable than others. In most cases, these variables included combinations of questions about personal attributes and parallel attributes of the other staff in the centralized IT organization. For example, the External Orientation category in Organizational Quality included the following items:

- I have consistent two-way communication with campus users to ensure their satisfaction.
- I believe people throughout the centralized IT organization have consistent two-way communication with campus users to ensure their satisfaction.

It can be argued that these constructs should be treated as a scale rather than an index and therefore reliability would be important. Based on the analysis of the internal consistency, if one took this viewpoint, future research will need to develop additional/different items to more validly measure these constructs or split these constructs in some fashion.

Other limitations of this study include the general weaknesses associated with survey research. Survey research does not usually capture situational context and behavior as would direct observation. In general, surveys are also not flexible in allowing tailored questions based on previous responses. Surveys are also subject to the problem of artificiality. They only collect self-reports of recalled or hypothetical actions and emotions (Babbie, 2004). Further, those who are less technologically savvy may not have participated in this study due to the online survey format and email participation request.

## **CONCLUSIONS AND FURTHER STUDY**

The chief information officer in higher education holds an extremely visible and complex position comprised of numerous roles and requiring a diverse set of skills, abilities, attributes, and knowledge. The person with this title has a tremendous amount of responsibility and serves many constituencies.

In reviewing the literature over 30 constituencies, over 50 roles, and almost 50 skills, abilities, attributes, and knowledge requirements were identified as being necessary for a successful CIO. In addition, chief information officers are working in rapidly changing environments with tremendous funding constraints, unique organizational cultures, differing administrative structures, increased privacy and security concerns, greater functional requirements, changing political climates, high expectations, intellectual property conflicts, inadequate IT management approaches, aging systems, increasing accountability, expensive initiatives, complex governance and decision making structures, increasing strategic responsibility, and changing institutional priorities (Moberg et al., 2000; Brooks, 2003; Hawkins, 2004; Clark, 2005; Hogue & Dodd, 2006; Lineman, 2007). Despite these challenges, colleges and universities “need to ensure effective IT leadership at the highest levels” (Katz et al., 2004, p. 6). Available literature about the CIO position is almost entirely based on expert opinion or the experiences of past CIOs and although these insights and experiences are extremely valuable, quantitative research studies are needed to validate, expand, and revise current success recommendations.



A 2003 study found that IT success in higher education was usually evaluated in terms of user satisfaction, technology reliability, and budget control (Griffiths, 2003). Although technology reliability and budget control are somewhat easily quantifiable for evaluation, user satisfaction is more difficult. Since user satisfaction has been determined to be a critical component in evaluating IT success, it is important to determine how a CIO should focus effort to succeed in satisfying users. A framework is needed to determine what makes a CIO successful for those in the position looking to improve and for those in the process of selecting their next technology leader (Hawkins, 2004). This study began the research necessary to develop such a framework.

Evidence-based management literature was consulted as a starting point from which to begin this study and the process of developing a framework for successful CIOs. In reviewing the evidence-based management literature, one of perhaps the most surprising findings was that although leadership matters, leaders do not have a “massive influence” over organizational performance (Pfeffer & Sutton, 2006h, p. 194). In fact, “their actions rarely explain more than 10 percent of the differences in performance between the best and the worst organizations and teams” (Pfeffer & Sutton, 2006h, p. 192). The literature notes that where organizational leaders may have the most positive impact is in improving organizational and group performance, valuing employees, and developing systems that enable others to succeed (Pfeffer & Sutton, 2006h). To this end, Pfeffer notes that “the best way to encourage performance is to build a high-performance culture. We know the components of such a system, and we ought to pay attention to this research and implement its findings” (2007a, p. 3). Therefore, this study focused on the technology environment the

CIO creates among his/her staff and how that impacts CIO performance in terms of user satisfaction. The study employed an evidence-based management approach to examine if superior performance in the nine areas used to define organizational quality (Table 2) and/or the development of a high-performance culture correlate with improved perceptions of chief information officer and technology organization performance in higher education.

Although additional research across a larger dataset is needed before the findings of this study can be generalized to the entire higher education population, the results of this exploratory study are consistent with the hypothesis that CIOs who create high-performance IT cultures and whose centralized IT organizations perform well in the nine areas used to define organizational quality are viewed as having more successful IT organizations and as being more successful CIOs. This study also makes many additional contributions to the field which are useful to current chief information officers, future CIOs, those evaluating CIOs, and those hiring chief information officers. These will be reviewed next.

### **Findings of Interest to Current CIOs**

There are many findings of interest from this study for current CIOs. First, the study identified which factors are most associated with user satisfaction with the IT organization (academic alignment, support, enablement, fiscal responsibility, and reliability) and with the CIO (communication, fiscal responsibility, innovation, and academic alignment). This provides CIOs baseline information regarding areas in which to begin to focus efforts by structuring services, developing communication strategies, determining committee goals, designing evaluation metrics, and/or creating employee job descriptions, reviews, and

incentives with the goal of improving performance in the factors above that correlate most with improved user satisfaction.

Second, it identified high-performance areas of opportunity for improvement (rewarding team performance, documenting procedures, improving systems, limiting status differences, investing in staff development, providing employees needed information, and creating an open and trusting environment) and organizational quality areas of opportunity for improvement (motivation, environment and values, and coordination and control). CIOs can use this information to begin to strategically improve the work environment for their employees, create a high-performance culture, and thereby potentially improve satisfaction.

Once again, this is an exploratory study and therefore in order to be most effective in implementing its findings, it is important that when deciding areas in which to focus improvement efforts, one selects areas that complement each other, fit within the organization's strategy, and do not disrupt an area in which the department already excels (Smet et al., 2007). Although this early research indicates that improvement in any of the organizational quality or high-performance areas should help the IT organization, IT leaders should create an iterative process where changes that are implemented are evaluated to determine their impact.

In the event that new initiatives do not bring about the desired result, it is important to determine if the lack of result was due to implementation issues before determining the failure was due to a faulty strategy.

*What actually provides competitive success and what is difficult to copy is not so much knowing what to do – deciding on the right strategy – but the ability to do it. That is why Richard Bank, has repeatedly argued that organizational culture and the ability to operate effectively – successful implementation – is much more important to organizational success than having the right strategy (Pfeffer & Sutton, 2006h, p.145).*

Therefore, when problems arise, it is important not to confuse improper strategy with ineffective execution. The CIO should not reject or reconsider a strategy decision that is not working without first looking at implementation complications as the cause of failure. “This problem of confusing strategy problems with implementation problems seems particularly common in service industries” (Pfeffer & Sutton, 2006h, p.152). CIOs may also have additional obstacles, such as budget and/or political constraints, which may have to be overcome to successfully implement new initiatives.

Third, the study identified what CIOs believe is most important for the success of the centralized information technology organization (reliability, satisfaction, communication, support, and responsiveness). They responded that innovation, budget management, and campus involvement in technology decisions are less important factors. High-performance IT teams, alignment, user enablement, and fiscal responsibility fell in the middle. Academic alignment, fiscal responsibility and innovation were among the factors most correlated with user satisfaction among all groups yet they were not rated as important by CIOs and perhaps therefore are areas in which to focus effort in order to improve satisfaction. Additionally, it can be argued that, in order for CIOs to excel in the areas most correlated with IT organization satisfaction, high-performance IT teams are critical and should be at the top rather than in the middle of this list.

Fourth, overall this study found that users were more satisfied with the IT organization’s performance than the CIO or centralized IT staff believed them to be. Interestingly, however, users perceived the IT organization to be less effective than CIO and centralized IT staff perceptions and users are less likely to believe the IT organization is doing an outstanding job. This seems to indicate that user satisfaction and effectiveness are

two distinct measurements and therefore effectiveness may be a new measure outside of user satisfaction, reliability, and budget control CIOs should evaluate to improve performance.

This is an area for further study.

Fifth, although information technology employees believe that some of the elements tied to their success are approximately equally tied to that of the IT organization (satisfaction, support, enablement, reliability, responsiveness, communication, and high-performance teams), those they believe are often less tied to their success (campus involvement in technology decisions, alignment with goals and priorities, budget management and fiscal responsibility, and innovation) are often highly correlated with overall CIO and IT satisfaction. CIOs, therefore, may want to begin to directly tie employee job descriptions, rewards, incentives, and responsibilities to these areas.

Sixth, study results indicate that only fifty-nine percent of CIOs responded that they have a clear understanding of what metrics will be used to evaluate their performance. The CIO often reports to non-technical senior university executives who may not know how best to evaluate technology organizations and leaders. CIOs can use the results from this study to proactively identify evaluation metrics and work with senior executives to develop an assessment framework. Since IT success in higher education is usually evaluated in terms of user satisfaction, technology reliability, and budget control (Griffiths, 2003) and user satisfaction is largely a component of enablement, support, communication, reliability, fiscal responsibility, academic alignment, and innovation (Tables 14 and 16), communication, enablement, support, innovation, and alignment should be a clear component of a CIOs performance review. Additionally, according to the findings in research question six above, effectiveness may be a new measure in addition to user satisfaction, reliability, and budget

control that might be best included in evaluating CIO and IT organization performance. Finally, if the effect size found in question four above exists in the population (an area for further study), CIO's success in creating high-performance teams should be toward the top rather than at the bottom of this list.

Seventh, decentralized IT staff members were the least satisfied with centralized IT organization and CIO performance (Table 28). This highlights an additional area in which the CIO and IT team should focus. Satisfaction with this group, as noted earlier, correlated strongly with responsiveness, communication, enablement, and academic alignment (IT organization) and responsiveness, communication, shared governance, and fiscal responsibility (CIO) (Tables 18 and 20). Special strategies should be developed for this group in order to serve their needs and improve their satisfaction.

Eighth, efforts should be made to raise campus awareness and build understanding surrounding the centralized IT organization's efforts to be fiscally responsible, innovative, and align with the academic mission and goals. Additionally, IT's governance structure should be well known and communicated regularly. CIOs should also proactively communicate their goals and achievements to raise visibility of and understanding for their position. These are all areas in which respondents were unsure of satisfaction.

Finally, users mostly or completely agreed that an effective centralized IT department is critical to the success of the institution and their individual success. Not too long ago, higher education operated with much less reliance on technology so substantial progress in user acceptance and reliance has been made. This indicates that communication efforts should shift from importance to enablement, support, reliability, alignment, effectiveness, and fiscal responsibility, for examples, to highlight technology's added value.

### **Findings of Interest to Future CIOs**

There are several findings of interest in this study for future CIOs. First, this study provides an extremely comprehensive overview of the position based on all recent relevant literature. When preparing to become a CIO, a future CIO can evaluate his/her strengths and weaknesses in terms of the roles, skills, abilities, attributes, and knowledge requirements found above. S/he can use this information to put together a professional development plan and seek out opportunities to improve skills and increase knowledge in areas of inexperience.

Second, since CIOs are evaluated in terms of user satisfaction, technology reliability, and budget control (Griffiths, 2003), a potential CIO must have experience in these areas and know how to be successful in each. This study found that effectiveness may also be an area to look at when evaluating CIOs, therefore, potential CIOs should have experience evaluating the effectiveness of their initiatives.

Third, according to evidence-based management literature, although leadership matters, a leader's actions "rarely explain more than 10 percent of the differences in performance between the best and the worst organizations and teams" and leaders may have the most positive impact by improving organizational and group performance, valuing employees, and developing systems that enable others to succeed (Pfeffer & Sutton, 2006h, pp. 192 - 200). Future CIOs can begin to hone these skills so that they are prepared to lead in a way that facilitates the success of others. Knowing the components of a high-performance culture as described above and creating such an environment is a critical skill needed for a CIO.

Finally, this study is extremely beneficial for those interviewing for CIO positions. By familiarizing themselves with the CIO position and acquiring the proper experience, CIO

candidates can communicate an understanding of the role and use concrete examples to highlight their abilities and preparation. Candidates should use the role, skill, ability, attribute, and knowledge requirement information above to ask questions to accurately understand the role envisioned for the CIO at a particular institution before accepting a position offer. Although many roles, skills, abilities, attributes, and knowledge requirements were identified for the position, a potential CIO should identify which are most important for the particular institution where they are interviewing and on what basis CIOs success will be evaluated. This information is crucial to negotiating terms of employment and knowing if the job expectations are reasonable and success in the position attainable.

### **Findings of Interest to Those Evaluating CIOs**

There are several findings of interest in this study for those evaluating CIOs. Study results indicate that only fifty-nine percent of CIOs responded that they have a clear understanding of what metrics will be used to evaluate their performance. CIOs must know how they will be evaluated.

The data from this study can be used to identify evaluation metrics. CIOs and executive leadership should work together to develop an assessment framework. Since IT success in higher education is usually evaluated in terms of user satisfaction, technology reliability, and budget control (Griffiths, 2003) and user satisfaction is largely a component of enablement, support, communication, reliability, fiscal responsibility, academic alignment, and innovation (Tables 18 and 20), communication, enablement, support, innovation, and alignment should be a clear component of a CIO's performance review. Additionally, according to the findings in research question six above, effectiveness may be a new measure in addition to user satisfaction, reliability, and budget control that might be best included in



evaluating CIO and IT organization performance. Further, the CIO and executive leadership should review the roles, skills, abilities, attributes, and knowledge requirements that were identified for the CIO position and choose which are most important for their institution and then weave those into their CIO's performance review. Finally, if the effect size found in questions two and four above exist in the population (an area for further study), CIOs performance in the nine areas used to define organizational quality their success at creating high-performance teams should be a key components of their evaluations.

### **Findings of Interest to Those Hiring CIOs**

In addition to education and experience, data from this study can be used to specifically identify hiring criteria used for selecting an institution's CIO. Since IT success in higher education is usually evaluated in terms of user satisfaction, technology reliability, and budget control (Griffiths, 2003) and user satisfaction is largely a component of enablement, support, communication, reliability, fiscal responsibility, academic alignment, and innovation (Tables 18 and 20), a candidate's ability to communicate, enable others to succeed, support users, encourage innovation, and achieve academic alignment should be a criteria used to hire a CIO.

Additionally, according to the findings in research question six above, an applicant's ability to evaluate IT's effectiveness may be a new criterion to include when deciding which candidate to hire for the position. Further, the hiring committee should review the roles, skills, abilities, attributes, and knowledge requirements that were identified for the CIO position above and choose which are most important (and which are not as important) for their institution. These should be used to screen applicant abilities and let candidates know the responsibilities and expectations of the CIO role at their particular institution.

Finally, if the effect size found in questions two and four above exist in the population (an area for further study), a CIO's ability to create organization that performs well in the nine areas used to define organizational quality as well as their ability to create high-performance teams should be a key components of the hiring criteria.

### **A Framework for CIO Success – A Beginning**

As mentioned above, a framework is needed to determine what makes a CIO successful for those in the position looking to improve and for those in the process of selecting their next technology leader (Hawkins, 2004). This study began the research necessary to develop such a framework.

Several findings from this initial exploratory study can be used to begin to develop this framework. First, in addition to user satisfaction, technology reliability, and budget control (Griffiths, 2003), effectiveness may be a new criterion to use when evaluating chief information officer performance. Second, an initial set of user satisfaction factors were identified and correlations between each and overall user satisfaction was determined. Third, organizational quality factors were defined and a correlation determined between an organization's organizational quality score and overall satisfaction with the CIO and IT department. Fourth, high-performance categories were defined and a correlation determined between an organization's high-performance score and overall satisfaction with the CIO and IT department.

As stated above, information technology user satisfaction, which was shown to differ between universities, is an outcome that must be the function of something. In this study, it was defined as a function of the IT organization's performance, the CIO's performance, other intervening variables, and subject score (which accounts for error).

## Overall Model

$$Y_{\text{user satisfaction}} \sim X_{\text{IT}} + X_{\text{CIO}} + U_{\text{other}} + S$$

$U_{\text{other}}$  is the portion of the difference between universities that is not accounted for by IT organization and CIO performance. University effect is an unmeasured variable in the model.

In 2003, Griffiths found that IT success in higher education was usually evaluated in terms of user satisfaction, technology reliability, and budget control. Based on this study, a revised and beginning framework for evaluating CIO success is suggested.

Although used earlier to define user satisfaction, the following model can be expanded to begin to build a model for defining CIO success. A CIO's success may be defined as a function of the IT organization's performance, the CIO's performance, and other intervening variables where:

$$Y_{\text{CIO success}} \sim X_{\text{IT}} + X_{\text{CIO}} + V_{\text{other}}$$

- The IT organization's performance is defined in terms of user satisfaction, effectiveness, and other performance variables.

$$X_{\text{IT}} \sim X_{\text{Satisfaction}} + X_{\text{Effectiveness}^*} + P_{\text{other}}$$

\*A new measure and area for further study

- User satisfaction, as defined in this study, is a function of academic alignment, communication, enablement, fiscal responsibility, importance (potentially an area that may no longer be necessary), innovation, reliability, responsiveness, shared governance, security (accidentally omitted from this study but important for future research), support, and other factors.

$$X_{\text{Satisfaction}} \sim X_{\text{AcademicAlignment}} + X_{\text{Communication}} + X_{\text{Enablement}} + X_{\text{FiscalResponsibility}} + X_{\text{Importance}}^{**} + X_{\text{Innovation}} + X_{\text{Reliability}} + X_{\text{Responsiveness}} + X_{\text{SharedGovernance}} + X_{\text{Security}}^{***} + X_{\text{Support}} + F_{\text{Other}}$$

\*\*Importance may no longer be necessary

\*\*\*An accidental omission from this study but one that should be included in further research

- The CIO's performance is a function of the centralized IT department's organizational quality score, the centralized IT department's high-performance score, institution specific CIO success metrics (selected, as suggested above, from the overall list of roles, skills, abilities, attributes, and knowledge requirements by the CIO and executive leaders based on individual institutional need), and other CIO performance variables.

$$X_{\text{CIO}} \sim X_{\text{OrgQual}} + X_{\text{High-Perf}} + X_{\text{InstitutionSpecific}} + C_{\text{Other}}$$

This leads to the following overall beginning framework for CIO success:

$$Y_{\text{CIO success}} \sim X_{\text{AcademicAlignment}} + X_{\text{Communication}} + X_{\text{Enablement}} + X_{\text{FiscalResponsibility}} + X_{\text{Importance}} + X_{\text{Innovation}} + X_{\text{Reliability}} + X_{\text{Responsiveness}} + X_{\text{SharedGovernance}} + X_{\text{Security}} + X_{\text{Support}} + F_{\text{Other}} + X_{\text{Effectiveness}} + P_{\text{Other}} + X_{\text{OrgQual}} + X_{\text{High-Perf}} + X_{\text{InstitutionSpecific}} + C_{\text{Other}} + V_{\text{Other}}$$

The weights and relative importance of each item in the model are areas for further study.

Results from this study are consistent with evidence-based management literature which states that where organizational leaders may have the most positive impact is in improving organizational and group performance, valuing employees, and developing systems that enable others to succeed (Pfeffer & Sutton, 2006h). Due to the number of participants, this is a good exploratory study but not one that can be generalized to the entire higher education population without further research. It is, however, a start.

## **Conclusion**

Too often, despite scientific evidence, organizations continue to use ineffective management practices. To address this issue, those who practice evidence-based management use academic research to inform organizational business decisions. Doing so effectively requires that managers identify good evidence, examine logic, conduct experiments, learn from failures, and embrace an attitude of wisdom (Pfeffer & Sutton, 2006a; Pfeffer & Sutton, 2006g; Pfeffer & Sutton, 2006h; Rousseau, 2006; Rousseau, 2007).

Evidence-based management literature indicates that leaders have less influence than many assume. Studies show that where leaders can be most effective is in building high-performance organizations that value, respect, and develop their employees. Creating environments that promote learning, building quality systems, developing community, downplaying status differences, rewarding group performance, creating a trusting environment, delegating decision authority, and helping others to succeed have been shown to be ways in which a leader can positively impact his or her organization (Pfeffer & Sutton, 2006g; Pfeffer & Sutton, 2006h; Pfeffer & Sutton, 2007a).

Technology alone does not create competitive advantage; people do. As technology continues to commoditize, its return on investment depends largely on people and processes (Hill, 2007). Therefore, “the successful CIO must assemble the right people with the right technical and soft skills” (Meester, 2004, p.119). Evidence-based management research points to a direct relationship between management practices that value employees and put them first and organizational success (Pfeffer & Veiga, 1999; Pfeffer & Sutton, 2006h).

A CIO’s success, therefore, lies in his/her organization’s success at facilitating the achievement of others. As the organization’s leader, even if one found a superhero to be the

CIO (someone with every ability on the literature review list identified earlier), unless that person can cultivate those abilities in his/her staff, s/he will not succeed. The literature and this study support that the CIO must set the agenda, manage, and lead his/her organization in such a way that allows its members to succeed in facilitating the achievement of others.

*Leaders often have the most positive impact when they help build systems where the actions of a few powerful and magnificently skilled people matter least. Perhaps the best way to view leadership is as the task of architecting organizational systems, teams, and cultures – as establishing the conditions and preconditions for others to succeed (Pfeffer & Sutton, 2006h, p.200).*

This study makes many important contributions to the field. It provides information highlighting where current chief information officers may begin focusing effort to improve their success, it suggests CIO hiring and evaluation criteria, it recommends where those aspiring to the position should focus professional development efforts, and it begins to develop a much needed framework for CIO success. As a result it is hoped that this study will improve CIO performance, aid in reducing CIO turnover, and create a more appealing job to which more aspire. Chief information officers and their staff members facilitate the success of many throughout the higher education community and therefore their success improves education, scholarship, and service and better positions the higher education organization for the future.

## APPENDIX A: Chief Information Officer (CIO) Survey

Intro

### Welcome -

Thank you for taking the time to fill out this survey about your college or university centralized information technology (IT) organization. Your assistance is greatly appreciated.

### Instructions:

This survey will take approximately 8-10 minutes to complete. Please complete the survey in one sitting if possible although you may return to it later from the same computer if interrupted.

### Reason For Survey:

This study will investigate which centralized information technology (IT) organization management practices most impact technology user satisfaction. It will also provide information about how campus users define their satisfaction with the centralized information technology (IT) organization.

Your institution's results WILL be made available to YQU (the institution's senior technology executive).

Published results WILL NOT identify you or your organization.

Your organization's responses will be securely stored and will remain confidential at all times.

It is critical to higher education institutions that their centralized information technology (IT) organizations succeed since technology organizations facilitate the accomplishments of the institution and its members.

### Giveaway:

At the end of the survey, you will be given the opportunity to enter into a drawing for your choice of a free Nintendo Wii or \$200!

Please click "Next ->" to Read Consent Information and Begin the Survey.

CON

### Consent to Participate In a Research Study - IRB Study # 09-0201

You are being given the opportunity to volunteer to participate in a survey to help determine which technology organization practices most impact user satisfaction on campus. It is critical to higher education institutions that their technology organizations succeed since IT organizations facilitate the accomplishments of the institution and its members.

The survey will be conducted using an online survey software. There are no anticipated risks to participants who take this survey. Although the survey software captures participants' IP addresses and you will have the option of putting in your email address to be entered in the Nintendo Wii or \$200 drawing, this information will not be used in the analysis and will be separated from the survey results before analysis to ensure anonymity. All data is stored within the survey software and is password protected.

Refusal to participate in this study will have no effect on any future services you may be entitled to from the University or technology department. You are free to withdraw from the study at any time without penalty.

To learn more about this study please contact Meredith Weiss at (919) 619-5443 or [mjweiss@email.unc.edu](mailto:mjweiss@email.unc.edu).

The principal investigator for this study is Meredith Weiss, Ph.D. ABD, UNC School of Information and Library Science at UNC Chapel Hill. Faculty Advisor: Dean Jose-Marie Griffiths.

The Information Technology Management in Higher Education study and this message have received approval from the UNC IRB on 2/11/2009, study #09-0201.

All research on human volunteers is reviewed by a committee that works to protect your rights and welfare. If you have questions or concerns about your rights as a research subject you may contact, anonymously if you wish, the Institutional Review Board at 919-966-3113 or by email to [IRB\\_subjects@unc.edu](mailto:IRB_subjects@unc.edu).

I have been given information about this research study and its risks and benefits and have had the opportunity to ask questions and to have my questions answered to my satisfaction. I freely give my consent to participate in this research project as shown by my decision to take the survey.

Copy Questions From...

Create a New Question

Minimize Back

Add Block

Q1  **Introductory Questions**

Please select your institution

Adelphi University

Q2  **Are you currently the senior most technology executive (Chief Information Officer, Vice President for IT, etc.) for your college or university?**

Yes

No



**If Yes is Selected, Then Skip To How long have you held this position ... [Edit](#)**

Dra1

Please enter your email address if you would like to be entered into a drawing to win your choice of a NINTENDO a Wii or \$200.



**If Please enter your email add... is Displayed, Then Skip To End of Survey [Edit](#)**

Q3

**How long have you held this position at your current institution?**

Less than 6 months

6 to 11 months

1-2 years

3-5 years

6-10 years

11+ years

Q4:  **Is this the first time you've held this position for a college or university?**

Yes

No



**If Yes is Selected, Then Skip To How many employees (NOT including stu... [Edit](#)**

Q5

**How many years total have you held the senior most technology executive (Chief Information Officer, Vice President for IT, etc.) for a college or university?**

Less than 1 year

1-2 years

3-5 years

6-10 years

11+ years



Q6 How many employees (NOT including student workers) are there in your centralized technology organization?

- Less than 25
- 25-50
- 51-100
- 101-200
- 201-300
- 301-400
- 401-500
- 501+

Q7  Is your institution Public or Private?

- Public
- Private

Q8  What is your approximate recurring annual centralized IT budget (not including any major non-recurring initiatives)?

- \$1,000,000 or less
- \$1,000,001 - \$5,000,000
- \$5,000,001 - \$10,000,000
- \$10,000,001 - \$25,000,000
- \$25,000,001 - 50,000,000
- \$50,000,001 - \$75,000,000
- \$75,000,001 - \$100,000,000
- \$100,000,001+

Q9  What are your approximate recurring annual institutional-wide IT expenditures (not including any major non-recurring initiatives)?

- \$1,000,000 or less
- \$1,000,001 - \$5,000,000
- \$5,000,001 - \$10,000,000
- \$10,000,001 - \$25,000,000
- \$25,000,001 - 50,000,000
- \$50,000,001 - \$75,000,000
- \$75,000,001 - \$100,000,000
- \$100,000,001 - \$150,000,000
- \$150,000,001 - \$200,000,000
- \$200,000,001 - \$250,000,000
- \$250,000,001+

Q10 What is the total number of students enrolled at your institution?

- 5,001 - 10,000
- 10,001 - 15,000
- 15,001 - 20,000
- 20,001 - 25,000
- 25,001 - 30,000
- 30,001 - 35,000
- 35,001 - 40,000
- 40,001 - 45,000
- 45,001 - 50,000
- 50,001+

Q11  Please select the response that completes this phrase:  
Information Technology management and responsibility at our institution is \_\_\_\_\_.

Very Decentralized    Mostly Decentralized    Equally Divided    Mostly Centralized    Very Centralized

- Very Decentralized
- Mostly Decentralized
- Equally Divided
- Mostly Centralized
- Very Centralized

[Copy Questions From...](#)

[Create a New Question](#)

Minimize Block

Add Block

#### Philosophy Questions

Block Options

Q12  Philosophy Questions

What is your leadership philosophy?

---

Q13  In your experience, what are the drivers of user satisfaction?

---

[Copy Questions From...](#)

[Create a New Question](#)

Minimize Block

Add Block

#### Centralized IT Organization Success

Block Options

Q14

How important do you believe the following are to the success of the centralized information technology (IT) organization?

	Not At All Important	Of Little Importance	Important	Very Important	Critical
End user satisfaction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
End user support	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
End user enablement (IT allows users to accomplish their goals)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reliability of technology services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Responsiveness of the technology organization	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Campus involvement in technology decisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technology alignment with campus goals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technology alignment with campus priorities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
IT budget management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
IT fiscal responsibility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Proactive communication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Effective communication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Innovation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
High performance IT employee teams (employees are respected, well trained, and valued)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q15

Comments (Optional)

---

Q16

How satisfied do you believe campus users are with the centralized information (IT) organization in the following areas?

	Extremely Dissatisfied	Very Dissatisfied	Somewhat Dissatisfied	Somewhat Satisfied	Very Satisfied	Extremely Satisfied
End user satisfaction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
End user support	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
End user enablement (IT allows users to accomplish their goals)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reliability of technology services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Responsiveness of the technology organization	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Campus involvement in technology decisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technology alignment with campus goals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technology alignment with campus priorities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
IT budget management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
IT fiscal responsibility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Proactive communication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Effective communication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Innovation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
High performance IT employee teams (employees are respected, well trained, and valued)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q17

Comments (Optional)

---

Copy Questions From...

Create a New Question

Minimize Block

Add Block

Performance Reviews

Block Options

Q18

Performance Reviews

Do you have a clear understanding of what metrics will be used to evaluate your performance in the lead technology role?

- Yes
- No
- Somewhat
- Comments (Optional)

Q19

Do you believe that those who conduct your performance reviews have adequate guidelines to carry out meaningful evaluations?

- Yes
- No
- Somewhat
- Comments (Optional)

Q20

Do you believe that those who conduct your performance reviews have adequate information to carry out meaningful evaluations?

- Yes
- No
- Somewhat
- Comments (Optional)

Q21

How heavily do you believe the following are factored into your performance reviews?

	Not At All Important	Of Little Importance	Important	Very Important	Critical	Not Sure
End user satisfaction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
End user support	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
End user enablement (IT allows users to accomplish their goals)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reliability of technology services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Responsiveness of the technology organization	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Campus involvement in technology decisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technology alignment with campus goals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technology alignment with campus priorities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
IT budget management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
IT fiscal responsibility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Proactive communication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Effective communication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Innovation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
High performance IT employee teams (employees are respected, well trained, and valued)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q22

Comments (Optional)

Copy Questions From...

Create a New Question

Q23

Major Accomplishments or Setbacks

During the past 6-12 months, has there been any non-routine major technology accomplishment or setback (i.e. security breach, ERP launch, etc.) that you believe will significantly impact current overall user satisfaction with the centralized information technology (IT) department on your campus either positively or negatively (check all that apply)?

- No
- Yes, positively impact user satisfaction
- Yes, negatively impact user satisfaction



If No Is Selected, Then Skip To During the past 6-12 months, has ther... [Edit](#)

Q24

Please explain the major technology accomplishment and/or setback that you believe will significantly impact current overall user satisfaction.

---

Q25

During the past 6-12 months, has there been any non-routine major technology accomplishment or setback (i.e. layoffs) that you believe will significantly impact current overall centralized information technology (IT) employee satisfaction on your campus either positively or negatively (check all that apply)?

- No
- Yes, positively impact centralized information technology (IT) employee satisfaction
- Yes, negatively impact centralized information technology (IT) employee satisfaction



If No Is Selected, Then Skip To End of Block [Edit](#)

Q26

11. Please explain the major technology accomplishment and/or setback that you believe will significantly impact current overall centralized information technology (IT) employee satisfaction.

---

Copy Questions From...

Create a New Question

Minimize Block

End Block

Q27

I believe the centralized IT organization at our institution is effective.

Disagree Completely   Disagree Mostly   Disagree Slightly   Agree Slightly   Agree Mostly   Agree Completely

Q28

I believe the centralized IT organization at our institution is doing an outstanding job.

Disagree Completely   Disagree Mostly   Disagree Slightly   Agree Slightly   Agree Mostly   Agree Completely

Q29

I believe overall user satisfaction with the centralized IT organization at our institution is high.

Disagree Completely   Disagree Mostly   Disagree Slightly   Agree Slightly   Agree Mostly   Agree Completely

Q30

Please select one response to fill the blank in this phrase:

I believe the centralized IT department on our campus does a \_\_\_ job than do other centralized campus units such as finance and human resources.

Much Worse   Worse   Slightly Worse   Slightly Better   Better   Much Better

Q31

Are there any comments you would like to add before completing this survey?

\_\_\_\_\_

Dra2

Please enter your email address if you would like to be entered into a drawing to win your choice of a NINTENDO a Wii or \$200.

\_\_\_\_\_

End

THANK YOU FOR YOUR PARTICIPATION!

Please click "Next ->" to complete the survey.

## APPENDIX B: Campus Technology Survey

Intro

### Welcome-

Thank you for taking the time to fill out this anonymous survey about your college or university centralized information technology (IT) organization. Your assistance is greatly appreciated.

### Instructions:

This survey will take approximately 12 minutes to complete. Please complete the survey in one sitting if possible although you may return to it later from the same computer if interrupted.

### Reason For Survey:

This study will determine which centralized technology organization practices most impact user satisfaction. It is critical to higher education institutions that their technology organizations succeed since IT organizations facilitate the accomplishments of the institution and its members.

### Giveaway:

At the end of the survey, you will be given the opportunity to enter into a drawing for your choice of either a free Nintendo Wii or \$200! If you choose to enter the drawing, you will be asked for your email address which will be separated from the survey results before analysis to ensure survey anonymity.

Please click "Next->" to Read Consent Information and Begin the Survey.

Con

### Consent to Participate in a Research Study - IRB Study # 09-0201

You are being given the opportunity to volunteer to participate in a survey to help determine which technology organization practices most impact user satisfaction on campus. It is critical to higher education institutions that their technology organizations succeed since IT organizations facilitate the accomplishments of the institution and its members.

The survey will be conducted using an online survey software. There are no anticipated risks to participants who take this survey. Although the survey software captures participants' IP addresses and you will have the option of putting in your email address to be entered in the Nintendo Wii or \$200 drawing, this information will not be used in the analysis and will be separated from the survey results before analysis to ensure anonymity. All data is stored within the survey software and is password protected.

Refusal to participate in this study will have no effect on any future services you may be entitled to from the University or technology department. You are free to withdraw from the study at any time without penalty.

To learn more about this study please contact Meredith Weiss at (919) 619-5443 or [mweiss@email.unc.edu](mailto:mweiss@email.unc.edu).

The principal investigator for this study is Meredith Weiss, Ph.D. ABD, UNC School of Information and Library Science at UNC Chapel Hill, Faculty Advisor: Dean Jose-Marie Griffiths. The Information Technology Management in Higher Education study and this message have received approval from the UNC IRB on 2/11/2009, study #09-0201.

All research on human volunteers is reviewed by a committee that works to protect your rights and welfare. If you have questions or concerns about your rights as a research subject you may contact, anonymously if you wish, the Institutional Review Board at 919-966-3113 or by email to [IRB\\_subjects@unc.edu](mailto:IRB_subjects@unc.edu).

I have been given information about this research study and its risks and benefits and have had the opportunity to ask questions and to have my questions answered to my satisfaction. I freely give my consent to participate in this research project as shown by my decision to take the survey.

Q1

### Introductory Questions

Please select your institution.

. Adelphi University



Q2  Currently, my primary role is that of \_\_\_\_\_

- Faculty
- Student
- Staff



- If Faculty is Selected, Then Skip To How many employees (NOT including stu... [Edit](#)
- If Staff is Selected, Then Skip To Do you hold an Information Technology... [Edit](#)

Q3  Are you 18 years of age or older?

- Yes
- No



- If Yes is Selected, Then Skip To Centralized Information Technol... [Edit](#)
- If No is Selected, Then Skip To Please enter your email address if yo... [Edit](#)

Q4

Do you hold an Information Technology (IT) position?

- Yes
- No



- If No is Selected, Then Skip To How many employees (NOT including stu... [Edit](#)

Q5  Do you work for your institution's centralized IT organization or a departmental/school IT organization?

- Institution's centralized IT organization
- Departmental or School IT organization
- Other please explain



- If Institution's centralized IT is Selected, Then Skip To How long have you worked for the cent... [Edit](#)

Q6

How many employees (NOT including student workers) do you supervise (both direct reports and those that report to your direct reports)?

- 0
- 1 - 5
- 6 - 10
- 11 - 25
- 26 - 50
- 51 - 100
- 101 - 250
- 251 - 500
- 501+

Q7 How long have you worked at this college or university?

- Less than 3 months
- 3-11 months
- 1-2 years
- 3-5 years
- 6-10 years
- 11+ years



If Less than 3 months is Selected, Then Skip To Please enter your email address if yo... [Edit](#)

Q8

**Centralized Information Technology (IT) Organization Performance**

Please respond to the following questions regarding the centralized information technology (IT) organization at your college or university (this survey DOES NOT pertain to departmental or school-based IT organizations).

What does the centralized information technology (IT) organization do very well?

---

Q9

Where could the centralized information technology (IT) organization do better?

---

Q10

What specific recommendations do you have for change?

---

**Q11 User Satisfaction Questions - Enablement**

Please respond to the following questions regarding the centralized information technology (IT) organization at your college or university (this survey DOES NOT pertain to departmental or school-based IT organizations).

	Disagree Completely	Disagree Mostly	Disagree Slightly	Agree Slightly	Agree Mostly	Agree Completely	Not Sure
The centralized Information Technology (IT) organization assists me in achieving my goals.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The centralized IT organization understands my needs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The centralized IT organization focuses on initiatives that matter to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q12**  Comments (optional)?

---

**Q13 User Satisfaction Questions - Support**

Please respond to the following questions regarding the centralized information technology (IT) organization at your college or university (this survey DOES NOT pertain to departmental or school-based IT organizations).

	Disagree Completely	Disagree Mostly	Disagree Slightly	Agree Slightly	Agree Mostly	Agree Completely	Not Sure
The centralized IT organization provides me the services I need.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The centralized IT organization provides me the technology training I need.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The centralized IT organization provides me good customer service.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The centralized IT organization supports my needs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q14**  Comments (optional)?

---

**Q15 User Satisfaction Questions – Reliability**

Please respond to the following questions regarding the centralized information technology (IT) organization at your college or university (this survey DOES NOT pertain to departmental or school-based IT organizations).

	Disagree Completely	Disagree Mostly	Disagree Slightly	Agree Slightly	Agree Mostly	Agree Completely	Not Sure
I can rely on centralized Information Technology (IT) organization employees.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The services provided to me by the centralized IT organization are stable.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The services provided to me by the centralized IT organization are reliable.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q16**  **Comments (optional)?**

---

**Q17**  **User Satisfaction Questions - Responsiveness**

Please respond to the following questions regarding the centralized information technology (IT) organization at your college or university (this survey DOES NOT pertain to departmental or school-based IT organizations).

	Disagree Completely	Disagree Mostly	Disagree Slightly	Agree Slightly	Agree Mostly	Agree Completely	Not Sure
The centralized IT organization is flexible.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The centralized IT organization is responsive.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q18**  **Comments (optional)?**

---

**Q19 User Satisfaction Questions – Shared Governance**

Please respond to the following questions regarding the centralized information technology (IT) organization at your college or university (this survey DOES NOT pertain to departmental or school-based IT organizations).

	Disagree Completely	Disagree Mostly	Disagree Slightly	Agree Slightly	Agree Mostly	Agree Completely	Not Sure
Centralized IT organization employees collaborate with members of the campus community to solve problems.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Centralized IT organization employees collaborate with members of the campus community to establish priorities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Responsibility for major technology initiatives are shared between the centralized IT organization and campus stakeholders (others on campus who have an interest in the project's outcome).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The centralized IT organization is effective at gathering support for initiatives.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I currently have adequate input into campus IT decision making.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I currently have adequate involvement with campus IT decision making.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q20**  Comments (optional)?

**Q210**  User Satisfaction Questions - Academic Alignment

Please respond to the following questions regarding the centralized information technology (IT) organization at your college or university (this survey DOES NOT pertain to departmental or school-based IT organizations).

	Disagree Completely	Disagree Mostly	Disagree Slightly	Agree Slightly	Agree Mostly	Agree Completely	Not Sure
The centralized IT organization understands the academic environment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The centralized IT organization's priorities seem to be aligned the institution's priorities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The centralized IT organization's priorities seem to be aligned the institution's purpose.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The centralized IT organization's priorities seem to be aligned with my priorities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q212**  Comments (optional)?

**Q23 User Satisfaction Questions – Fiscal Responsibility**

Please respond to the following questions regarding the centralized information technology (IT) organization at your college or university (this survey DOES NOT pertain to departmental or school-based IT organizations).

	Disagree Completely	Disagree Mostly	Disagree Slightly	Agree Slightly	Agree Mostly	Agree Completely	Not Sure
The centralized Information Technology (IT) organization seems to manage its resources well.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The centralized IT organization seems to fund initiatives that assist me in achieving my goals.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The centralized IT organization seems to be fiscally responsible.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q24**  Comments (optional)?

**Q25**  ONLY A FEW QUESTIONS LEFT - Thank you again for your participation!

**User Satisfaction Questions - Communication**

Please respond to the following questions regarding the centralized information technology (IT) organization at your college or university (this survey DOES NOT pertain to departmental or school-based IT organizations).

	Disagree Completely	Disagree Mostly	Disagree Slightly	Agree Slightly	Agree Mostly	Agree Completely	Not Sure
The centralized IT organization communicates effectively with me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am aware of the priorities of the centralized IT organization.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am aware of the goals of the centralized IT organization.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The centralized IT organization communicates effectively.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The centralized IT organization communicates proactively.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am aware of our campus vision for technology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am aware of how the centralized IT organization works toward supporting our campus vision.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The centralized IT organization manages change well.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q26**  Comments (optional)?

Q27 User Satisfaction Questions – Innovation

Please respond to the following questions regarding the centralized information technology (IT) organization at your college or university (this survey DOES NOT pertain to departmental or school-based IT organizations).

	Disagree Completely	Disagree Mostly	Disagree Slightly	Agree Slightly	Agree Mostly	Agree Completely	Not Sure
The centralized IT organization is innovative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q28  Comments (optional)?

Q29  User Satisfaction Questions - Importance

Please respond to the following questions regarding the centralized information technology (IT) organization at your college or university (this survey DOES NOT pertain to departmental or school-based IT organizations).

	Disagree Completely	Disagree Mostly	Disagree Slightly	Agree Slightly	Agree Mostly	Agree Completely	Not Sure
An effective centralized IT organization is critical to the success of our institution.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
An effective centralized IT organization is critical to my success.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q30  Comments (optional)?

Q31  Final Questions

The centralized IT organization at our institution is effective.

Disagree Completely    Disagree Mostly    Disagree Slightly    Agree Slightly    Agree Mostly    Agree Completely

Q32  I am satisfied with the performance of the central IT organization.

Disagree Completely    Disagree Mostly    Disagree Slightly    Agree Slightly    Agree Mostly    Agree Completely

Q33  I believe the central IT organization is doing an outstanding job.

Disagree Completely    Disagree Mostly    Disagree Slightly    Agree Slightly    Agree Mostly    Agree Completely

Q34 Overall my satisfaction with the centralized Information Technology (IT) organization at our institution is high.

Disagree Completely    Disagree Mostly    Disagree Slightly    Agree Slightly    Agree Mostly    Agree Completely

Q35  Comments (optional)?

Q36  The Chief Information Officer (senior most technology leader for the college or university) at our institution is effective.

Disagree Completely    Disagree Mostly    Disagree Slightly    Agree Slightly    Agree Mostly    Agree Completely    Not Sure

Q37  I am satisfied with the performance of the Chief Information Officer (senior most technology leader for the college or university).

Disagree Completely    Disagree Mostly    Disagree Slightly    Agree Slightly    Agree Mostly    Agree Completely    Not Sure

Q38  I believe the Chief Information Officer (senior most technology leader for the college or university) is doing an outstanding job.

Disagree Completely    Disagree Mostly    Disagree Slightly    Agree Slightly    Agree Mostly    Agree Completely    Not Sure

Q39  Comments (optional)?

Q40  Please select one response to fill the blank in this phrase: I believe the centralized IT department does a \_\_\_\_\_ job than do other centralized campus units such as finance and human resources.

Much Worse    Worse    Slightly Worse    Slightly Better    Better    Much Better



Q41  Are there any comments you would like to add before completing this survey?



If Are there any comments you ... Is Displayed, Then Skip To Please enter your email address if yo... [Edit](#)

Q43

How long have you worked for the centralized information technology (IT) organization at this Institution?

- Less than 3 months
- 3 -11 months
- 1-2 years
- 3-5 years
- 6-10 years
- 11+ years



If Less than 3 months Is Selected, Then Skip To Please enter your email address if yo... [Edit](#)

Q44

How many employees (NOT including student workers) do you supervise (both direct reports and those that report to your direct reports)?

- 0
- 1-5
- 6-10
- 11-25
- 26-50
- 51-100
- 101+

Q45

Values, Priorities, Challenges

In your opinion, what are the values of the centralized IT organization?

---

Q46 In your opinion, what are the priorities of the centralized IT organization?

Q47 What obstacles and/or challenges stand in your way of reaching centralized IT organization goals?

Q48 What obstacles and/or challenges stand in your way of reaching your full potential as a centralized IT organization employee?

Q49 Centralized IT Organization Management

I feel accountable for the results I must deliver.

Disagree Completely    Disagree Mostly    Disagree Slightly    Agree Slightly    Agree Mostly    Agree Completely

Q50 I believe people throughout the centralized IT organization are accountable for the results they must deliver.

Disagree Completely    Disagree Mostly    Disagree Slightly    Agree Slightly    Agree Mostly    Agree Completely

Q51 I have the skills I need to support the centralized IT organization's technology initiatives.

Disagree Completely    Disagree Mostly    Disagree Slightly    Agree Slightly    Agree Mostly    Agree Completely

Q52 I believe people throughout the centralized IT organization have the skills they need to support the centralized IT organization's technology initiatives.

Disagree Completely    Disagree Mostly    Disagree Slightly    Agree Slightly    Agree Mostly    Agree Completely

Q53 Our centralized IT organization's performance is measured regularly.

Disagree Completely    Disagree Mostly    Disagree Slightly    Agree Slightly    Agree Mostly    Agree Completely

Q54 Our centralized IT organization's performance is reported regularly.

Disagree Completely Disagree Mostly Disagree Slightly Agree Slightly Agree Mostly Agree Completely

Q55 Technology risks are measured regularly.

Disagree Completely Disagree Mostly Disagree Slightly Agree Slightly Agree Mostly Agree Completely

Q56 Technology risks are reported regularly.

Disagree Completely Disagree Mostly Disagree Slightly Agree Slightly Agree Mostly Agree Completely

Q57 I know the goals of the centralized IT organization.

Disagree Completely Disagree Mostly Disagree Slightly Agree Slightly Agree Mostly Agree Completely

Q58 I know how my job supports the goals of the centralized IT organization.

Disagree Completely Disagree Mostly Disagree Slightly Agree Slightly Agree Mostly Agree Completely

Q59 I believe in the goals of the centralized IT organization.

Disagree Completely Disagree Mostly Disagree Slightly Agree Slightly Agree Mostly Agree Completely

Q60 The centralized IT organization has a strong culture of shared values.

Disagree Completely Disagree Mostly Disagree Slightly Agree Slightly Agree Mostly Agree Completely

Q61 I fit in well with the centralized IT organization's culture.

Disagree Completely Disagree Mostly Disagree Slightly Agree Slightly Agree Mostly Agree Completely

Q62 I have consistent two-way communication with campus users to ensure their satisfaction.

Disagree Completely Disagree Mostly Disagree Slightly Agree Slightly Agree Mostly Agree Completely

Q63 I believe people throughout the centralized IT organization have consistent two-way communication with campus users to ensure their satisfaction.

Disagree Completely Disagree Mostly Disagree Slightly Agree Slightly Agree Mostly Agree Completely

Q64  I am encouraged to be innovative.

Disagree Completely	Disagree Mostly	Disagree Slightly	Agree Slightly	Agree Mostly	Agree Completely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q65  The centralized IT organization is innovative.

Disagree Completely	Disagree Mostly	Disagree Slightly	Agree Slightly	Agree Mostly	Agree Completely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q66  I am encouraged to generate new ideas to improve the centralized IT organization.

Disagree Completely	Disagree Mostly	Disagree Slightly	Agree Slightly	Agree Mostly	Agree Completely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q67  I am a leader among my peers.

Disagree Completely	Disagree Mostly	Disagree Slightly	Agree Slightly	Agree Mostly	Agree Completely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q68  I inspire employees to perform better.

Disagree Completely	Disagree Mostly	Disagree Slightly	Agree Slightly	Agree Mostly	Agree Completely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q69  I am inspired to perform better by individuals at all levels throughout the centralized IT organization.

Disagree Completely	Disagree Mostly	Disagree Slightly	Agree Slightly	Agree Mostly	Agree Completely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q70  I am inspired to perform better by my supervisor.

Disagree Completely	Disagree Mostly	Disagree Slightly	Agree Slightly	Agree Mostly	Agree Completely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q71  I am inspired to perform better by the senior most technology leader on our campus (Chief Information Officer, Vice President etc.).

Disagree Completely	Disagree Mostly	Disagree Slightly	Agree Slightly	Agree Mostly	Agree Completely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q72  I am encouraged to stay with the centralized IT organization (continue working for the centralized IT organization).

Disagree Completely	Disagree Mostly	Disagree Slightly	Agree Slightly	Agree Mostly	Agree Completely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q73  I believe people throughout the centralized IT organization are encouraged to stay with the organization (continue working for the centralized IT organization).

Disagree Completely	Disagree Mostly	Disagree Slightly	Agree Slightly	Agree Mostly	Agree Completely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q74**  **Centralized IT Organization Work Environment**  
 Centralized IT organization employees work in self-managed teams rather than traditionally supervised groups.

Never	Very Rarely	Rarely	Occasionally	Frequently	Very Frequently
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q75**  **Teams are rewarded for group performance.**

Never	Very Rarely	Rarely	Occasionally	Frequently	Very Frequently
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q76**  **The centralized IT organization has quality systems in place that help me succeed.**

Disagree Completely	Disagree Mostly	Disagree Slightly	Agree Slightly	Agree Mostly	Agree Completely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q77**  **The centralized IT organization has well-documented procedures in place that help me succeed.**

Disagree Completely	Disagree Mostly	Disagree Slightly	Agree Slightly	Agree Mostly	Agree Completely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q78**  **The information that I need to succeed in my job is readily shared with me.**

Disagree Completely	Disagree Mostly	Disagree Slightly	Agree Slightly	Agree Mostly	Agree Completely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q79**  **The IT organization invests in my staff development.**

Disagree Completely	Disagree Mostly	Disagree Slightly	Agree Slightly	Agree Mostly	Agree Completely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q80**  **I have sufficient job training to grow my abilities.**

Disagree Completely	Disagree Mostly	Disagree Slightly	Agree Slightly	Agree Mostly	Agree Completely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q81**  **I am encouraged to develop my skills.**

Disagree Completely	Disagree Mostly	Disagree Slightly	Agree Slightly	Agree Mostly	Agree Completely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q82**  **I feel safe voicing my opinion.**

Disagree Completely	Disagree Mostly	Disagree Slightly	Agree Slightly	Agree Mostly	Agree Completely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Q83**  **I feel secure in my position (have employment security).**

Disagree Completely	Disagree Mostly	Disagree Slightly	Agree Slightly	Agree Mostly	Agree Completely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q84 I am valued.

Disagree Completely Disagree Mostly Disagree Slightly Agree Slightly Agree Mostly Agree Completely

Q85  I am treated well.

Disagree Completely Disagree Mostly Disagree Slightly Agree Slightly Agree Mostly Agree Completely

Q86  I am motivated by my current level of job autonomy (freedom and discretion allowed in my job role).

Disagree Completely Disagree Mostly Disagree Slightly Agree Slightly Agree Mostly Agree Completely

Q87  I have decision authority.

Disagree Completely Disagree Mostly Disagree Slightly Agree Slightly Agree Mostly Agree Completely

Q88  I have meaningful responsibilities.

Disagree Completely Disagree Mostly Disagree Slightly Agree Slightly Agree Mostly Agree Completely

Q89  I am respected within the IT organization.

Disagree Completely Disagree Mostly Disagree Slightly Agree Slightly Agree Mostly Agree Completely

Q90  My contributions are important.

Disagree Completely Disagree Mostly Disagree Slightly Agree Slightly Agree Mostly Agree Completely

Q91  My job is meaningful.

Disagree Completely Disagree Mostly Disagree Slightly Agree Slightly Agree Mostly Agree Completely

Q92  I am well paid.

Disagree Completely Disagree Mostly Disagree Slightly Agree Slightly Agree Mostly Agree Completely

Q93  Comments on the Centralized IT Organization Work Environment questions above (optional)?

Q94  Centralized IT Organization Work Environment (continued)

The centralized IT organization is very selective about its new hires.

Disagree Completely    Disagree Mostly    Disagree Slightly    Agree Slightly    Agree Mostly    Agree Completely

Q95  The climate within the centralized IT organization is open and trusting.

Disagree Completely    Disagree Mostly    Disagree Slightly    Agree Slightly    Agree Mostly    Agree Completely

Q96  Employees at all levels of the centralized IT organization want to help others succeed.

Disagree Completely    Disagree Mostly    Disagree Slightly    Agree Slightly    Agree Mostly    Agree Completely

Q97  Status differences throughout the centralized IT organization are minimal.

Disagree Completely    Disagree Mostly    Disagree Slightly    Agree Slightly    Agree Mostly    Agree Completely

Q98  The senior most executive centralized IT leader (i.e. Chief Information Officer, Vice President for IT) creates a community (friendly, supportive, open) environment.

Disagree Completely    Disagree Mostly    Disagree Slightly    Agree Slightly    Agree Mostly    Agree Completely

Q99  My supervisor creates a community (friendly, supportive, open) environment.

Disagree Completely    Disagree Mostly    Disagree Slightly    Agree Slightly    Agree Mostly    Agree Completely

Q100  Salary differences across levels within the centralized IT organization are fair (i.e. management salaries are higher than employee salaries but not tremendously higher).

Disagree Completely    Disagree Mostly    Disagree Slightly    Agree Slightly    Agree Mostly    Agree Completely

Q101  Recognition for centralized IT organization success is shared with employees.

Disagree Completely    Disagree Mostly    Disagree Slightly    Agree Slightly    Agree Mostly    Agree Completely

Q102  The centralized IT organizational culture is collaborative.

Disagree Completely    Disagree Mostly    Disagree Slightly    Agree Slightly    Agree Mostly    Agree Completely

Q103

Comments on the Centralized IT Organization Work Environment questions above (optional)?

Q104

ALMOST FINISHED ONLY A FEW QUESTIONS LEFT - THANK YOU AGAIN

**IT Success**

How important do you believe the following are to your success?

	Not At All Important	Of Little Importance	Important	Very Important	Critical
End user satisfaction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
End user support	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
End user enablement (IT allows users to accomplish their goals)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reliability of technology services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Responsiveness of the technology organization	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Campus involvement in technology decisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technology alignment with campus goals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technology alignment with campus priorities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
IT budget management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
IT fiscal responsibility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Proactive communication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Effective communication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Innovation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
High performance IT employee teams (employees are respected, well trained, and valued)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q105

Comments (optional)?



Q106 How important do you believe the following are to the success of the technology organization?

	Not At All Important	Of Little Importance	Important	Very Important	Critical
End user satisfaction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
End user support	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
End user enablement (IT allows users to accomplish their goals)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reliability of technology services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Responsiveness of the technology organization	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Campus involvement in technology decisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technology alignment with campus goals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technology alignment with campus priorities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
IT budget management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
IT fiscal responsibility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Proactive communication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Effective communication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Innovation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
High performance IT employee teams (employees are respected, well trained, and valued)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q107  Comments (optional)?

---

Q108

How satisfied do you believe campus users are with the centralized information technology (IT) organization in the following areas?

	Extremely Dissatisfied	Very Dissatisfied	Somewhat Dissatisfied	Somewhat Satisfied	Very Satisfied	Extremely Satisfied
End user satisfaction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
End user support	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
End user enablement (IT allows users to accomplish their goals)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reliability of technology services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Responsiveness of the technology organization	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Campus involvement in technology decisions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technology alignment with campus goals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Technology alignment with campus priorities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
IT budget management	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
IT fiscal responsibility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Proactive communication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Effective communication	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Innovation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
High performance IT employee teams (employees are respected, well trained, and valued)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q109

Comments (optional)?

Q110

FINAL QUESTIONS!

I believe the centralized information Technology (IT) organization at our institution is effective.

Disagree Completely	Disagree Mostly	Disagree Slightly	Agree Slightly	Agree Mostly	Agree Completely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q111

I believe the central IT organization is doing an outstanding job.

Disagree Completely	Disagree Mostly	Disagree Slightly	Agree Slightly	Agree Mostly	Agree Completely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q112

I believe the senior most technology executive for the college or university (i.e. Chief Information Officer, Vice President for IT) is effective.

Disagree Completely	Disagree Mostly	Disagree Slightly	Agree Slightly	Agree Mostly	Agree Completely
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q113

I believe the senior most technology executive for the college or university (i.e. Chief Information Officer, Vice President for IT) is doing an outstanding job.

Disagree Completely   Disagree Mostly   Disagree Slightly   Agree Slightly   Agree Mostly   Agree Completely

Q114

I believe overall user satisfaction with the centralized Information Technology (IT) organization at our institution is high.

Disagree Completely   Disagree Mostly   Disagree Slightly   Agree Slightly   Agree Mostly   Agree Completely

Q115

Please select one response to fill the blank in this phrase:  
I believe the centralized IT department does a \_\_\_ job than do other centralized campus units such as finance and human resources.

Much Worse   Worse   Slightly Worse   Slightly Better   Better   Much Better

Q116

Are there any comments you would like to add before completing this survey?

Draw

Please enter your email address if you would like to be entered into a drawing to win your choice of a NINTENDO Wii or \$200.

Your email address will be separated from the survey results before analysis to ensure survey anonymity.

End

THANK YOU FOR YOUR PARTICIPATION!

Please click "Next ->" to complete the survey.

### APPENDIX C: Doctoral/Research Universities

<b>The Carnegie Foundation for the Advancement of Teaching</b>		
(DRU: Doctoral/Research Universities, RU/H: Research Universities – high research activity, RU/VH: Research Universities – very high research activity)		
Adelphi University	Garden City	NY
Alliant International University-San Diego	San Diego	CA
American University	Washington	DC
Andrews University	Berrien Springs	MI
Antioch University New England	Keene	NH
Argosy University-Orange Campus	Santa Ana	CA
Argosy University-Sarasota Campus	Sarasota	FL
Argosy University-Twin Cities Campus	Eagan	MN
Arizona State University at the Tempe Campus	Tempe	AZ
Auburn University Main Campus	Auburn University	AL
Azusa Pacific University	Azusa	CA
Ball State University	Muncie	IN
Barry University	Miami	FL
Baylor University	Waco	TX
Biola University	La Mirada	CA
Boston College	Chestnut Hill	MA
Boston University	Boston	MA
Bowling Green State University-Main Campus	Bowling Green	OH
Brandeis University	Waltham	MA
Brigham Young University	Provo	UT
Brown University	Providence	RI
California Institute of Integral Studies	San Francisco	CA
California Institute of Technology	Pasadena	CA
Capella University	Minneapolis	MN
Carlos Albizu University	San Juan	PR
Carnegie Mellon University	Pittsburgh	PA
Case Western Reserve University	Cleveland	OH
Catholic University of America	Washington	DC
Central Michigan University	Mt Pleasant	MI
Claremont Graduate University	Claremont	CA
Clark Atlanta University	Atlanta	GA
Clark University	Worcester	MA
Clarkson University	Potsdam	NY
Clemson University	Clemson	SC
Cleveland State University	Cleveland	OH
College of William and Mary	Williamsburg	VA
Colorado School of Mines	Golden	CO
Colorado State University	Fort Collins	CO
Columbia University in the City of New York	New York	NY

Cornell University-Endowed Colleges	Ithaca	NY
CUNY Graduate School and University Center	New York	NY
Dartmouth College	Hanover	NH
DePaul University	Chicago	IL
Drexel University	Philadelphia	PA
Duke University	Durham	NC
Duquesne University	Pittsburgh	PA
East Carolina University	Greenville	NC
East Tennessee State University	Johnson City	TN
Emory University	Atlanta	GA
Fielding Graduate University	Santa Barbara	CA
Florida Agricultural and Mechanical University	Tallahassee	FL
Florida Atlantic University-Boca Raton	Boca Raton	FL
Florida Institute of Technology-Melbourne	Melbourne	FL
Florida International University	Miami	FL
Florida State University	Tallahassee	FL
Fordham University	Bronx	NY
George Fox University	Newberg	OR
George Mason University	Fairfax	VA
George Washington University	Washington	DC
Georgetown University	Washington	DC
Georgia Institute of Technology-Main Campus	Atlanta	GA
Georgia Southern University	Statesboro	GA
Georgia State University	Atlanta	GA
Golden Gate University-San Francisco	San Francisco	CA
Harvard University	Cambridge	MA
Hofstra University	Hempstead	NY
Howard University	Washington	DC
Idaho State University	Pocatello	ID
Illinois Institute of Technology	Chicago	IL
Illinois State University	Normal	IL
Immaculata University	Immaculata	PA
Indiana State University	Terre Haute	IN
Indiana University-Bloomington	Bloomington	IN
Indiana University of Pennsylvania-Main Campus	Indiana	PA
Indiana University-Purdue University-Indianapolis	Indianapolis	IN
Inter American University of Puerto Rico-Metro	San Juan	PR
Iowa State University	Ames	IA
Jackson State University	Jackson	MS
Johns Hopkins University	Baltimore	MD
Kansas State University	Manhattan	KS
Kent State University-Main Campus	Kent	OH
Lehigh University	Bethlehem	PA
Long Island University-C W Post Campus	Brookville	NY
Louisiana State Univ & Ag & Mech & Hebert Laws	Baton Rouge	LA

Ctr		
Louisiana Tech University	Ruston	LA
Loyola University Chicago	Chicago	IL
Marquette University	Milwaukee	WI
Massachusetts Institute of Technology	Cambridge	MA
Mayo Graduate School	Rochester	MN
Miami University-Oxford	Oxford	OH
Michigan State University	East Lansing	MI
Michigan Technological University	Houghton	MI
Mississippi State University	Mississippi State	MS
Montana State University-Bozeman	Bozeman	MT
Morgan State University	Baltimore	MD
New Jersey Institute of Technology	Newark	NJ
New Mexico State University-Main Campus	Las Cruces	NM
New School University	New York	NY
New York University	New York	NY
North Carolina A & T State University	Greensboro	NC
North Carolina State University at Raleigh	Raleigh	NC
North Dakota State University-Main Campus	Fargo	ND
Northcentral University	Prescott	AZ
Northeastern University	Boston	MA
Northern Arizona University	Flagstaff	AZ
Northern Illinois University	Dekalb	IL
Northwestern University	Evanston	IL
Nova Southeastern University	Ft Lauderdale	FL
Oakland University	Rochester Hills	MI
Ohio State University-Main Campus	Columbus	OH
Ohio University-Main Campus	Athens	OH
Oklahoma State University-Main Campus	Stillwater	OK
Old Dominion University	Norfolk	VA
Oral Roberts University	Tulsa	OK
Oregon State University	Corvallis	OR
Pace University-New York	New York	NY
Pacific University	Forest Grove	OR
Pacifica Graduate Institute	Carpinteria	CA
Pennsylvania State University-Main Campus	University Park	PA
Pepperdine University	Malibu	CA
Polytechnic University	Brooklyn	NY
Portland State University	Portland	OR
Princeton University	Princeton	NJ
Purdue University-Main Campus	West Lafayette	IN
Regent University	Virginia Beach	VA
Rensselaer Polytechnic Institute	Troy	NY
Rice University	Houston	TX
Rutgers University-New Brunswick	New Brunswick	NJ

Rutgers University-Newark	Newark	NJ
St. John's University-New York	Queens	NY
Saint Louis University-Main Campus	St Louis	MO
Saint Mary's University of Minnesota	Winona	MN
Samford University	Birmingham	AL
San Diego State University	San Diego	CA
The Scripps Research Institute	La Jolla	CA
Seton Hall University	South Orange	NJ
South Carolina State University	Orangeburg	SC
South Dakota State University	Brookings	SD
Southern Illinois University Carbondale	Carbondale	IL
Southern Methodist University	Dallas	TX
Spalding University	Louisville	KY
Stanford University	Stanford	CA
Stevens Institute of Technology	Hoboken	NJ
SUNY at Albany	Albany	NY
SUNY at Binghamton	Binghamton	NY
SUNY at Buffalo	Buffalo	NY
SUNY at Stony Brook	Stony Brook	NY
SUNY College of Environmental Science and Forestry	Syracuse	NY
Syracuse University	Syracuse	NY
Teachers College at Columbia University	New York	NY
Temple University	Philadelphia	PA
Tennessee State University	Nashville	TN
Texas A & M University	College Station	TX
Texas A & M University-Commerce	Commerce	TX
Texas A & M University-Kingsville	Kingsville	TX
Texas Christian University	Ft Worth	TX
Texas Tech University	Lubbock	TX
Texas Woman's University	Denton	TX
Trevecca Nazarene University	Nashville	TN
Trinity International University	Deerfield	IL
Tufts University	Medford	MA
Tulane University of Louisiana	New Orleans	LA
Union Institute & University	Cincinnati	OH
University of Akron Main Campus	Akron	OH
University of Alabama, The	Tuscaloosa	AL
University of Alabama at Birmingham	Birmingham	AL
University of Alabama in Huntsville	Huntsville	AL
University of Alaska Fairbanks	Fairbanks	AK
University of Arizona	Tucson	AZ
University of Arkansas at Little Rock	Little Rock	AR
University of Arkansas Main Campus	Fayetteville	AR
University of Bridgeport	Bridgeport	CT
University of California-Berkeley	Berkeley	CA

University of California-Davis	Davis	CA
University of California-Irvine	Irvine	CA
University of California-Los Angeles	Los Angeles	CA
University of California-Riverside	Riverside	CA
University of California-San Diego	La Jolla	CA
University of California-Santa Barbara	Santa Barbara	CA
University of California-Santa Cruz	Santa Cruz	CA
University of Central Florida	Orlando	FL
University of Chicago	Chicago	IL
University of Cincinnati-Main Campus	Cincinnati	OH
University of Colorado at Boulder	Boulder	CO
University of Colorado at Denver and Health Sciences Center	Denver	CO
University of Connecticut	Storrs	CT
University of Dayton	Dayton	OH
University of Delaware	Newark	DE
University of Denver	Denver	CO
University of Florida	Gainesville	FL
University of Georgia	Athens	GA
University of Hartford	West Hartford	CT
University of Hawaii at Manoa	Honolulu	HI
University of Houston-University Park	Houston	TX
University of Idaho	Moscow	ID
University of Illinois at Chicago	Chicago	IL
University of Illinois at Urbana-Champaign	Champaign	IL
University of Iowa	Iowa City	IA
University of Kansas Main Campus	Lawrence	KS
University of Kentucky	Lexington	KY
University of La Verne	La Verne	CA
University of Louisiana at Lafayette	Lafayette	LA
University of Louisville	Louisville	KY
University of Maine	Orono	ME
University of Maryland-Baltimore County	Baltimore	MD
University of Maryland-College Park	College Park	MD
University of Massachusetts-Amherst	Amherst	MA
University of Massachusetts-Boston	Boston	MA
University of Massachusetts-Lowell	Lowell	MA
University of Memphis	Memphis	TN
University of Miami	Coral Gables	FL
University of Michigan-Ann Arbor	Ann Arbor	MI
University of Minnesota-Twin Cities	Minneapolis	MN
University of Mississippi Main Campus	University	MS
University of Missouri-Columbia	Columbia	MO
University of Missouri-Kansas City	Kansas City	MO
University of Missouri-Rolla	Rolla	MO



University of Missouri-St. Louis	St Louis	MO
University of Montana-Missoula, The	Missoula	MT
University of Nebraska at Lincoln	Lincoln	NE
University of Nevada-Las Vegas	Las Vegas	NV
University of Nevada-Reno	Reno	NV
University of New Hampshire-Main Campus	Durham	NH
University of New Mexico-Main Campus	Albuquerque	NM
University of New Orleans	New Orleans	LA
University of North Carolina at Chapel Hill	Chapel Hill	NC
University of North Carolina at Charlotte	Charlotte	NC
University of North Carolina at Greensboro	Greensboro	NC
University of North Dakota-Main Campus	Grand Forks	ND
University of North Texas	Denton	TX
University of Northern Colorado	Greeley	CO
University of Notre Dame	Notre Dame	IN
University of Oklahoma Norman Campus	Norman	OK
University of Oregon	Eugene	OR
University of Pennsylvania	Philadelphia	PA
University of Phoenix-Online Campus	Phoenix	AZ
University of Pittsburgh-Main Campus	Pittsburgh	PA
University of Puerto Rico-Rio Piedras Campus	Rio Piedras	PR
University of Rhode Island	Kingston	RI
University of Rochester	Rochester	NY
University of St. Thomas	St Paul	MN
University of San Diego	San Diego	CA
University of San Francisco	San Francisco	CA
University of South Carolina-Columbia	Columbia	SC
University of South Dakota	Vermillion	SD
University of South Florida	Tampa	FL
University of Southern California	Los Angeles	CA
University of Southern Mississippi	Hattiesburg	MS
University of Tennessee, The	Knoxville	TN
University of Texas at Arlington, The	Arlington	TX
University of Texas at Austin, The	Austin	TX
University of Texas at Dallas, The	Richardson	TX
University of Texas at El Paso, The	El Paso	TX
University of the Pacific	Stockton	CA
University of Toledo	Toledo	OH
University of Tulsa	Tulsa	OK
University of Utah	Salt Lake City	UT
University of Vermont and State Agricultural Coll	Burlington	VT
University of Virginia-Main Campus	Charlottesville	VA
University of Washington-Seattle Campus	Seattle	WA
University of West Florida, The	Pensacola	FL
University of Wisconsin-Madison	Madison	WI

University of Wisconsin-Milwaukee	Milwaukee	WI
University of Wyoming	Laramie	WY
Utah State University	Logan	UT
Vanderbilt University	Nashville	TN
Virginia Commonwealth University	Richmond	VA
Virginia Polytechnic Institute and State Univ	Blacksburg	VA
Wake Forest University	Winston Salem	NC
Walden University	Minneapolis	MN
Washington State University	Pullman	WA
Washington University in St. Louis	St Louis	MO
Wayne State University	Detroit	MI
West Virginia University	Morgantown	WV
Western Michigan University	Kalamazoo	MI
Wichita State University	Wichita	KS
Widener University-Main Campus	Chester	PA
Wilmington College	New Castle	DE
Worcester Polytechnic Institute	Worcester	MA
Wright State University-Main Campus	Dayton	OH
Yale University	New Haven	CT
Yeshiva University	New York	NY

## APPENDIX D: Introductory Email to CIO

Email Subject: Request for help from a Ph.D. student

Dear (CIO Name),

My name is Meredith Weiss and I am a Ph.D. student studying the success of senior technology executives in higher education. I also hold the position of Associate Dean for Information Technology. As I am certain you know, the position you are in is an extremely challenging one that is critical to the success of higher education institutions.

Current articles about chief information officer (CIO) success are almost entirely based on expert opinion or the experiences of past technology leaders and although these insights and experiences are extremely valuable, quantitative research studies are needed to give CIOs concrete areas in which to focus efforts in order to succeed.

**I am asking for your help by participating in a new research study.** I realize and respect that you are busy and promise that this will not take but a **few minutes** of your time. **I know as technology leaders we are often asked for our participation in research studies and hope even if you usually decline, that you will participate in this study.**

I am asking the senior technology executive at every institution identified with doctoral level programs through The Carnegie Foundation for the Advancement of Teaching to participate in this study.

### **What you will receive for participating:**

1. An analysis of how campus users at your institution and across the country define user satisfaction.
2. An analysis of current user satisfaction at your institution.
3. A list of management practices IT leaders have implemented within their centralized IT organization that have been associated with higher user satisfaction.
4. An analysis revealing if the creation of high-performance technology teams improve IT department and CIO success.
5. An analysis of current management practices taking place within your technology organization.
6. An analysis of how CIOs are being evaluated across the country.
7. A complete dataset (without identifying information) of all responses at your institution.

Your institution's results **WILL** be made available to **YOU** (the institution's senior technology executive).

**Published results will NOT identify you or your organization.**

**Your organization's responses will be securely stored and will remain confidential at all times.**

It is critical to higher education institutions that their centralized information technology (IT) organizations succeed since technology organizations facilitate the accomplishments of the institution and its members.

**Participation is easy.**

I am attaching simple directions explaining how your institution can participate using an online survey.

I sincerely hope that you will agree to participate in this research study. **Please contact me using the email below to let me know if you will participate in this new study or be unable to.** The more institutions that participate, the more information I will be able to provide to you and other technology leaders across the country. Thank you very much in advance for your consideration and hopefully for your participation in this study.

Best wishes-

Meredith Weiss

--

You are being given the opportunity to volunteer to participate in a research study to help determine which technology organization practices most impact user satisfaction on campus. It is critical to higher education institutions that their technology organizations succeed since IT organizations facilitate the accomplishments of the institution and its members.

To learn more about this study please contact Meredith Weiss at (919) 619-5443 or mlweiss@email.unc.edu.

The principal investigator for this study is Meredith Weiss, M.I.S., M.B.A., Ph.D. ABD, UNC School of Information and Library Science at UNC Chapel Hill. Faculty Advisor: Dean Jose-Marie Griffiths. The Information Technology Management in Higher Education study and this message have received approval from the UNC IRB on 2/11/2009, study #09-0201.

## **APPENDIX E: Introductory Email to CIO's Assistant**

Email Subject: Request for help from a Ph.D. student

Dear (CIO's Assistant's Name),

My name is Meredith Weiss and I am a Ph.D. student studying the success of senior technology executives in higher education. As I am certain you know, the chief information officer (CIO) position is an extremely challenging one that is critical to the success of higher education institutions.

Current articles about CIO success are almost entirely based on expert opinion or the experiences of past technology leaders and although these insights and experiences are extremely valuable, quantitative research studies are needed to give CIOs concrete areas in which to focus efforts in order to succeed.

**I am asking for your help by participating in a new study. I realize and respect that you are busy and promise that this will not take but a few minutes of your time.**

I am asking the senior technology executive at every institution identified with doctoral level programs through The Carnegie Foundation for the Advancement of Teaching to participate in this study.

### **What you will receive for participating:**

1. An analysis of how campus users at your institution and across the country define user satisfaction.
2. An analysis of current user satisfaction at your institution.
3. A list of management practices IT leaders have implemented within their centralized IT organization that have been associated with higher user satisfaction.
4. An analysis revealing if the creation of high-performance technology teams improve IT department and CIO success.
5. An analysis of current management practices taking place within your technology organization.
6. An analysis of how CIOs are being evaluated across the country.
7. A complete dataset (without identifying information) of all responses at your institution.

Your institution's results **WILL** be made available to the institution's senior technology executive.

**Published results will NOT identify you or your organization. Your organization's responses will be securely stored and will remain confidential at all times.**

It is critical to higher education institutions that their centralized information technology (IT) organizations succeed since technology organizations facilitate the accomplishments of the institution and its members.

**Participation is easy.**

I am attaching simple directions explaining how your institution can participate using an online survey.

I sincerely hope that you will agree to participate in this research study. **Please contact me using the email below to let me know if you will participate in this new study or be unable to.** The more institutions that participate, the more information I will be able to provide to you and other technology leaders across the country. Thank you very much in advance for your consideration and hopefully for your participation in this study.

Best wishes-

Meredith Weiss

--

You are being given the opportunity to volunteer to participate in a research study to help determine which technology organization practices most impact user satisfaction on campus. It is critical to higher education institutions that their technology organizations succeed since IT organizations facilitate the accomplishments of the institution and its members.

To learn more about this study please contact Meredith Weiss at (919) 619-5443 or [mlweiss@email.unc.edu](mailto:mlweiss@email.unc.edu).

The principal investigator for this study is Meredith Weiss, M.I.S., M.B.A., Ph.D. ABD, UNC School of Information and Library Science at UNC Chapel Hill. Faculty Advisor: Dean Jose-Marie Griffiths. The Information Technology Management in Higher Education study and this message have received approval from the UNC IRB on 2/11/2009, study #09-0201.

## APPENDIX F: Follow Up Email to CIO

Email Subject: Follow Up On Request for help from a Ph.D. student

Hello (CIO NAME),

I wanted to take a quick moment and follow up on the email I sent to you a couple of weeks ago. I realize you are very busy and since I have not heard back from you yet, I thought I'd send you a quick reminder. I am hoping you will be able to help me. In case you did not receive my original email, I have included a copy below.

Thank you in advance for your help.

Best-

Meredith Weiss

--

Dear (CIO NAME),

My name is Meredith Weiss and I am a Ph.D. student studying the success of senior technology executives in higher education. I also hold the position of Associate Dean for Information Technology. As I am certain you know, the position you are in is an extremely challenging one that is critical to the success of higher education institutions.

Current articles about chief information officer (CIO) success are almost entirely based on expert opinion or the experiences of past technology leaders and although these insights and experiences are extremely valuable, quantitative research studies are needed to give CIOs concrete areas in which to focus efforts in order to succeed.

**I am asking for your help by participating in a new research study.** I realize and respect that you are busy and promise that this will not take but a **few minutes** of your time. **I know as technology leaders we are often asked for our participation in research studies and hope even if you usually decline, that you will participate in this study.**

I am asking the senior technology executive at every institution identified with doctoral level programs through The Carnegie Foundation for the Advancement of Teaching to participate in this study.

### **What you will receive for participating:**

1. An analysis of how campus users at your institution and across the country define user satisfaction.

2. An analysis of current user satisfaction at your institution.
3. A list of management practices IT leaders have implemented within their centralized IT organization that have been associated with higher user satisfaction.
4. An analysis revealing if the creation of high-performance technology teams improve IT department and CIO success.
5. An analysis of current management practices taking place within your technology organization.
6. An analysis of how CIOs are being evaluated across the country.
7. A complete dataset (without identifying information) of all responses at your institution.

Your institution's results **WILL** be made available to **YOU** (the institution's senior technology executive).

**Published results will NOT identify you or your organization.**

**Your organization's responses will be securely stored and will remain confidential at all times.**

It is critical to higher education institutions that their centralized information technology (IT) organizations succeed since technology organizations facilitate the accomplishments of the institution and its members.

**Participation is easy.**

I am attaching simple directions explaining how your institution can participate using an online survey.

I sincerely hope that you will agree to participate in this research study. **Please contact me using the email below to let me know if you will participate in this new study or be unable to.** The more institutions that participate, the more information I will be able to provide to you and other technology leaders across the country. Thank you very much in advance for your consideration and hopefully for your participation in this study.

Best wishes-

Meredith Weiss

--



You are being given the opportunity to volunteer to participate in a research study to help determine which technology organization practices most impact user satisfaction on campus. It is critical to higher education institutions that their technology organizations succeed since IT organizations facilitate the accomplishments of the institution and its members.

To learn more about this study please contact Meredith Weiss at (919) 619-5443 or [mlweiss@email.unc.edu](mailto:mlweiss@email.unc.edu).

The principal investigator for this study is Meredith Weiss, M.I.S., M.B.A., Ph.D. ABD, UNC School of Information and Library Science at UNC Chapel Hill. Faculty Advisor: Dean Jose-Marie Griffiths. The Information Technology Management in Higher Education study and this message have received approval from the UNC IRB on 2/11/2009, study #09-0201.

## APPENDIX G: How Your Institution Can Participate – Simple Instructions

### How Your Institution Can Participate – Simple Instructions

---

**Steps may be completed in any order or simultaneously.  
Please complete all steps by March 31, 2009.**

***Step One:***

The senior most technology executive should take the brief 8 minute Chief Information Officer (CIO) Survey online at  
[http://uncodum.qualtrics.com/SE?SID=SV\\_aVuZuife6Pzh8ji&SVID=Prod](http://uncodum.qualtrics.com/SE?SID=SV_aVuZuife6Pzh8ji&SVID=Prod).

***Step Two:***

Many institutions have a listserv that can be used to request research study participation from their campus community.

Please have someone from your staff send out the email below to the campus community [faculty, staff (including Information Technology employees) and students] asking them to take part in this research study by taking a Campus Technology Survey online.

**THAT'S IT!**

**We will send you the results and dataset as soon as the analysis is completed!**

---

**Email Text for Step Two Above:**

Subject Line for the Email: Please Take the Campus Technology Survey

Email Text:

Please take this anonymous survey to help determine which centralized information technology organization practices most impact user satisfaction on campus. You will also have the chance to Win your choice of a Nintendo Wii or \$200.

We need your help! This is a voluntary research study for the campus community. To learn more about this study please contact Meredith Weiss at (919) 619-5443 or [mlweiss@email.unc.edu](mailto:mlweiss@email.unc.edu).

The principal investigator for this study is Meredith Weiss, Ph.D. ABD, UNC School of Information and Library Science at UNC Chapel Hill. Faculty Advisor: Dean Jose-Marie Griffiths. The Information Technology Management in Higher Education study and this message have received approval from the UNC IRB on 2/11/2009, study #09-0201.

TAKE THE SURVEY NOW AT –

[http://uncodum.qualtrics.com/SE?SID=SV\\_2i6qYO5rgdLGdog&SVID=Prod](http://uncodum.qualtrics.com/SE?SID=SV_2i6qYO5rgdLGdog&SVID=Prod)

## APPENDIX H: Email to CIO Listserve

Email Subject: Request for assistance

Hello Everyone,

I am conducting a new research study on the success of senior technology executives in higher education and am looking for CIOs willing to participate.

Current articles about chief information officer (CIO) success are almost entirely based on expert opinion or the experiences of past technology leaders and although these insights and experiences are extremely valuable, quantitative research studies are needed to give CIOs concrete areas in which to focus efforts in order to succeed.

**I realize and respect that you are busy and promise that this will not take but a few minutes of your time. I know as technology leaders we are often asked for our participation in research studies and hope even if you usually decline, that you will participate in this study.**

This first study will focus on institutions with doctoral level programs through The Carnegie Foundation for the Advancement of Teaching. If your institution falls into this category, I'm asking for your help.

### **What you will receive for participating:**

1. An analysis of how campus users at your institution and across the country define user satisfaction.
2. An analysis of current user satisfaction at your institution.
3. A list of management practices IT leaders have implemented within their centralized IT organization that have been associated with higher user satisfaction.
4. An analysis revealing if the creation of high-performance technology teams improve IT department and CIO success.
5. An analysis of current management practices taking place within your technology organization.
6. An analysis of how CIOs are being evaluated across the country.
7. A complete dataset (without identifying information) of all responses at your institution.

Your institution's results **WILL** be made available to **YOU** (the institution's senior technology executive).

**Published results will NOT identify you or your organization.**

**Your organization's responses will be securely stored and will remain confidential at all times.**

**Participation is very easy. If you are interested, please contact me directly off this list for more information.**

Thank you and best wishes-

Meredith Weiss

Meredith Weiss  
Associate Dean for Administration, Finance, and Information Technology  
University of North Carolina at Chapel Hill  
mlweiss@email.unc.edu  
919-962-4706

--

You are being given the opportunity to volunteer to participate in a research study to help determine which technology organization practices most impact user satisfaction on campus. It is critical to higher education institutions that their technology organizations succeed since IT organizations facilitate the accomplishments of the institution and its members.

To learn more about this study please contact Meredith Weiss at (919) 962-4706 or mlweiss@email.unc.edu.

The principal investigator for this study is Meredith Weiss, M.I.S., M.B.A., Ph.D. ABD, UNC School of Information and Library Science at UNC Chapel Hill. Faculty Advisor: Dean Jose-Marie Griffiths. The Information Technology Management in Higher Education study and this message have received approval from the UNC IRB on 2/11/2009, study #09-0201.

## APPENDIX I: Email to Faculty

Email Subject: Request for help from a Ph.D. student

Dear (FACULTY MEMBER'S NAME),

My name is Meredith Weiss and I am a Ph.D. student studying the success of senior technology executives in higher education. As I am certain you know, the chief information officer (CIO) position is an extremely challenging one that is critical to the success of higher education institutions.

Current articles about CIO success are almost entirely based on expert opinion or the experiences of past technology leaders and although these insights and experiences are extremely valuable, quantitative research studies are needed to give CIOs concrete areas in which to focus efforts in order to succeed.

**I am asking for your help. I'd like to get your institution's participation in my study and was wondering if you might be willing to help me. I realize and respect that you are busy and promise that this will not take but a few minutes of your time.**

I am asking the senior technology executive at every institution identified with doctoral level programs through The Carnegie Foundation for the Advancement of Teaching to participate in this study.

### **What your campus will receive for participating:**

1. An analysis of how campus users at your institution and across the country define user satisfaction.
2. An analysis of current user satisfaction at your institution.
3. A list of management practices IT leaders have implemented within their centralized IT organization that have been associated with higher user satisfaction.
4. An analysis revealing if the creation of high-performance technology teams improve IT department and CIO success.
5. An analysis of current management practices taking place within your technology organization.
6. An analysis of how CIOs are being evaluated across the country.
7. A complete dataset (without identifying information) of all responses at your university.

### **What you will receive for your help:**

The undying gratitude of a Ph.D. student. Hopefully you remember the dissertation process and are willing to help out a future colleague ☺.

Your institution's results **WILL** be made available to the institution's senior technology executive.

**Published results will NOT identify you or your organization.  
Your organization's responses will be securely stored and will remain confidential at all times.**

If you would be willing to help me get your institution included in this study, please respond to this email.

Thank you in advance for any assistance you are willing to provide.

Best-  
Meredith

Meredith Weiss  
School of Information and Library Science  
University of North Carolina at Chapel Hill  
mlweiss@email.unc.edu  
919-962-4706

### APPENDIX J: Between Universities Variance

Obs	CovParm	Subject	Estimate	StdErr	ZValue	ProbZ
1	Intercept	Institution	4.2565	2.1623	1.97	0.0245
2	Residual		21.0561	0.5382	39.12	<.0001
3	ICC		0.1682	.	.	.

**APPENDIX K: Research Question One Results**

*Which factors most impact user satisfaction with the centralized technology organization?  
Which factors are most associated with satisfaction with the CIO?*

<b>Factors Correlated with Satisfaction with the Centralized IT Organization</b>				
	<b>Faculty</b>	<b>Students</b>	<b>Non-Centralized IT Staff</b>	<b>Non-IT Staff</b>
Very Highly Correlated	Academic Alignment 0.87207 <.0001 452 9.6% Not Sure	Fiscal Responsibility 0.79713 <.0001 950 27.2% Not Sure	Responsiveness 0.86908 <.0001 171 3.4% Not Sure	Academic Alignment 0.80278 <.0001 996 10.4% Not Sure
	Innovation 0.85849 <.0001 368 26.4% Not Sure	Support 0.78354 <.0001 1144 12.3% Not Sure	Communication 0.84035 <.0001 175 1.1% Not Sure	Support 0.79378 <.0001 1082 2.6% Not Sure
	Enablement 0.85003 <.0001 475 5.0% Not Sure	Academic Alignment 0.78089 <.0001 1107 15.2% Not Sure	Enablement 0.83906 <.0001 173 2.3% Not Sure	Fiscal Responsibility 0.78897 <.0001 826 25.7% Not Sure
	Support 0.84344 <.0001 474 5.2% Not Sure	Reliability 0.77027 <.0001 1137 12.9% Not Sure	Academic Alignment 0.82526 <.0001 169 4.5% Not Sure	Reliability 0.77734 <.0001 1070 3.7% Not Sure
	Responsiveness 0.83041 <.0001 454 9.2% Not Sure	Enablement 0.75947 <.0001 1131 13.3% Not Sure	Fiscal Responsibility 0.81767 <.0001 162 8.5% Not Sure	Enablement 0.77132 <.0001 1057 4.9% Not Sure
	Fiscal Responsibility 0.82265 <.0001 354 29.2% Not Sure	Innovation 0.75350 <.0001 921 29.4% Not Sure	Support 0.81444 <.0001 174 1.7% Not Sure	Responsiveness 0.76581 <.0001 1054 5.1% Not Sure



Highly Correlated	Reliability 0.80658 <.0001 463 7.4% Not Sure	Responsiveness 0.72083 <.0001 1064 18.5% Not Sure	Shared Governance 0.78779 <.0001 172 2.8% Not Sure	Innovation 0.76213 <.0001 832 25.1% Not Sure
	Communication 0.75694 <.0001 481 3.8% Not Sure	Communication 0.65985 <.0001 1170 10.3% Not Sure	Reliability 0.75743 <.0001 173 2.3% Not Sure	Communication 0.70873 <.0001 1086 2.3% Not Sure
	Shared Governance 0.75452 <.0001 442 11.6% Not Sure	Shared Governance 0.56786 <.0001 1034 20.8% Not Sure	Innovation 0.74491 <.0001 164 7.3% Not Sure	Shared Governance 0.61398 <.0001 1012 8.9% Not Sure
	Importance of IT 0.25303 <.0001 500 0.0% Not Sure	Importance of IT 0.40907 <.0001 1305 0.0% Not Sure	Importance of IT 0.28367 0.0001 177 0.0% Not Sure	Importance of IT 0.23227 <.0001 1111 0.0% Not Sure

<b>Factors Correlated with Satisfaction with the Centralized IT Organization (Research Universities Only)</b>				
	<b>Faculty</b>	<b>Students</b>	<b>Non-Centralized IT Staff</b>	<b>Non-IT Staff</b>
Very Highly Correlated	Academic Alignment 0.87155 <.0001	Fiscal Responsibility 0.79721 <.0001	Responsiveness 0.86833 <.0001	Academic Alignment 0.80283 <.0001
	Innovation 0.85489 <.0001	Support 0.78356 <.0001	Communication 0.83908 <.0001	Support 0.78898 <.0001
	Enablement 0.84661 <.0001	Academic Alignment 0.78090 <.0001	Enablement 0.83837 <.0001	Fiscal Responsibility 0.78664 <.0001
	Support 0.84085 <.0001	Reliability 0.77057 <.0001	Academic Alignment 0.82381 <.0001	Enablement 0.77101 <.0001
	Responsiveness 0.82598 <.0001	Enablement 0.75946 <.0001	Fiscal Responsibility 0.81641 <.0001	Reliability 0.77010 <.0001
	Fiscal Responsibility 0.82027 <.0001	Innovation 0.75352 <.0001	Support 0.81309 <.0001	Innovation 0.76604 <.0001
	Reliability 0.80266 <.0001	Responsiveness 0.72082 <.0001	Shared Governance 0.78645 <.0001	Responsiveness 0.76280 <.0001
	Shared Governance 0.75667 <.0001	Communication 0.65983 <.0001	Reliability 0.75740 <.0001	Communication 0.70123 <.0001
	Communication 0.74959 <.0001	Shared Governance 0.56785 <.0001	Innovation 0.74305 <.0001	Shared Governance 0.60169
Highly Correlated	Importance of IT 0.24679 <.0001	Importance of IT 0.40528 <.0001	Importance of IT 0.23690 0.0015	Importance of IT 0.21598 <.0001

<b>Factors Correlated with Satisfaction with the CIO</b>				
	<b>Faculty</b>	<b>Students</b>	<b>Non-Centralized IT Staff</b>	<b>Non-IT Staff</b>
Highly Correlated	Academic Alignment 0.72256 <.0001 285 43.0% Not Sure	Fiscal Responsibility 0.65191 <.0001 624 52.2% Not Sure	Responsiveness 0.68457 <.0001 134 24.3% Not Sure	Fiscal Responsibility 0.62750 <.0001 569 48.8% Not Sure
	Fiscal Responsibility 0.69795 <.0001 247 50.6% Not Sure	Communication 0.63113 <.0001 702 46.2% Not Sure	Communication 0.68057 <.0001 137 22.6% Not Sure	Communication 0.59617 <.0001 659 40.7% Not Sure
	Innovation 0.69329 <.0001 255 49.0% Not Sure	Innovation 0.62096 <.0001 614 53.0% Not Sure	Shared Governance 0.66334 <.0001 136 23.2% Not Sure	Academic Alignment 0.59312 <.0001 626 43.7% Not Sure
	Communication 0.68905 <.0001 295 41.0% Not Sure	Support 0.60866 <.0001 687 47.4% Not Sure	Fiscal Responsibility 0.66064 <.0001 131 26.0% Not Sure	Innovation 0.55192 <.0001 572 48.5% Not Sure
	Shared Governance 0.63235 <.0001 280 44.0% Not Sure	Academic Alignment 0.58579 <.0001 679 48.0% Not Sure	Innovation 0.64126 <.0001 129 27.1% Not Sure	Support 0.52776 <.0001 655 41.0% Not Sure
	Enablement 0.63112 <.0001 291 41.8% Not Sure	Reliability 0.57680 <.0001 685 47.5% Not Sure	Enablement 0.61004 <.0001 136 23.2% Not Sure	Shared Governance 0.52464 <.0001 634 42.9% Not Sure
	Responsiveness 0.62193 <.0001 286 42.8% Not Sure	Shared Governance 0.57059 <.0001 665	Academic Alignment 0.60167 <.0001 134 24.3% Not Sure	Enablement 0.50798 <.0001 647 41.8% Not Sure

		49.0% Not Sure		
	Support	Responsiveness	Support	Reliability
	0.61725	0.56112	0.57667	0.49755
	<.0001	<.0001	<.0001	<.0001
	292	663	136	651
	41.6% Not Sure	49.2% Not Sure	23.2% Not Sure	41.4% Not Sure
	Reliability	Enablement	Reliability	Responsiveness
	0.54548	0.55900	0.50934	0.48775
	<.0001	<.0001	<.0001	<.0001
	289	681	136	648
	42.2% Not Sure	47.8% Not Sure	23.2% Not Sure	41.7% Not Sure
Correlated	Importance of IT	Importance of IT	Importance of IT	Importance of IT
	0.27383	0.36398	0.29108	0.22526
	<.0001	<.0001	0.0005	<.0001
	301	773	138	668
	39.8% Not Sure	40.8% Not Sure	22.0% Not Sure	39.9% Not Sure

<b>Factors Correlated with Satisfaction with the CIO (Research Universities Only)</b>				
	<b>Faculty</b>	<b>Students</b>	<b>Non-Centralized IT Staff</b>	<b>Non-IT Staff</b>
Highly Correlated	Academic Alignment 0.71666 <.0001	Fiscal Responsibility 0.65278 <.0001	Responsiveness 0.68336 <.0001	Fiscal Responsibility 0.60665 <.0001
	Fiscal Responsibility 0.69262 <.0001	Communication 0.63134 <.0001	Communication 0.67869 <.0001	Communication 0.57858 <.0001
	Innovation 0.68775 <.0001	Innovation 0.62086 <.0001	Shared Governance 0.66128 <.0001	Academic Alignment 0.57537 <.0001
	Communication 0.68027 <.0001	Support 0.60911 <.0001	Fiscal Responsibility 0.65857 <.0001	Innovation 0.52309 <.0001
	Shared Governance 0.62895 <.0001	Academic Alignment 0.58617 <.0001	Innovation 0.63912 <.0001	Support 0.51545 <.0001
	Enablement 0.62331 <.0001	Reliability 0.57834 <.0001	Enablement 0.60784 <.0001	Shared Governance 0.50564 <.0001
	Responsiveness 0.61158 <.0001	Shared Governance 0.57108 <.0001	Academic Alignment 0.59890 <.0001	Enablement 0.50558 <.0001
	Support 0.60722 <.0001	Responsiveness 0.56110 <.0001	Support 0.57390 <.0001	Responsiveness 0.52122 <.0001
	Reliability 0.53565 <.0001	Enablement 0.55897 <.0001	Reliability 0.50762 <.0001	Reliability 0.52115 <.0001
Correlated	Importance of IT 0.26951 <.0001	Importance of IT 0.36334 <.0001	Importance of IT 0.28802 0.0006	Importance of IT 0.21519 <.0001

<b>Means and Number of Unsure Responses</b>					
<b>Variable</b>	<b>Label</b>	<b>Mean</b>	<b>N</b>	<b>Unsure</b>	
Q210_1	Q210_1	4.7332287	2549	547	
Q210_2	Q210_2	4.7547247	2434	662	
Q210_3	Q210_3	4.7871046	2466	630	
Q210_4	Q210_4	4.3419913	2541	555	
Q25_1	Q25_1	4.3843429	2823	273	
Q25_2	Q25_2	3.4326885	2533	563	
Q25_3	Q25_3	3.4239686	2545	551	
Q25_4	Q25_4	4.1547184	2734	362	
Q25_5	Q25_5	4.0799242	2640	456	
Q25_6	Q25_6	3.4137931	2610	486	
Q25_7	Q25_7	3.4667192	2539	557	
Q25_8	Q25_8	4.1401914	2090	1006	
Q11_1	Q11_1	4.8263063	2775	321	
Q11_2	Q11_2	4.4943036	2721	375	
Q11_3	Q11_3	4.4001591	2514	582	
Q23_1	Q23_1	4.5649485	1940	1156	
Q23_2	Q23_2	4.3502192	2053	1043	
Q23_3	Q23_3	4.6163410	1689	1407	
Q29_1	Q29_1	5.5290413	2858	238	
Q29_2	Q29_2	5.1450869	2819	277	
Q15_1	Q15_1	4.8146789	2725	371	
Q15_2	Q15_2	4.8104129	2785	311	
Q15_3	Q15_3	4.8260406	2811	285	
Q17_1	Q17_1	4.2858932	2396	700	
Q17_2	Q17_2	4.7191052	2727	369	
Q19_1	Q19_1	4.4933775	2114	982	
Q19_2	Q19_2	4.2869023	1924	1172	
Q19_3	Q19_3	4.2751641	1828	1268	
Q19_4	Q19_4	4.2131410	1872	1224	
Q19_5	Q19_5	3.2291667	2352	744	
Q19_6	Q19_6	3.1128291	2393	703	
Q13_1	Q13_1	4.8400845	2839	257	
Q13_2	Q13_2	4.1840422	2657	439	
Q13_3	Q13_3	4.8127936	2767	329	
Q13_4	Q13_4	4.6821928	2791	305	
Q1	Q1	13.7274330	2836	260	
Q14	Q14	18.5170494	2874	222	

Q16	Q16	14.4224411	2843	253
Q18	Q18	9.0933285	2743	353
Q20	Q20	22.8044361	2660	436
Q24	Q24	13.4171030	2292	804
Q26	Q26	30.6525085	2912	184
Q30	Q30	9.7919225	3095	1
Q212	Q212	18.4263338	2724	372
Q27_1	Q27_1	4.2901532	2285	811
Q35	Q35	17.6552504	3095	1
Q39	Q39	13.0792553	1880	1216
<b>Faculty</b>				
Q35	Q35	17.1200000	500	0
Q39	Q39	12.7176080	301	199
Q31	Q31	4.4520000	500	0
Q232	Q232	4.3440000	500	0
Q33	Q33	4.0820000	500	0
Q34	Q34	4.2420000	500	0
Q36	Q36	4.4673540	291	209
Q37	Q37	4.4081633	294	206
Q38	Q38	4.3076923	286	214
<b>Students</b>				
Q35	Q35	17.7626340	1305	0
Q39	Q39	12.9417853	773	533
Q31	Q31	4.5570881	1305	1
Q232	Q232	4.4773946	1305	1
Q33	Q33	4.3080460	1305	1
Q34	Q34	4.4337165	1305	1
Q36	Q36	4.5345304	724	582
Q37	Q37	4.4993307	747	559
Q38	Q38	4.4503311	755	551
<b>Non-Centralized IT Staff</b>				
Q35	Q35	14.6685393	177	0
Q39	Q39	10.9855072	138	40
Q31	Q31	3.9717514	177	1
Q232	Q232	3.7118644	177	1

Q33	Q33	3.4350282	177	1
Q34	Q34	3.6327684	177	1
Q36	Q36	3.7925926	135	43
Q37	Q37	3.8014706	136	42
Q38	Q38	3.6074074	135	43
<b>Non-IT Staff</b>				
Q35	Q35	18.2484248	1111	1
Q39	Q39	13.8338323	668	444
Q31	Q31	4.6786679	1111	1
Q232	Q232	4.6012601	1111	1
Q33	Q33	4.4266427	1111	1
Q34	Q34	4.5418542	1111	1
Q36	Q36	4.8982512	629	483
Q37	Q37	4.8463950	638	474
Q38	Q38	4.7639752	644	468



## APPENDIX L: Research Question Two Results

*Are technology organizations with a higher straight average of performance in the nine areas used to define organizational quality (Table 2) viewed as performing better than those which do not?*

### Pearson Correlation Coefficients

Number of Observations = 11

Prob > |r| under H0: Rho=0

#### Org Quality Score

IT Satisfaction	0.21201 0.5314
CIO Satisfaction	0.24977 0.4589

<b>Organizational Quality Questions</b>		
<b>Nine Organizational Quality Areas</b>	<b>Campus Technology Survey</b>	<b>Mean</b>
Accountability	Questions 49-50	5.1275258
Capability	Questions 51- 52	4.7569386
Coordination and Control	Questions 53-56	3.7112712
Direction	Questions 57-59	4.6757128
Environment and Values	Questions 60-61	4.2458973
External Orientation	Questions 62-63	4.3781263
Innovation	Questions 64-66	4.3710500
Leadership	Questions 67-71	4.3764171
Motivation	Questions 72-73	4.2939944
Organizational Quality Score	Average of nine areas above	4.4374370

### APPENDIX M: Research Question Three Results

*Are technology organizations with a higher performance in certain combinations of the nine areas used to define organizational quality (Table 2) viewed as performing better than those which do not?*

<b>With Overall Centralized IT Organization Satisfaction</b>	<b>RSquare</b>	<b>Correlation</b>
Coordination and Control Direction Motivation	0.6039	0.7771
Coordination and Control Direction External Orientation	0.5892	0.7676
Coordination and Control Direction Environment and Values	0.5647	0.7515
Accountability Coordination and Control Direction	0.5599	0.7483
Coordination and Control Direction Innovation	0.5597	0.7481
Direction Leadership Motivation	0.5591	0.7477
Coordination and Control Direction Leadership	0.5552	0.7451
Capability Coordination and Control Direction	0.5501	0.7417
Direction Environment and Values Motivation	0.5381	0.7336
Accountability Direction Motivation	0.5373	0.7330
<b>With Overall CIO Satisfaction</b>		
Coordination and Control Direction External Orientation	0.6248	0.7904
Coordination and Control Direction Environment and Values	0.5961	0.7721
Coordination and Control Direction Motivation	0.5543	0.7445
Coordination and Control Direction Leadership	0.5519	0.7429
Coordination and Control Direction Innovation	0.5403	0.7350
Accountability Coordination and Control Direction	0.5325	0.7297
Capability Coordination and Control Direction	0.5300	0.7280
Direction Innovation Motivation	0.4548	0.6744
Direction External Orientation Motivation	0.4461	0.6679
Accountability Direction Motivation	0.4446	0.6668

## APPENDIX N: Research Question Four Results

*Are current higher education technology leaders building high-performance organizations that value, respect, and develop their employees (Table 3)? Is there a correlation between the degree to which this is done and perceptions of CIO and technology organization performance?*

Are current higher education technology leaders building high-performance organizations that value, respect, and develop their employees (Table 3)?

<b>High-Performance Culture Results By Category</b>	<b>Mean</b>
Meaningful Jobs (Mean Q86-91)	4.87
Valued, Well-Treated Employees (Mean Q84+85)	4.83
Psychological Safety and Job Security (Mean Q82+83)	4.51
Work Climate/Recognition (Mean Q94-102)	4.23
Good Pay (Mean Q92)	4.20
Staff Development (Mean Q79-81)	4.15
Teamwork and Team Rewards (Mean Q74+75)	3.68
Systems, Procedures, and Information Availability (Mean Q76-78)	3.52
<b>Overall mean by category</b>	<b>4.25</b>

<b>High-Performance Culture Results By Question</b>	<b>Mean</b>
My job is meaningful.	5.09866
My contributions are important.	5.06032
I have meaningful responsibilities.	5.03479
My supervisor creates a community (friendly, supportive, open) environment.	4.99013
I am treated well.	4.90406
I am motivated by my current level of job autonomy (freedom and discretion allowed in my job role).	4.86909
I am respected within the IT organization.	4.82755
I am valued.	4.75896
I feel secure in my position (have employment security).	4.68215
I am encouraged to develop my skills.	4.66191
The senior most executive centralized IT leader (i.e. chief information officer, vice president for IT) creates a community (friendly, supportive, open) environment.	4.51652
The centralized IT organization is very selective about its new hires.	4.46972
I feel safe voicing my opinion.	4.34755
Recognition for centralized IT organization success is shared with employees.	4.32334
I have decision authority.	4.30233
Employees at all levels of the centralized IT organization want to help others succeed.	4.27181
Centralized IT organization employees work in self-managed teams rather than traditionally supervised groups.	4.23129
I am well paid.	4.20245
The centralized IT organization culture is collaborative.	4.06843
I have sufficient job training to grow my abilities.	4.04204
The climate within the centralized IT organization is open and trusting.	3.93699
The information I need to succeed in my job is readily shared with me.	3.86273
Salary differences across levels within the centralized IT organization are fair (i.e. management salaries are higher than employee salaries but not tremendously higher).	3.85255
The IT organization invests in my staff development.	3.74941
Status differences throughout the centralized IT organization are minimal.	3.66465
The centralized IT organization has quality systems in place that help me succeed.	3.53531
The centralized IT organization has well-documented procedures in place that help me succeed.	3.15988
Teams are rewarded for group performance.	3.12968
<b>Overall mean by question</b>	<b>4.30551</b>

Is there a correlation between the degree to which this is done and perceptions of CIO and technology organization performance?

**Pearson Correlation Coefficients**

Number of Observations = 11

Prob > |r| under H0: Rho=0

	IT Org	CIO
High Performance Score (mean of questions)	0.1626	0.2169
	0.6329	0.5218
High Performance Score (mean of categories)	0.14372	0.18648
	0.6733	0.5830

Are technology organizations with a higher performance in certain combinations of high-performance questions viewed as performing better than those which do not?

<b>Results for Satisfaction with the centralized IT organization</b>				
<b>Questions</b>			<b>RSquare</b>	<b>Correlation</b>
Q83	Q91	Q95	0.9349	0.9669
Q83	Q88	Q91	0.9247	0.9616
Q83	Q89	Q91	0.9152	0.9567
Q75	Q77	Q83	0.9045	0.951
Q81	Q83	Q91	0.9001	0.9487
Q84	Q89	Q102	0.8917	0.9443
Q83	Q90	Q91	0.8887	0.9427
Q76	Q83	Q90	0.8882	0.9425
Q74	Q89	Q97	0.8832	0.9398
Q83	Q88	Q90	0.8829	0.9396

<b>Results for the belief that the chief information officer is doing an outstanding job</b>				
<b>Questions</b>			<b>RSquare</b>	<b>Correlation</b>
Q83	Q89	Q91	0.9354	0.9672
Q83	Q91	Q95	0.9352	0.9671
Q83	Q91	Q99	0.9286	0.9636
Q83	Q91	Q92	0.9285	0.9636
Q83	Q88	Q91	0.9281	0.9634
Q81	Q83	Q91	0.9255	0.9620
Q83	Q91	Q97	0.9253	0.9619
Q79	Q83	Q91	0.9241	0.9613
Q83	Q90	Q91	0.9225	0.9605
Q83	Q91	Q102	0.9224	0.9604

Are technology organizations with a higher performance in certain combinations of high-performance categories viewed as performing better than those which do not?

<b>Results for satisfaction with the centralized IT organization</b>		
<b>Categories</b>	<b>RSquare</b>	<b>Correlation</b>
Staff Development Psychological Safety & Job Security Meaningful Jobs	0.7900	0.8888
Systems, Procedures, & Information Availability Psychological Safety & Job Security Meaningful Jobs	0.7881	0.8877
Psychological Safety & Job Security Meaningful Jobs Work Climate/Recognition	0.7703	0.8776
Psychological Safety & Job Security Meaningful Jobs Good Pay	0.7670	0.8758
Teamwork & Rewards Systems, Procedures, & Information Availability Safety & Security	0.7663	0.8754
Psychological Safety & Job Security Valued, Well-Treated Employees Meaningful Jobs	0.7588	0.8711
Teamwork & Team Rewards Psychological Safety & Job Security Meaningful Jobs	0.7570	0.8701
Systems, Procedures, & Information Availability Psychological Safety & Job Security Work Climate/Recognition	0.7210	0.8491
Systems, Procedures, & Information Availability Psychological Safety & Job Security Valued, Well-Treated Employees	0.6666	0.8164
Systems, Procedures, & Information Availability Psychological Safety & Job Security Good Pay	0.6600	0.8124

<b>Results for the belief that the chief information officer is doing an outstanding job</b>		
<b>Categories</b>	<b>RSquare</b>	<b>Correlation</b>
Systems, Procedures, & Information Availability Psychological Safety & Job Security Meaningful Jobs	0.7861	0.8866
Psychological Safety & Job Security Valued, Well-Treated Employees Meaningful Jobs	0.7818	0.8842
Psychological Safety & Job Security Meaningful Jobs Good Pay	0.7801	0.8832
staff Psychological Safety & Job Security Meaningful Jobs	0.7751	0.8804
Teamwork & Team Rewards Psychological Safety & Job Security Meaningful Jobs	0.7686	0.8767
Psychological Safety & Job Security Meaningful Jobs Work Climate/Recognition	0.7675	0.8761
Systems, Procedures, & Information Availability Psychological Safety & Job Security Work Climate/Recognition	0.7625	0.8732
Teamwork & Team Rewards Systems, Procedures, & Information Availability Psychological Safety & Job Security	0.7167	0.8466
Systems, Procedures, & Information Availability Psychological Safety & Job Security Valued, Well-Treated Employees	0.6813	0.8254
Teamwork & Team Rewards Systems, Procedures, & Information Availability Work Climate/Recognition	0.6691	0.818

## APPENDIX O: Research Question Five Results

*What do CIOs believe is important for the success of the centralized information technology organization?*

<b>CIO Perceptions of IT Organization Success Factors</b>		
<b>How important are the following to the success of the IT organization?</b>	<b>Mean All Institutions</b>	<b>Mean Research Institutions Only</b>
Reliability of technology services	4.6071	4.5217
End user satisfaction	4.5714	4.6087
Proactive communication	4.5357	4.5217
End user support	4.4643	4.4783
Responsiveness of the technology organization	4.4643	4.4783
Effective communication	4.4643	4.4348
High-performance IT employee teams (employees are respected, well trained, and valued)	4.4286	4.3913
Technology alignment with campus goals	4.3571	4.3478
Technology alignment with campus priorities	4.2857	4.3478
End user enablement (IT allows users to accomplish their goals)	4.1786	4.2609
IT fiscal responsibility	4.1071	4.1304
Campus involvement in technology decisions	3.9643	4.0000
IT budget management	3.9286	3.9130
Innovation	3.6429	3.5652



## APPENDIX P: Research Question Six Results

*What do CIOs believe is important for the success of the centralized information technology organization?*

### Institution 9

	<b>CIO Response</b>	<b>Centralized IT Organization</b>	<b>Campus Users</b>
<b>Enablement</b>	3.00	4.17	3.31
<b>Support</b>	2.00	3.92	3.05
<b>Reliability</b>	3.00	3.83	3.72
<b>Responsiveness</b>	3.00	3.58	3.16
<b>Shared Governance</b>	3.00	3.92	2.80
<b>Academic Alignment</b>	4.00	4.29	3.40
<b>Fiscal Responsibility</b>	3.00	4.00	2.89
<b>Communication</b>	No Data Available	3.54	2.78
<b>Innovation</b>	No Data Available	4.17	3.25
<b>Overall satisfaction IT organization is high</b>	No Data Available	3.83	2.94
<b>Believe the centralized IT organization is effective</b>	No Data Available	4.83	3.26
<b>Believe the centralized IT organization is doing an outstanding job</b>	No Data Available	4.17	2.74
<b>Believe centralized IT organization does a better job than does other centralized campus units (i.e. finance and human resources)</b>	No Data Available	4.58	3.16

**Institution 232**

	<b>CIO Response</b>	<b>Centralized IT Organization</b>	<b>Campus Users</b>
<b>Enablement</b>	4.00	4.41	4.48
<b>Support</b>	5.00	4.45	4.50
<b>Reliability</b>	5.00	4.34	4.63
<b>Responsiveness</b>	4.00	4.28	4.44
<b>Shared Governance</b>	4.00	3.90	3.75
<b>Academic Alignment</b>	5.00	4.22	4.54
<b>Fiscal Responsibility</b>	5.00	4.17	4.41
<b>Communication</b>	4.00	4.09	3.65
<b>Innovation</b>	4.00	3.90	4.33
<b>Overall satisfaction IT organization is high</b>	5.00	4.45	4.21
<b>Believe the centralized IT organization is effective</b>	6.00	4.90	4.36
<b>Believe the centralized IT organization is doing an outstanding job</b>	5.00	4.72	4.14
<b>Believe centralized IT organization does a better job than does other centralized campus units (i.e. finance and human resources)</b>	5.00	4.69	4.07

**Institution 229**

	<b>CIO Response</b>	<b>Centralized IT Organization</b>	<b>Campus Users</b>
<b>Enablement</b>	3.00	4.31	4.58
<b>Support</b>	4.00	4.62	4.65
<b>Reliability</b>	3.00	4.41	4.88
<b>Responsiveness</b>	3.00	4.55	4.57
<b>Shared Governance</b>	2.00	4.03	3.83
<b>Academic Alignment</b>	3.00	4.22	4.52
<b>Fiscal Responsibility</b>	3.00	4.45	4.49
<b>Communication</b>	3.50	4.26	3.77
<b>Innovation</b>	3.00	4.10	4.00
<b>Overall satisfaction IT organization is high</b>	2.00	4.38	4.43
<b>Believe the centralized IT organization is effective</b>	5.00	4.90	4.59
<b>Believe the centralized IT organization is doing an outstanding job</b>	4.00	4.66	4.28
<b>Believe centralized IT organization does a better job than does other centralized campus units (i.e. finance and human resources)</b>	5.00	4.62	4.26

**Institution 141**

	<b>CIO Response</b>	<b>Centralized IT Organization</b>	<b>Campus Users</b>
<b>Enablement</b>	4.00	3.93	4.35
<b>Support</b>	5.00	3.93	4.18
<b>Reliability</b>	4.00	4.31	4.77
<b>Responsiveness</b>	4.00	3.69	4.08
<b>Shared Governance</b>	4.00	3.31	3.64
<b>Academic Alignment</b>	5.00	3.76	4.32
<b>Fiscal Responsibility</b>	5.00	4.05	4.12
<b>Communication</b>	5.00	3.31	3.69
<b>Innovation</b>	4.00	3.59	3.73
<b>Overall satisfaction IT organization is high</b>	4.00	3.69	4.04
<b>Believe the centralized IT organization is effective</b>	5.00	4.41	4.31
<b>Believe the centralized IT organization is doing an outstanding job</b>	4.00	3.97	3.93
<b>Believe centralized IT organization does a better job than does other centralized campus units (i.e. finance and human resources)</b>	4.00	4.34	4.07

**Institution 228**

	<b>CIO Response</b>	<b>Centralized IT Organization</b>	<b>Campus Users</b>
<b>Enablement</b>	4.00	3.95	4.51
<b>Support</b>	5.00	4.25	4.52
<b>Reliability</b>	5.00	4.30	4.84
<b>Responsiveness</b>	3.00	3.85	4.52
<b>Shared Governance</b>	2.00	3.90	3.68
<b>Academic Alignment</b>	3.00	3.88	4.61
<b>Fiscal Responsibility</b>	5.00	3.50	4.35
<b>Communication</b>	3.00	3.58	3.64
<b>Innovation</b>	3.00	3.55	4.16
<b>Overall satisfaction IT organization is high</b>	3.00	3.65	4.38
<b>Believe the centralized IT organization is effective</b>	5.00	4.10	4.54
<b>Believe the centralized IT organization is doing an outstanding job</b>	3.00	3.45	4.15
<b>Believe centralized IT organization does a better job than does other centralized campus units (i.e. finance and human resources)</b>	3.00	3.90	4.22

**Institution 220**

	<b>CIO Response</b>	<b>Centralized IT Organization</b>	<b>Campus Users</b>
<b>Enablement</b>	5.00	4.10	4.84
<b>Support</b>	4.00	4.40	4.93
<b>Reliability</b>	4.00	3.90	4.97
<b>Responsiveness</b>	5.00	4.00	4.83
<b>Shared Governance</b>	4.00	4.00	3.94
<b>Academic Alignment</b>	4.00	4.10	4.83
<b>Fiscal Responsibility</b>	4.00	4.15	4.75
<b>Communication</b>	4.00	3.60	4.18
<b>Innovation</b>	5.00	4.20	4.58
<b>Overall satisfaction IT organization is high</b>	5.00	4.40	4.64
<b>Believe the centralized IT organization is effective</b>	5.00	4.40	4.75
<b>Believe the centralized IT organization is doing an outstanding job</b>	5.00	4.30	4.56
<b>Believe centralized IT organization does a better job than does other centralized campus units (i.e. finance and human resources)</b>	4.00	4.60	4.32

**Institution 207**

	<b>CIO Response</b>	<b>Centralized IT Organization</b>	<b>Campus Users</b>
<b>Enablement</b>	5.00	4.14	4.28
<b>Support</b>	4.00	4.00	4.39
<b>Reliability</b>	5.00	4.29	4.46
<b>Responsiveness</b>	4.00	3.86	4.19
<b>Shared Governance</b>	5.00	4.14	3.52
<b>Academic Alignment</b>	4.00	4.07	4.37
<b>Fiscal Responsibility</b>	4.00	4.14	4.31
<b>Communication</b>	4.00	3.50	3.65
<b>Innovation</b>	5.00	4.57	4.11
<b>Overall satisfaction IT organization is high</b>	5.00	3.71	4.15
<b>Believe the centralized IT organization is effective</b>	6.00	4.43	4.36
<b>Believe the centralized IT organization is doing an outstanding job</b>	5.00	4.29	3.97
<b>Believe centralized IT organization does a better job than does other centralized campus units (i.e. finance and human resources)</b>	6.00	4.43	4.38

**Institution 140**

	<b>CIO Response</b>	<b>Centralized IT Organization</b>	<b>Campus Users</b>
<b>Enablement</b>	4.00	4.33	4.22
<b>Support</b>	4.00	4.48	4.46
<b>Reliability</b>	4.00	4.71	4.57
<b>Responsiveness</b>	4.00	4.48	4.04
<b>Shared Governance</b>	5.00	4.05	3.69
<b>Academic Alignment</b>	5.00	4.23	4.00
<b>Fiscal Responsibility</b>	5.00	3.93	3.94
<b>Communication</b>	4.50	3.66	3.70
<b>Innovation</b>	5.00	4.10	4.07
<b>Overall satisfaction IT organization is high</b>	4.00	4.29	4.12
<b>Believe the centralized IT organization is effective</b>	5.00	4.76	4.27
<b>Believe the centralized IT organization is doing an outstanding job</b>	4.00	4.33	4.03
<b>Believe centralized IT organization does a better job than does other centralized campus units (i.e. finance and human resources)</b>	4.00	4.29	3.86



**Institution 99**

	<b>CIO Response</b>	<b>Centralized IT Organization</b>	<b>Campus Users</b>
<b>Enablement</b>	5.00	4.07	4.74
<b>Support</b>	4.00	4.13	4.49
<b>Reliability</b>	5.00	3.93	4.95
<b>Responsiveness</b>	6.00	3.93	4.37
<b>Shared Governance</b>	4.00	4.00	4.26
<b>Academic Alignment</b>	4.00	3.87	4.94
<b>Fiscal Responsibility</b>	4.00	3.77	4.50
<b>Communication</b>	5.00	3.87	4.14
<b>Innovation</b>	4.00	3.73	4.33
<b>Overall satisfaction IT organization is high</b>	5.00	3.93	4.68
<b>Believe the centralized IT organization is effective</b>	5.00	4.07	4.95
<b>Believe the centralized IT organization is doing an outstanding job</b>	5.00	3.67	4.63
<b>Believe centralized IT organization does a better job than does other centralized campus units (i.e. finance and human resources)</b>	5.00	4.87	4.63

**Institution 39**

	<b>CIO Response</b>	<b>Centralized IT Organization</b>	<b>Campus Users</b>
<b>Enablement</b>	5.00	4.79	4.96
<b>Support</b>	5.00	4.79	5.10
<b>Reliability</b>	5.00	4.21	5.13
<b>Responsiveness</b>	6.00	4.64	4.99
<b>Shared Governance</b>	4.00	4.07	4.41
<b>Academic Alignment</b>	5.00	4.64	4.95
<b>Fiscal Responsibility</b>	5.50	4.54	4.89
<b>Communication</b>	4.50	4.54	4.57
<b>Innovation</b>	4.00	4.36	4.95
<b>Overall satisfaction IT organization is high</b>	5.00	5.07	4.95
<b>Believe the centralized IT organization is effective</b>	6.00	5.21	5.02
<b>Believe the centralized IT organization is doing an outstanding job</b>	5.00	5.14	4.90
<b>Believe centralized IT organization does a better job than does other centralized campus units (i.e. finance and human resources)</b>	5.00	4.36	4.30

**Institution 325**

	<b>CIO Response</b>	<b>Centralized IT Organization</b>	<b>Campus Users</b>
<b>Enablement</b>	5.00	4.50	5.06
<b>Support</b>	5.00	5.00	5.24
<b>Reliability</b>	6.00	5.50	5.49
<b>Responsiveness</b>	4.00	5.00	5.03
<b>Shared Governance</b>	5.00	4.50	4.54
<b>Academic Alignment</b>	5.00	4.50	5.20
<b>Fiscal Responsibility</b>	5.00	4.50	5.06
<b>Communication</b>	4.50	5.00	4.33
<b>Innovation</b>	5.00	4.50	4.89
<b>Overall satisfaction IT organization is high</b>	5.00	5.00	5.13
<b>Believe the centralized IT organization is effective</b>	6.00	5.00	5.16
<b>Believe the centralized IT organization is doing an outstanding job</b>	5.00	5.00	4.94
<b>Believe centralized IT organization does a better job than does other centralized campus units (i.e. finance and human resources)</b>	5.00	5.00	4.16

<b>CIO and IT Perception of Campus User Satisfaction</b>			
	<b>CIO Perception (CIO Survey)</b>	<b>Centralized IT Perception (Campus Survey)</b>	<b>Actual Campus User Satisfaction (Campus Survey)</b>
Enablement <i>Q16_3</i>   <i>Q108_3</i>   <i>Q11</i>	4.27	4.25	4.48
Support <i>Q16_2</i>   <i>Q108_2</i>   <i>Q13</i>	4.27	4.36	4.50
Reliability <i>Q16_4</i>   <i>Q108_4</i>   <i>Q15</i>	4.45	4.34	4.76
Responsiveness <i>Q16_5</i>   <i>Q108_5</i>   <i>Q17</i>	4.18	4.17	4.38
Shared Governance <i>Q16_6</i>   <i>Q108_6</i>   <i>Q19</i>	3.82	3.98	3.82
Academic Alignment <i>Q16_7&amp;8</i>   <i>Q108_7&amp;8</i>   <i>Q210</i>	4.27	4.16	4.52
Fiscal Responsibility <i>Q16_9&amp;10</i>   <i>Q108_9&amp;10</i>   <i>Q23</i>	4.41	4.11	4.34
Communication <i>Q16_11&amp;12</i>   <i>Q108_11&amp;12</i>   <i>Q25</i>	4.20	3.90	3.83
Innovation <i>Q16_13</i>   <i>Q108_13</i>   <i>Q27</i>	4.20	4.07	4.22
Overall satisfaction IT organization is high <i>Q29</i>   <i>Q114</i>   <i>Q34</i>	4.30	4.22	4.33

	<b>CIO Belief</b>	<b>IT Employee Belief</b>	<b>User Belief</b>			
Believe the centralized IT organization is effective <table border="1"> <tr> <td><i>Q27</i></td> <td><i>Q110</i></td> <td><i>Q31</i></td> </tr> </table>	<i>Q27</i>	<i>Q110</i>	<i>Q31</i>	5.40	4.64	4.51
<i>Q27</i>	<i>Q110</i>	<i>Q31</i>				
Believe the centralized IT organization is doing an outstanding job <table border="1"> <tr> <td><i>Q28</i></td> <td><i>Q111</i></td> <td><i>Q33</i></td> </tr> </table>	<i>Q28</i>	<i>Q111</i>	<i>Q33</i>	4.50	4.34	4.21
<i>Q28</i>	<i>Q111</i>	<i>Q33</i>				
Believe centralized IT organization does a better job than does other centralized campus units (i.e. finance and human resources) <table border="1"> <tr> <td><i>Q30</i></td> <td><i>Q115</i></td> <td><i>Q40</i></td> </tr> </table>	<i>Q30</i>	<i>Q115</i>	<i>Q40</i>	4.60	4.52	4.13
<i>Q30</i>	<i>Q115</i>	<i>Q40</i>				

**APPENDIX Q: Research Question Seven Results**

*Do centralized information technology employees believe the elements tied to their success are the same as those tied to the centralized technology organization's success?*

	<b>Important to Employee ("My") Success</b>	<b>Important to Technology Organization's Success</b>	<b>Difference</b>
End User Satisfaction	4.59	4.57	0.02
End User Support	4.45	4.47	-0.02
End User Enablement	4.44	4.42	0.02
Reliability of Technology Services	4.58	4.67	-0.09
Responsiveness of the Technology Organization	4.38	4.41	-0.03
Campus Involvement in Technology Decisions	3.80	4.01	-0.21
Technology Alignment with Campus Goals	4.16	4.31	-0.15
Technology Alignment with Campus Priorities	4.15	4.30	-0.14
IT Budget Management	4.00	4.34	-0.34
IT Fiscal Responsibility	4.07	4.31	-0.24
Proactive Communication	4.32	4.33	-0.01
Effective Communication	4.48	4.42	0.05
Innovation	3.94	4.04	-0.10
High-Performance IT Teams	4.17	4.18	-0.01

**APPENDIX R: Research Question Eight Results**

*Do CIOs have a clear understanding of what metrics will be used to evaluate their performance? Which elements do CIOs believe are most heavily factored into their performance reviews? Do CIOs believe that those conducting their performance reviews have adequate guidelines and information to carry out meaningful evaluations?*

	Yes	No	Somewhat
Do CIOs have a clear understanding of what metrics will be used to evaluate their performance?	59%	26%	15%
Do CIOs believe that those conducting their performance reviews have adequate guidelines and information to carry out meaningful evaluations?	74%	19%	7%

End User Satisfaction	4.21
Reliability of Technology Services	4.21
Responsiveness of the Technology Organization	4.11
IT Fiscal Responsibility	4.07
IT Budget Management	4.00
Technology Alignment with Campus Priorities	3.75
Technology Alignment with Campus Goals	3.64
Effective Communication	3.64
End User Support	3.61
Proactive Communication	3.61
End User Enablement	3.54
High-Performance IT Teams	3.32
Campus Involvement in Technology Decisions	3.29
Innovation	3.11

## APPENDIX S: Research Question Nine Results

*How important do users believe the centralized information technology department is to their success and that of their intuition?*

**The MEANS Procedure**  
**Institution's Success**  
Analysis Variable : Q29\_1

<b>Respondent</b>	<b>Number of Observations</b>	<b>Mean</b>
Faculty	500	5.6560000
Students	1305	5.5609195
Non-Centralized IT Staff	177	5.5649718
Non-IT Staff	1111	5.7398740

**The MEANS Procedure**  
**"My" Success**  
Analysis Variable : Q29\_2

<b>Respondent</b>	<b>Number of Observations</b>	<b>Mean</b>
Faculty	500	5.2480000
Students	1305	5.3141762
Non-Centralized IT Staff	177	5.0621469
Non-IT Staff	1111	5.3708371



## APPENDIX T: Internal Consistency

**Internal consistency information using Cronbach's Alpha**

**Organizational Quality Areas**

**Accountability**

<b>Cronbach Coefficient Alpha</b>	
<b>Variables</b>	<b>Alpha</b>
Raw	0.842743

<b>Cronbach Coefficient Alpha with Deleted Variable</b>		
<b>Raw Variables</b>		
<b>Deleted Variable</b>	<b>Correlation with Total</b>	<b>Alpha</b>
<b>Q49</b>	0.776242	.
<b>Q50</b>	0.776242	.

<b>Pearson Correlation Coefficients, N = 11 Prob &gt;  r  under H0: Rho=0</b>		
	<b>Q49</b>	<b>Q50</b>
<b>Q49</b>	1.00000	0.77624
<b>Q49</b>		0.0050
<b>Q50</b>	0.77624	1.00000
<b>Q50</b>	0.0050	

## Capability

<b>Cronbach Coefficient Alpha</b>	
<b>Variables</b>	<b>Alpha</b>
Raw	-1.90205

<b>Cronbach Coefficient Alpha with Deleted Variable</b>		
<b>Raw Variables</b>		
<b>Deleted Variable</b>	<b>Correlation with Total</b>	<b>Alpha</b>
<b>Q51</b>	-.532354	.
<b>Q52</b>	-.532354	.

<b>Pearson Correlation Coefficients, N = 11</b>		
<b>Prob &gt;  r  under H0: Rho=0</b>		
	<b>Q51</b>	<b>Q52</b>
<b>Q51</b>	1.00000	-0.53235
<b>Q51</b>		0.0918
<b>Q52</b>	-0.53235	1.00000
<b>Q52</b>	0.0918	

### Coordination and Control

<b>Cronbach Coefficient Alpha</b>	
<b>Variables</b>	<b>Alpha</b>
Raw	0.935377

<b>Cronbach Coefficient Alpha with Deleted Variable</b>		
	<b>Raw Variables</b>	
<b>Deleted Variable</b>	<b>Correlation with Total</b>	<b>Alpha</b>
<b>Q53</b>	0.952772	0.879433
<b>Q54</b>	0.811137	0.933625
<b>Q55</b>	0.810766	0.929438
<b>Q56</b>	0.849759	0.916443

<b>Pearson Correlation Coefficients, N = 11</b>				
<b>Prob &gt;  r  under H0: Rho=0</b>				
	<b>Q53</b>	<b>Q54</b>	<b>Q55</b>	<b>Q56</b>
<b>Q53</b>	1.00000	0.94245	0.79831	0.82047
<b>Q53</b>		<.0001	0.0032	0.002
<b>Q54</b>	0.94245	1.00000	0.62712	0.69084
<b>Q54</b>	<.0001		0.0389	0.0186
<b>Q55</b>	0.79831	0.62712	1.00000	0.88723
<b>Q55</b>	0.0032	0.0389		0.0003
<b>Q56</b>	0.82047	0.69084	0.88723	1.00000
<b>Q56</b>	<.0001	<.0001	<.0001	

**Direction**

<b>Cronbach Coefficient Alpha</b>	
<b>Variables</b>	<b>Alpha</b>
Raw	0.893069

<b>Cronbach Coefficient Alpha with Deleted Variable</b>		
	<b>Raw Variables</b>	
<b>Deleted Variable</b>	<b>Correlation with Total</b>	<b>Alpha</b>
<b>Q57</b>	0.778673	0.863499
<b>Q58</b>	0.702432	0.927395
<b>Q59</b>	0.929055	0.756844

<b>Pearson Correlation Coefficients, N = 11 Prob &gt;  r  under H0: Rho=0</b>			
	<b>Q57</b>	<b>Q58</b>	<b>Q59</b>
<b>Q57</b>	1.00000	0.60903	0.88875
<b>Q57</b>		0.0467	0.0003
<b>Q58</b>	0.60903	1.00000	0.77639
<b>Q58</b>	0.0467		0.005
<b>Q59</b>	0.88875	0.77639	1.00000
<b>Q59</b>	0.0003	0.005	

**Environment and Values**

<b>Cronbach Coefficient Alpha</b>	
<b>Variables</b>	<b>Alpha</b>
Raw	0.899014

<b>Cronbach Coefficient Alpha with Deleted Variable</b>		
<b>Raw Variables</b>		
<b>Deleted Variable</b>	<b>Correlation with Total</b>	<b>Alpha</b>
<b>Q60</b>	0.866802	.
<b>Q61</b>	0.866802	.

<b>Pearson Correlation Coefficients, N = 11 Prob &gt;  r  under H0: Rho=0</b>		
	<b>Q60</b>	<b>Q61</b>
<b>Q60</b>	1.00000	0.8668
<b>Q60</b>		0.0006
<b>Q61</b>	0.8668	1.00000
<b>Q61</b>	0.0006	

## External Orientation

<b>Cronbach Coefficient Alpha</b>	
<b>Variables</b>	<b>Alpha</b>
Raw	-.024686

<b>Cronbach Coefficient Alpha with Deleted Variable</b>		
<b>Raw Variables</b>		
<b>Deleted Variable</b>	<b>Correlation with Total</b>	<b>Alpha</b>
Q62	-0.01532	.
Q63	-0.01532	.

<b>Pearson Correlation Coefficients, N = 11</b>		
<b>Prob &gt;  r  under H0: Rho=0</b>		
	<b>Q62</b>	<b>Q63</b>
<b>Q62</b>	1.00000	-0.01532
<b>Q62</b>		0.9643
<b>Q63</b>	-0.01532	1.00000
<b>Q63</b>	0.9643	

## Innovation

<b>Cronbach Coefficient Alpha</b>	
<b>Variables</b>	<b>Alpha</b>
Raw	0.933885

<b>Cronbach Coefficient Alpha with Deleted Variable</b>		
	<b>Raw Variables</b>	
<b>Deleted Variable</b>	<b>Correlation with Total</b>	<b>Alpha</b>
<b>Q64</b>	0.869179	0.931814
<b>Q65</b>	0.910494	0.865875
<b>Q66</b>	0.888754	0.906304

<b>Pearson Correlation Coefficients, N = 11 Prob &gt;  r  under H0: Rho=0</b>			
	<b>Q64</b>	<b>Q65</b>	<b>Q66</b>
<b>Q64</b>	1.00000	0.85991	0.82798
<b>Q64</b>		0.0007	0.0016
<b>Q65</b>	0.85991	1.00000	0.88023
<b>Q65</b>	0.0007		0.0003
<b>Q66</b>	0.82798	0.88023	1.00000
<b>Q66</b>	0.0016	0.0003	

## Leadership

<b>Cronbach Coefficient Alpha</b>	
<b>Variables</b>	<b>Alpha</b>
Raw	0.671106

<b>Cronbach Coefficient Alpha with Deleted Variable</b>		
	<b>Raw Variables</b>	
<b>Deleted Variable</b>	<b>Correlation with Total</b>	<b>Alpha</b>
<b>Q67</b>	0.241084	0.688291
<b>Q68</b>	0.216605	0.692050
<b>Q69</b>	0.643944	0.544812
<b>Q70</b>	0.613559	0.540421
<b>Q71</b>	0.562947	0.584399

<b>Pearson Correlation Coefficients, N =11</b>					
<b>Prob &gt;  r  under H0: Rho=0</b>					
	<b>Q67</b>	<b>Q68</b>	<b>Q69</b>	<b>Q70</b>	<b>Q71</b>
<b>Q67</b>	1.00000	0.80322	0.04652	0.10005	0.02093
<b>Q67</b>		0.0029	0.892	0.7698	0.9513
<b>Q68</b>	0.80322	1.00000	-0.08243	0.06516	0.00357
<b>Q68</b>	0.0029		0.8096	0.849	0.9917
<b>Q69</b>	0.04652	-0.08243	1.00000	0.63735	0.77278
<b>Q69</b>	0.892	0.8096		0.0349	0.0053
<b>Q70</b>	0.10005	0.06516	0.63735	1.00000	0.64367
<b>Q70</b>	0.7698	0.849	0.0349		0.0326
<b>Q71</b>	0.02093	0.00357	0.77278	0.64367	1.00000
<b>Q71</b>	0.9513	0.9917	0.0053	0.0326	



**Motivation**

<b>Cronbach Coefficient Alpha</b>	
<b>Variables</b>	<b>Alpha</b>
Raw	0.973405

<b>Cronbach Coefficient Alpha with Deleted Variable</b>		
<b>Raw Variables</b>		
<b>Deleted Variable</b>	<b>Correlation with Total</b>	<b>Alpha</b>
<b>Q72</b>	0.955445	.
<b>Q73</b>	0.955445	.

<b>Pearson Correlation Coefficients, N = 11 Prob &gt;  r  under H0: Rho=0</b>		
	<b>Q72</b>	<b>Q73</b>
<b>Q72</b>	1.00000	0.95544
<b>Q72</b>		<.0001
<b>Q73</b>	0.95544	1.00000
<b>Q73</b>	<.0001	

## High-Performance Areas

### Meaningful Jobs

Cronbach Coefficient Alpha	
Variables	Alpha
Raw	0.932844

Cronbach Coefficient Alpha with Deleted Variable		
Raw Variables		
Deleted Variable	Correlation with Total	Alpha
Q86	0.840336	0.915888
Q87	0.743505	0.942288
Q88	0.860537	0.915415
Q89	0.790307	0.921940
Q90	0.855554	0.915838
Q91	0.864447	0.914629

Pearson Correlation Coefficients, N = 12 Prob >  r  under H0: Rho=0						
	Q86	Q87	Q88	Q89	Q90	Q91
Q86	1.00000	0.77383	0.77903	0.62560	0.72965	0.79396
Q86		0.0007	0.0006	0.0126	0.0020	0.0004
Q87	0.77383	1.00000	0.62375	0.72296	0.60886	0.60917
Q87	0.0007		0.0130	0.0023	0.0160	0.0159
Q88	0.77903	0.62375	1.00000	0.70422	0.83588	0.92178
Q88	0.0006	0.0130		0.0034	0.0001	<.0001
Q89	0.62560	0.72296	0.70422	1.00000	0.78279	0.67985
Q89	0.0126	0.0023	0.0034		0.0006	0.0053
Q90	0.72965	0.60886	0.83588	0.78279	1.00000	0.88952
Q90	0.0020	0.0160	0.0001	0.0006		<.0001
Q91	0.79396	0.60917	0.92178	0.67985	0.88952	1.00000
Q91	0.0004	0.0159	<.0001	0.0053	<.0001	

**Valued, Well-Treated Employees**

<b>Cronbach Coefficient Alpha</b>	
<b>Variables</b>	<b>Alpha</b>
Raw	0.930581

<b>Cronbach Coefficient Alpha with Deleted Variable</b>		
	<b>Raw Variables</b>	
<b>Deleted Variable</b>	<b>Correlation with Total</b>	<b>Alpha</b>
<b>Q84</b>	0.874883	.
<b>Q85</b>	0.874883	.

<b>Pearson Correlation Coefficients, N = 12</b>		
<b>Prob &gt;  r  under H0: Rho=0</b>		
	<b>Q84</b>	<b>Q85</b>
<b>Q84</b>	1.00000	0.87488
<b>Q84</b>		<.0001
<b>Q85</b>	0.87488	1.00000
<b>Q85</b>	<.0001	

**Psychological Safety and Job Security**

<b>Cronbach Coefficient Alpha</b>	
<b>Variables</b>	<b>Alpha</b>
Raw	0.886111

<b>Cronbach Coefficient Alpha with Deleted Variable</b>		
<b>Raw Variables</b>		
<b>Deleted Variable</b>	<b>Correlation with Total</b>	<b>Alpha</b>
<b>Q82</b>	0.795857	.
<b>Q83</b>	0.795857	.

<b>Pearson Correlation Coefficients, N = 12</b>		
<b>Prob &gt;  r  under H0: Rho=0</b>		
	<b>Q82</b>	<b>Q83</b>
<b>Q82</b>	1.00000	0.79586
<b>Q82</b>		0.0004
<b>Q83</b>	0.79586	1.00000
<b>Q83</b>	0.0004	

### Work Climate/Recognition

Cronbach Coefficient Alpha	
Variables	Alpha
Raw	0.958010

Cronbach Coefficient Alpha with Deleted Variable		
Raw Variables		
Deleted Variable	Correlation with Total	Alpha
Q94	0.751339	0.956592
Q95	0.907613	0.948906
Q96	0.877455	0.950990
Q97	0.925826	0.947961
Q98	0.824003	0.953291
Q99	0.658019	0.960431
Q100	0.711840	0.959026
Q101	0.873338	0.950667
Q102	0.938273	0.947831

Pearson Correlation Coefficients, N = 12 Prob >  r  under H0: Rho=0									
	Q94	Q95	Q96	Q97	Q98	Q99	Q100	Q101	Q102
Q94	1.00000	0.81685	0.62289	0.76934	0.67808	0.35501	0.49793	0.81911	0.65825
Q94		0.0002	0.0131	0.0008	0.0055	0.1941	0.0589	0.0002	0.0076
Q95	0.81685	1.00000	0.82319	0.93155	0.79316	0.49707	0.63521	0.83337	0.89096
Q95	0.0002		0.0002	<.0001	0.0004	0.0594	0.0109	0.0001	<.0001
Q96	0.62289	0.82319	1.00000	0.82945	0.79903	0.67858	0.67139	0.73726	0.89277
Q96	0.0131	0.0002		0.0001	0.0004	0.0054	0.0061	0.0017	<.0001
Q97	0.76934	0.93155	0.82945	1.00000	0.72649	0.64111	0.71788	0.79901	0.94117
Q97	0.0008	<.0001	0.0001		0.0022	0.01	0.0026	0.0004	<.0001
Q98	0.67808	0.79316	0.79903	0.72649	1.00000	0.62741	0.53146	0.84421	0.74391
Q98	0.0055	0.0004	0.0004	0.0022		0.0123	0.0415	<.0001	0.0015
Q99	0.35501	0.49707	0.67858	0.64111	0.62741	1.00000	0.52906	0.58071	0.75075
Q99	0.1941	0.0594	0.0054	0.01	0.0123		0.0426	0.0232	0.0013

<b>Q100</b>	0.49793	0.63521	0.67139	0.71788	0.53146	0.52906	1.00000	0.65154	0.78425
<b>Q100</b>	0.0589	0.0109	0.0061	0.0026	0.0415	0.0426		0.0085	0.0005
<b>Q101</b>	0.81911	0.83337	0.73726	0.79901	0.84421	0.58071	0.65154	1.00000	0.76223
<b>Q101</b>	0.0002	0.0001	0.0017	0.0004	<.0001	0.0232	0.0085		0.001
<b>Q102</b>	0.65825	0.89096	0.89277	0.94117	0.74391	0.75075	0.78425	0.76223	1.00000
<b>Q102</b>	0.0076	<.0001	<.0001	<.0001	0.0015	0.0013	0.0005	0.001	

### Staff Development

<b>Cronbach Coefficient Alpha</b>	
<b>Variables</b>	<b>Alpha</b>
Raw	0.945820

<b>Cronbach Coefficient Alpha with Deleted Variable</b>		
<b>Raw Variables</b>		
<b>Deleted Variable</b>	<b>Correlation with Total</b>	<b>Alpha</b>
<b>Q79</b>	0.89228	0.916413
<b>Q80</b>	0.930577	0.886307
<b>Q81</b>	0.84047	0.955323

<b>Pearson Correlation Coefficients, N = 12</b>			
<b>Prob &gt;  r  under H0: Rho=0</b>			
	<b>Q79</b>	<b>Q80</b>	<b>Q81</b>
<b>Q79</b>	1.00000	0.91503	0.79626
<b>Q79</b>		<.0001	0.0004
<b>Q80</b>	0.91503	1.00000	0.84769
<b>Q80</b>	<.0001		<.0001
<b>Q81</b>	0.79626	0.84769	1.00000
<b>Q81</b>	0.0004	<.0001	

### Teamwork and Team Rewards

<b>Cronbach Coefficient Alpha</b>	
<b>Variables</b>	<b>Alpha</b>
Raw	0.494648

<b>Cronbach Coefficient Alpha with Deleted Variable</b>		
<b>Raw Variables</b>		
<b>Deleted Variable</b>	<b>Correlation with Total</b>	<b>Alpha</b>
<b>Q74</b>	0.329354	.
<b>Q75</b>	0.329354	.

<b>Pearson Correlation Coefficients, N = 12 Prob &gt;  r  under H0: Rho=0</b>		
	<b>Q74</b>	<b>Q75</b>
<b>Q74</b>	1.00000	0.32935
<b>Q74</b>		0.2306
<b>Q75</b>	0.32935	1.00000
<b>Q75</b>	0.2306	

**Systems, Procedures, and Information Availability**

<b>Cronbach Coefficient Alpha</b>	
<b>Variables</b>	<b>Alpha</b>
Raw	0.918881

<b>Cronbach Coefficient Alpha with Deleted Variable</b>		
<b>Raw Variables</b>		
<b>Deleted Variable</b>	<b>Correlation with Total</b>	<b>Alpha</b>
<b>Q76</b>	0.869867	0.859054
<b>Q77</b>	0.823151	0.896424
<b>Q78</b>	0.837162	0.894845

<b>Pearson Correlation Coefficients, N = 12</b>			
<b>Prob &gt;  r  under H0: Rho=0</b>			
	<b>Q76</b>	<b>Q77</b>	<b>Q78</b>
<b>Q76</b>	1.00000	0.80982	0.82506
<b>Q76</b>		0.0003	0.0002
<b>Q77</b>	0.80982	1.00000	0.76718
<b>Q77</b>	0.0003		0.0008
<b>Q78</b>	0.82506	0.76718	1.00000
<b>Q78</b>	0.0002	0.0008	



## Factors Potentially Impacting User Satisfaction

### Academic Alignment

Cronbach Coefficient Alpha	
Variables	Alpha
Raw	0.950991

Cronbach Coefficient Alpha with Deleted Variable		
Raw Variables		
Deleted Variable	Correlation with Total	Alpha
Q210_1	0.863371	0.940975
Q210_2	0.916975	0.925134
Q210_3	0.914129	0.926364
Q210_4	0.840364	0.950875

Pearson Correlation Coefficients, N = 2230 Prob >  r  under H0: Rho=0				
	Q210_1	Q210_2	Q210_3	Q210_4
Q210_1	1.00000	0.85104	0.82817	0.77934
Q210_1		<.0001	<.0001	<.0001
Q210_2	0.85104	1.00000	0.91935	.80627
Q210_2	<.0001		<.0001	<.0001
Q210_3	0.82817	0.91935	1.00000	0.82069
Q210_3	<.0001	<.0001		<.0001
Q210_4	0.77934	0.80627	0.82069	1.00000
Q210_4	<.0001	<.0001	<.0001	

**Communication**

<b>Cronbach Coefficient Alpha</b>	
<b>Variables</b>	<b>Alpha</b>
Raw	0.963018

<b>Cronbach Coefficient Alpha with Deleted Variable</b>		
<b>Raw Variables</b>		
<b>Deleted Variable</b>	<b>Correlation with Total</b>	<b>Alpha</b>
Q25_1	0.804345	0.960933
Q25_2	0.872121	0.957013
Q25_3	0.872253	0.957009
Q25_4	0.881445	0.956521
Q25_5	0.857535	0.957873
Q25_6	0.845846	0.958658
Q25_7	0.888973	0.955987
Q25_8	0.830056	0.959509

<b>Pearson Correlation Coefficients, N = 2230</b>								
<b>Prob &gt;  r  under H0: Rho=0</b>								
	<b>Q25_1</b>	<b>Q25_2</b>	<b>Q25_3</b>	<b>Q25_4</b>	<b>Q25_5</b>	<b>Q25_6</b>	<b>Q25_7</b>	<b>Q25_8</b>
<b>Q25_1</b>	1.00000	0.68569	0.66740	0.85592	0.80746	0.63172	0.68225	0.74601
<b>Q25_1</b>		<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
<b>Q25_2</b>	0.68569	1.00000	0.92684	0.75229	0.73076	0.80940	0.83409	0.69942
<b>Q25_2</b>	<.0001		<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
<b>Q25_3</b>	0.66740	0.92684	1.00000	0.74722	0.72492	0.82131	0.83672	0.71190
<b>Q25_3</b>	<.0001	<.0001		<.0001	<.0001	<.0001	<.0001	<.0001
<b>Q25_4</b>	0.85592	0.75229	0.74722	1.00000	0.89079	0.71166	0.76017	0.78923
<b>Q25_4</b>	<.0001	<.0001	<.0001		<.0001	<.0001	<.0001	<.0001
<b>Q25_5</b>	0.80746	0.73076	0.72492	0.89079	1.00000	0.69298	0.74357	0.78682
<b>Q25_5</b>	<.0001	<.0001	<.0001	<.0001		<.0001	<.0001	<.0001
<b>Q25_6</b>	0.63172	0.80940	0.82131	0.71166	0.69298	1.00000	0.90331	0.71848

<b>Q25_6</b>	<.0001	<.0001	<.0001	<.0001	<.0001		<.0001	<.0001
<b>Q25_7</b>	0.68225	0.83409	0.83672	0.76017	0.74357	0.90331	1.00000	0.76488
<b>Q25_7</b>	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001		<.0001
<b>Q25_8</b>	0.74601	0.69942	0.71190	0.78923	0.78682	0.71848	0.76488	1.00000
<b>Q25_8</b>	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	

## Enablement

<b>Cronbach Coefficient Alpha</b>	
<b>Variables</b>	<b>Alpha</b>
Raw	0.923807

<b>Cronbach Coefficient Alpha with Deleted Variable</b>		
<b>Raw Variables</b>		
<b>Deleted Variable</b>	<b>Correlation with Total</b>	<b>Alpha</b>
<b>Q11_1</b>	0.825009	0.909866
<b>Q11_2</b>	0.873143	0.867160
<b>Q11_3</b>	0.847137	0.889063

<b>Pearson Correlation Coefficients, N = 2428</b>			
<b>Prob &gt;  r  under H0: Rho=0</b>			
	<b>Q11_1</b>	<b>Q11_2</b>	<b>Q11_3</b>
<b>Q11_1</b>	1.00000	0.80793	0.77233
<b>Q11_1</b>		<.0001	<.0001
<b>Q11_2</b>	0.80793	1.00000	0.83465
<b>Q11_2</b>	<.0001		<.0001
<b>Q11_3</b>	0.77233	0.83465	1.00000
<b>Q11_3</b>	<.0001	<.0001	

### Fiscal Responsibility

<b>Cronbach Coefficient Alpha</b>	
<b>Variables</b>	<b>Alpha</b>
Raw	0.942141

<b>Cronbach Coefficient Alpha with Deleted Variable</b>		
<b>Raw Variables</b>		
<b>Deleted Variable</b>	<b>Correlation with Total</b>	<b>Alpha</b>
Q23_1	0.893624	0.904819
Q23_2	0.850575	0.938653
Q23_3	0.895121	0.903556

<b>Pearson Correlation Coefficients, N = 1521</b>			
<b>Prob &gt;  r  under H0: Rho=0</b>			
	<b>Q23_1</b>	<b>Q23_2</b>	<b>Q23_3</b>
<b>Q23_1</b>	1.00000	0.82463	0.88440
<b>Q23_1</b>		<.0001	<.0001
<b>Q23_2</b>	0.82463	1.00000	0.82663
<b>Q23_2</b>	<.0001		<.0001
<b>Q23_3</b>	0.88440	0.82663	1.00000
<b>Q23_3</b>	<.0001	<.0001	

## Importance

<b>Cronbach Coefficient Alpha</b>	
<b>Variables</b>	<b>Alpha</b>
Raw	0.809808

<b>Cronbach Coefficient Alpha with Deleted Variable</b>		
<b>Raw Variables</b>		
<b>Deleted Variable</b>	<b>Correlation with Total</b>	<b>Alpha</b>
<b>Q29_1</b>	0.696108	.
<b>Q29_2</b>	0.696108	.

<b>Pearson Correlation Coefficients, N = 2808</b>		
<b>Prob &gt;  r  under H0: Rho=0</b>		
	<b>Q29_1</b>	<b>Q29_2</b>
<b>Q29_1</b>	1.00000	0.69611
<b>Q29_1</b>		<.0001
<b>Q29_2</b>	0.69611	1.00000
<b>Q29_2</b>	<.0001	

## Reliability

<b>Cronbach Coefficient Alpha</b>	
<b>Variables</b>	<b>Alpha</b>
Raw	0.931316

<b>Cronbach Coefficient Alpha with Deleted Variable</b>		
	<b>Raw Variables</b>	
<b>Deleted Variable</b>	<b>Correlation with Total</b>	<b>Alpha</b>
<b>Q15_1</b>	0.790108	0.953008
<b>Q15_2</b>	0.891102	0.874121
<b>Q15_3</b>	0.898199	0.868396

<b>Pearson Correlation Coefficients, N = 2672</b>			
<b>Prob &gt;  r  under H0: Rho=0</b>			
	<b>Q15_1</b>	<b>Q15_2</b>	<b>Q15_3</b>
<b>Q15_1</b>	1.00000	0.76776	0.77662
<b>Q15_1</b>		<.0001	<.0001
<b>Q15_2</b>	0.76776	1.00000	0.91025
<b>Q15_2</b>	<.0001		<.0001
<b>Q15_3</b>	0.77662	0.91025	1.00000
<b>Q15_3</b>	<.0001	<.0001	

## Responsiveness

<b>Cronbach Coefficient Alpha</b>	
<b>Variables</b>	<b>Alpha</b>
Raw	0.876442

<b>Cronbach Coefficient Alpha with Deleted Variable</b>		
<b>Raw Variables</b>		
<b>Deleted Variable</b>	<b>Correlation with Total</b>	<b>Alpha</b>
<b>Q17_1</b>	0.781316	.
<b>Q17_2</b>	0.781316	.

<b>Pearson Correlation Coefficients, N = 2380</b>		
<b>Prob &gt;  r  under H0: Rho=0</b>		
	<b>Q17_1</b>	<b>Q17_2</b>
<b>Q17_1</b>	1.00000	0.78132
<b>Q17_1</b>		<.0001
<b>Q17_2</b>	0.78132	1.00000
<b>Q17_2</b>	<.0001	



### Shared Governance

<b>Cronbach Coefficient Alpha</b>	
<b>Variables</b>	<b>Alpha</b>
Raw	0.947884

<b>Cronbach Coefficient Alpha with Deleted Variable</b>		
<b>Raw Variables</b>		
<b>Deleted Variable</b>	<b>Correlation with Total</b>	<b>Alpha</b>
<b>Q19_1</b>	0.835459	0.939016
<b>Q19_2</b>	0.870962	0.934823
<b>Q19_3</b>	0.870345	0.934726
<b>Q19_4</b>	0.857537	0.936218
<b>Q19_5</b>	0.831445	0.939693
<b>Q19_6</b>	0.797518	0.944395

<b>Pearson Correlation Coefficients, N = 1473</b>						
<b>Prob &gt;  r  under H0: Rho=0</b>						
	<b>Q19_1</b>	<b>Q19_2</b>	<b>Q19_3</b>	<b>Q19_4</b>	<b>Q19_5</b>	<b>Q19_6</b>
<b>Q19_1</b>	1.00000	0.87727	0.81081	0.80318	0.66455	0.62888
<b>Q19_1</b>		<.0001	<.0001	<.0001	<.0001	<.0001
<b>Q19_2</b>	0.87727	1.00000	0.85145	0.83251	0.69455	0.66470
<b>Q19_2</b>	<.0001		<.0001	<.0001	<.0001	<.0001
<b>Q19_3</b>	0.81081	0.85145	1.00000	0.85691	0.71099	0.68144
<b>Q19_3</b>	<.0001	<.0001		<.0001	<.0001	<.0001
<b>Q19_4</b>	0.80318	0.83251	0.85691	1.00000	0.70098	0.66971
<b>Q19_4</b>	<.0001	<.0001	<.0001		<.0001	<.0001
<b>Q19_5</b>	0.66455	0.69455	0.71099	0.70098	1.00000	0.93603
<b>Q19_5</b>	<.0001	<.0001	<.0001	<.0001		<.0001
<b>Q19_6</b>	0.62888	0.66470	0.68144	0.66971	0.93603	1.00000
<b>Q19_6</b>	<.0001	<.0001	<.0001	<.0001	<.0001	

Support

<b>Cronbach Coefficient Alpha</b>	
<b>Variables</b>	<b>Alpha</b>
Raw	0.897455

<b>Cronbach Coefficient Alpha with Deleted Variable</b>		
<b>Raw Variables</b>		
<b>Deleted Variable</b>	<b>Correlation with Total</b>	<b>Alpha</b>
<b>Q13_1</b>	0.803401	0.860243
<b>Q13_2</b>	0.673248	0.912114
<b>Q13_3</b>	0.785243	0.862791
<b>Q13_4</b>	0.859160	0.836790

<b>Pearson Correlation Coefficients, N = 2548</b>				
<b>Prob &gt;  r  under H0: Rho=0</b>				
	<b>Q13_1</b>	<b>Q13_2</b>	<b>Q13_3</b>	<b>Q13_4</b>
<b>Q13_1</b>	1.00000	0.60686	0.72759	0.81950
<b>Q13_1</b>		<.0001	<.0001	<.0001
<b>Q13_2</b>	0.60686	1.00000	0.59976	0.65837
<b>Q13_2</b>	<.0001		<.0001	<.0001
<b>Q13_3</b>	0.72759	0.59976	1.00000	0.78986
<b>Q13_3</b>	<.0001	<.0001		<.0001
<b>Q13_4</b>	0.81950	0.65837	0.78986	1.00000
<b>Q13_4</b>	<.0001	<.0001	<.0001	

### Satisfaction with the Centralized Information Technology Organization

<b>Cronbach Coefficient Alpha</b>	
<b>Variables</b>	<b>Alpha</b>
Raw	0.969686

<b>Cronbach Coefficient Alpha with Deleted Variable</b>		
<b>Raw Variables</b>		
<b>Deleted Variable</b>	<b>Correlation with Total</b>	<b>Alpha</b>
<b>Q31</b>	0.913240	0.964315
<b>Q232</b>	0.933855	0.957167
<b>Q33</b>	0.918800	0.961942
<b>Q34</b>	0.938275	0.956158

<b>Pearson Correlation Coefficients, N = 3093</b>				
<b>Prob &gt;  r  under H0: Rho=0</b>				
	<b>Q31</b>	<b>Q232</b>	<b>Q33</b>	<b>Q34</b>
<b>Q31</b>	1.00000	0.90566	0.86142	0.88193
<b>Q31</b>		<.0001	<.0001	<.0001
<b>Q232</b>	0.90566	1.00000	0.88326	0.90596
<b>Q232</b>	<.0001		<.0001	<.0001
<b>Q33</b>	0.86142	0.88326	1.00000	0.91301
<b>Q33</b>	<.0001	<.0001		<.0001
<b>Q34</b>	0.88193	0.90596	0.91301	1.00000
<b>Q34</b>	<.0001	<.0001	<.0001	

## Overall Satisfaction

### Satisfaction with the Chief Information Officer

<b>Cronbach Coefficient Alpha</b>	
<b>Variables</b>	<b>Alpha</b>
Raw	0.984968

<b>Cronbach Coefficient Alpha with Deleted Variable</b>		
	<b>Raw Variables</b>	
<b>Deleted Variable</b>	<b>Correlation with Total</b>	<b>Alpha</b>
<b>Q36</b>	0.966961	0.977625
<b>Q37</b>	0.974430	0.972351
<b>Q38</b>	0.959446	0.982879

<b>Pearson Correlation Coefficients, N = 1725 Prob &gt;  r  under H0: Rho=0</b>			
	<b>Q36</b>	<b>Q37</b>	<b>Q38</b>
<b>Q36</b>	1.00000	0.96638	0.94637
<b>Q36</b>		<.0001	<.0001
<b>Q37</b>	0.96638	1.00000	0.95627
<b>Q37</b>	<.0001		<.0001
<b>Q38</b>	0.94637	0.95627	1.00000
<b>Q38</b>	<.0001	<.0001	

## REFERENCES

- Agee, A., & Holisky, D. (2003). Crossing the great divide: Implementing change by creating collaborative relationships. In B. Dewey (Ed.), *Leadership, higher education, and the information age* (pp. 61-80). New York: Neal-Schuman.
- Albrecht, B., Bender, B., Katz, R. N., Pirani, J. A., Salaway, G., Sitko, T. D., et al. (2004). Information technology alignment in higher education. *EDUCAUSE Center for Applied Research Study*, 3.
- Applegate, L. M., & Elam, J. J. (1992). New information systems leaders: A changing role in a changing world. *MIS Quarterly*, 16(4), 469-490.
- Ayati, M., & Curzon, S. (2003). How to spot a CIO in trouble. *EDUCAUSE Quarterly*, 26(4), 18-23.
- Babbie, E. (2004). *The practice of social research* (10th ed.). United States: Thomson Wadsworth.
- Barone, C. A. (2005). Leadership, goals, & transformation: An interview with John C. Hitt. *EDUCAUSE Review*, 25.
- Beatty, R. C., Arnett, K. P., & Liu, C. (2005). CIO/CTO job roles: An emerging organizational model. *Communications of the IIMA*, 5(2).
- Berkman, E. (2002). *The state of the CIO: Skills*. Retrieved January 7, 2008, from [www.cio.com/archive/030102/skills.html](http://www.cio.com/archive/030102/skills.html)
- Bernard, A. (2007). *Availability of skills tops list of CIO concerns*. Retrieved March 14, 2008, from <http://www.cioupdate.com/trends/article.php/3704946>
- Broadbent, M., & Kitzis, E. S. (2005). *The new CIO leader*. Boston, Massachusetts: Harvard Business School Press.
- Brooks, L. (2003). Finding the vision: Shaping technology support services in the twenty-first century institution. In B. Dewey (Ed.), *Leadership, higher education and the information age* (pp. 39-60). New York: Neal-Schuman.
- Brown, W. (2004). *A study of chief information officer effectiveness in higher education*. Unpublished doctoral dissertation, Nova Southeastern University.
- Brown, W. (2006). CIO effectiveness in higher education. *EDUCAUSE Quarterly*, 29(1), 48-53.

- Bucher, J., Horgan, B., Moberg, T., Paterson, R., & Todd, D. (2001). The realities of a new senior-level IT position. *EDUCAUSE Quarterly*, 24(2), 34-38.
- Burns, J. M. (1978). *Leadership*. New York: Harper & Row.
- Caldwell, B. (1990). A new bible for MIS. *Information Week*, (October 15), 36-40.
- Camp, J. S., DeBlois, P. B., & EDUCAUSE Current Issues Committee. (2007). *Current issues survey report, 2007* EDUCAUSE.
- Carnegie Foundation Staff, The. *The Carnegie Foundation for the Advancement of Teaching*. Retrieved April 1, 2008, from <http://www.carnegiefoundation.org/index.asp>
- Cavanaugh, J. C. (2004). We need to reframe the IT issue. *EDUCAUSE Review*, 39(1), 6.
- Chester, T. M. (2006). A roadmap for IT leadership and the next ten years. *EDUCAUSE Quarterly*, 29(2), 56-60.
- Christenberry, J. (2001). *Seamanship of the CIO: Fish versus cut bait or...Bail versus abandon ship!* Paper presented at EDUCAUSE Southeast Regional, Orlando, FL.
- Christensen, C. M., & Raynor, M. E. (2003). Why hard-nosed executives should care about management theory. *Harvard Business Review*, Sep; 81(9):66-74.
- CIO Canada Staff. (2007). Talent crunch tops list of CIO concern. *IT World Canada*, March 14, 2008.
- CIO Magazine Staff. Top ten concerns. *CIO*, Retrieved April 13, 2007, from <http://www.cio.co.uk/concern/>
- Clark, A. J. (2005). IT governance: Determining who decides (Research Bulletin No. 24). Boulder, Colorado: EDUCAUSE Center for Applied Research.
- Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences*. Hillsdale, New Jersey: Lawrence Erlbaum Associates, Inc.
- Cramm, S. (2005). IT marketing smarts. *CIO*, Retrieved 1/18, 2008, from [http://www.cio.com/article/107908/IT\\_Marketing\\_Smarts](http://www.cio.com/article/107908/IT_Marketing_Smarts)
- Crawford, G., Rudy, J. A., & EDUCAUSE Current Issues Committee. (2003). Fourth annual EDUCAUSE survey identifies current IT issues. *EDUCAUSE Quarterly*, 26(2), 12-26.
- CXOToday Staff. (2006). Gartner highlights CIO concerns. *CXOToday*, March 14, 2008.
- DeLisi, P. (1998). *CEOs look at the IT function*. Featured presentation at the CIO Magazine Perspectives Conference, Orlando, FL.

- Dewey, B. I., DeBlois, P. B., & EDUCAUSE Current Issues Committee. (2006). Current IT issues survey report, 2006. *EDUCAUSE Quarterly*, 29(2), 12-30.
- Drabier, R. (2003). Developing a campuswide vision for use of information technology in teaching and learning. In B. Dewey (Ed.), *Leadership, higher education, and the information age* (pp. 3-10). New York: Neal - Schuman.
- Duderstadt, J. J., Atkins, D. E., & Van Houweling, D. (2002). *Higher education in the digital age: Technology issues and strategies for American colleges and universities*. Westport, Ct: Oryx Press.
- Earl, M. J., & Feeny, D. F. (1995). Is your CIO adding value? *McKinsey Quarterly*, (2), 144.
- EDUCAUSE Quarterly Staff. Publication guidelines. *EDUCAUSE Quarterly*, Retrieved April 8, 2008, from <http://connect.educause.edu/eq/contribute>
- Egan, M. (2004). The first 90 days. In D. Lane (Ed.), *CIO wisdom: Best practices from Silicon Valley's leading IT experts* (pp. 35). Upper Saddle River, New Jersey: Prentice Hall.
- Feldman, J. (2003). *IT leadership alchemy*. Upper Saddle River, NJ: Prentice Hall.
- Field, A. (2001). Boardroom strategies & tactics. *CIO Insight*, p.41.
- Fox, B. J. (2004). Communications: Communication excellence in IT management. In D. Lane (Ed.), *CIO wisdom: Best practices from Silicon Valley's leading IT experts* (pp. 71). Upper Saddle River, New Jersey: Prentice Hall.
- Friedman, T. L. (2005). *The world is flat: A brief history of the twenty-first century* (First ed.). New York: Farrar, Straus and Giroux.
- Goldstein, K. L. (2007). Preparing the next IT leaders: Financial management. *EDUCAUSE Quarterly*, 30(2), 61-63.
- Gottschalk, P. (2002). The chief information officer: A study of managerial roles in Norway. *Proceedings of the 35th Hawaii International Conference on System Sciences*, 8, 241.
- Graeser, V., Willcocks, L., & Pisanias, N. (1998). *Developing the IT scorecard*. Wimbledon, London: Business Intelligence Ltd.
- Green, K. *Campus computing 2007*. Claremont, CA: Claremont Graduate University.
- Griffiths, J.M. (2003) *Information technology success and best practices in higher education: 2003 independent research results*. Study and Report for Collegis, Inc., June 2003.

- Gross, G. (2006). Government CIO survey: IT security is top concern. *Network World Online*. Retrieved March 14, 2008, from <http://www.networkworld.com/news/2006/030706-government-cio-survey.html>
- Haggerty, N. (2000) Understanding the link between IT project manager skills and project success research in progress. *SIGCPR 2000*, Evanston, IL.
- Hallet, T., & Mott, R. (2003). Dell's CIO on strategy, skills, Microsoft and more: One of the top IT users in the world opens up to silicon.com. Retrieved June 1, 2003, from Silicon.com: [www.silicon.com/news/500021/1/3769.html](http://www.silicon.com/news/500021/1/3769.html)
- Hawkins, B. (2004). Selecting a CIO. *EDUCAUSE Review*, 39(6).
- Hawkins, B. (2006). 12 habits of successful IT professionals. *EDUCAUSE Review*, 41(1), 57-66.
- Hawkins, B., & Barone, C. A. (2003). Assessing information technology: Changing the conceptual framework. *Organizing and managing information resources on your campus* (Polley A. McClure ed.). San Francisco: Jossey-Bass.
- Hawkins, B., & Oblinger, D. G. (2005). The myth about CIOs. *EDUCAUSE Review*, 40(1), 12-13.
- Hawkins, B., & Oblinger, D. G. (2007). The myth about managing IT: The CIO manages information technology. *EDUCAUSE Review*, 42(2), 10-11.
- Hawkins, B., Rudy, J., & Madsen, J. (2003). *EDUCAUSE core data service 2002 summary report*.
- Hill, A. (2007). Architecture, portfolio management, organizational development -- integrated foundations for strategy realization. In J. Stenzel (Ed.), *CIO best practices: Enabling strategic value with information technology*. Hoboken, New Jersey: John Wiley & Sons, Inc. p. 43.
- Hoffman, T. (2007). Recruitment issues top CIO concerns: Study. Retrieved March 14, 2008, from Computer World New Zealand: <http://computerworld.co.nz:80/news.nsf/printer/BE934DBDC2F61043CC257372000492CE>
- Hogue, W. F., & Dodd, D. W. (2006). Professional development for aspiring CIOs. *EDUCAUSE Quarterly*, 29(3), 49-50.
- Hogue, W. F., & Pringle, E. M. (2005). What's next after you say hello: First steps in mentoring. *EDUCAUSE Quarterly*, 28(2), 50-52.



- Hoyle, R. H. (1999). *Statistical strategies for small sample research*. Thousand Oaks, CA: Sage.
- Hugos, M. (2007). Harnessing IT to drive enterprise strategy. In J. Stenzel (Ed.), *CIO best practices: Enabling strategic value with information technology* (p. 1). Hoboken, New Jersey: John Wiley & Sons, Inc.
- Hugos, M., & Stenzel, J. (2007). Managing for returns on IT investments. In J. Stenzel (Ed.), *CIO best practices: Enabling strategic value with information technology* (p. 321). Hoboken, New Jersey: John Wiley & Sons, Inc.
- Jackson, G. A. (2004). A CIO's question: Will you still need me when I'm 64? *The Chronicle of Higher Education*, Volume 50, Issue 21, Page B22.
- Kaplan, R. S., & Norton, D. P. (1996). *The balanced scorecard: Translating strategy into action*. Boston: Harvard Business School Press.
- Katz, R. N., Kvavik, R. B., Penrod, J. I., Pirani, J. A., Nelson, M. R., & Salaway, G. (2004). Information technology leadership in higher education: The condition of the community. *EDUCAUSE Center for Applied Research Study*, 1.
- Kelly, T. D., & Sharif, N. M. (2005). Understanding the mindset of higher education CIOs. *EDUCAUSE Quarterly*, 28(4), 33-43.
- Kotter, J. P. (1990). What leaders really do. *Harvard Business Review*, 68(May/June), 103-104.
- Kuo, K. (2000). The power of mentoring. *EDUCAUSE Review*, 35(2), 8-11.
- Kwak, M. (2001). Information technology: Technical skills, people skills: It's not either/or. *MIT Sloan Management Review*, 42(3), 16.
- Lane, D. (2004). Foreword. In D. Lane (Ed.), *CIO wisdom: Best practices from Silicon Valley's leading IT experts* (pp. xxv). Upper Saddle River, New Jersey: Prentice Hall.
- Lawler III, E. E. (2007). Why HR practices are not evidence-based. *Academy of Management Journal*, 50(5), 1033.
- Leslie, K., Loch, M. A., & Schaninger, W. (2006). Managing your organization by the evidence. *The McKinsey Quarterly*, (3), 65.
- Lin, G. (2004). The tao perspective. In D. Lane (Ed.), *CIO wisdom: Best practices from silicon valley's leading IT experts* (p. 51). Upper Saddle River, New Jersey: Prentice Hall.

- Lineman, J. P. (2005). *The chief information officer in higher education: A study in managerial roles*. Unpublished doctoral dissertation, Capella University.
- Lineman, J. P. (2007). The corporate CIO model and the higher education CIO. *EDUCAUSE Quarterly*, 30 (1), 4-5.
- Luftman, J., Papp, R., & Brier, T. (1999). Enablers and inhibitors of business-IT alignment. *Communications of the Association for Information Systems*, 1(11), 1-33.
- Maltz, L., DeBlois, P. B., & EDUCAUSE Current Issues Committee. (2005). *Trends in current issues, 2000–2005* EDUCAUSE.
- Maughan, G. (2001). Communication and information systems infrastructure. In G. Maughan (Ed.), *Technology leadership: Communication and information systems in higher education* (pp. 17-28). San Francisco, CA: Jossey-Bass.
- McGee, M. K. (2006, September 18). What keeps CIOs awake at night? Old and new worries, says survey. *Information Week*.
- McKenna, R. (2004). Foreword. In D. Lane (Ed.), *CIO wisdom: Best practices from Silicon Valley's leading IT experts* (pp. xix). Upper Saddle River, New Jersey: Prentice Hall.
- Meester, G. (2004). IT organization. In D. Lane (Ed.), *CIO wisdom: Best practices from Silicon Valley's leading IT experts* (p. 95). Upper Saddle River, New Jersey: Prentice Hall.
- Moberg, T., Bucher, J., Horgan, B., Paterson, R., & Todd, D. (2000). CIOs on the move. *EDUCAUSE Quarterly*, 23(3), 20-25.
- Nelson, M. R. (2003). The CIO in higher education: Leadership, competencies, effectiveness. *EDUCAUSE Center for Applied Research*, 33 (22), 1-13.
- Nelson, M. R., & Green, M. W. (2003). *Study on higher education information management and leadership: Questionnaire results*, working paper, Lally School of Management and Technology at Rensselaer Polytechnic Institute.
- Niven, P. (2007). IT performance management using the balanced scorecard. In J. Stenzel (Ed.), *CIO best practices: Enabling strategic value with information technology* (p. 185). Hoboken, New Jersey: John Wiley & Sons, Inc.
- North Dakota Information Technology Department Staff. *Definition of information technology*. Retrieved April 28, 2008, from <http://www.nd.gov/itd/planning/definition.html>
- Penrod, J. (2001). Observations from a four time CIO. Presentation at EDUCAUSE Seminar on Academic Computing, Snowmass Village, CO.

- Penrod, J. (2003). Building an effective governance and decision-making structure for information technology. In P. McClure (Ed.), *Organizing and managing information resources on your campus* (pp. 15-28). San Francisco, CA: Jossey-Bass.
- Pfeffer, J. (1999a). Seven practices of successful organizations part 1. *Health Forum Journal*, 42(1), 24-27.
- Pfeffer, J. (1999b). Seven practices of successful organizations part 2. *Health Forum Journal*, 42(2), 55-57.
- Pfeffer, J. (2007a). *Testimony submitted for the record for United States House of Representatives committee on oversight and government reform*, from [http://www.evidence-basedmanagement.com/research\\_practice/commentary/pfeffer\\_congressional\\_testimony\\_08mar2007.pdf](http://www.evidence-basedmanagement.com/research_practice/commentary/pfeffer_congressional_testimony_08mar2007.pdf) .
- Pfeffer, J. (2007b). *What were they thinking?* Boston, Massachusetts: Harvard Business School Press.
- Pfeffer, J., & Sutton, R. I. (2008a) *Evidence-based management*. Retrieved March, 24, 2008a, from <http://www.evidence-basedmanagement.com/>
- Pfeffer, J., & Sutton, R. I. (2008b) *Evidence-based management movements*. Retrieved March, 24, 2008b, from <http://www.evidence-basedmanagement.com/movements/index.html>
- Pfeffer, J., & Sutton, R. I. (2006a). Evidence-based management. *Harvard Business Review*, 84(1), 62-74.
- Pfeffer, J., & Sutton, R. I. (2006b). Profiting from evidence-based management. *Strategy & Leadership*, 34(2), 35.
- Pfeffer, J., & Sutton, R. I. (2006c). A matter of fact. *People Management*, 24-30.
- Pfeffer, J., & Sutton, R. I. (2006d). Benchmarking: Dangerous half truths. *CriticalEYE REVIEW: The Journal of Europe's Centre for Business Leaders*, (15), 1-5.
- Pfeffer, J., & Sutton, R. I. (2006e). Act on facts, not faith. *Stanford Social Innovation Review*, 39-47.
- Pfeffer, J., & Sutton, R. I. (2006f). The real brain teaser. *People Management*, 12(8), 28.
- Pfeffer, J., & Sutton, R. I. (2006g). Sometimes less is more. *Leadership Excellence*, 23(3), 14-15.
- Pfeffer, J., & Sutton, R. I. (2006h). *Hard facts dangerous half-truths and total nonsense*. Boston, Massachusetts: Harvard Business School Press.

- Pfeffer, J., & Sutton, R. I. (2007). Suppose we took evidence-based management seriously: Implications for reading and writing management. *Academy of Management Learning & Education*, 6(1), 153-158.
- Pfeffer, J., & Veiga, J. F. (1999). Putting people first for organizational success. *The Academy of Management Executive*, 13(2), 37-47.
- Pirani, J. A. (2004). *Information technology alignment in higher education*, EDUCAUSE Center for Applied Research, 1-10.
- Poley, J. (2001). Leadership. In G. Maughan (Ed.), *Technology leadership: Communication and information systems in higher education* (pp. 83-94). San Francisco, CA: Jossey-Bass.
- Post, G. V., & Anderson, D. L. (2003). *Management information systems: Solving business problems with information technology*. San Francisco: McGraw-Hill Irwin.
- Prewitt, E. (2005, February 1). What will it take for CIOs to succeed in 2005? *CIO Magazine*, 37.
- Reich, B. H., & Nelson, K. M. (2003). In their own words: CIO visions about the future of in-house IT organizations. *The DATA BASE for Advances in Information Systems*, 34(4), 28-44.
- Renaud, R., & Murray, A. (2003). Organizing for leadership: How university libraries can meet the leadership challenge in higher education. In B. Dewey (Ed.), *Leadership, higher education, and the information age* (pp. 163-180). New York: Neal-Schuman.
- Robbins, S., & Pappas, A. (2004). Within and beyond: Understanding the role of the CIO. In D. Lane (Ed.), *CIO wisdom: Best practices from silicon valley's leading IT experts* (p. 1). Upper Saddle River, New Jersey: Prentice Hall.
- Ross, J. W., & Weill, P. (2002). Six IT decisions your IT people shouldn't make. *Harvard Business Review*, 80(11), 84-91.
- Rothfeder, J., & Driscoll, L. (1990, February, 26). CIO is starting to stand for 'Career is over'. *Business Week*, (3147) 78-80.
- Rousseau, D. (2006). Is there such a thing as "evidence-based management"? *Academy of Management Review*, 31(2), 256-269.
- Rousseau, D., & McCarthy, S. (2007). Educating managers from an evidence-based perspective. *Academy of Management Learning & Education*, 6(1), 84-101.

- Sabherwal, R., & Kirs, P. (1992). The alignment between organizational critical success factors and IT capability in academic institutions. *Decision Sciences*, 25(2), 301.
- Schaffer, C. J. (2004). The formal educational and career experiences perceived to be important for the success of a CIO in higher education. Unpublished doctoral dissertation, The University of Toledo.
- Schubert, K. D. (2004). *CIO survival guide the roles and responsibilities of the chief information officer*. Hoboken, New Jersey: John Wiley & Sons, Inc.
- Seddon, P. B., Graeser, V., & Willcocks, L. P. (2002). Measuring organizational IS effectiveness: An overview and update of senior management perspectives. *The DATA BASE for Advances in Information Systems* 33, (2), 11-28.
- Smaltz, D. (1999). *Antecedents of CIO effectiveness: A role-based perspective*. Unpublished Doctoral, Florida State University.
- Smet, A. D., Loch, M. A., & Schaninger, W. (2007a). The link between profits and organizational performance. *The McKinsey Quarterly*, (3), 6-8.
- Smet, A. D., Palmer, R., & Schaninger, W. (2007b). *The missing link: Connecting organizational and financial performance*. Unpublished manuscript.
- Smith, G. S. (2006). *Straight to the top: Becoming a world-class CIO*. Hoboken, New Jersey: John Wiley & Sons, Inc.
- Stenzel, J. (Ed.). (2007). *CIO best practices: Enabling strategic value with information technology*. Hoboken, New Jersey: John Wiley & Sons, Inc.
- Stenzel, J., & Stenzel, C. (1997). Implementing IT performance measurement: An interview with Dr. Bruce Kavan. *Journal of Strategic Performance Management* 1, (6), 14.
- Synott, W. R., & Gruber, W. H. (1981). *Information resource management: Opportunities and strategies for the 1980's*. New York, New York: John Wiley and Sons.
- Vavra, M., & Lane, D. (2004). Strategic planning. In D. Lane (Ed.), *CIO wisdom: Best practices from Silicon Valley's leading IT experts* (pp. 223-251). Upper Saddle River, New Jersey: Prentice Hall.
- Waggener, S., & Zoppi, S. (2004). The metrics of IT: Management by measurement. In D. Lane (Ed.), *CIO wisdom: Best practices from Silicon Valley's leading IT experts* (pp. 355). Upper Saddle River, New Jersey: Prentice Hall.
- Wang, C. (1997). *Techno vision 2*. New York: McGraw-Hill.

- Ward, D., & Hawkins, B. (2003). Presidential leadership for information technology. *EDUCAUSE Review*, 38(3), 36-47.
- Ware, L. (2003a). By the numbers. *CIO*, 20.
- Ware, L. (2003b) The state of the CIO 2003. *CIO*, 67.
- Webb, M. (2004). Foreword. In D. Lane (Ed.), *CIO wisdom: Best practices from Silicon Valley's leading IT experts* (pp. xxiii). Upper Saddle River, New Jersey: Prentice Hall.
- Weill, P., & Ross, J. W. (2004). *IT governance: How top performers manage IT decision rights for superior results*. Cambridge: Harvard Business School Press.
- Weill, P., & Woodham, R. (2002). *Don't just lead, govern: Implementing effective IT governance*, No. CISR WP No. 326, Cambridge, Massachusetts: MIT Sloan School of Management.
- White, T. (2001). Reinventing the IT department. Woburn, MA: Butterworth-Heinemann.
- Worthen, B. (2002). And now for the good news. *CIO Magazine*, 54-59.
- Zastrocky, M., & Schlier, F. (2000). The higher education CIO in the 21st century. *EDUCAUSE Quarterly*, (1), 53-59.