Structures and Relationships between the Business Executive and Information Technology Executive at the University: A Mixed Methods Study

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STRUCTURES AND RELATIONSHIPS BETWEEN
THE BUSINESS EXECUTIVE AND INFORMATION TECHNOLOGY EXECUTIVE
AT THE UNIVERSITY: A MIXED METHODS STUDY

by

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A DISSERTATION

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This study uses an explanatory mixed methods methodology to attempt to determine the reporting relationships between business and IT executives within the university. The study also explores IT and business executives thoughts on these relationships. Supporting research from organizational studies and business-IT alignment is combined in order to enhance the study. In the first quantitative phase, an exploratory factor analysis is used to determine organizational dimension factors while simple response and frequency analysis are used to model the top occurring organizational structures between IT and business executives. The second qualitative phase used semi-structured interviews with 12 random CIOs and CFOs to further explore the top three models and organizational dimensions.

The study found that while CIOs and CFOs said that the organizational structure was not important, a place on the executive team was highly desired. This was further supported by the exploratory factor analysis in phase 1. Other findings indicated that the university environment is unique from that of private industry with the additional component of academia and often combined position of the CFO. The changing role and function of IT was noted by both CFOs and CIOs which has led to the need for IT to be highly involved in university strategy as well as the need for more collaboration with internal and external stakeholders. The findings in this study echo some of the previous findings in business-IT alignment and organizational study research.
Universities should reflect on these findings since reporting relationships between business and IT are affecting the academic environment as well as private industry.
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CHAPTER 1 – INTRODUCTION

Information technology (IT) can be defined as “the capabilities offered by computers, software applications, and telecommunications” (Davenport & Short, 1990, p. 1). These capabilities have rooted themselves in everything as technology continues to grow at an astronomical rate. The change within IT has grown rapidly. Ten years ago, IT was considered a tool that was used in business operations. IT was considered by most people as a part of operations similar to processes used to keep the lights in a building functioning. Now, technology is not just a tool, but a digital way of communicating, storing, processing and transferring most information. In 2007, ninety-four percent of the world's information was found to exist in a digital format stored in IT devices (Hilbert & Lopez, 2011). IT is an important part of the everyday person's life through the use of cell phones, satellite television, and the Internet; however, IT is even more important in the process of business. Businesses and higher education institutions of all kinds use IT in everything.

But IT cannot be defined in a finite, static list of items. To understand how intertwined IT is in a business person's life, let's define an example. Bob, a university professor, walks in to his office building on campus talking on his cell phone. After hanging up the call, he immediately texts his wife to make sure she got safely to work. Reaching his office, Bob sits down and cracks open his laptop, which instantly connects to the Internet. He accesses his email and then goes onto the campus courseware system to update some online content for his class. In these five minutes, Bob has made numerous IT connections through his cell phone and laptop touching hundreds of IT devices managed by various IT personnel on-campus as well as off-campus. He has also instantly accessed incoming communication from his contacts through email and connected with his students through the updating of the online courseware. Clearly, in Bob's case, if any part of IT was affected, Bob's ability to work or communicate effectively would be severely
impaired. In fact, since IT is used to perform most business processes, IT has been shown to have an impact on business's bottom line (Brynjolfsson & Hitt, 1996; Luftman, 2000, 2004; Xue, Ray & Sambamurthy, 2012).

To define the line drawn between business and IT, one should imagine IT as the technical group that works on the systems, software, and all connections to the Internet while the business group is the group of people concerned with business operations—financial as well as day-to-day business policy. In a typical company, the IT group may be consolidated into one department but would consist of individuals with technical expertise to take care of computer-type software, hardware, servers, networking issues—usually regarding the Internet or a company's intranet—helpdesk and support issues surrounding technology. On the other hand, the business group may be spread among several departments—such as budgeting and operations.

In a university setting the groupings are similar, the IT group may consist of several technical groups all dedicated to computing, networking, software problems and support issues while the business group could be described as administration consisting of financial officers, business officers as well as vice chancellors or vice provosts. Not only can IT have an impact on a business's bottom line, but higher education institutions, as well, have felt the outcomes of IT in relationship to business processes. Because IT holds a strong place in influencing business processes in a university as well as a business’s bottom line in industry, many researchers have begun to examine an alignment between business and IT groups.

Many articles and case studies have concluded that the alignment of business and IT has an effect on an organization's performance (de Leede, Looise & Alders, 2002; Irani, 2002; Kearns & Lederer, 2003) so understanding alignment could directly relate to having a quality higher education system. Reich and Benbasat (2000) define business-IT alignment as “the degree to which the information technology mission, objectives and plans support and are supported by the business mission, objectives and plans” (p. 82). Business-IT alignment suggests that the missions
and objectives of business and IT should be cohesive and parallel. Luftman, Papp and Brier (1999) propose that alignment is “applying IT in an appropriate and timely way, in harmony with business strategies, goals and needs” (p. 3). Furthermore, Galliers (1993, 1999) and Ciborra (1997) found that if the strategic alignment of business and IT is achieved, IT's effectiveness will be positively influenced, which will then lead to more profits on the business end. In other words, if the business and IT units could be aligned in their missions or structures, the organization, as a whole, could be more successful.

Because of the effect business-IT alignment has on an organization, many models have been created to study the alignment of the two groups, business and IT. Henderson & Venkatraman (1990) created the SAM (Strategic Alignment Model) as a framework to measure the alignment between business and IT. Further studies found more support for the SAM model (Maes, Rijsenbrij, Truijens & Goedvolk, 2000; Avison, Jones, Powell & Wilson, 2004). Luftman (2004, 2010) created the SAMM (Strategic Alignment Maturity Model) to further SAM framework to measure the maturity of the business and IT alignment and its effect on business processes. Many researchers succeeding Luftman extended the SAMM by examining projects and incorporating more strategic and functional layers (Avison et al., 2004; Khaiata & Zualkernan, 2009; Maes, et al., 2000). Other frameworks aside from SAMM were also developed to further examine IT and business alignment including a business scorecards system (Huang & Hu, 2007; Wong, Chiang, & McLeod, 2009). However, these static models often failed to replicate the diversity of IT and business scenarios that exist within higher education and industry. Because the vary nature of technology is often characterized by innovations, which breeds rapid changes, working towards a static model that has fixed outcomes might be the wrong framework (Chan & Reich, 2007).

Although many models and frameworks exist to attempt measurement of the alignment, the complexities of IT and business may not neatly fit within a static model. Too many dynamic
factors exist in the relationship between IT and business (Levy, 2000; Shpilberg, Berez, Puyear & Shah, 2007; Tallon & Kraemer, 2003). Gartner, a leading research company in the information technology arena, recently published the top ten priorities for IT executives (i.e. Chief Information officers or CIOs) and non-IT executives (i.e. Chief Executive Officers or CEOs) gathered through an extensive survey (Pettey & Goasduff, 2012). The completely different priorities among the business executives and IT executives illustrates that although the two groups seem to be intertwined by technology, their goals and missions are different in all other aspects.

By stepping away from the idea of a static model, Chan (2002) suggests that perhaps the entanglement between business-IT alignment can be broken down into two separate categories: strategic and structural. Chan's strategic alignment component mirrors the overarching goal of business-IT alignment and “focuses on the fit between priorities and activities of the IS [IT] function and those of the business unit” (p. 98). However, the second component, structural alignment, concentrates on the organizational structure through reporting and decision-making relationships as well as location and deployment of the IT team. Keying off of Chan's components—strategic and structural, both components hold vast interest within the realm of a four-year university system. Mostly bureaucratic in structure (Weingartner, 2011; Birnbaum, 1988), universities have only recently appeared to have noticed the importance of the IT staff and some have responded by appropriating the term CIO to the executive of the IT group (Educause, 2009; Young, 2010). However, simply changing the name of the position may not be enough. Other aspects may need to be explored in order to make IT an integral part of the university business.

Purpose of the Study

The purpose of this mixed-methods study is to examine the components influencing the reporting relationships of business and IT by looking specifically at the business executive officer
and IT executive officer positions at universities. Because business-IT alignment is complex, one component of business-IT alignment known as structural alignment will be examined. Throughout this study, the term structural alignment will be used interchangeably with the term reporting relationships for easier reference. Looking in-depth at the reporting relationships should help contribute to the whole of business-IT alignment research which can benefit not only universities but also private industries.

In the first quantitative phase of this explanatory, mixed methods study, statistical results were obtained by gathering data on the hierarchical organizational charts of four-year institutions across the United States. The data were gathered based on organization structure variables from Pugh, Hickson, Hinings & Turner (1968) and then compared with two forms of exploratory analyses. The second, qualitative phase, will take an in-depth look at the reporting relationships between business and IT executives through interviews and document collection in an attempt to explain the quantitative results.

**Theoretical Perspective**

Due to the overlapping nature of organizational studies and business-IT alignment research (Chan, 2001; Orlikowski & Barley, 2001), two main theories were used as a framework. Functional role structure in bureaucracies from organizational theory (Parsons, 1960; Evan, 1993) was drawn upon to support the notion that roles are differentiated by levels and that the higher levels of a hierarchy may provide additional benefits. Second, Chan's model of structural and strategic alignment (Chan, 2002; Sabherwal & Chan, 2001) was used to integrate the idea of functional role structure into the realm of business-IT alignment. These two main theories will be combined to form the overarching theoretical perspective for this research study.

In the first main theory, Parsons (1960) noted the flow of formal authority through a hierarchical, pyramidal type of network. He suggests that the upper level of an organization gives
more authority and prestige to the roles—different job functions within an organization. The roles of a university are distinctly different from that of a private business because of the inclusion of academics. Academics plays a large part in defining a variety of expertise at the technical level and adding an additional role component of academics at the managerial level (Parsons, 1960). Although at the university, the roles within the levels are different from that of a private business, the idea of authority remains the same (Parsons, 1960). Connecting to the idea of the prestige and authority at the managerial level, Evan (1993) adds that the reporting relationships between the executives at the managerial level give them additional opportunities that the lower level roles do not have. The relationships between executives give them the ability to strategize and listen to ideas that represent the whole of the organization not only just among themselves but also in collaboration with external bodies. Evan (1993) believed that these key interactions greatly enhanced the ability of the executives to operate within their respective roles. Since IT is intertwined with the big picture of an organization like the university, IT may benefit from a spot on the executive team creating a more effective strategy and organizational structure.

In the second main theory, Chan, Huff, Copeland, and Barclay (1997) studied the idea that information technology (referred to as information systems [IS] in this article) should complement the business strategy. In order to explore alignment, a survey was created off an existing SAM model (Henderson & Venkatraman, 1999; Venkatraman, 1989). The results indicated that strategic alignment with IT does have an effect on business performance and, furthermore, IT and business should be intertwined in future planning processes. With the IT executive residing in a variety of different positions and layers of an organization like a university, bringing IT together with business may prove difficult depending on the organizational structure.

In order to begin intertwining business and IT together, Sabherwal & Chan (2001) used a business organization performance model developed by Miles and Snow (1978) to compare and
contrast business strategies with alignment strategies. By incorporating business and IT strategies together, Sabherwal and Chan (2001) sought to find which business typology was more supportive of the alignment between business and IT groups. The business typologies developed by Miles and Snow (1978) incorporated not only business strategy angles but also business structure. The correlated results showed that different business typologies needed different IT strategic approaches (Sabherwal & Chan, 2001). This implies that strategy does not only influence structure but that structure may also influence strategy (Galbraith, 1972; Habib & Victor, 1991). Drawing on strategy as well as structure, Chan (2002) attempted to redefine strategic alignment and introduce structural components, as well. When looking at the structural alignment, Chan (2002) found that the organizational structure had an effect on overall alignment strategy.

The idea that business theory can be combined with business-IT alignment theory was recognized by Sabherwal and Chan (2001) as well as Orlikowski and Barley (2001). As such, organization structure theory (Evan, 1993; Parsons, 1960) will be combined with Chan's (2002) model of structural alignment to further add to research on business-IT alignment. In this study, structural alignment—also known as reporting relationships—is seen as one component of a complex theory known as business-IT alignment. So although business-IT alignment may be referenced, it will not be the overarching goal of the study. In addition to contributing to business-IT alignment research, previous studies have failed to examine the unique higher education environment. Although universities have an academic focus, the idea of business and IT working together to accomplish the mission is just as prevalent in the university environment as in private industry.
Statement of the Problem

Within the academic confines of the university system, a quick perusal of a university's executive level organization chart finds the IT group's presence noticeably lacking with a much heavier emphasis on business, academics, external relations and athletics categories (Bess & Dee, 2008; Weingartner, 2011). Since IT has become so important and intertwined within the university, further examination of the executive structure of the four-year university is needed. In looking at the importance of the executive structure, Weber (1992) explains that the placement of position and level within a hierarchical organizational structure—such as bureaucratic structure—implies authority. The higher the level in the hierarchical organizational structure, the greater the authority (Gouldner, 1954; Katz & Kahn, 1966; Merton, 1968). Because IT executives may lack placement within the same level and position as the business executives, IT may be perceived by business as lacking the same importance and, as a result, may not have the proper reporting relationships (Chan, 2002). Without the proper reporting relationships, decision-making abilities between IT and business may not be effective, leading to bad decisions and inefficient performance.

Many studies (for example, Luftman, 2004, 2000; Venkatraman, 1999) have attempted to quantify the relationship between business and IT through quantitative instruments and methods. Because of the complexity that exists around the reporting relationships between business and IT, a strict, quantitative study proved inadequate. A more detailed look at the reporting relationships that surround the business and IT groups at the university was deserved.

Research Objectives

The central guiding research objective for the entire study is:

- To determine the reporting relationships and then explore IT and business executives thoughts on these relationships at 4-year universities.
In order to target quantitative objectives for phase 1, sub-objectives that stem from the main objective are:

- To examine the relationship between variables in hierarchical organizational structures with the IT and business executives at 4-year universities.
- To model different hierarchical organizational structures between IT and business executives at 4-year universities.

The research sub-objectives for Phase 2, which were built upon results from Phase 1, are:

- To explore how IT and business executives think about organizational structure and relationships at 4-year universities.
- To explore other factors that may have a greater affect on reporting relationships between the IT and business executives at 4-year universities.

**Definitions and Terms**

*Business executive* – Executive, administrative, president or department head in charge of many business functions. At a university, often this person is the vice chancellor (or vice provost) of business and finance.

*Business groups* – Business groups are divisions, sections or departments of people within a business, organization or university. These groups of people are typically associated with the finance, project management or budgeting operations. Depending on the company's size, the CFO (chief financial officer) or CEO (chief executive officer) may be in charge of this group. In the university setting, this group is typically lead by a chief business officer sometimes referred to as the Vice Chancellor of Business.

*Business processes* – Business processes are a series of actions that are taken to complete a task or produce a product or service.
Business-IT alignment – Business-IT alignment can be defined as “the degree to which the information technology mission, objectives and plans support and are supported by the business mission, objectives and plans” (Sabherwah & Chan, 2001). Luftman and Kempaiah (2007) also point out that many studies concentrate on how IT is in sync or aligned with business but that “alignment must also address how business is aligned with IT; IT can both enable and drive business change” (pg. 166).

Chief Information Officer (CIO) – Executive officer in charge of the all functions of the IT department or division and is sometimes referred to as the IT manager or IT director. This position is titled CIO at 56 percent of the time, director of IT at 16 percent, vice president of IT at 7 percent and chief technology officer (CTO) at 6 percent (CIO magazine, 2010).

Chief Executive Officer (CEO) – Executive officer in charge of all functions of the business division. Many times the CEO is referred to as the visionary for the company; the CEO directs and guides the company along their future path making major business decisions. Sometimes referred to as the project manager or the business manager.

Chief Financial Officer (CFO) – Executive officer in charge of all functions of the financial business division. Many times the CFO oversees budgeting, large projects and finances.

Information technology (IT) – Information technology can be defined as “the capabilities offered by computers, software applications, and telecommunications” (Davenport & Short, 1990). Information technology encompasses a wide range of functions in an organization including management of the Internet and all network connections, implementation of all business process software (whether through in-house hardware/software or outsourcing), and management of all the different IT people. Sometimes also referred to as information systems (IS).

IT executive(s) – Executive, administrative, president or department head in charge of many IT functions. At a university, this person has many titles ranging anywhere from chief
information officer (CIO) to Vice Chancellor of Information Technology (IT). The lower level IT executive positions have titles like assistant vice chancellor of IT or director of information technology.

*IT groups* – IT groups are divisions, sections, or departments of people within a business, organization, or university. These groups of people are focused on technical aspects like server management, helpdesk/support functions or computer programming.

*Non-IT executives* – Executive, administrative, president, or department head that is in charge of non-IT functions such as project or operations management, business management, or financial management. At a university, often this person is a vice chancellor or vice provost of business and finance.

*President* – This is the position title of the head of the entire university or college. This position is also used interchangeably with Chancellor. The equivalent in private industry would be CEO.

*Reporting relationships* – These relationships encompass the static organizational structure as well as the more dynamic dotted lines and informal relationships that can occur through roles. This is used synonymously with structural alignment.

*Strategic alignment* – Refers to the fit or alignment of the functions and goals of the business and IT groups. The idea is to make sure that IT is using and implementing technology into the organization in order to meet the missions and goals of the company.

*Structural alignment* – Refers to the positioning or role of IT in relation to business within the organizational structure and how this influences and affects the alignment of business-IT as a whole. A good structural alignment will allow IT and business to freely collaborate with one another. This term is used synonymously with reporting relationships.

*Vice Chancellor or Vice Provost of Business and Finance* – This is a CFO equivalent position within the higher education system. This position can also be called Vice Chancellor or
Vice Provost of Business Affairs or Vice Chancellor or a similar title.

_Vice Chancellor or Vice Provost of Technology_ – This is a CIO equivalent position within the higher education system.

**Possible Limitations of the Study**

Limitations of the study could include:

- The researcher has a background in IT which could introduce a bias into both quantitative and qualitative parts of the study.
- Although the sample is complete within the characteristics chosen, the sample size of universities is not large due to time constraints.
- A lack of current and complete organizational charts in the online search can potentially limit the data available for collection.

**Significance of the Study**

The present study can greatly contribute to this immature area of research. No existing studies have studied IT and business executives by combining aspects from IT research and organization theory in the university environment to this researcher's knowledge. Performing the research within this population may allow business and IT groups to understand more about the business and IT executive relationship. This study can also be used by the business and IT groups to identify factors within their organizational structure that may help the groups communicate better.

The mixed methods design of this study can also contribute interesting insight. Quantitative research is scattered in this genre and mixed methods research is very sparse. The need for continued research of both kinds—qualitative and quantitative—has been stressed in
Luftman (2004), Luftman and Kempaiah (2007), Chan (2002), and de Leede, et al. (2002) as well as Avison, et al. (2004). This study presents both qualitative and quantitative methods with a unique focus on reporting relationships at the higher education level.
CHAPTER 2 – LITERATURE REVIEW

Literature from the past 20 years was scoured to find material applicable to the problem at hand. Searches included the key terms such as business-IT alignment; gap business IT; gap business information technology; information technology management; organizational structure; role theory; position organizational structure and IT management. This review of literature is not meant to be a complete collection on the past 100 years of organizational structure theory but rather a collection that is relevant to business-IT alignment as well as the university environment. The literature review starts with a review of the unique university organizational and administrative structure as well as some highlights on higher education as a business model. The second section contains a review of business-IT alignment models and different business-IT components. The third section of organizational structure highlights the model of bureaucracy; hierarchical organization structure, strategy and roles; and implied authority through reporting relationships. The final section brings together the three sections with a final review on literature that intertwines the different genres uniting university, business-IT alignment and organizational structure research together.

The Unique University

University organizational structure. The organizational structure of the university is unique (Callan, 1997; Cole, 2004; Donoghue, 2008). Oftentimes, the shared governance model is touted as the structure under which faculty and administration are governed (Bergquist, 2007; Birnbaum, 1988; Nelson, 2010; Weingartner, 2011). However, shared governance is really only one piece of the governing model. According to Nelson (2010), “Academic freedom, shared governance, and tenure together support the higher education system we have had in place for over half a century” (p. 31). Nelson (2010) quotes an unpublished paper by Robert Birnbaum that
examines the academic and administrative sides of the universities. Both the academic and administrative sides of higher education are very important with the administrative side controlling all of the legalities and the faculty side controlling the instruction. Although some naysayers of the shared governance university model say that a centralized, corporate model would be more efficient, the Association of Governing Boards (AGB) argues in its report that in order for shared governance to work, it simply must be understood by both parties—administration and faculty (Schwartz, Skinner & Bowen, 2009). In fact, the shared governance is needed in the higher education environment as the faculty are the most well equipped to deal with tenure, curriculum and accreditation issues while the administration is better equipped for finance, endowments and other budgeting issues (Nelson, 2010).

In Bergquist and Pawlak's (2007) examination of the university, six main cultures were identified within the faculty side as well as leadership techniques on how to engage the cultures. Faculty need authority to be able to hire the best teachers and fire those who are non-performers; faculty need to be able to control the curriculum and guarantee free speech in the classroom in order to promote learning; and faculty need to be assured through tenure that they will be free to keep doing what is best for their program, department and campus (Birnbaum, 1988; Nelson, 2010).

In the same token that faculty need authority, the administration also needs authority. The administrative bodies on campus have a clear line of sight when it comes to efficient and productive business practices. So, in the best interest of everyone on the university campus, the administration may need to go against an academic committee or come to a different conclusion on a policy. However, there is a fine line between holding power and using power wisely. Nelson (2010) reminds the administration, “The further one gets from department life, however, the greater the risk of misjudgment when power is exercised outside systems for peer review” (p. 40). Weingartner (2011) also states that good university administration comes from making decisions
based on the collective knowledge and mission of the university as a whole. Shattock (2002) says, “Institutions work best when governance is seen as a partnership between the corporate and the collegial approaches, and where a sense of common purpose informs the balance of the relationship” (p. 243). Both faculty and administration must be united in their goals for the institution and understand that they must act for the good of all on the campus and not just themselves.

With both sides of the university depicted—administrative and faculty, the organizational structure is still represented hierarchically. Weingartner (2011) states that the university population is highly unique in that it is made up of four distinct groups of individuals: faculty, students, administration and professional staff. The apex of such a hierarchical structure is depicted in three sections, “the first taking up the very top of the pyramid; the second devoted to a selection of administrators who, most sensibly, report directly to the president; and the third devoted to the president's own staff” (p. 15). Within this discussion, Weingartner (2011) refers to the head of the university at the very top of the pyramid or level one as compared to the CEO of a company. Although there are distinct differences between a CEO of a large company as compared to the president of a university, Weingartner (2011) chooses the acronym, CEO, to describe the head of the university as collaborating and directing the mission of the entire university system. The next level—level two—of the apex of the hierarchy, contains different administrators that supervise different divisions within the university. The different administrators are classified as chief academic officer, chief operating officer (in charge of budgetary and business processes), athletics director, external relations director and legal counsel director (Weingartner, 2011). IT and library units are mentioned in passing as units that must support the university mission. An example of a university organizational chart, as depicted by Bess and Dee (2008), is shown in Appendix A.

Similar to Miles and Snow's (1978) description of four different types of organizations,
Birnbaum (1988) describes four different types of university organizations. These four different models (Table 1) are “the bureaucracy, the collegium, the political system and the organized anarchy” (p. 175). Birnbaum states that the four models “reflect our need to impose order and meaning on equivocal events and thereby help us believe that we truly understand the internal operations of colleges and universities” (p. 175). The first of such institutions is the collegial institution. Within this institution, the faculty and administration all have academic degrees—advanced or professional. Birnbaum (1988) claims that this helps to proliferate the idea of shared governance and de-emphasize the organizational chart. At this type of four-year university, the administration and faculty operate in tandem referring to one another affectionately. Here at the collegial institution—referred to as Heritage College—culture is emphasized and administration and faculty share equally in the decision-making processes. Heritage College is upheld as the ideal institution for both a working and learning environment (Birnbaum, 1988).

The next institution is referred to as a bureaucratic institution and is referred to as the People's Community College—a 2-year public institution. Working through the same categories, Birnbaum (1988) depicts how the organizational chart (Appendix A) is much more emphasized in such an institution. Rules and regulations are also highly enforced as is rational behaviors. Processes must follow step-by-step instructions involving certain offices in the hierarchy and most certainly, a fair share of paperwork. The third institution mentioned is the political institution known as Regional State University. The workings of this institution are capitalized by small interest groups that like to operate independently but also interact with the other smaller groups when needed. The final institution is that of an anarchical institution known as Flagship University. The anarchical institution is categorized by its unclear mission. This institution seems to operate along many different pathways simultaneously because decision-making processes are left undefined. Birnbaum (1988) compares the anarchical institution to the ideas put forth by Cohen and March (1974).
Table 1

*College Types according to Birnbaum*

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heritage College</td>
<td>Collegial</td>
<td>- Private, 4-year (Ivy League implied)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Emphasis on undergraduate liberal arts &amp; sciences</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Small number of undergraduate students (only top 25%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Many, traditional students</td>
</tr>
<tr>
<td>People's Community</td>
<td>Bureaucratic</td>
<td>- Public, 2-year</td>
</tr>
<tr>
<td>College</td>
<td></td>
<td>- 5,700 non-traditional students</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Emphasis on the college mirroring a business structure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Vocational curriculum</td>
</tr>
<tr>
<td>Regional State University</td>
<td>Political</td>
<td>- Public, 4-year (state university)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 13,500 students (mostly traditional)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Large undergrad emphasis; few professional programs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Mix of students pursuing academic and vocational work</td>
</tr>
<tr>
<td>Flagship University</td>
<td>Anarchical</td>
<td>- Public, 4-year</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- 27,500 students (large mixture of all-types)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Large research &amp; development emphasis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Selective graduate school</td>
</tr>
</tbody>
</table>

*Note.* Adapted from Birnbaum (1988) “How Colleges Work”.

In looking at the four models of institutions, several variables emerge that could influence the structure of an organization. Birnbaum (1988) suggests in these four models that the size of the university may play an influencing role along with the classification of public vs private as well as the 2-year versus 4-year distinction. In discussion of the anarchical institution, a picture was painted of a public institution with a very large population of both undergraduate and graduate students while the collegial institution appeared to be much smaller in nature with a smaller graduate-level student population. This is significant as Birnbaum (1988) appears to suggest that the vision and makeup of the institution influences the ideas behind the
organizational structure and leadership of the institution.

Although Birnbaum (1988) thought that the ideas influenced the structure, Meyer and Rowan (1977) say that formal structures are simply a reflection of the myths developed by the organization rather than shaped by the work activities. This idea suggests that an organization's structure is simply a required document and that the actual managerial structure is loosely coupled. An organizational structure chart represents a picture of inefficiency to Meyer and Rowan (1977). Weick (1976) identifies with loose coupled systems by stating that indicators of loosely coupled systems could be that a situation is observed where several different paths can lead to the same destination; individuals or divisions do not coordinate actions; rules and regulations are absent or very broad; and the organizational network is very connected but actions by individuals and divisions do not necessarily effect one another. Loose coupling activities that occur within organizations point towards a gap that exists between the formal organizational structure and informal work activities and processes.

Ouchi (1977, 1979) believed that the control placed in an organization came in three main types. One of those types was bureaucracy with the control being held through the structure and commonly understood rules. The other two were clans and markets. Clans held control through a socialization process while markets were based heavily on individual controls. Strange and Banning (2001) also believed that many of the control and organizational processes were held outside of the organizational structure. Although the organizational chart was considered representative of the “division of labor” and the “distribution of power”, they strongly felt that the structure and processes were dictated based on many different informal mechanisms (p. 60). Strange and Banning (2001) point out that the arrangement of power can be most clearly seen during a time of scarce resources. They state, “Some of the most revealing moments in organized environments (whether tightly or loosely arranged) come when resources are cut, boundaries of authority are ignored, or someone proposes the development of new programs and practices” (p.
As to the tight or loosely arranged divisions of power and authority, many of these are driven by culture (Barney, 1986; Denison & Mishra, 1995) through different artifacts, the defined behaviors, values and assumptions of an organization or grouping within an organization. Strange and Banning (2001) believe that many of the cultural divisions within a university can be driven and segmented at the department level.

**University as a business model.** Much of what makes the university unique is the driving force of academia. Historically, the idea of the university or higher education institution is that of attaining knowledge. The knowledge attained, however, does not allude to the idea of an occupational skill or work trade learned, but rather, knowledge in the form of critical thinking and a higher intellectual awareness. John Henry Newman in the “Idea of a University” (1854) held, “The consequence is that, on an occasion like this, many words are necessary, in order, first, to bring out and convey what surely is no difficult idea in itself,—that of the cultivation of the intellect as an end;” Newman strongly believed that a university should be a haven for intellectual growth with the idea that students gain the overall knowledge needed through a liberal arts education.

Lately, a struggle has been seen towards that of the movement of the higher education system to more of a private business model. Some have struggled between the seemingly conflicting mission of academic versus that of the corporate culture (Farrow & Kasarda, 2009). But, the higher education system in the United States has never fully mirrored that of the Western European university. In fact, from the very beginning, the United States has always had an atmosphere of fierce competition among higher education institutions. Keller (2004) stated that in the United States all of the universities have always been in direct competition with one another for faculty, students and resources. This attitude of competitiveness and business acumen seems to now be bleeding over into the very core functions of the university through the way the very
system is administered and the way that courses are taught.

Today, the typical university has added many administrative departments that are run by people who may or may not have backgrounds in academia. Many universities are implementing positions like CEO (Chief Executive Officer), CIO (Chief Information Officer), and CFO (Chief Financial Officer) to mirror the corporation archetype (Gumport, 1997; Rhoades & Slaughter, 2004). The core conflict between the administration and faculty of the university dates back to the European academies that existed long before higher education institutions were present in the United States. In these academies (using the word academy loosely), the faculty were the university (Garland, 2009). There was no administration or even an organized structure. As time went on, universities grew and grew in size and function until administration was necessary to run the day-to-day business activities. On the administrative side of the university, administrators are concerned with balance sheets, supply and demand and overall growth of the university (Birnbaum & Eckel, 2002). Garland (2009) emphasizes that faculty members operate in all areas of expertise pursuing abstract research ideas while administrators are more concrete; administrators see things in black and white so things like faculty or technology all have an impact on the bottom line. The faculty members must strategize their new ventures and make sure they are consistent with the strategic mission and plans of the college (Cole, 2004).

With the growth of administration in the university comes a change in policy and procedure. The university now has a strategic mission and plans overall sometimes segmented to each college. Individual departments are even driven to draft strategic documents and make sure that the faculty are achieving certain goals (Birnbaum & Eckel, 2002; Donoghue, 2008). Some departments reach out to accreditation organizations to show that they are actively meeting certain outcomes and goals through their classroom instruction and student organizations, which can be seen as a type of higher education benchmarking. Birnbaum (2001) discusses the different management trends within higher education systems which have all come from business
management practices. Birnbaum (2001) contends that benchmarking is prevalent in the university system today and requires faculty and administrators to examine their processes and then set future goals for improvement. Setting benchmarks and goals and having mission statements allows the administration of a university to closely mirror the management practices of a corporation.

**Business-IT Alignment**

**Business-IT alignment models.** After looking at the university literature, the influence that the executive structure of a university holds might be considerable. Delving further into the idea of the business executive and the IT executive, another category of literature comes into scope known as business-IT alignment. Viewing the business-IT alignment literature shows that several models and instruments have been built based on the idea that if the business group within an organization meshed or strategized with the IT group, the organization's performance would increase. One very popular model within this field of research is the Strategic Alignment Model (SAM).

Henderson & Venkatraman (1990) created the strategic alignment model (SAM) as a framework of how to align business and IT within an organization. In this model, four different domains existed to further define the strategic alignment. The four domains were business strategy; organizational infrastructure and processes; IT strategy; and IT infrastructure and processes (Figure 1). The business strategy domain covered all attributes that would give a competitive advantage to an organization placing them above their competitors (Galliers, 1993, 1999). The domain also included business objectives and goals related to production and business governance. Organizational infrastructure and processes referred to the internal structure and reporting structure. This domain also included key organizational processes and skills sets of individuals. IT strategy, similar to business strategy, focused on the IT scope, the attributes of IT
that positively influenced business strategies and IT governance. Last, IT infrastructure and processes was an exact replica of business infrastructure and processes domain except as the infrastructure was keyed towards that of IT.

Figure 1. Strategic Alignment Model. Reprinted from Henderson & Venkatraman (1999)'s “Strategic alignment: Leveraging information technology for transforming organizations.” Copyright Henderson & Venkatraman (1999).

Henderson and Venkatraman (1990) examined the four domains and found that when management within a company used all four domains simultaneously the company appeared to be more successful than those that did not employ this method. In the same study, different types of IT management effectiveness was also examined (Henderson & Venkatraman, 1990). Among these forms of IT management—single-loop, double-loop, focused, and uni-directional, the uni-directional (a cross-domain) perspective was found to be the least effective. Also, they found that the focused and double-loop perspectives (complete not cross-domain) were the strongest, most
effective IT management perspectives. This further re-enforced the idea that using all four domains within the business and IT realm appeared to be the most effective strategy. The study further seemed to validate the SAM as it addressed all four domains. The idea that business and IT should somehow be aligned was also further validated.

In further research, Henderson and Venkatraman (1999) outlined four different alignment perspectives that organization's could potentially use. The strategy was using “business strategy as the driver” with two different perspectives (pg. 477). The first perspective uses a “strategy execution” in which business strategy drives the organization and IT design (pg. 477). The second perspective operates through IT as IT is utilized to implement business strategy. The second strategy is outlined as using “IT strategy as the enabler” (pg. 478). The first perspective in this strategy is “competitive potential” in which new and innovative IT is used to develop strategy and governance in the organization (pg. 478). The second perspective centers around service where the focus of the IT and business is on the customers and all strategy is formed around the idea of customer service. Validating Venkatraman's model, Bergeron, Raymond and Rivard (2004) used a confirmatory factor analysis and found that the model could indeed be used to align business and IT strategically and structurally.

Although all the model and all perspectives developed matched up to a few companies mentioned in the study, the researchers' goal was not to find the right strategy or combination but just to examine all of the strategies formed with their model, SAM. The researchers model and strategies were also specific to a small group of companies so the end-results seem very static. No combinations of strategies or perspectives were examined.

Luftman, et al. (1999) used the SAM to do an extensive 5-year longitudinal study and sought to create a more dynamic view of alignment. Twelve components (split into four domains) mirrored the categories found earlier by Henderson and Venkatraman (1990, 1999). The components were simply analyzed further and provided in more detail. Luftman, et al. (1999)
then examined the enablers and inhibitors in the alignment of business and IT. The results found were that the key enabler personnel was the same as the inhibitor personnel. The same person within the company that allowed for a more effective IT group was the same person in another company that inhibited IT effectiveness. For example, the senior executive support for IT at one company used tactics to enable IT, but this same person within another company inhibited IT and so was labeled as an inhibitor. Luftman, et al. (1999) emphasized that inhibitors should be minimized while enablers maximized in order for effective IT-business alignment.

Luftman (2000) sought to develop another model to measure the maturity of the business-IT alignment. Luftman thought a model that measures maturity, SAMM (shown in Figure 2), would help businesses calculate where they were in the business-IT alignment process. As such, the model would help the businesses improve and achieve a mature business-IT alignment by

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*Figure 2. Alignment Maturity Criteria. Reprinted from Luftman (2000)’s “Assessing business-IT alignment maturity” Copyright Luftman (2000).*
knowing the next steps to take. Luftman (2000) operated off his previous principles that inhibitors should be minimized while enablers should be maximized. Luftman (2000) created five levels of alignment maturity that look similar to a 5-point Likert scale: “Initial/ad hoc process, committed process, established focus process, improved/managed process, and optimized process” (p. 7). In this same study six alignment criterion consisting of “communications, competency/value measurement, governance, partnership, scope & architecture, and skills maturity” which is depicted in Figure 2 was created (p. 10). After creating the maturity model, a case study was performed to show that the model was able to help evolve a company’s IT-business alignment and help them reach their business goals (Sledgianowski & Luftman, 2005). Luftman and Kempaiah (2007) later drew a scaled line within their modeling defining exactly where an organization had to score in order for their business and IT to be considered aligned and effective.

Since business-IT alignment was and is still a large concern, Luftman (2004) describes his strategic alignment model more in-depth and explains that his annual survey from 1980-2008 continually shows that IT and business alignment are a top ten concern for CIOs along with IT strategic planning, retaining and hiring IT staff, improving IT quality, and reducing costs. At around the same time, Avison, et al. (2004) studied the validation of SAM (Henderson & Venkatraman, 1990). Within the financial services industry, the SAM model did prove to provide insight into how the IT and business strategy should best be integrated (Avison, et al., 2004).

In order to complement the created models and provide easier strategies for businesses to use, Avison, et al. (2004) along with Maes, et al.(2000) created differing frameworks. Maes, et al. (2000) created a unified framework to attempt to map the flow of information and communication through the SAM while Avison, et al. (2004) attempted to adopt a common framework to make SAM easier for businesses to assess their business-IT alignment. Moving away from SAM and SAMM, a business scorecards system was examined as a viable alternative (Huang & Hu, 2007; Wong, Chiang, & McLeod, 2009). In this system, a top-down approach was used to plan
strategies and execution from the executive level down to IT. The system was not based on a static model but rather a dynamic system that could be updated systematically as often as needed. This system was found to enhance reporting relationships from both a horizontal and vertical standpoint. Ferreira, Araujo, and Baião, F. A. (2011) explored ways in which different business-IT alignment models could be adequately communicated to IT so that the business model was fully understood. This research found that some of the business models were not fully understood by IT and, as a result, IT could not align itself fully with business.

Moving away from SAM, Strnadl (2006) thought that IT could be described in terms of tight coupling (similar to loose and tight coupling ideas from Weick, 1976). Strnadl believed that IT was tightly coupled to driving business processes. He thought that a process-driven architecture model called PDA would then be a better way to address the alignment issue between business and IT. PDA is a conceptual model that attempts to bring together and explain IT and business processes to better pave discussion and communication between these two groups. This was similar to an approach used by Bassellier and Benbasat (2004) to try and increase the business competence level of IT professionals. If IT understood business better, especially in the areas of organizational needs and professionalism, IT could become more competitive (Bassellier & Benbasat, 2004; Norman & Zawacki, 2002). Kearns and Lederer (2003) created an initial model which was later expanded by Kearns and Sabherwal (2007). This research used a surveying process to sample a large number of CIOs and found that there was a large importance in knowledge sharing between CIOs and top executives. The model created was structured to track the information flow between business and IT. The overall knowledge sharing between the two groups appeared to lead to better strategic decisions and ideas linking together business and IT (Kearns & Lederer, 2003; Lee, Trauth & Farwell, 1995; Todd, McKeen, & Gallupe, 1995). Throughout the models and frameworks, business-IT alignment continues to be examined and continues to be at the forefront of business concerns (Currin & Calkins, 2009).
**Business-IT alignment components.** Outside of the model and frameworks, other components of business-IT alignment have been examined. Chan, et al. (1997) studied the idea that information technology (referred to as information systems [IS] in this article) should complement the business strategy. In this study, they attempted to address how such a strategic alignment should be measured and how the alignment (whether poor or excellent) would affect business performance. Chan, et al. (1997) developed a survey instrument based off of an earlier instrument by Venkatraman (1989). Venkatraman's study had focused on not only measuring the IT and business strategies, but also on reimagining the role and fit of IT within business. Although Chan, et al. (1997) used the current SAM model, the model was changed into slightly different groupings and dimensions to adapt to differing organizational and business strategies. For example, a business performance category measured the company in terms of business performance like economic growth and overall reputation while an information systems effectiveness category measured in terms of technology performance. The two other strategy-based categories measured the focus taken by business and IT whether that be a defensive approach focusing on the internal strength measures or an aggressive approach focusing on outward marketing tactics. After the survey instrument was piloted, it was then distributed among the financial and manufacturing private businesses in North America with more than 100 employees. The study found that strategic alignment with IT does have an effect on business performance and, furthermore, the realized business and IT strategies should be focused upon intertwining business and IT in future planning processes. The shortcomings of this study outlined that even though the industries studied were similar each business may have their own needs that cannot be surveyed or reflected in a survey. Other missing data was that the organizational structure and financial data were not examined.

Another such survey instrument was later created to attempt to measure and assess a business-IT strategy and maturity within the components of governance, partnership between IT
and business groups, and value (Khaiata & Zualkernan, 2009). The idea behind Khaiata and
Zualkernan's (2009) survey was to make another tool for businesses that was easy to use and
distribute. By looking at the survey results, the business should understand the concentration area
that would create better alignment between IT and business. IT governance, a component within
Kaiata's and Zualkernan's survey has been intensely discussed in other research (De Haes &
Grembergen, 2009; Weill & Ross, 2004). Although different parts of IT governance have been
found to be inter-related to business-IT alignment, no one structure has been proclaimed as ideal.

Information and communication flow, a key component added within the business-IT
framework (Avison, et al., 2000; Maes, et al., 2000), was acknowledged as a dimension needing
attention on the survey. Khaiata and Zualkernan (2009) referred to information and
communication flow as knowledge management and noted that lack of knowledge management
definitely created a barrier between the two groups of business and IT. Furthermore, Hunter
(2009) defines talking at a business level to be one of the typical CIO problems. He states, “When
the CIO and her team can't discuss the business in the same terms as the other members of the
executive team, IT is doomed to be an outsider, an order taker—never a full participant in running
the enterprise” (p.15). A CIO must be able to talk on business terms in order to be a full effective
member of the enterprise. Kilov & Sack (2007) examined the communication phenomenon
between IT and non-IT employees in-depth. They found that when IT used fundamental,
universal concepts to describe complex, ever-changing IT, the communication between IT and
non-IT increased significantly, but when complex, technical acronyms are used, non-IT people
tend to tune out of the conversation.

Moving along the same lines and incorporating theory from outside business-IT
alignment, Weiss and Thorogood (2011) attempted to show that aligning business with IT could
be used as a “strategic weapon” (p. 31). The idea put forth was that all previous business-IT
alignment literature was ultra-focused on the internal relationships and intra-workings of an
organization. Businesses were disenchanted with the idea of aligning business and IT because of the large undertaking that might produce a fuzzy end result (Curran & Culkins, 2009). In order to fully align the business and IT processes, external relations must also be highly considered through marketing strategies. Using a case study approach, Weiss and Thorogood (2011) found that when companies adapted the newly created IT as a strategic weapon approach, business and IT became more fully aligned without much effort. This draws a lot of similarities with earlier literature that referenced aligning business with IT so that IT could be used as a competitive advantage (Chan, 2001; Ciborra, 1997; Galliers, 1993, 1999; Powell & Dent-Micallef, 1997).

Using a similar tactic to find better alignment strategies, Chan (2002) drew inferences that perhaps the idea of strategic alignment was not the only alignment component but that another component, structural alignment may also play a role. This is similar to a case study performed by de Leede, et al. (2002), which found that structural alignment between or linkages between different company functions must be achieved. Chan defined strategic alignment as a dynamic term that had not quite yet been defined by previous research (Luftman, 2000, 2004; Venkatraman, 1999). Since Chan considered the term dynamic, findings showed that static models may not be the way to examine alignment (Chan & Reich, 2007; Shpilberg, et al., 2007; Tallon & Kraemer, 2003). Findings also indicated that the structural alignment—defined as the fit of the organizational structure with defined roles, positions and duties—had been overlooked in previous studies and needed to be examined. When looking at the structural alignment, Chan (2002) indicated structural alignment did play a role in business-IT alignment.

One other component in business-IT alignment research has been that of value. This is examined as one component in alignment models (Henderson & Venkatraman, 1999; Luftman, et al., 1999; Luftman, 2000, 2004; Kempaiah and Luftman, 2007), but has also been examined more in depth on its own (Peppard & Ward, 1999; Wilcoxson, 2004). Business partners often want to know whether or not the CIO and IT in general are adding value to the company (Boyle, R.,
1994; Earl & Feeny, 1994). CIOs feel that the value of IT is sometimes difficult to translate into concrete terms on a balance sheet because of the intertwining nature of IT into processes as well as the backend (Irani, 2002). Because of the often fuzzy nature of IT, Peppard and Ward (1999) examined IT's value in terms of culture. He felt that if business understood IT better and made an effort to partner with IT, they would understand why IT had a difficult time defining its value. Wilcoxon (2004) also found that IT struggled with defining its value. Over a three-year period, business and IT still struggled in terms of reporting relationships as well as cost consequences (Wilcoxon, 2004). Trying to look closer at value, Xue, et al. (2012) found that a company is most effective when it concentrates on either cost efficiency or innovation through IT, but not both. Although IT produces value through innovation, Xue, et al. (2012) found that this was harder to define in terms of black and white cost. Overall, business executives have a hard time grasping the reporting relationships needed by IT as well as the overall cost of IT maintenance and projects (Brynjolfsson & Hitt, 1996; Xue, et al., 2012; Wilcoxon, 2004).

**Organizational Structure Theory**

**Organizational structure & bureaucratic model.** The first noted theorist on the model of bureaucracy was Weber (1992). Weber (1992) believed that the bureaucratic model was generally governed by strict rules and regulations and that all authority and behavior of the organization and the people within it adhered to the written and legal documents of the organization. The position of an official was dictated in a similar manner with the employee staying within the pre-defined boundaries of the organization and never moving out of order. The structure of the organization was hierarchical with upmost authority starting at the highest level. Upmost authority existing at the highest level implies that the vertical lines in the organization chart play a crucial role and define authority for the leaders as well as accountability for the employees (Merton, 1968; Weber, 1992). Vertical lines in the organization chart play a crucial
role as these lines outline authority and control levels. Goulder (1954) extensively studied a mine and factory company and found three types of bureaucracy which extended Weber's original idea. Although Gouldner indicated there was an authority-based bureaucracy similar to Weber's called punishment-centered, two others were noted—mock and representative. The types of bureaucracy in Gouldner's study changed within the boundaries of the company according to the level of the worker. The miners, working below the surface experienced a much more relaxed type of supervision that was based on relationships while the above surface factory workers experienced a more traditional more of punishment-centered bureaucracy bound by paperwork, rules and the hierarchy (Gouldner, 1954).

Others noted a distaste for bureaucratic structure. According to Heckscher (1994), “bureaucracy allowed little room for lateral, cross-level, or cross-boundary communication networks, that is, informal or emergent networks, a feature for which it has been frequently criticized” (p. 447). This was earlier expounded by Blake and Mouton (1964) when they stated that bureaucracy tended to stifle communication due to the fact that interactions were often based on power-based political or opportunistic agendas instead of concentrating on motivation and teamwork within the employee culture. Blake and Mouton believed that communication issues and lack of strategy and planning were the two largest management concerns. Blau (1970) further researched the bureaucratic structure of organizational structures like governmental and regulatory industry. He found that the structure was not indicative of the actual relationships between employees. The organizational structure did not often dictate how the needed work activities were structured (Gouldner, 1954; Pugh, et al., 1968).

Although bureaucracy was not advertised as the ideal structure, Mintzberg (1980) sought to classify all existing organizational structures into five divisions. Three of these divisions were devoted to different types of bureaucracies. These divisions are the “simple structure”, “machine bureaucracy”, “professional bureaucracy”, “divisionalized form”, and “adhocracy” (p. 330). The
three categories of bureaucracy—machine bureaucracy, professional bureaucracy, and divisional form—are usually older, more established organizations with a bureaucratic structure. The first of the bureaucratic organizational structures was machine bureaucracy with centralized management and a concentration standardization of work processes. Organizations within this category were companies with “simple repetitive work such as insurance and telephone companies, government agencies with similar work such as post offices and tax collection departments...” (p. 333). The second of the bureaucratic structures was that of the divisional form, which implies that there is a company headquarters controlling multiple smaller divisions. “The Divisionalized Form is very fashionable in industry, found in pure or partial form among the vast majority of America's largest corporations...” (Mintzberg, 1980, p. 336). The last bureaucratic structure is the professional bureaucracy, which Mintzberg thought mirrored closely to the university system. In this university structure model of professional bureaucracy, the faculty are given considerable autonomy to operate within their field of study and work in concert with the administrative part of the structure. The administration at the university is expected to be highly collaborative due to the complex nature of the job positions—each faculty position requiring extensive training. Mintzberg (1980) mentions that the collaboration should occur through task forces as well as committees.

Whether the organizational structure is bureaucratic in nature or not, throughout all the studies mentioned, the clear, underlying factor remained that the hierarchical, organizational structure is present. All five of Mintzberg's (1980) defined structures depict a hierarchical pyramid counting the two organizational structures that were not considered to be bureaucratic in nature. The adhocracy and the simple structure—which were not considered bureaucratic—both involved a top-down format with vertical and horizontal lines.

Further supporting the idea that hierarchical pyramids are present and important, Tannenbaum, Kavčič, Rosner, Vianello, and Wieser (1974) found that organizations across five
different countries have some sort of top-down hierarchical diagram that dictates the chain of command. Although in two countries, the charts appeared flatter, levels were still clear and vertical and horizontal lines were still indicated. According to Tannenbaum, et al. (1974), “Most if not all work organizations are structured hierarchically, although the character of hierarchy may differ from one organization to another” (p. 2). Furthermore, the positions at the higher levels of the hierarchy hold greater status than those at lower levels. Status is defined by Tannenbaum, et al. (1974):

Accordingly, persons at higher levels are considered more important, and have greater responsibility, official respectability and recognition. They also receive higher pay and enjoy greater privileges and perquisites: stock options, longer vacations, and paid sick leaves. The responsibility, respect, and recognition, along with the greater material rewards associate with status, contribute significantly to the satisfaction of important needs—and to a sense of self esteem. (p. 8)

In the end, the American plants that were included in this study found that personnel was driven to achieve by moving up in the hierarchy. The top part of the hierarchy was viewed as almost as an elitist group that was highly influential in the decision-making process of the organization controlling and coordinating the processes of all subordinates (Tannenbaum, et al., 1974).

When thinking about the different forms of hierarchies, Giessner and Schubert (2007) found that people tend to associate power and leadership based on the position and role of the person in the hierarchical organizational chart. Previous studies had already indicated that people with power are typically able to influence others by controlling resources (Galinsky, Gruenfeld & Magee, 2003; Keltner, Gruenfeld & Anderson, 2003). If the people toward the top of the hierarchy hold more power, then other people will be influenced by the power and will desire to follow the people at the top of the hierarchy towards a common goal. Although power does not imply the idea of leadership, a person needs power in order to effectively lead (Goodwin, 2003).
Effective leadership and power is also encompassed by having authority. In Fiske's (2004) Relational Models Theory 2.0, four ways of relating were defined: “(1) what people have in common, (2) ordered differences, (3) additive imbalances, or (4) ratios” (p. 3). The “ordered differences” relationship is also known as “Authoritative Ranking (AR)” and shows that people tend to rank individuals based on different traits (Fiske, 2004, p. 4). Furthermore, Fiske (2004) noted that people tend to mentally rank individuals in a linear-fashioned state in an up-down or side-to-side relationship. This is easily related to a visual hierarchical chart ranking people by those considered to have the most authority to the least authority according to the amount of vertical space present (Giessner & Schubert, 2007). When a position is extended higher in an organizational chart, individuals will associate this role or person as having a better authority ranking or higher power within the organization (Fiske, 2004; Giessner & Schubert, 2007). So if a business executive is ranked higher than the IT executive on an organizational chart, the business executive will hold more authority.

Organizational structure, strategy & roles. Other theories about organizational structure abound. Porter (1980) calls for a different organizational structure and strategy based on whether the goal is efficiency or learning. Within the bounds of contingency theory, Miles and Snow (1978) also believe that an organization's design should morph depending on the strategy needed. They defined four different organizational strategies that they believed with related to four different organization designs and strategies. The four organizational strategies were Defenders, Prospectors, Analyzers and Reactors. Further defined, Defenders have many expert managers to drive the organization's limited domain of operation and do not usually search outside of their own organization for new opportunities; Prospectors ride the waves of emerging trends creating a hard-to-follow act for their competitors; and Analyzers tried to imitate the Prospectors most promising ideas while Reactors sit back and only take action to change factors
when forced (Miles & Snow; 1978). The idea that the organization business strategy should fit the organization structure and type has also been explored in other research. Delving down further, Habib and Victor (1991) as well as Galbraith (1972) found that the organization structure can have a large influence on a business strategy and that by matching an organization structure to an organization type better economic efficiency could be achieved. Adding to the idea that organizations should fit structure to strategy, Levy (2000) takes the idea of an organization into the array of chaos. He showed that by using complexity theory which combines a wide array of components, an organization might be able to better adapt the business strategy to the organizational needs.

Organizational types and strategies have also been defined on the basis of communication flow within an organization. Daft (2008) defines communications as related to four different organizational design structures similar to those of Miles and Snow (1978). He states that different organizational designs are needed depending on the nature of the work produced in order to provide effective communications. Tushman (1978) agrees with this theory. He believes that the communications patterns with an organization's structure and the nature of the work are dependent upon one another. Even more so, the organization's structure and communication within the organization seem highly dependent on one another. “Communication and organization structure powerfully influence each other. Behavior and communication are patterned by the structure of the organization” (Sagini, 2001, p. 346). The structure of an organization influencing communication so much that barriers can be created by departmentalizing expertise and functions (Clampitt, 2005). To overcome the barriers, the need to communicate from the top-down through and across the structure is a key component (Barrett, 2008; Clampitt, 2005; Guffy, Rhodes & Regin, 2010; Smith & Mounter, 2008).

While communication and structure seem to be integral parts of an organization, Etzioni (1975) argued that the informal structure through relationships also played a large part in the
functioning of an organization. Both formal and informal relationships influence one another and are dependent on different organizational types (Etzioni, 1975). Etzioni discusses three different types of organizational structure: “L-structure”, “T-structure”, and “R-structure” (p. 226). Within the L-structure and T-structure organizations, the charisma and power of the leader is localized at the top. The R-structure is compared to that of the university. “Thus, in a university, for example, the administrators tend to be the formal heads of the organization, but they possess chiefly utilitarian power, while faculty members, who serve the university's normative goals more directly, tend to possess whatever charisma there is” (p. 227). Within this statement, Etzioni (1975) implies that although formal authority through the hierarchical structure can control, a group within the organization that has charisma might also be able to exert control. Dunbar, Dutton and Torbert (1982) performed a case study looking at the the chair of a university department and his control over senior faculty. Although the chair was able to create new policy and enforce rules, the senior faculty were also able to create a lot of discomfort and dissatisfaction in the working environment. Thus, even though the chair had formal authority, the faculty could still control part of the environment with their charisma (Dunbar, et al., 1982).

**Organizational structure & implied authority.** Within the hierarchical structure of an organization, different levels of authority exist (Merton, 1968; Mintzberg, 1980, 1983; Parsons, 1960; Weber, 1992). Mintzberg (1980, 1983) separated the authority levels of an organization by group: “operating core”, “middle line”, “strategic apex”, “technostructure”, and “support staff” (p. 11). Within each group, different levels of authority and duties existed. Two groups of note are the technostructure—described as the analysts that dictate work flows and standardize work patterns—and the strategic apex—described as the board of directors, president and executive committee (Mintzberg, 1980, 1983). In the flow of formal authority, Mintzberg notes that the technostructure is directly below and to the right of the executive committee.
Parsons (1960) noted the hierarchical structure of many organizations and noted the authority of differentiated roles in the pyramidal network. Parsons believed that the structure of an organization could be split into three levels: “technical”, “managerial”, and “institutional” (p. 60). The technical level was attributed to the staff of an organization that carry out the day-to-day duties; the managerial level that administered the internal workings; and the institutional level which managed the external relations as well as the legality and legitimacy of the internal organization. These three structures were considered to be role structures dictating the authority of personnel as well as their respective role within the organization. Further examining different types of organizations, Parsons (1960) noted that at a university, the technical level would refer to the faculty and the professional staff; the managerial level would refer to the administrative positions like vice chancellors, vice provosts or other executive types of positions; and the institutional level refers to the board of trustees now commonly referred to as the board of regents at many universities and colleges.

Further defining role sets at the three levels, Evan (1993) extrapolates the higher the level of an organization the more prestigious the position. This prestige is noted by the number of lower levels underneath a given role as well as connections to external bodies. Furthermore, when engaging in these prestigious positions, members of the higher level may have expanded opportunities to engage in a large range of interactions. This range of interactions can happen not only within the grouping of executives on the upper level but also with relationships with external bodies. Evan (1993) believes that the external relationships are a key relationship that gives the higher level members greater insight into the strategy and mission of the organization. As a whole, these interactions can greatly enhance the effectiveness that the higher level role provides to an organization.

Within the framework of the formal authority structure, duties and roles are assigned to appropriate personnel existing within certain functions and groups and are tightly connected to
structure (Merton, 1968; Parsons, 1960). Within bureaucratic organizations, like a university systems, roles are given to complete a specific function within the organization (Katz & Kahn, 1978). Along this same line, Keats and Hitt (1988) noted that the organizations that had less divisions were actually subject to more chaos. In line with this observation, they also noted that the strategy of an organization followed the structure. As indicated in Birnbaum's (1988) example of a bureaucratic university, boxes on the organizational chart note functions and roles while lines on the organizational chart illustrate information flow. Boxes close to one another on the chart most likely communicate more often than those further apart. Furthermore, the existence of an office within a certain level of the chart sends a signal both inside and outside of an organization noting the importance (Birnbaum, 1988; Katz & Kahn, 1978; Weingartner, 2011). If an office or function is noted as less important, the level or box will be further towards the bottom or non-existent. Also, noted is the line of authority and that those able to directly report to executive positions or to the president will be able to have a greater influence on calling important items to attention (Birnbaum, 1988; Weingartner, 2011).

Not only do the top executive positions in the organizational hierarchy appear to hold much authority, leadership and power, the chief executive officer (CEO) of a company—president or chancellor of a university—also holds considerable influence over the organizational structure (Lewin & Stephens, 1994). Arguing against contingency theory, Bobbitt and Ford (1980) noted organization structure differences even between homogenous groups of private companies. Within this realm the idea was suggested that perhaps the CEO influenced more than simply the vision, values and overall mission of the company (Hambrick & Mason, 1984; Mintzberg, 1989). The CEO might also have great influence over the design and structure of the organization (Lewin & Stephens, 1994; Meyer & Starbuck, 1993). When the CEO was controlling the design, the organizational structure could take on a multitude of different approaches depending on the characteristics of the CEO such as gender and personality traits (Lewin & Stephens, 1994).
Luftman and Kempaiah (2007) also found that the reporting structure of the CIO to the CEO appeared to be the best reporting structure for IT and enabled the best alignment. However, they also remind organizations that the reporting structure to the CEO must be married with a slew of other components in order to make alignment effective overall.
Uniting University, Business-IT Alignment and Organization Structure

Bringing it all together. Business-IT alignment studies have been united with other social elements like organizational structure and communication genres. In Sabherwal & Chan (2001), a business organization performance model developed by Miles and Snow (1978) was used in order to pursue whether alignment between business and IT was better in one of the strategies. The performance model by Miles and Snow defined a typology of three business strategies—Defender, Analyzer, and Prospector. Sabherwal & Chan (2001) sought to compare and contrast the three business strategies with theoretical business-IT alignment strategies. By incorporating business and IT strategies together, Sabherwal and Chan (2001) thought they would be able to find which business typology was more supportive of the alignment between business and IT groups. As such, business theory was brought together with strategic alignment theory.

Sifting through IT strategic alignment theory, three strategic IT attributes—efficient IT, flexible IT and comprehensive IT—were found that would best be compared with the three business strategies. Again a survey was created to rank measure the six business and IT attributes and the survey was distributed to North American financial services and manufacturing firms with more than 100 employees. Four administrative employees with similar titles of CEO, CIO, and CFO were asked to complete the surveys (Sabherwal & Chan, 2001). The results were then compiled and companies were placed into Prospector, Analyzer and Defender categories. Perceived business performance was then compiled from the survey data and indicated that business-IT alignment seemed to have greater influence when pairing different IT strategies according to the business category. For example, Defenders would align business and IT better if they concentrated on a IT efficiency strategy while Prospectors should focus on a flexible IT strategy for best alignment. Sabherwal and Chan (2001) concluded that business-IT alignment was more important than first thought and businesses needed to “understand and monitor the nature of this investment” in IT (p. 25). This study showed that business theory and alignment
theory can be integrated to further research in both areas. Future research indicated further examining the Defender category and the factors that influence business-IT alignment within their strategies.

Reich and Benbasat (2001) also attempted to model the alignment utilizing a communications model with antecedents and current practices. They felt that there were four main propositions that would heavily affect the alignment of business and IT. These four propositions were a shared knowledge base between business and IT; successes in implementing IT; the level of communication between business and IT; and connections between IT and business planning processes. Reich and Benbasat (2001) thought that if all four of these domains were being positively met, IT and business would work well and the organization would perform better overall. Campbell (2005) keyed in on communications and different communications terms as the important factor that would bring business and IT together. He found that collaboration and networking efforts between business and IT groups brought a significant improvement in their working relationships.

In order for the organization to perform better and more efficiently, Banker, Hu, Pavlou and Luftman (2011) thought that the reporting structure between the CEO and CIO should be further examined. Although Miles and Snow (1978) and Hambrick and Mason (1984) felt that the structure and strategy were codependent, Banker, et al., further suggested that the structure should not be allowed to control the IT role within the organization. In fact, the research showed that there was not one ideal structure. Instead two structures emerged as a fit depending on a firm's strategy. In the case of a firm driven by producing the lowest cost product, Banker et al. suggested that a reporting structure where the CIO reported to the CFO worked better while the firm interested in high customer service quality was better represented with the CIO reporting to the CEO. In both cases, the takeaway was that the CIO reporting structure seems to be dependent on the overall strategy of a company.
Although many findings emerged surrounding the reporting relationships between business and IT, Reich and Benbasat (2001) along with Sabherwal & Chan (2001) and Banker, et al. (2011) bring forth the idea that business-IT alignment theory cannot stand alone but may need support from other genres in order to fully research the problem. Reich and Benbasat (2001) bring in outside literature to support the ideas of the way communication flows in an organization (Littlejohn, 1996) as well as organization theory from Mintzberg (1993). Although Sabherwal and Chan (2001) concentrate on Miles and Snow's (1978) theory, other outside sources from White (1986) and Hambrick (1981) are brought in to support the way strategy and authority in an organization is thought to work. Orlikowski and Barley (2001) researched the idea that organizational studies should be intertwined with technology because of the cause and effect nature that that technology seemed to have on organizational systems. Orlikowski and Barley found that a large percentage of IT literature dealt with social and economic factors and heavily drew upon organizational studies research in order to pursue the impact.

In order to examine the complex topic of reporting relationships between business and IT in the university system, business-IT alignment literature has been combined with that of university research as well as organizational structure research. The idea behind combining these genres is to use already existing elements and combine them into something that is of use to the university when thinking of the business processes, IT, organizational structure and reporting relationships.
CHAPTER 3 – METHODOLOGY

The grounding approach of this study is mixed methods. This research procedure is championed by researchers like Teddlie and Tashakkori (2009) and Creswell and Plano Clark (2011). Mixed methods allows using both available research methods, in tandem, to allow for a more complete analysis and picture of the research study (Teddlie & Tashakkori, 2009; Creswell & Plano Clark, 2011). Reporting relationships are complex ideas that may go beyond the static definition of levels and categories. By performing a quantitative analysis and identifying models and then moving to a qualitative portion, a more complete picture of a complex idea may emerge. As stated by Johnson and Onwuegbuzie (2004), “Mixed methods research is the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the purpose of breadth and depth of understanding and corroboration.” Since there has been little qualitative research done in this field of study and little to no mixed-methods studies, this study should help shed more light on the reporting relationships concept within the realm of business-IT alignment as it intertwines with organizational structure.

Target Population & Sample Size

The target population in this study is four-year universities with a high-undergraduate population and a Master's level program. The four-year universities were chosen based on Carnegie Foundation for the Advancement of Teaching (referred to as Carnegie) classification (Table 2). The left-hand side of Table 2 represents the classification categories provided from the Carnegie website while the right-hand side represents the specific category selected to return the chosen universities. The acronyms in the Classification Used column in Table 2 are explained in more detail within Table 3.
Table 2

*Classifying Factors Based on Carnegie*

<table>
<thead>
<tr>
<th>Carnegie Classification Category</th>
<th>Classification Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduate Instructional Program Classification</td>
<td>Prof+A&amp;S/SGC</td>
</tr>
<tr>
<td>Enrollment Profile Classification</td>
<td>HU</td>
</tr>
<tr>
<td>Basic Classification</td>
<td>Master's L</td>
</tr>
</tbody>
</table>


Table 3

*Classifying Factors with Definitions from Carnegie*

<table>
<thead>
<tr>
<th>Carnegie Classification Used</th>
<th>Classification Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prof+A&amp;S/SGC (Professions plus arts &amp; sciences, some graduate coexistence)</td>
<td>“60–79 percent of bachelor’s degree majors were in professional fields, and graduate degrees were observed in at least half of the fields corresponding to undergraduate majors” (Carnegie, 2010a).</td>
</tr>
<tr>
<td>HU (High Undergraduate)</td>
<td>“Fall enrollment data show both undergraduate and graduate/professional students, with the latter group accounting for 10–24 percent of FTE enrollment” (Carnegie, 2010a).</td>
</tr>
<tr>
<td>Master's L (Master's Large)</td>
<td>“Master's program size was based on the number of master's degrees awarded in 2008-09. Those awarding at least 200 degrees were included among larger programs” (Carnegie, 2010a).</td>
</tr>
</tbody>
</table>

*Note.* Adapted from Carnegie Foundation for the Advancement of Teaching, 2010, Classification Definitions. http://classifications.carnegiefoundation.org

Detailed reasons go into choosing each category for the universities. First, the mixture of professional, arts and sciences category was chosen so that the universities would not be ultra-focused in one area but have a balanced outlook on the academic side. The universities also share a common focus in a high undergraduate population. This type of population should be more in-line with typical university charts (Birnbaum, 1988 & Weingartner, 2011). Although the
universities have Master's programs, the graduate degrees are not the focus of the universities. Universities that are more focused in graduate programs and research tend to have more administrative branches in external relations as well as research and development (Tolbert, 1985). A good example of such an institution would be the University of Nebraska Lincoln where an entire administrative position and subordinates are focused on agricultural research and development (University of Nebraska-Lincoln Agricultural Research Division, 2013).

In a comprehensive search, 62 universities share the common characteristics listed. The reasoning behind choosing this homogenous sample group is to produce a sample set that is aligned in their focus. In this sample set, the focus was towards undergraduate education with a high undergraduate population in a 4-year university setting. In looking at business-IT alignment literature, the variances between industries is thought to greatly influence alignment (Reich & Benbasat, 1996; Chan, 2002; Sabherwal & Chan, 2001). Since structural alignment or reporting relationships are a key component of business-IT alignment, the target sample attempts to mirror a homogenous group within the diverse university system to try and reduce external variances in reporting relationships.

After locating all of the universities in the target sample, an online search of the university websites commenced. The researcher located administrative organizational charts and any other data that showed the level, positioning and category of the IT and business executive. The IT and business executive positions were further verified by utilizing the Higher Education Directory also known as HED-Connect (Higher Education Publications, Inc., 2012). Within this database, categories #10, #13 and #27 will be the focus on this study (all categories shown in Appendix B). Category #10 is defined as the chief financial/business officer—equivalent to a CFO—while Category #13 is defined as the director of computing and information management and Category #27 is the Chief Information Officer. During the pilot study, the researcher noticed that either #13 or #27 was used but never both. By vetting the organizational charts against the
categories and names provided by the Higher Education Directory the IT and business executive will be identified.

**Reduce coverage and sampling errors.** By running a search using the aforementioned terms within the Carnegie (2010b) classification system, all four-year universities and colleges within the search were included. The homogenous population studied was specific to certain criteria to try and achieve similarity between organizations studied. The exhaustive study of all universities within the target population eliminated any coverage errors. Sampling errors were also be non-existent as the entire target population will be included in the study.

**Research Design**

The design in this research study was a sequential explanatory mixed methods approach consisting of two phases (Creswell & Plano Clark, 2011). In the first quantitative phase, categorical, level and position data were collected on the IT and business positions. After the data were gathered and formatted, an exploratory factor analysis was performed to categorize and compare key components. The goal of this portion of the study was to identify relationships that may occur between the variables and then to create the top models that occur within the reporting relationships. In the second, qualitative phase, a semi-structured interview process was conducted to help further explain the relationships that appeared within the first analysis as well as which model appears to create the best reporting relationships between IT and business.

In order to better visualize the study, a model has been provided in Appendix C. The emphasis in this study is given to the combination of the quantitative and the qualitative results specifically with how the qualitative results have added value to the statistics. In this second phase, attention will be given to in-depth explanation provided by the case studies as to which reporting relationship model appears to align the best with the business and IT groups.
Phase I – Quantitative

Quantitative data collection. In the first part of this study, the primary technique for data collection was manual recording, performed by the researcher. The data collection consisted of gathering organizational charts from the online presence of the selected universities. In a small, random target sample of 6 universities of varying sizes and classifications, all universities were found to have an online presence including either easily accessible organization charts or data referring to the organizational structure. A survey either through mail or electronic was considered for this portion of this project. However, data gathering by survey would have needed an explanation of the concepts of level and category to the targeted population. Any confusion on the levels and categories might have led to inaccurate responses and tainted data. So, the researcher decided that manual collection would produce more valid results. Other reasons for performing the manual data gathering:

- The researcher has previous experience in a university within the IT position and is familiar with the IT executive role on a university organizational chart.
- The targeted personnel for the survey were either the business executive or the IT executive. Manual data collection eliminated any bias towards one group.
- The targeted personnel for the survey do not have prior knowledge of the organizational structure and may not want to take time to learn knowledge needed for the survey.

Variables in quantitative analysis. The research statement in the first quantitative research section was to determine the relationship between the level and category of the IT executive and business executive at four-year universities. Through much literature review, reporting relationships have been determined to be an important factor and even one that can influence strategy (Chan, 2001; Keats & Hitt, 1988). Through this review and an intense pilot
study of university organizational charts, five important variables emerged: level of the position within the organization structure, category of the position, reporting position title, size of the university by student population and type of university—public or private. These variables were re-enforced through two key sources of literature.

The first key source of literature, Pugh, et al. (1968), defined 16 functional categories used within an organization based loosely on Bakke's (1959) activity variables. Bakke's variables were defined by studying the basic resources that were essential to the operation of the organization. Using Bakke as a starting point, Pugh, et al. (1968) defined several organizational structure variables which have been used again by Miller (1987) and Damanpour (1991) in order to try to define the dimensions of organizational structure. These organizational structure variables include specialization, vertical differentiation, professionalization, formalization and centralization (Damanpour, 1991; Miller, 1987; Pugh, et al., 1968). In this study, the key variables specialization, vertical differentiation and centralization will be used to classify dimensions of organizational structure. The idea of vertical differentiation—referred to as levels in this study—reflects the organization's hierarchical structure by looking at the number of vertical spans within the organizational structure on which a specific position resided.

Specialization referred to the specialty category or function under which an executive resides—in this study specialization will be referred to as category. Centralization referred to decision making in an organization and specifically in this study as the position to which the CIO reports.

The second key source of literature helps redefine the specialization variables for higher education (Table 4). Bringing in another set of key sources of research—Bess and Dee (2008) and Weingartner (2011)—a fresh perspective from higher education can be found. Bess and Dee (2008) concentrate on defining the roles of the administration, but also state that the different functional categories are obvious. Bess and Dee (2008) says, “The roles of the other staff officers are fairly obvious from the functions indicated in their job titles; however, not every institution
provides the same title for the same role.” Weingartner (2011) also adds to these functional categories by stating that a specific set of functions and powers are assigned to particular offices in higher education like the chief academic officer and business and finance officer. Furthermore, Miller (1987) uses the idea of technocratization to help further define a dimension of organizational structure noting that technology has become a factor within organizations and affects the structure. Table 4 further depicts examples of specific categories that Pugh referred to as specializations as well as categories that are prevalent, today, in the university environment (Bess & Dee, 2008; Pugh, et al., 1968 & Weingartner, 2011).

Table 4
*Categories of Positions as Defined by Birnbaum, Pugh & Weingartner*

<table>
<thead>
<tr>
<th>Private Industry Category Position Examples</th>
<th>University Category Position Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operations / Facilities</td>
<td>Student Affairs</td>
</tr>
<tr>
<td>Administration and Planning</td>
<td>Academic Affairs</td>
</tr>
<tr>
<td>Finances &amp; Accounting</td>
<td>Business &amp; Finance</td>
</tr>
<tr>
<td>Sales or Service</td>
<td>Graduate Program</td>
</tr>
<tr>
<td>Customer Relations</td>
<td>External Relations</td>
</tr>
</tbody>
</table>

Keeping these two sources of information in mind, this study will collect the level of the IT executive and the business executive within the university organizational structure. The level number recorded for the business executive will be the number of levels between the top-residing university executive—President or Chancellor—and the Chief Financial Officer (CFO) equivalent. The CFO within a university is often labeled as the Vice Provost of Business and Finance or very similar title. The value recorded for the IT executive will be the number of levels between the top-residing university executive and the Chief Information Officer (CIO) equivalent. This position title within university structure varies. Some examples include Director
of IT, Vice Provost of IT or Chief Technology Officer.

Referring again to Pugh, et al. (1968) and referencing Bess and Dee (2008) and Weingartner (2011), the category will also be collected. The category, in this case, refers to the specialization where the IT executive resides. Important to note is the fact that none of the referenced literature includes a functional category for technology. Through literature review and study of organizational charts, the idea that IT is important and has an effect on business strategy and even potentially business profits remains. Within the IT group—present on all university's organizational charts, the functions and activities adhere directly to a unique focus on providing and maintaining technology to the university. As such, the technology category will be added to the category section.

The remaining variables—university size and type—refer to the student population number and whether the university is considered private or public. Within Pugh, et al. (1968), the type of organization and size widely varied. However, both Weingartner (2011) and Birnbaum (1988) recognize differing types and sizes of universities and even define models based on these differences. In the case of this research, the size and type were allowed to vary but were held constant within the genre of the university which differentiates this portion of the study from Pugh's. The university size and type was used within the analysis to compare and contrast against the other organizational structures variables. In this manner, a determination was made whether or not the university size and type has a relationship with the organizational structure variables. This idea was also backed by Blau (1970) and Hsu, Marsh & Mannari (1983) who both found that variables such as the type and size of an organization can affect administrative differences within private industries.

**Quantitative data analysis.** Analysis of the quantitative data were examined in three sections with a fourth part occurring after the qualitative analysis. For part one, the data were
analyzed using an exploratory factor analysis (EFA). In part two, the data were analyzed using categorical principal-components analysis (CATPCA), which allowed the inclusion of nominal variables. Part three of the analysis used simple frequency and response statistics to create models while part four occurred after the qualitative phase and brought together both quantitative and qualitative data for analysis.

The analysis of data in part one took the five variables—level, category, reporting title, university size and type—and ran the variables through an exploratory factor analysis (EFA). The analysis in this stage looked for simple structure which showed a type of relationship between the variables creating new factors. If simple structure was achieved, the factors could point future researchers in the right direction for what type of organizational structure data to collect.

In part two of the quantitative analysis, a categorical principal-components analysis (CATPCA) was used. This type of analysis is similar to an EFA, but allows nominal variables like university type to be included. This had the potential to show whether or not the university type and size variables were interrelated to the other organizational structure variable data.

Part three of the quantitative analysis used simple frequency tables to hold certain variables constant in order to produce the most common university organizational structure models occurring within the sample. The frequency tables used a combination of the inter-related variables found in the first two analyses in order to create the models. The final analysis, part four, was included in the discussion section which brought together both quantitative and qualitative analyses attempting to find common ground. Statistical Package for Social Sciences (SPSS) software was used to conduct the statistical analysis for all three parts of the quantitative phase.

**Measuring reliability and validity in quantitative data.** One of the glaring issues in manual collection of the quantitative data is the issue of human mistakes or bias created by the
researcher. To avoid these, reliability was enhanced by comparison of the business and IT executive positions selected with the Higher Education Directory database. This comparison provided not only reliability to the manual selection process, but also validity to the location of the IT and business executives on the organizational charts.

The levels and categories of the IT and business executives was further verified by performing an inter-rater reliability analysis (Creswell, 2009). To perform this analysis, a panel was gathered and prepped on how the levels and categories were determined with this research project. The panel was then asked to place a level and a category on the IT and business executive position within four random university organization charts that are in the target sample. Notes were compared between the panel and the researcher. A debate ensured over differences in rating levels. After agreement was achieved, the researcher continued through the data, rating levels and categories based on the rules set within the panel discussion and earlier instructions.

**Qualitative – Phase II**

**Qualitative data collection.** The second, qualitative phase concentrated on exploring the results received in Phase I by randomly selecting participants from each model. One IT executive and one business executive was randomly selected from the top public and private university organizational structure model for a total of 12 interviews. These interviewees were then recruited through the emails shown in Appendix D and Appendix E. An informed consent form (see Appendix F) was approved by IRB and also provided to the participants during the recruiting process so that they were fully aware of the study's purpose, how their information would be handled, and that their participation was voluntary. In this part of the study, a grounded theory case study approach was used. Semi-structured interview sessions were conducted over the phone with the participants. A concentration on a conversational and open-ended manner—allowing participants to speak freely—was made. Although all the questions were covered, the order was
not strictly followed and the interviewee took the lead on many occasions allowing other, ad-hoc questions to be introduced into discussion. Allowing other conversational questions to be introduced during the interview also allowed the researcher to ask a question following a problem or issue that emerged from a previous interview. Journaling during the interviews was also used to take note of tone of voice and other items that were not conveyed in the transcription.

The interview consisted of five open-ended questions which were based off the statistical results found in Phase I. These questions focused on the reporting relationships between IT and the business executive. The questions focused on not only how the reporting relationships currently work but how the interviewee thinks the relationships should work. The first question focused the interviewee's attention on the organizational structure while the second question concentrated on the reporting relationship. Although these two questions were intertwining, the idea was to keep prompting the interviewee to talk about how the reporting relationships actually worked. The third question was more broad questioning whether or not technology was a part of the overall strategy with the fourth question prompting to see if the executive access for IT was intricately tied to any of the responses from the first three questions. The fifth question was left open to encourage the interviewee to talk about any other factor that he felt was inter-related to the subject. Interview questions as approved by IRB are provided in Appendix G.

The participants received the questionnaire approximately five business days ahead of their scheduled interview. The phone interviews were audio-recorded and then transcribed directly after interviewing. After transcription, the respondents were given a brief period of time of at least two days to review the transcription and correct any misunderstandings.

Documents were also gathered to try and verify participants' statements in the interview process. Examples of such documents were budget reports, memos, accreditation reports and strategic plans. These documents were not analyzed but rather will be used as evidence to support the participants' statements and to support discussion.
**Qualitative data analysis.** In the qualitative data analysis, a grounded theory approach was taken by sifting through the materials collected to find codes and themes. The initial data analysis included in-depth exploration—reading and transcribing—of the interviews. The journals and notes were also examined. The data were then segmented and labeled. The next step entailed coding the data and then aggregating the similar codes together to form themes. After the themes were formed, the findings—phrases to better define the themes—were structured around phrases used by the participants’ when talking about the key themes. After this point, a thematic narrative was constructed. This methodology mirrors that suggested by Charmaz (2006), Creswell (2009) and Teddlie & Tashakkori (2011).

The idea behind the themes and findings was to find out what qualitative data seemed to emphasize about the best reporting relationships between business and IT executives and their subordinates. Finding the “why” enabled greater insight into the problem. However, the qualitative data also lent itself to exploring the other factors surrounding the reporting relationships. The end result produced ideas of how the reporting relationships between the IT and business executives worked and what other factors seemed to be important in regards to organizational structure and reporting relationships.

**Establishing credibility.** According to Creswell (2009), several procedures can be used for verification in qualitative research. In this study, three of the eight primary strategies were targeted (p. 196). The first strategy was to use very detailed descriptions of the results. Creswell (2009) says to “use rich, thick description to convey the findings. This may transport the readers to the setting and give the discussion an element of shared experiences” (p. 196). When relaying the results, first-hand quotes from the IT executives and business executives were used to invite the reader to share the story from the point of these executives. This also attempted to provide
validity by sharing directly from an expert's viewpoint.

The second strategy applied the researcher's own expertise in the IT field of how the IT executives may operate internally and externally with their respective department. This expertise was gained by eight years of industry experience working directly with the IT and business executives. The responsibilities of the researcher included consulting and analyzing situations for the IT and business executives and then working directly with the IT executive to integrate solutions. Creswell (2009) calls this strategy “prolonged time in the field. In this way, the researcher develops an in-depth understanding of the phenomenon under study and can convey detail about the site and people that lends credibility to the narrative account” (p.196). The researcher's experience in the IT field in a higher education environment gave insight as to how an IT department might operate and was used to direct conversation in the interviews.

The third strategy deployed was to integrate other research into the study that would support the themes. Creswell (2009) says to “triangulate different data sources of information by examining evidence from the sources and use it to build a coherent justification for the themes” (p.196). Many different data sources were used including literature reviews, semi-structured interviews, journaling before and after the interview, note-taking during the interview, journaling while reading through the transcription and models to represent the IT-business relationship.

Advantages and Disadvantages of the Mixed Methods Approach

Advantages and disadvantages of the mixed methods approach have been discussed by various researchers (Creswell, 2009; Creswell & Plano Clark, 2011; Johnson & Onwueguzie, 2004 ; Teddlie & Tashakkori, 2011). Disadvantages of the mixed methods approach to this study were:

• A lot of time was needed to complete the study.
• More resources were dedicated than with a single approach.

• The first phase may not have produced the intended results leaving nothing further to explore in the second phase.

• This researcher had to explore analysis of both quantitative and qualitative types of data.

Advantages of the explanatory mixed methods approach were:

• A single researcher implemented this mixed methods approach because the phases were not simultaneous but sequential.

• This type of study fit very well with the phenomenon being studied as the variables of reporting relationships between IT and business executives have not been studied in a higher education environment.

• Allowing a general quantitative phase followed by qualitative provided further explanation of the strategic and structural business-IT alignment.

• Unexpected results did arise from the quantitative study. Having the second phase of qualitative research left room to explain the unexpected.
  ◦ This led to a broader set of research questions that were asked and answered.

Research Permissions and Ethical Considerations

This research study and all its elements given to the qualitative participants were first sanctioned by the IRB committee at the University of Nebraska at Lincoln. All participants in the qualitative interview process were given time to read and respond to the official IRB letter detailing the study. All 12 participants also received a consent form and consent was obtained from all 12 participants before beginning the interviews. Participants were made aware that the interviews would be audio-recorded via the consent form and then again during the interview process.
All interview audio recordings used in this study have been destroyed as well as all transcriptions. All participant responses are coded anonymously in the study. The only distinction between participants is by a generic title of CFO and CIO and type of university. No personal information can be gleaned from any part of the qualitative themes. No demographic characteristics were obtained or reported. The researcher felt strongly that responses be kept anonymous since some strong feelings about administrative leaders were espoused during the interview process.

**Role of the Researcher**

The researcher was thoroughly involved with all aspects of the research. In the first phase, the researcher manually gathered the data and tabulated the results. To protect anonymity of the universities and provide for a random sample, the researcher had a master file of university names along with a university identification number. The university identification number was used in all spreadsheets. The master list was only referred to in order to schedule interviews after the random sample numbers were selected.

In the second phase, the researcher performed all telephone interviews by herself. This ensured consistency throughout the semi-structured interview process. Keeping the interviews constant will provide another form on reliability within the qualitative data.

In order to keep out bias towards individual experiences, the researcher is excluding universities and colleges from the qualitative portion of the study with which she has worked in-depth. Creswell (2009) makes a note that one should stay away from conducting research that is too close to home base. By avoiding colleges and universities that the researcher has worked with in her IT experience will reduce this bias in the study.
CHAPTER 4 – FINDINGS

Since a mixed methods approach was used, both quantitative and qualitative data were collected separately, in phases. To recap, quantitative data were captured first and analyzed in Phase 1. Qualitative interview questions for Phase 2 were then created based on the quantitative results. The qualitative data were then analyzed and results were given. A final analysis of the two phases together was then performed in an attempt to bring all data together in Chapter 5 – Discussion (p. 100). Thus, this chapter is outlined in the two phases. Phase 1 describes the data collected and the quantitative analysis while phase 2 describes the qualitative data collected and analysis.

Quantitative Analysis – Phase 1

In the phase 1, data were gathered from online sources and then compiled using five main variables: university type, university size, level on which the business and IT executive resided, category on which the IT executive resided and reporting title under which the IT executive resided. These five variables were used to perform both an exploratory factor analysis (EFA) as well as a categorical principal-components analysis (CATPCA) to explore relationships that may appear between the variables. The last performed analysis consisted of using simple statistics to build the top three models according to university type.

Quantitative data collection. The sample used in this study was comprised of organizational tree data collected from 68 different university websites. During data collection, six universities had inadequate or inconsistent data and so were not used in the sample. As displayed in Table 5, the 62 universities are represented according to private and public university type. Although the Carnegie classification system includes a very small population classification,
no universities in this sample were classified in this category. The main population studied in this case was medium populations at 4-year private and public universities.

Table 5
Data Collection of Public and Private Universities (N=62)

<table>
<thead>
<tr>
<th>Classification</th>
<th>Public Universities</th>
<th>Private Universities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small Population</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>Medium Population</td>
<td>20</td>
<td>21</td>
</tr>
<tr>
<td>Large Population</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
<td>33</td>
</tr>
</tbody>
</table>

Note. N = 62. Based on student population. Very small population classification = 0 and not depicted.

In addition to the type of university and the student population size, detailed information was collected depicting the CIO and the equivalent CFO levels in the university organizational chart (Table 6). Levels were defined starting with the president or equivalent title as Level 1, the vice presidents as Level 2, assistant vice presidents or executive directors at Level 3 and directors at Level 4.

Table 6
Organizational Structure Levels of CIO's and CFO's at Public and Private Universities

<table>
<thead>
<tr>
<th>Classification</th>
<th>CIO level</th>
<th>CFO level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 2</td>
<td>15</td>
<td>56</td>
</tr>
<tr>
<td>Level 3</td>
<td>43</td>
<td>6</td>
</tr>
<tr>
<td>Level 4</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>62</td>
<td>62</td>
</tr>
</tbody>
</table>
Further data were collected to group the CIO's reporting executive structure into categories and direct supervisor title (Table 7 and Table 8). Although the majority of universities had one person fulfilling both a CFO and COO role in a finance and administration category, six universities split the executive structure into singular finance or administration roles. Although Tables 7 and 8 are much alike, Table 8 reflects that although the CIO may be within the same category, the supervisory roles can differ.

Table 7
*Categories of CIO Placement within University Organizational Structure*

<table>
<thead>
<tr>
<th>Categories</th>
<th># of CIO's</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology</td>
<td>15</td>
</tr>
<tr>
<td>Finance &amp; Administration</td>
<td>23</td>
</tr>
<tr>
<td>Academic Affairs</td>
<td>15</td>
</tr>
<tr>
<td>Administration</td>
<td>4</td>
</tr>
<tr>
<td>Finance</td>
<td>2</td>
</tr>
<tr>
<td>Student Affairs</td>
<td>1</td>
</tr>
<tr>
<td>Advancement</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>62</td>
</tr>
</tbody>
</table>
Table 8

*Titles of CIO's Supervisor within University Organizational Structure*

<table>
<thead>
<tr>
<th>CIO's Supervisor</th>
<th># of CIO's</th>
</tr>
</thead>
<tbody>
<tr>
<td>President</td>
<td>15</td>
</tr>
<tr>
<td>VP Finance &amp; Administration</td>
<td>22</td>
</tr>
<tr>
<td>Provost or VP Academic Affairs</td>
<td>14</td>
</tr>
<tr>
<td>VP Administration</td>
<td>4</td>
</tr>
<tr>
<td>VP Finance</td>
<td>2</td>
</tr>
<tr>
<td>VP Student Affairs</td>
<td>1</td>
</tr>
<tr>
<td>VP Advancement</td>
<td>2</td>
</tr>
<tr>
<td>Asst VP Finance &amp; Administration</td>
<td>1</td>
</tr>
<tr>
<td>Asst Provost or VP Academic Affairs</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>62</strong></td>
</tr>
</tbody>
</table>

Lastly, data were collected indicating whether or not the CIO position had direct placement on the presidential leadership team or if the CIO had a position on a committee with direct access to the executive leadership team—executive leadership team indicating that the head of the university was included on this team. Out of 62 CIO positions studied, 27 CIOs had direct access to the president through a committee (Table 9). The rest of the reported CIO positions did not serve on a committee with direct access to the executive leadership team.

Table 9

*CIO Placement in Committees within University Organizational Structure*

<table>
<thead>
<tr>
<th>Resides on Executive Committee</th>
<th># of CIOs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, on executive leadership team</td>
<td>18</td>
</tr>
<tr>
<td>Yes, on another committee with direct executive access</td>
<td>9</td>
</tr>
<tr>
<td>No direct executive access through a committee</td>
<td>35</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>62</strong></td>
</tr>
</tbody>
</table>
**Quantitative analysis.** Several analysis of the data were performed in Phase I to explore data validity and different variable structures and modeling of the data. The first analysis performed was an inter-rater reliability analysis to vet the researcher's methodology of manual data gathering (Creswell, 2009). The second analysis performed was an exploratory factor analysis (EFA). The idea was to explore the data for underlying factors allowing the researcher to focus on whether or not the organizational structure influenced the relationship between business and IT. The exploratory methodology aligns well with this study as the variables were not known to be either independent or dependent and allowed for underlying dimensions to potentially be determined (Jackson, 1991; Thompson, 2004). Since EFA can only be used to explore continuous variables and the data set was mixed, categorical PCA was also used to explore underlying factors between both nominal and ordinal variables (Linting, Meulman, Groenen, & Van der Kooij, 2007). After EFA and a categorical PCA, simple analyses were performed using cross tabulated frequency and response patterns.

**Inter-rater reliability analysis.** In order to provide validity in the manual analyzing of categories and levels within the organizational charts, two graduate students were employed to rate three random university organizational charts taken from the sample. Before rating the charts, the graduate students (one student working on a PhD from Colorado State University and the other student working on a PhD from Purdue University) were instructed as to how the levels and categories were being defined on the organizational charts. After this discussion, they were asked to rate the levels of the university organizational chart starting with the CEO position—President or Chancellor—and work down through until they noted the CIO position. They were also asked to circle the CFO and CIO positions on the organizational chart and then categorize the CIO into one of the seven categories (reference back to Table 7).
After the rating the organizational charts, a discussion ensued between the research and the graduate students to determine differences in the ratings. However, both graduate students rated the levels without any deviation from each other or from the researcher's own chart. There was also no deviation noted in the positions labeled as CIO and CFO nor was there any deviation noted in the assigning of categories to the CIO. It should be noted that at first, one student was confused on the categories. He posed questions such as, “How were the categories created? Who am I placing in a category? The CIO or CFO?” After a second explanation, this student did not have any further questions. No further tables or charts have been noted on this section as there was no deviation from any of the original ratings of the researcher. Therefore, all data sets would correlate with a 1.0. Since there was no deviation from the original researcher's findings, more support has been given to the methodology of manually categorizing and assigning levels.

**Exploratory factor analysis.** Before the EFA could be completed, several screening tests of the data were in order. When the EFA was first performed, the Kaiser-Meyer-Oikin (KMO) measure of sampling adequacy reflected 0.665. According to Kaiser (1974), anything below 0.50 is unacceptable. Although 0.665 was acceptable, a brief scan of the anti-image correlation matrix—which renders a KMO statistic for each variable—depicted the student population variable at 0.20 which was far below the acceptable level of KMO > 0.5 (Field, 2013). A brief scan of the ending pattern and structure matrix also indicated that simple structure would not be achieved as the student population variable was not highly loaded on any factor. Based on these two facts, the student population variable was removed from the EFA and the analysis was performed again.

After removing the student population variable, the EFA depicted KMO > .5 and the Bartlett's test of sphericity was p < .0005 indicating statistical significance (Table 10). Examination of the correlation matrix indicated that two correlations with the CFO level variable
were low (Table 11). However, the CFO level variable contained very little variance (standard deviation 0.30), which may account for the lack of correlation.

Table 10

*KMO Measure and Barlett's Test for EFA of University Organizational Structure*

<table>
<thead>
<tr>
<th>Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy</th>
<th>0.667</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approx Chi-Square</td>
<td>106.621</td>
</tr>
<tr>
<td>degrees of freedom</td>
<td>6</td>
</tr>
<tr>
<td>Significance</td>
<td>p &lt; 0.0005</td>
</tr>
</tbody>
</table>

Note. \( N = 62 \)

Table 11

*Correlation Matrix, Means Standard Deviations and Communalities for EFA*

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>M</th>
<th>SD</th>
<th>( h^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. CIO level</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td>2.82</td>
<td>0.529</td>
<td>0.706</td>
</tr>
<tr>
<td>2. CFO level</td>
<td>.423</td>
<td>1.000</td>
<td></td>
<td></td>
<td>2.10</td>
<td>0.298</td>
<td>0.351</td>
</tr>
<tr>
<td>3. CIO category</td>
<td>.536</td>
<td>.130</td>
<td>1.000</td>
<td></td>
<td>2.45</td>
<td>1.387</td>
<td>0.763</td>
</tr>
<tr>
<td>4. CIO's supervisor</td>
<td>.673</td>
<td>.255</td>
<td>.794</td>
<td>1.000</td>
<td>2.65</td>
<td>1.756</td>
<td>0.867</td>
</tr>
</tbody>
</table>

Note. \( N = 62 \). All correlations significant at \( p < .0005 \) except for the CFO level variable at \( p < .16 \). \( h^2 = \) communalities.

The next step to explore was how many factors should be retained from the analysis. The Kaiser-Guttman rule suggests only retaining those components with eigenvalues greater than 1. Referencing Table 12, only one factor would be obtained as only one factor has an eigenvalue greater than 1. However, visually studying the scree plot (Figure 3) indicates an inflection point to retain two factors (Cattell, 1966). It is also important to note that the second factor in Table 12 loaded at eigenvalue 0.953—just below 1. According to Field (2013), the Kaiser-Guttman rules
are only valid when there are less than 30 variables and communalities after extraction are greater than 0.70 or if the sample size is greater than 250 and the communalities are all above 0.60. In the case of this analysis, the sample size is both less than 250 and less than 30 variables. Referencing the communalities in Table 11, the CFO level variable communality was 0.35 after extraction and the average communalities (2.687 / 4 = 0.67) were still below 0.70 implying that Kaiser's rules will not be appropriate. Looking towards Joliffe (1986), the suggestion is to retain components whose eigenvalues are greater than 0.70 as retaining only eigenvalues above 1 may suggest that the retained variables would all be interrelated. Finally, utilizing a third parallel analysis—or bootstrapping procedure—with p < 0.05 and 1000 simulated data sets, two factors remained prevalent (Hayton, Allen & Scarpello, 2004; O'Connor, 2000). Referencing Figure 4, the first factor clearly depicts an eigenvalue higher than p < 0.05 (2.09 > 0.64) and the second factor is also higher at p < 0.05 (0.29 > 0.25). Again viewing Figure 4, the line graph depicts that two factor points are above—although the second is barely above—the 95% confidence level. Utilizing the final parallel analysis with reference to the scree plot inflection and eigenvalue analysis, two factors were retained in order to explore the maximum amount of clustering in the analysis.

Table 12

<table>
<thead>
<tr>
<th>Factor</th>
<th>Eigenvalue</th>
<th>% of variance</th>
<th>Cumulative %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.485</td>
<td>55.974</td>
<td>55.974</td>
</tr>
<tr>
<td>2</td>
<td>0.953</td>
<td>11.209</td>
<td>67.183</td>
</tr>
</tbody>
</table>

*Note.* Initial eigenvalues with percent of variance after extraction displayed.
Figure 3. Scree Plot of Eigenvalues for Four Variables for EFA. Scree illustrates elbow at the second eigenvalue predicting a potential two factors for further analysis.

Figure 4. Parallel Analysis of Eigenvalues, 50% and 95% Intervals for EFA of University Organizational Structure. This analysis performs a bootstrapping type of procedure taking a subset of the sample and reproducing times 1000. Eigenvalues 1 and 2 are noticeably above the 95th percentile—although eigenvalue 2 is barely above.
Retaining two-factors and then analyzing based on a two-factor solution accounted for 67.18% of the total variance (Table 12). The rotation type—oblique rotation—for the two-factor analysis was chosen based on the idea that correlation may exist between factors. Since independence between the initial variables could not be assumed, a two-factor oblique rotation was conducted producing both a pattern and structure matrix (Table 13). By examining both the pattern and structure matrix, two distinct loadings emerge, which are supported by both matrices (Graham, Guthrie & Thompson, 2003). When determining the rules to achieve a simple structure, Field (2013) recommends focusing on values higher than 0.4 and concentrating on the highest loaded value if the variable loaded highly on more than one factor in the matrices. According to these rules in the pattern matrix, the first factor could be labeled CIO Placement within Organizational Structure with high loadings on the CIO category and CIO Supervisory Role while the second factor could be labeled as CIO and CFO Organizational Structure Levels with high loadings on the CIO level and CFO level. Viewing the structure matrix with the same rules as the pattern matrix produces similar results. Graham, et al. (2003) caution against variables that load in a contradicting manner in pattern and structure matrices. Since the pattern and structure matrices have no conflicting results, the factor solution found in the pattern matrix is strengthened by the findings in the structure matrix and simple structure is achieved.
Table 13
*Summary of Factor Loadings for Pattern and Structure Matrices for Oblique Two-Factor Solution for EFA for University Organizational Structure*

<table>
<thead>
<tr>
<th>Pattern Matrix</th>
<th>Structure Matrix</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Factor</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>CIO level</td>
<td>0.433</td>
</tr>
<tr>
<td>CFO level</td>
<td>-0.048</td>
</tr>
<tr>
<td>CIO category</td>
<td><strong>0.911</strong></td>
</tr>
<tr>
<td>CIO's supervisor</td>
<td><strong>0.875</strong></td>
</tr>
</tbody>
</table>


*Categorical principal components analysis.* Since the idea of the categorical principal components analysis (CATPCA) was to extend the exploratory factor analysis to include nominal variables, the same exploratory approach was used. Just like EFA, principal components analysis seeks to explore underlying structures. However, principal components analysis does this with slightly different algorithms. Although the solution is often the same, the PCA, or CATPCA in this case, may produce slightly exaggerated loadings and account for more of the variance than EFA (Field, 2013). However, the CATPCA has a distinct advantage over EFA in having the ability to take a nonlinear look at the data by converting qualitative variables into quantitative. By not limiting the analysis to only continuous variables, nonlinear relationships between ordinal and nominal variables can be explored (Young, 1981). The idea behind this analysis remains the same as EFA: to examine the underlying structure of the variables.

To begin examining the underlying structure, the initial variables need to be vetted. In order to fully take advantage of nonlinear relationships, the initial variables must first be classified and a decision must be made on whether or not the variables should keep their ordered quantifications (Linting, et al., 2007). In running an analysis with the least restrictions, the
following transformations were noted in Figure 5. By examining the charts, three potential nonmonotonic, nonlinear relationships stand out in the shapes of the CIO category and the CIO's supervisor. This suggests that these variables should be kept as nominal in the analysis to preserve potential relationships.

![Figure 5. Transformation Plots of All Eight Variables in CATPCA for University Organizational Structure. Variable names shortened for brevity: StudentPop = student population; InstType = institution type; OtherComm = other committees; ExecComm = exec committee; CFOLvl = CFO level; CIOLvl = CIO level; CIOCat = CIO category; and CIOSup = CIO's supervisor.](image)

Moving forward, the number of components was next determined by examining multiple scree plots in each dimension and then determining the inflection point. Referring to Figure 6, the scree appears to occur directly after the second component, indicating that two components
should be used in analysis. Although two components seems small, the total variance described by the two components is 66.3%, which explains almost two-thirds of the entire structure (Table 14). Although traditional EFA looked at retaining factors with eigenvalues > 1, Linting and Meulman (2007) suggests that eigenvalues in a nonlinear analysis should be vetted more thoroughly so a solution is to deduce the number of components based on at least six different dimensions of scree plots.

![Figure 6. Overlay Scree Plot Depicting Eigenvalues on the First through Sixth Dimensions. Each dimension has a separate line with different shapes for each plotted point. The table provides exact figures for each plotted point on the chart.](image-url)
Table 14

*Eigenvalues, Percentages of Variance, Cumulative Percentages and Cronbach's Alpha for Factors for EFA of University Organizational Structure*

<table>
<thead>
<tr>
<th>Factor</th>
<th>Eigenvalue</th>
<th>% of variance</th>
<th>Cumulative %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3.801</td>
<td>47.508</td>
<td>47.508</td>
</tr>
<tr>
<td>2</td>
<td>1.507</td>
<td>18.837</td>
<td>66.345</td>
</tr>
</tbody>
</table>

*Note. \( N = 62. \)*

Next, the component loading plot was examined for case outliers. Since the plot portrayed no extreme outliers—one point completely isolated from any other grouping—the transformed variables were saved and submitted to a linear PCA to examine the rotated solution. As seen from Figure 7, the unrotated solution reveals loadings in all four quadrants. As such, it is no surprise that the rotated solution did not offer much better loadings (Table 15). The loadings, represented in Table 15, do describe more variable clusters than were previously known through the EFA, but the results differ from the EFA. In the CATPCA analysis, the CFO level and CIO level variables no longer load together as they did in the previous EFA. Instead, the non-continuous variable—exec committee—loads negatively with the CIO level, CIO category, and CIO's supervisor variables in Factor 1, which could be referred to as the CIO Organizational and Supervisory Structure Factor. Factor 2 is a bit ambiguous with the institution type variable negatively loaded with the student population variable pointing out that these two nominal variables do not seem to be structurally related to the other variables in the analysis. The last two variables—other committees and CFO level—are just under the 0.40 mark and do not load highly on either Factor 1 or Factor 2 (both variables placed in italics to note the possibility). However, following the strict rule of only referencing loadings greater than 0.40, simple structure was not achieved in this second analysis with nonlinear and linear variables loading together.
Figure 7. Unrotated Loadings in CATPCA with Eight Variables from University Organizational Structure. This figure plots all unrotated loadings from dimension 1 and dimensions 2 (two factors) in the CATPCA.
Table 15
Rotated Factor Loadings in CATPCA with Eight Variables from University Organizational Structure

<table>
<thead>
<tr>
<th></th>
<th>Pattern Matrix</th>
<th>Structure Matrix</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Factor 1</td>
<td>Factor 2</td>
</tr>
<tr>
<td>CIO level</td>
<td>0.965</td>
<td>-0.103</td>
</tr>
<tr>
<td>CFO level</td>
<td>0.129</td>
<td>-0.349</td>
</tr>
<tr>
<td>CIO category</td>
<td>0.976</td>
<td>-0.078</td>
</tr>
<tr>
<td>CIO's supervisor</td>
<td>0.964</td>
<td>-0.045</td>
</tr>
<tr>
<td>student population</td>
<td>0.058</td>
<td>0.799</td>
</tr>
<tr>
<td>institution type</td>
<td>-0.021</td>
<td>-0.839</td>
</tr>
<tr>
<td>exec committee</td>
<td>-0.866</td>
<td>0.095</td>
</tr>
<tr>
<td>other committees</td>
<td>0.356</td>
<td>0.237</td>
</tr>
</tbody>
</table>

Note. N = 62. Boldface indicates highest factor loadings. Principal components used with oblique rotation.

In order to achieve simple structure, a second linear PCA was performed on the CATPCA transformed variables. Because student population and institution type loaded highly together and did not cluster together with any other significant variables, both were left out of the second analysis. From this second analysis (Table 16), the CIO level, CIO category, CIO's supervisor and exec committee variables—exec committee negatively loaded—again clustered together alluding to a CIO Organizational Structure Factor. The second factor changed significantly from the previous analysis. In this case, the other committees variable negatively loaded with the CFO level suggesting a separate CFO Organizational Structure Factor. All variables in the second analysis loaded highly above 0.40 with each loading on only one factor which achieves simple structure. This further strengthened the case to leave out the previous non-significant classification variables in order to see the more significant loadings and achieve simple structure.
Table 16  
*Rotated Factor Loadings in CATPCA with Six Variables from University Organizational Structure*

<table>
<thead>
<tr>
<th>Pattern Matrix</th>
<th>Structure Matrix</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Factor</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>CIO level</td>
<td>0.982</td>
</tr>
<tr>
<td>CFO level</td>
<td>0.241</td>
</tr>
<tr>
<td>CIO category</td>
<td><strong>0.988</strong></td>
</tr>
<tr>
<td>CIO's supervisor</td>
<td><strong>0.971</strong></td>
</tr>
<tr>
<td>exec committee</td>
<td>-0.861</td>
</tr>
<tr>
<td>other committees</td>
<td>0.268</td>
</tr>
</tbody>
</table>

*Note. N = 62. Boldface indicates highest factor loadings. Principal components used with oblique rotation. Institution type and student population variables were removed from this analysis.*

*Simple modeling analysis – frequency and response patterns.* The final quantitative analysis performed was a simple analysis looking at frequency and response patterns to build the top recurring models seen within university organizational structure. Within the university organizational structure sample of 62, there was not a large variation in the level of the CFO. In fact, the CFO was at level two 97% of the time in the public university sample (N = 29) with only one CFO sitting at level three making up the remaining 3% (Table 17). In the private university sample (N = 33), the CFO was at level two 85% of the time and at level three the remaining 15%. Looking towards the CIO position within university organizational structure, the CIO was at level two in the public university sample 28% of the time, at level three 69%, and at level four the least amount at 3% (Table 18). In the private university sample, the CIO was at level two at 21% of the time, level three at 70% and at level four the least amount at 9%.
Table 17
*CFO Level and Institution Type Frequencies, Cross-Tabulated*

<table>
<thead>
<tr>
<th>CFO Levels</th>
<th>Institution Type</th>
<th>Public</th>
<th>Private</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Executive</td>
<td>% within CIOLvl</td>
<td>50.0%</td>
<td>50.0%</td>
<td></td>
</tr>
<tr>
<td>Level 2</td>
<td>% within InstType</td>
<td>96.6%</td>
<td>84.8%</td>
<td></td>
</tr>
<tr>
<td>% of Total</td>
<td></td>
<td>45.2%</td>
<td>45.2%</td>
<td>90.3%</td>
</tr>
<tr>
<td>Middle</td>
<td>% within CIOLvl</td>
<td>16.7%</td>
<td>83.3%</td>
<td></td>
</tr>
<tr>
<td>Level 3</td>
<td>% within InstType</td>
<td>3.4%</td>
<td>15.2%</td>
<td></td>
</tr>
<tr>
<td>% of Total</td>
<td></td>
<td>1.6%</td>
<td>8.1%</td>
<td>9.7%</td>
</tr>
<tr>
<td>Totals</td>
<td>Count</td>
<td>29</td>
<td>33</td>
<td>62</td>
</tr>
<tr>
<td></td>
<td>% of Total</td>
<td>46.8%</td>
<td>53.2%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

*Note. N = 62. CIOLvl = CIO level and InstType = Institution Type.*
### Table 18

*CIO Level and Institution Type Frequencies, Cross-Tabulated*

<table>
<thead>
<tr>
<th>CIO Levels</th>
<th>Public</th>
<th>Private</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Count</strong></td>
<td>8</td>
<td>7</td>
<td>15</td>
</tr>
<tr>
<td><strong>Executive</strong></td>
<td>% within CIOLvl</td>
<td>53.3%</td>
<td>46.7%</td>
</tr>
<tr>
<td><strong>Level 2</strong></td>
<td>% within InstType</td>
<td>27.6%</td>
<td>21.2%</td>
</tr>
<tr>
<td><strong>% of Total</strong></td>
<td></td>
<td>12.9%</td>
<td>11.3%</td>
</tr>
<tr>
<td><strong>Count</strong></td>
<td>20</td>
<td>23</td>
<td>43</td>
</tr>
<tr>
<td><strong>Middle</strong></td>
<td>% within CIOLvl</td>
<td>46.5%</td>
<td>53.5%</td>
</tr>
<tr>
<td><strong>Level 3</strong></td>
<td>% within InstType</td>
<td>69.0%</td>
<td>69.7%</td>
</tr>
<tr>
<td><strong>% of Total</strong></td>
<td></td>
<td>32.3%</td>
<td>37.1%</td>
</tr>
<tr>
<td><strong>Count</strong></td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td><strong>Low</strong></td>
<td>% within CIOLvl</td>
<td>25.0%</td>
<td>75.0%</td>
</tr>
<tr>
<td><strong>Level 4</strong></td>
<td>% within InstType</td>
<td>3.4%</td>
<td>9.1%</td>
</tr>
<tr>
<td><strong>% of Total</strong></td>
<td></td>
<td>1.6%</td>
<td>4.8%</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>Count</strong></td>
<td>29</td>
<td>33</td>
</tr>
<tr>
<td><strong>% of Total</strong></td>
<td></td>
<td>46.8%</td>
<td>53.2%</td>
</tr>
</tbody>
</table>

*Note. N = 62. CIOLvl = CIO level and InstType = Institution Type.*

Since the CFO was most often at level two in the public university samples, the CFO level was held constant at two with the institution type at public (N = 28) to explore the top models within the public university organizational structure (Table 19). Looking at Table 19, the six categories appear at the top with the levels of CIO along the side. Three top models emerge from this table with the CIO at level two in the technology category occurring 29% of the time within the reduced sample of N = 28; the CIO at level three underneath the finance and administration category at 25%; and the CIO at level three underneath the academic affairs category at 25%. These three models are illustrated in Figure 8.
Table 19
CIO Level and Categories in Public Universities with CFO at Level 2, Cross-Tabulated

<table>
<thead>
<tr>
<th></th>
<th>Tech &amp; Admin</th>
<th>Academic Affairs</th>
<th>Admin</th>
<th>Finance Affairs</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Executive % within CIO Lvl</td>
<td>100.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Level 2 % within CIO Cat</td>
<td>100.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>% of Total</td>
<td>28.6%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Count</td>
<td>0</td>
<td>7</td>
<td>7</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>CIO Middle % within CIO Lvl</td>
<td>0.0%</td>
<td>36.8%</td>
<td>36.8%</td>
<td>15.8%</td>
<td>5.3%</td>
</tr>
<tr>
<td>Levels Level 3 % within CIO Cat</td>
<td>0.0%</td>
<td>87.5%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>% of Total</td>
<td>0.0%</td>
<td>25.0%</td>
<td>25.0%</td>
<td>10.7%</td>
<td>3.6%</td>
</tr>
<tr>
<td>Count</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Low % within CIO Lvl</td>
<td>0.0%</td>
<td>100.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Level 4 % within CIO Cat</td>
<td>0.0%</td>
<td>12.5%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>% of Total</td>
<td>0.0%</td>
<td>3.6%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Totals</td>
<td>8</td>
<td>8</td>
<td>7</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>% of Total</td>
<td>28.6%</td>
<td>28.6%</td>
<td>25.0%</td>
<td>10.7%</td>
<td>3.6%</td>
</tr>
</tbody>
</table>

Note. Institution type = public and CFO level = 2 held constant. N = 28. CIO Lvl = CIO level and CIO Cat = CIO Category; Tech = Technology, Finance & Admin = Finance and Administration, Admin = Administration.
Figure 8. Top Three Models of Public University Organizational Structure. Model 1 is the top model occurring 29% of the time (N = 28) when the CFO is at the executive level (level two). Models 2 & 3 both occur 25% of the time when the CFO is at level two.

When looking at the sample of private universities, the CFO was again held constant at level two since this structure comprised 85% (N = 26) of the total occurrences (N = 33). Referring to Table 20, the top three models were the same as the public university. However, whereas the top public university models shared a fairly even percentage, the top model among private university organizational structure was the CIO at level three underneath finance and administration occurring 43% of the time within the reduced sample of N = 26. The other top two models—both occurring 25% of the time—were the CIO at executive level (level two) and the CIO at level three underneath the academic affairs category (Figure 9).
Table 20  
*CIO Level and Categories in Private Universities with CFO at Level 2, Cross-Tabulated*

<table>
<thead>
<tr>
<th>CIO Categories</th>
<th>Technology</th>
<th>Finance &amp; Administration</th>
<th>Academic Affairs</th>
<th>Advancement</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Executive % within CIO lvl</td>
<td>100.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Level 2 % within CIO Cat</td>
<td>100.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>CIO % of Total</td>
<td>25.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>25.0%</td>
</tr>
<tr>
<td>Levels Count</td>
<td>0</td>
<td>12</td>
<td>7</td>
<td>2</td>
<td>21</td>
</tr>
<tr>
<td>Middle % within CIO lvl</td>
<td>0.0%</td>
<td>57.1%</td>
<td>33.3%</td>
<td>9.5%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Level 3 % within CIO Cat</td>
<td>0.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>% of Total</td>
<td>0.0%</td>
<td>42.9%</td>
<td>25.0%</td>
<td>7.1%</td>
<td>75.0%</td>
</tr>
<tr>
<td>Totals Count</td>
<td>7</td>
<td>12</td>
<td>7</td>
<td>2</td>
<td>28</td>
</tr>
<tr>
<td>% of Total</td>
<td>25.0%</td>
<td>42.9%</td>
<td>25.0%</td>
<td>7.1%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

*Note.* Institution type = private and CFO level = 2 held constant. *N* = 28. CIO lvl = CIO level and CIO Cat = CIO Category.
Figure 9. Top Three Models of Private University Organizational Structure. Model 1 is the top model occurring 43% of the time when the CFO is at the executive level (level two). Models 2 & 3 both occur 25% of the time when the CFO is at level two.
The last tables, Tables 21 and 22, again display the CIO level and category. However, in Table 21, the CFO level is held constant at level 3 with the institution type of public. In Table 22, the CFO level is held constant at level 3 with the institution type of private. These two tables illustrate very low occurrences—with categories containing only 1 or 0—within their respective samples with public at $N = 1$ and private at $N = 7$. As such, none of these occurrences were modeled.

Table 21
*CIO Level and Categories in Public Universities with CFO at Level 3, Cross-Tabulated*

<table>
<thead>
<tr>
<th>CIO Category</th>
<th>Finance &amp; Administration</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>CIO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Middle</td>
<td>% within CIO Level</td>
<td>100.0%</td>
</tr>
<tr>
<td>Levels</td>
<td>% within CIO Category</td>
<td>100.0%</td>
</tr>
<tr>
<td></td>
<td>% of Total</td>
<td>100.0%</td>
</tr>
<tr>
<td>Total</td>
<td>Count</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>% of Total</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

*Note. Institution type = public and CFO level = 3 held constant. $N = 1$.*
Table 22
*CIO Level and Categories in Private Universities with CFO at Level 3, Cross-Tabulated*

<table>
<thead>
<tr>
<th>CIO Categories</th>
<th>Finance &amp; Admin</th>
<th>Academic Affairs</th>
<th>Admin</th>
<th>Finance</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Executive</td>
<td>50.0%</td>
<td>0.0%</td>
<td>50.0%</td>
<td>0.0%</td>
<td>20.0%</td>
</tr>
<tr>
<td>Level 2</td>
<td>50.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>CIO % of Total</td>
<td>20.0%</td>
<td>0.0%</td>
<td>20.0%</td>
<td>0.0%</td>
<td>40.0%</td>
</tr>
<tr>
<td>Levels</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Count</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Middle % within CIOLvl</td>
<td>33.3%</td>
<td>33.3%</td>
<td>0.0%</td>
<td>33.3%</td>
<td></td>
</tr>
<tr>
<td>Level 3 % within CIOCat</td>
<td>50.0%</td>
<td>100.0%</td>
<td>0.0%</td>
<td>100.0%</td>
<td></td>
</tr>
<tr>
<td>% of Total</td>
<td>20.0%</td>
<td>20.0%</td>
<td>0.0%</td>
<td>20.0%</td>
<td>60.0%</td>
</tr>
<tr>
<td>Totals</td>
<td>Count</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>% of Total</td>
<td>40.0%</td>
<td>20.0%</td>
<td>20.0%</td>
<td>20.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

*Note. N = 5. Institution type = private and CFO level = 3 held constant. CIOLvl = CIO level and CIOCat = CIO Category; Finance & Admin = Finance and Administration, Admin = Administration.*

The last item to examine was the occurrence of the CIO on the executive level committee as well as any other committee with direct access to the president and executive team. A noted difference did occur between the amount of times the CIO was at the executive level (level 2)—15 times with 8 at public universities and 7 at private (referring back to Table 18)—and on the executive committee—18 times with 10 at the public universities and 8 at the private universities (Table 23).
Table 23
*CIO on the Executive Committee in the Public and Private Universities*

<table>
<thead>
<tr>
<th>Institution</th>
<th>CIO on Executive Committee?</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>Public</td>
<td>10</td>
<td>19</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>% within InstType</td>
<td>34.5%</td>
<td>65.5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% within ExecComm</td>
<td>55.6%</td>
<td>43.2%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of Total</td>
<td>16.1%</td>
<td>30.6%</td>
<td>46.8%</td>
<td></td>
</tr>
<tr>
<td>Private</td>
<td>8</td>
<td>25</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>% within InstType</td>
<td>24.2%</td>
<td>75.8%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% within ExecComm</td>
<td>44.4%</td>
<td>56.8%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of Total</td>
<td>12.9%</td>
<td>40.3%</td>
<td>53.2%</td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>18</td>
<td>44</td>
<td>62</td>
<td></td>
</tr>
<tr>
<td>% of Total</td>
<td>29.0%</td>
<td>71.0%</td>
<td>100.0%</td>
<td></td>
</tr>
</tbody>
</table>

*Note. N = 62. InstType = institution type and ExecComm = executive committee.*

A total of four occurrences were noted—two at the public universities and two at private—where the CIO was not at the executive level but was present on the executive committee.

During these occurrences where the CIO was not at the executive level but was present on the executive committee, the CIO resided underneath the finance and administration category three times—most highly occurring—and underneath academic affairs one time (Table 24).
Table 24
CIO on Executive Committee, Not at Executive Level at Public and Private Universities

<table>
<thead>
<tr>
<th>CIO Category</th>
<th>Finance &amp; Administration</th>
<th>Academic Affairs</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>CIO</td>
<td>Middle</td>
<td>% within CIOLvl</td>
<td></td>
</tr>
<tr>
<td>Level</td>
<td>Level 3</td>
<td>% within CIOCat</td>
<td></td>
</tr>
<tr>
<td>% of Total</td>
<td>75.0%</td>
<td>25.0%</td>
<td></td>
</tr>
<tr>
<td>% of Total</td>
<td>75.0%</td>
<td>25.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Total</td>
<td>Count</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>% of Total</td>
<td>75.0%</td>
<td>25.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Note. N = 4. Executive committee = yes and CIO level does not equal 2 held constant. CIOLvl = CIO level and CIOCat = CIO Category.
In addition to the executive committee, the CIO was on other committees with direct access to the executive team, which includes the president, a total of nine times—four in public universities and five in private (Table 25). Drilling further down, Table 26 depicts the level of the CIO and reporting category when the CIO was on another committee with direct executive access at public universities. Not one particular model was ranked highly as each category and/or level had only one occurrence. Table 27 illustrates the level and reporting category of the CIO when on other committees with direct executive access at the private universities. In this case, the highest frequency occurred when the CIO was at level three (middle level) underneath the finance and administration category.

Table 25
*CIO on Another Committee with Direct Executive Access in the Public and Private Universities*

<table>
<thead>
<tr>
<th>Institution Type</th>
<th>CIO on Other Committee?</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Count</td>
<td>4</td>
<td>25</td>
</tr>
<tr>
<td>Public % within InstType</td>
<td>13.8%</td>
<td>86.2%</td>
</tr>
<tr>
<td>% within OtherComm</td>
<td>44.4%</td>
<td>47.2%</td>
</tr>
<tr>
<td>% of Total</td>
<td>6.5%</td>
<td>40.3%</td>
</tr>
<tr>
<td>Count Private % within InstType</td>
<td>15.2%</td>
<td>84.8%</td>
</tr>
<tr>
<td>% within OtherComm</td>
<td>55.6%</td>
<td>52.8%</td>
</tr>
<tr>
<td>% of Total</td>
<td>8.1%</td>
<td>45.2%</td>
</tr>
<tr>
<td>Count Totals</td>
<td>9</td>
<td>53</td>
</tr>
<tr>
<td>% of Total</td>
<td>14.5%</td>
<td>85.5%</td>
</tr>
</tbody>
</table>

Note. N = 62. InstType = institution type and OtherComm = other committee. Other committee refers to a committee where the CIO has direct access to the executive, leadership team.
Table 26
*CIO on Another Committee in the Public Universities*

<table>
<thead>
<tr>
<th>CIO Category</th>
<th>Finance &amp; Administration</th>
<th>Academic Affairs</th>
<th>Administration</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Middle % within CIOLvl</td>
<td>33.3%</td>
<td>33.3%</td>
<td>33.3%</td>
<td></td>
</tr>
<tr>
<td>Level 3 % within CIOCat</td>
<td>50.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td></td>
</tr>
<tr>
<td>CIO % of Total</td>
<td>25.0%</td>
<td>25.0%</td>
<td>25.0%</td>
<td>75.0%</td>
</tr>
<tr>
<td>Levels</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low % within CIOLvl</td>
<td>100.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>Level 4 % within CIOCat</td>
<td>50.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>% of Total</td>
<td>25.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>25.0%</td>
</tr>
<tr>
<td>Total</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>% of Total</td>
<td>50.0%</td>
<td>25.0%</td>
<td>25.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Note. *N = 4.* Institution type = public, CIO level not equal to 2 and other committee = yes held constant. CIOLvl = CIO level and CIOCat = CIO Category.

Table 27
*CIO on Another Committee in the Private Universities*

<table>
<thead>
<tr>
<th>CIO Category</th>
<th>Finance &amp; Administration</th>
<th>Academic Affairs</th>
<th>Advancement</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>CIO Middle % within CIOLvl</td>
<td>60.0%</td>
<td>20.0%</td>
<td>20.0%</td>
<td></td>
</tr>
<tr>
<td>Level 3 % within CIOCat</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td></td>
</tr>
<tr>
<td>% of Total</td>
<td>60.0%</td>
<td>20.0%</td>
<td>20.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Total</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>% of Total</td>
<td>60.0%</td>
<td>20.0%</td>
<td>20.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Note. *N = 4.* Institution type = private, CIO level not equal to 2 and other committee = yes held constant. CIOLvl = CIO level and CIOCat = CIO Category.
Qualitative Analysis – Phase 2

Taking the results from phase 1, two objectives were identified for phase 2. These two objectives can be summed up by stating that the idea of the qualitative phase was to explore the different structural models to see how business and IT executives think about the reporting relationships within the university. The qualitative interview was also organized to allow for other factors that may be influencing the reporting relationships outside of the structural models to be brought to attention. Upon initial review, the researcher planned on interviewing only CIOs from the university. However, after both quantitative analyses displayed groupings with the CFO and CIO variables on one factor, the researcher decided that both perspectives needed to be included. Having an executive representative to interview from each model from both the IT and business groups would thoroughly examine reporting relationships in all models across both university types.

Even though the first quantitative phase showed no relationships between the type of university and the other variables during the exploratory factor analyses (EFA) or the categorical principal components analyses (CATPCA), the two university types were still represented separately in the interviewing process for three reasons:

1. Birnbaum (1988) suggested that the types of universities would vary not only in size but also in focus and structure.
2. The modeling of the data at the end of the Phase 1 shows the ranking of the top models according to percentage differed between private and public.
3. If university type was disregarded, the interviews represent more focus on the three main models since the three main models are the same in both public and private; the models are simply ranked differently.

Taking these three reasons into account, during the transcription process, the interviews were completely anonymized except for the model number and university type represented.
All interviews were conducted using voice interviews only with the exception of one participant. This participant felt much more comfortable communicating via email and answering the questions in text. As a result, the interview was conducted by sending this participant a list of the questions with prompts and then receiving back answers. Further questions were then asked by the researcher via email and the participant fully responded. Since the researcher was satisfied with the results gained, the text results have been included in the qualitative portion in the same format as the other interviews.

**Qualitative description of the participants.** Since three models emerged in the first quantitative phase in both the public and private universities for a total of six models, one IT executive and one business executive were randomly chosen for maximal representation from each model.

This led to a total of 12 participants:

- Two private university CFOs with the exact title of Vice President for Finance and Administration and Vice President of Finance.
- One private university assistant CFO with the title Associate Vice President for Finance.
- Three private university CIOs with the respective titles: Vice President of Information Technology Services; Vice President and CIO; and Vice President Chief of Information and Technology.
- Three public university CFOs with the respective titles: Vice President of Business Affairs, Vice Chancellor for Finance and Administration; and Vice President for Finance and Administration.
- Three public university CIOs with the respective titles: Vice President for Technology and CIO; Vice Provost of Technology and CIO; and CIO.
Although qualitative research usually includes full descriptions of each participant, the researcher decided that the level of anonymity needed to get free-flowing responses was higher in these specific cases. Some of the participants seemed to be concerned about their privacy within the research because executives at the university operate more in the public eye. Since making a rich description of each participant would pose a higher risk of identification, only an overall synopsis is provided with differences noted by position and university size.

The accessibility of the business executives at the private universities was very easy. Cooperation from the first asked participants was obtained through email without any issue. The business executives were very cooperative and gracious with their time. On the other side of the private university at the IT executive level, the interviews were not as easily obtained. The IT executives were harder to pin down on an interview and a second choice random sample was made to obtain a participant for one of the private models. Even with this caveat, all IT executives were very good participants and more than willing to help with any additional information needed.

Obtaining interviews with the public university executives was a very different process than experienced with the private university executives. The same exact methods were used, but only two out of the six participants responded within a two-week time frame. The other four remaining business and IT executives had to be contacted by phone and through administrative assistants on multiple occasions in order to obtain a time slot for interviews. In the last two cases, second, third and then fourth random samples had to be used before a response could be obtained. The process to obtain interviews with the public IT and business executives was more tedious than with their private counterparts.

**Qualitative themes.** Although the interview methodology was aimed at brevity, the responses were rich. The questions asked within the semi-structured interview were all related to
organizational structure and reporting relationships. As the interviews progressed, the
conversation within the interviews also built as the researcher used the previous interview
experiences to ask about related problems and concerns. This idea of constant comparison
(Locke, 2001) allowed the researcher to focus in on story lines and other factors within the topic
of organizational structure and reporting relationships. After the interviews were transcribed, the
researcher utilized word cloud software in order to find the main repetitive words in the
transcripts. The idea of word cloud software is to feed in an array of text in order to form a cloud
of words. The most repetitive words appear bigger and at the top with the least repetitive smaller
and at the bottom. Referring to Appendix H, the word cloud created from the participants'
transcriptions is shown. In this word cloud, the most repetitive words are at the top and the word
count is noted beside the word in parenthesis. The top emerging, important words gave the
researcher direction when iteratively cycling through the transcripts. Looking again at Appendix
H, words like provost, technology and business were ignored to find more rich, descriptive words
like relationship, people, part, and team, which could all be tied around a phrase like collaborative
relationships.

After repetitively reading the transcripts, the researcher performed coding and then
journaled while coding. From the journaling and coding with reference to the word cloud, six
main themes emerged (Table 28). The iterative cycling between reading the transcriptions,
journals, codes and word cloud helped solidify the meaning of the data (Dey, 1993). The wording
within the main themes concentrated on using in vivo codes—using the participant's words—to
preserve the meaning of the expressed views (Charmaz, 2006). Rereading the transcripts with the
six main themes in mind, the researcher created the thematic narrative.
Table 28
*Six Themes that Emerged from Qualitative Interviews*

<table>
<thead>
<tr>
<th>Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. IT needs to be addressed in strategic objectives.</td>
</tr>
<tr>
<td>2. Role and function of IT has changed.</td>
</tr>
<tr>
<td>3. IT needs collaborative relationships with internal and external stakeholders.</td>
</tr>
<tr>
<td>4. IT's voice at the executive level is critical.</td>
</tr>
<tr>
<td>5. Academic environment is unique.</td>
</tr>
<tr>
<td>6. Viewing IT solely as a cost hinders its ability to contribute to the university.</td>
</tr>
</tbody>
</table>

**Theme 1 – IT needs to be addressed in strategic objectives.** One of the main ideas of this study is that IT is so intertwined with business processes that it must be part of the big picture or overall strategy of an organization in order for that organization to be effective. One CFO felt that technology permeated everything and could not be separated from the university mission, “One of the weaknesses is not having a direct voice because technology permeates all aspects. It permeates operations. It permeates faculty, teaching, courses online.” When technology permeates an entire institution, the CFOs felt that the role of the IT executive must become part of the strategy of the institution. A CFO agreed, “I think that the CIO role has become much more strategic from a business model standpoint; the CIO has to be much stronger on the business side of the institution because of how complicated IT has become and the decisions that surround that position.”

One CFO in particular was adamant that IT was paramount to the university and more comprehensive than a CFO role when he stated, “My role is comprehensive. IT’s the entire institution.” This was a powerful statement coming from an individual that was in charge of the finances for the entire university. Another CFO made a similar statement when she said, “The Chief Technology/Information Officer is a critical position that will set the tone for the
technology infrastructure for the campus now and in the future. Decisions and plans regarding this critical infrastructure made now may very well determine the future of the campus.”

Another CFO said that technology was intertwined so thoroughly that it had to be part of strategy, “You can't separate technology from what we are trying to do as a university. It really needs to be integrated with the decision-making, like what are our top priorities and what are our strategic objectives and things like that.” Even though the CFO's perspective is normally that of finance, the CFO represents the big picture of finance for the whole university. Another CFO stated, “As CFO, I am very conscious of the responsibility and the campus' dependency on the technology infrastructure.” To integrate IT with the university strategy, one CFO thought that IT needs to be connected or have a reporting structure to the CFO to understand the big picture of finance, “I think in having a CIO report to the CFO, there is a plus side because there is a better understanding of the budget or lack thereof for technology. So there's more of an understanding of the financial situation and limited resources for allocation.”

The CIOs echoed similar opinions as the CFOs stating that technology was integral to all operations and touched all aspects of campus life. When talking about the organizational structure, one CIO said, “Just so many things get done through technology...,” and another stated, “I think just being able to work close with everyone and in getting to know what the plans and goals are for everyone is key because technology affects everyone on campus.” Another CIO described how technology was a such an important part of a university campus:

What I mean by that is we know, and I guess I should say I know, but people who rely on technology realize that technology really is a key player in what goes on—whether its in the instructional side, whether its in the business side, whether its in the institutional side; we are touching just about every aspect of the campus in some capacity.”

Because of the intertwining nature of technology with the big picture, the participants also implied that technology had to be made a part of not only the whole strategy and mission of
the university but also a part of the business strategy. One CIO mentioned that IT needed to be a “key initiative” while another CFO stated that the relationship between the CIO and himself was “a business model.” Another CFO felt particularly passionate about the idea that IT must be better involved in the business planning processes and not just confined within academics. He said,

I think that the representation could be enhanced because it is so focused on the academic side of the house. I think there needs to be a greater balance between business planning around IT and academic planning around IT. There just needs to be a greater dovetail. . . . But I think even providing the instructional technology needs of the institution requires a really great sense of business strategy and business forte when it comes to making decisions around the total technology needs of the institution.”

**Theme 2 – Role and function of IT has changed.** Because technology has changed so fast, the CIOs and CFOs felt that the role of the IT person had dramatically changed. They saw IT as a department that used to be more concerned with operations. One CFO commented that IT used to be a “backend process” around ten years ago similar to that of “keeping the lights on.” Now, IT has a different function that is much closer to the customer. The CFO continued this thought by saying, “In other words if you look at it from a business standpoint, you have got an end product that goes to the customer which is instruction and research of the faculty and then you have a backend process collecting student billing and running operations and paying payroll.”

One CIO commented that he sometimes felt uncomfortable in the role that the President wanted him to play. He said, “He [the President] usually puts the CIO in this dictator role where he says that you're going to do it the way I want done. Then, you break your relationships with your business partners. It's a struggle to try and play both sides and keep everybody going the same direction.”

With technology touching the customer, one CIO expressed strong thoughts about the
accountability she feels, “I feel like, I feel personally on the hook if we have students that have technology needs not met.” Furthermore, she felt that if the needs were not being met, she is the one that would be held personally accountable,

I mean I'm going to have to talk to the vice president of student affairs about integration, website design, mobility applications. Those are things that I feel like, because I have the faculty role with the faculty support unit, that they're going to jump down my throat. It's going to be my throat they jump down. They are not going to go to the Provost and say that you need to go and talk to the vice president over there because we are not getting enough support or whatever. I am held accountable for that.

Because of the direct accountability felt, another CIO commented that technology had its own image that was actively spread across the entire campus. He said that he had seen IT executives on other campuses “disassociate themselves” and “create barriers” to IT, which ended up hurting the entire campus. On his campus, customer service was not an option. It was a must. The CIO said,

Again, I think part of that again, is with the president's structure and the way he does it. Then even the attitude that I carry of saying that we are here to support campus. You have been around enough to know that this is not the image that technology will always portray across the campus environment. I am a huge advocate of saying that we are here to support. As a result, we are trying to be more customer service oriented.

Another CFO expressed a similar story when he talked about how IT used to create roadblocks on their campus,

Well that evolved from where I was at before as a consumer, the IT folks became the approval authority on whether I could buy a computer or not. Instead of deciding how they could mass these purchases together they became the approval authority. This
became somewhat dysfunctional on this campus because leaders were not able to spend the money they thought was appropriate. It became a bottleneck and a hamper to growth. He went on to talk about how the leaders got together with the CIO and emphasized that her position was more than purchasing but was wrapped around the strategy of the entire institution right down to the students study habits. He says,

Yea. Because with her, the technology is of such importance. It's a dynamic role and she needs to have the position for not just purchasing but the ability to make strategic improvements on this campus for the students' quest for technology in the classroom as well as the support throughout the labs and the campus environment where they have the little study carousels.

He also felt that her position not only influenced the students that were already on-campus but had a large impact on students that may want to attend the university in the future, “All of that is moving so quickly, at such a fast-pace, that she needs to have the authority to make those kind of calls at the executive level. The position has to be, it has to be competitive for the students that we want to get here.”

Students were the focus of another CIO when he commented, “We have to be very broad-based and customer oriented and know what's coming so that we can plan and do our best for the entire campus.” So not only does IT need to have a customer service focus, but perhaps that focus drives the needs for the whole university. One CFO felt that the needs of business and IT could be driven through the overarching university mission when he said, “We exist to enhance, educate and enrich the lives of our students.”

Aside from directly having an impact on the students, many commented on how the IT role has shifted. One of the big roles that IT needs to play is being supportive and helpful. One CIO commented,

We are not here because you are here. And, I say you meaning the instructors, the
students, the staff, and whatever the case may be. But, we are here to support you in order to make students successful. And that is an attitude that is prescribed very dominantly by our president and is being filtered throughout the campus environment.

So IT exists to support staff and faculty in order to make the students successful. The CIO also felt that support and customer service was part of their own success. She said, “We are successful because we have been able to integrate and help develop the culture that technology is here to help.” The idea that technology can be helpful is not a common way of thinking among the people at some universities. One CIO talks about the fight for this culture,

And I think that's one of the things that I bring as a strength to the leadership of this department is the ability to get it out there. We make mistakes but we are here for you so if you need something let us help you up front instead of trying to help you after the fact. That is still a battle we try to fight but it's getting better.

Although there is clearly a concentration of support in IT for the students and others at the university, the CIOs and CFOs discussed in detail how IT was also directly involved in strategy and culture at the university. One CIO remarked,

I would also like to have some sessions where we talk about their [Deans and other directors] strategic planning and how IT can do things to help them meet their goals and their strategic plans. Then I can model my strategic plan so it is really in support of the entire campus and their needs.

Another CIO supported this comment about strategy and also commented on how IT has become much more complex:

I think that the CIO role has become much more strategic and much more, from a business model standpoint. The CIO has to be much stronger on the business side of the institution because of how complicated IT has become and the decisions that surround that position.
Another CFO described IT as having vision that was directly tied to the competitiveness of the university. “That's a key piece of our culture that if we are in a support role of our academic mission, but in addition, the CIO, the CIO in particular, has to establish the cultural vision, the technology vision, for this campus that allows us to stay competitive. You can't do that in a pure support role.”

Last, one CFO compared the idea of the changing role of IT to the changing organization structure model for IT. He referred to the model of the CIO placed down in the organization structure as traditional and stated that it only works if IT concentrates on pure operations. IT as it is today, touching the consumer, needs to have a reporting relationship to the leadership team that control the university mission. He says,

So probably I would think the traditional set up might more geared toward backend, but you might know this better than me, backend running operations and maybe not as much on the customer or the faculty side. Because of how technology has shot so quickly to the customer where before it was more of a backend process like how you process payroll with technology and what do you use computers. Right now, IT is used for delivering your product in some cases.

Another CFO agreed that the CIO position had been through many different structure changes reporting to the Provost and then to the CFO at different times throughout the years. She commented, “Whether this position reports to the Provost, the CFO or the President depends on the specific needs of the campus. And like ours, it may change as the campus needs change.”

**Theme 3 – IT needs collaborative relationships with internal and external stakeholders.** In addition to IT’s changed role and function, the participants seemed to place an emphasis on relationships between departments. A few of the CIOs used words like “isolation” and “independently” to describe how IT had previously operated compared to the customer
service role that was now expected. One CIO reported a structure change which helped facilitate important internal relationships:

The library reports to the CIO here and I think that has been incredibly helpful to the library to have that information service retrieval element to it. I think one of the other things that is actually growing is that IT needs have a strong connection to PR, you know the public relations. That’s one thing that we are working on is to have much stronger connections between the IT area, systems area and the other departments because you can’t work independently anymore.

When talking about IT working with other departments, another CIO stated, “It's not that we can work in isolation.”

The participants stressed that an area like IT needs to build relationships with departments across campus to really feel out the users' needs. One CIO stated that informal meetings were being held, and she wanted to see more regularly occurring meetings with different departments. She said,

Well, certainly I think there can always be more direct communication from users to the IT administration. I would like to incorporate more meetings with the departments, academic areas and the chairs, the Dean. I would like to have some regular meetings once a month or something where we can have conversational brainstorming sessions about what's working for them and what's not. I would like to talk about what can IT do better to help them and where are their needs and what are their thoughts about their futures.

A CIO at another campus talked about the informal meetings that would take place between IT and the other academic departments on campus. He stressed the importance of having a good relationship with the provost so that good communication occurred. He expressed, “And so the Provost, he quite handily gives us access to the Deans. So we go and talk to the Deans. We see them around the campus. We go to their buildings. We go to colleges and the different meetings
that they have so we have access at all sorts of levels like that.” The participants' felt that relationships are vitally important. To sum it up, one CIO poetically said, “It's the relationships that matter and if you don't have the right relationships then nothing is going to work.”

The participants felt that IT cannot work in an independent silo anymore to accomplish the mission of the entire university. They thought that it must be intertwined between all categories of a university. A CFO who worked within a model where IT reported to academic affairs was frustrated that IT was academically bound. He felt that IT did not venture outside of academics enough and needed to relate better with other university divisions, especially the business division. He talks about wanting a better connection with IT, “So I think that it would be beneficial to have a report into the CIO because I think there needs to be a greater business model tied to IT than an instructional model is how I would describe it.” Along this same line, one CFO felt that cross-communication with the Provost was of utmost importance because the CIO reported to the Provost. She said, “The Provost and I work very closely together to ensure our efforts are aligned to make sure there is 1) a technology plan in place; 2) a redundancy system for business continuity; and 3) a funding strategy for both.”

The participants also mentioned that connections to other departments provide IT with not only good relationships but also a place to start planning. One CIO mentioned, “I think just being able to work more closely and in getting to know what the plans and goals are for everyone on campus are important because technology affects everyone on campus.” This went hand-in-hand with another CIO that had responsibility for the teaching and learning technology division underneath IT. She described how these relationships had given her team a better perspective, “So it is a really kind of unusual mix but it gives us a perspective that is very helpful. The structure kind of knits together both the academic and technical mentions of the University. It has gotten awards and has been very well received by faculty here. It works well.” In addition to the better perspective on how technology should benefit academics, she also felt that relationships between
other departments was of great importance. She talked about how she attended meetings with the Deans and felt these internal communications and relationships were very important.

And because of those relationships it works out really well. And like I said I have the chance to, and I do attend, campus administrator meetings. When there, I always ask the group if there is anything they want to say about their needs to get a heads up to IT. And that's kind of the campus leadership team at this meeting with all the Dean's and the directors and academic chairs for the campus.”

In addition to the internal relationships built between departments, two CIOs felt that the relationships were dependent solely upon communication factors, which placed communication even above organizational structure as an influencing factor. One CIO said,

But I would agree with that statement that it is really all about the communication in any structure, any environment. You could have the best structure in the world but if anyone in those positions are not communicating well, and sharing and working together effectively, it doesn't matter what the structure is. It really does come back to people's perspectives. I call it having the right fit of people that can work together as a team.

The other CIO stated,

It's all about the communication. I don't really think the structure is that big deal as that you are all communicating. The CIO needs to also understand the responsibility for what we do as a university is tied up with technology. They need to understand that's part of their responsibility to make sure the students are getting what they need and the faculty are getting what they need.

A CFO also expressed agreement that the individuals made things work well together, “It does work well at my university and the way we are structured but that may in part be dependent upon the individuals.”
Another element of IT relationships that the participants emphasized was the ability to seek external guidance from an advisory council. An assistant CFO described how no one on the executive team had any technology experience nor should they be expected to have it. He likened this to the President of the university not necessarily having an accounting or financial background but still supervising the CFO. So, an advisory council relationship was paramount in order to guide the IT executive in decision-making. He said,

That gives the kind of vision for what is fundamentally needed from IT offerings from an external perspective like wireless capabilities. Do you do your e-mail through Google? Do you do cloud? How much do you put on the cloud with security concerns? Big picture issues. I think they [the advisory council] provide a level of expertise that if I was the CFO I would not have either.

This assistant CFO went on to re-emphasize that the IT executive was the one with the most technical skills in the entire university staff. He felt the only way to provide additional guidance was outside the university. He went on to say, “So how do you bring expertise and guidance to somebody who's the smartest one on staff and technology? We will bring in outside people from other organizations that have that skill set.”

Another CIO commented on the great importance she thought existed with the communication from an outside committee. However, her goal was to re-energize the committee and get her external relationships in a better place. She said,

Also advisory committees. I would love to re-institute that here; we have had those in the past but they have not been very active. It's typically the same people over and over better on that committee and so there's not anything fresh or new that we are doing. It's just kind of going through the motions. So I would like to revise and re-energize an IT committee for the campus.
Theme 4 – IT’s voice at the executive level is critical. In addition to needing relationships, there was resounding agreement across the business and IT executives that IT needed a voice at the executive level. Out of the twelve interviews, only one CFO did not clearly express the need for IT to be at the executive table. However, this particular CFO was an advocate for IT and felt that he advocated strongly for IT when he sat at the executive table. When IT did not have a voice at the executive level, dissatisfaction was expressed. A CFO working under a model where IT directly reported to academic affairs stated, “It [IT] is a much more comprehensive role than it has been in the past and so many of those decisions don’t have the benefit of the capital and master planning of the institution because it is more focused on the academic sector of the institution.” Even though the CFO did not have a stake within the IT group, he still felt that their voice needed to be included in the campus strategy.

Another CIO who had worked within several different organizational structures used words like “buried” and “lessening of effectiveness” to describe how he felt when he was not able to sit at the executive table. He clearly stated, “So I’ve worked in it in both situations and it can work in the other structure where you are reporting to someone who then reports to the President. But, IT is so integral into every unit, every facet of the department. Everyone needs and uses the technology daily. So to be kind of buried and to have to hear information that affects IT through someone else, a relay in the interpretation occurs. You're just not on the front line. So I did see a lessening of my effectiveness and my ability to act quickly. I wanted to be at the table and express the IT perspectives and the needs and how we could help and just be there as part of the team overall. So I think it did lessen the effectiveness not to be directly involved with the other vice presidents in cabinet meetings.” Even a CIO who had never experienced another type of structure agreed when she said, “I sit on the administrative council, which is the president's council. I have the opportunity to speak directly to that group. So in that respect I really think that piece is kind of a trust thing. It is however it works. I can easily see a situation where if I weren't on the
president's cabinet and I didn't have good relationships that I have and there wasn't a trust relationship that I would be trying to elbow my way in to a VP slot.”

Agreement resounded from yet another CIO that brought a vivid picture of IT being shoved down and losing their voice entirely if IT moved down several levels in the organizational chart, “I think if the person in my role was directly reporting to the CFO and did not have the position on the cabinet that it would be very difficult because I think IT would really take a more than a backseat. I think it would be in the trunk of the car. [laughs]”

Another CIO felt that if IT was not at the table, technology would lose focus. “If you push IT down in the decision-making or any organization it just really loses its focus. I mean one of the things I have to deal with is also from a medical perspective and health care is notorious for pushing their technology way down in the priority of what they do. It creates this large separation between the key people that are trying to make strategic decisions for the business and the people that are actually trying to deliver the technology. The closer those can be tied together the better.”

Other thoughts from a CFO were that not only would things not work, but the ideas that are exchanged at the executive table are invaluable for the CIO. He said,

It would not work. If she were not at the cabinet executive level, she would not have the ability to sit there and listen to the plans of the academic dept; listen to the capability and the resources available in the budget arena; and help determine how she could support the academic mission within the confines of the resources available for it. She needs to be there. It would not work otherwise.

The idea that the executive table is a coveted environment for IT was expressed over and over again. One CIO said,

On the flip side of being in the cabinet meetings, I can hear the areas that they are working on, for example new projects, the difficulties they might have and I can see how technology interacts and effects them. So I can let them know what we are doing to help
them out to meet their needs. So it just really works well to be in that open and expressive environment.

Other phrases said by CIOs to indicate the table talk occurring at the executive level included things like, “talking about those things that are being critical to the success of the university” and “expressing concerns.” Words used when talking about placement at the table were “initiatives”, “endeavors”, “negotiate”, “responsibility” and “accountability”. These phrases and words all indicate that important tasks are talked about at the executive table and that IT needs a place at this table to hear and negotiate.

**Theme 5 – Academic environment is unique.** Although many understand some of the differences between the university and private industry environment, many of the CFOs and CIOs interviewed kept coming back to major defining differences concerning IT. One big difference noted was that in the university environment, the chief operating officer and chief financial officer are often a combined position. One CIO stated, “I came from business but I came back to the university environment. They do not typically have chief operating officers so our CFO actually acts as that which makes it very difficult when he controls all the money and does all the operational responsibility.” As well as a combined position, the university also has an academic division. Within the academic division at a university resides the faculty with all of their varied expertise. One CIO compared the university to that of an octopus, “In private industries you have very defined areas of expertise and in universities you have the same expertise all over the place. So it’s kind of different. Well you have probably heard the saying, it’s like trying to put socks on an octopus.”

Because of these differences, two of the CIOs felt that the communication with the academic side was of utmost importance even moving down the levels in the organizational structure to make sure communication was met with Deans and faculty. One CIO said, “There are
some elements of communication—decision-making—that work through the structure but if you want to communicate the technology, its benefits and what it can do and so forth as a CIO you have really got to get to know the Deans, for example.” The other CIO already fostered a close relationship with the academic side by housing the teaching and learning component. However, she said that this structure was in danger due to the installment of a new provost. She said,

I had the chance to think about those kinds of relationships and those kind of impacts because there may be the possibility that this new provost is going to want to pull out the teaching and learning people and segregate them. As I think about my own reaction to that from a numbers standpoint and from an empire standpoint it really doesn't matter. If he pulls that away from me and I don't have responsibility for it, it will make my life a lot easier but we will not be serving the needs of the university very well. So that's just a growing pain. This new person just doesn’t understand the structure or know much about it. He's thinking about it because that's normal. It's normal to have teaching and learning report right to the Provost.

So not only is the higher education environment unique, but the fit of IT in such an environment is also very unique. One CFO felt that the academic environment was so unique that he thought CFOs and CIOs that had closer academic ties looked through an entirely different lens. He first stated, “It's ironic that when we use those terms but those of us who come from an academic background have a better, I won't say better, but I will say all of us look through different lenses as we approach our role.” He then went on to clarify that he preferred colleagues with the background in academia because they were closer to the university's mission. He said,

I believe a CFO who has not gone through an academic program, a rigorous doctoral program, and who has not been on the front lines as an academic would certainly have a different perspective and look through a different lens as they are making strategic decisions. I feel the same is probably true for chief information officers. So I am biased
toward having someone who has that academic appreciation and that academic
background to blend with the business perspective and the technology perspective.

Technical knowledge integrated with academia is one perspective but an assistant CFO
had another interesting perspective in that higher education may be struggling to meet the needs
of the student because the university has not defined who that student is. He claimed that there
were two types of students—on-campus, physical students and online students. Because the
university was struggling to place technology to fit the needs of the right student, the assistant
CFO claimed that IT would have no direction either. He said,

Right now I don't think there's a clarity on where IT is going. So they put the CIO in that
role to figure it out and they end up getting ping-ponged between finances and spending
money and faculty wanting more services and then in-house needs versus customer. They
are not in a pleasant place. The organizational stress is placed on their shoulders without
much guidance.

Theme 6 – Viewing IT solely as a cost hinders its ability to contribute to the university.

The final finding was that IT needs to be seen as vital and intertwined with the university so that
it can be fully financially supported. Many CIOs felt that IT was consistently underfunded
because it was viewed solely as a redline cost. One CIO stated, “I do think that this position needs
to report to the President. It needs to be a position that is viewed not just as an expense or
something that is focused on enabling things.” Although stating his agreement, another CIO
claimed, “It's very important that technology not be viewed as strictly enablement or a cost
associated with doing business, even though it is, of course. IT needs to be viewed in terms of
part of the prioritization of key initiatives, part of the decisions up with what the university wants
to do.” He went on to argue that reporting to the CFO created barriers when it came time to trying
to spend money. He said, “That's where I struggle with the structure because I think it impedes
that kind of arrangement when you are reporting to someone who all he cares about is keeping
costs under control.” He seemed so intent that IT had incurred a bad name always associated in
the red with finances that he thought maybe the name CIO should be changed to create a new
start. He commented,

We have even discussed within forums around this environment about even changing the
name of the role. Maybe chief information officer is not the right name but I don't know
what you call it. Maybe it is time for a new set of terms or something to make people quit
thinking that it is strictly looking at cost of doing business, but that it is also trying to
work best solutions to solve problems and being an integral goal with day-to-day
business.

One CFO felt that if IT reported to a different position, the financial situation might also
be different. He said, “I think having a CIO report to the CFO, I guess the plus side is there is a
better understanding of the budget or lack thereof for technology. So there's more of an
understanding of the financial situation and limited resources to allocation. Anything a CFO
would kind of help communicate generally on finances.” In addition, this CFO felt that reporting
to the president might help IT effectively capture more resources because the president might be
willing to take on risk rather than the CFO. He said,

The reporting to the president piece is helpful because sometimes there is maybe a
situation where they don't want to spend money where there's not a lot of money to spend.
So they want to spend it wisely. But the president might be more aggressive in spending
money and more willing to take risk to spend money and so that helps the CIO.

The CFO also felt that an external relationship might help support the IT executive in gaining
more funding. He commented, “What they [the advisory committee] are helpful in doing is
providing more of a leadership and oversight to the CIO and also giving him a sounding board to
make the case for needs, for budget needs, for things he needs to purchase.”
Another CIO pondered the idea of something called shadow IT. He thought that shadow IT greatly affected the image that IT was a cost burden when perhaps the numbers did not outline the true story. The CIO said,

But the thing that I think is a very big problem across all segments or industries is this concept of shadow IT. Technology changes so fast they do not feel like central IT can deliver everything they need. Then, they go off and slot money and spend on things that are very inefficient. Then, they put that back on the central organization how to integrate it all back in. . . . You lose the visibility when you run your reports because you can't look at how much technology is actually being spent. The President or the board members go crazy and say that we need to look at all the money we are spending. You are looking at your central IT budget and saying, wait a minute, where are all these numbers coming from. So it's just a matter of if you can get them all marching in the same direction, then the efficiencies are just magnificent.

The last takeaway was the fact that the participants appeared to insinuate that IT would not do well without adequate funding and support from administration for this funding. One CFO said, “Plans can always be improved upon and there is never enough money to do what we want to do.” Another CIO spoke with clarity when he stated,

I mean if we went into more of the specific details of this or that, yea, we could do it but the bottom line is that technology is not going to be successful if you don't have the support at the administrative level regardless of where they report to and if the appropriate funding is not made available in order to occur and to allow success.

With this final statement, the participant felt it was clear that support of IT endeavors at the top level along with funding helped ensure the success of IT projects.
CHAPTER 5 – DISCUSSION

This chapter is divided into four main sections. The first three sections center around the research objectives. Since the central guiding research objective of this mixed methods study implied both quantitative and qualitative directions, the quantitative objectives will be discussed in the first section followed by the qualitative objective discussion in the second section. The third section will look at the overarching central guiding research question bringing the findings from both quantitative and qualitative together. Recommendations for future research conclude the study. The initial objectives for the study are provided below in the order discussed.

Sub-objectives for the quantitative phase:

• To examine the relationship between variables in hierarchical organizational structures with the IT and business executives at 4-year universities.

• To model different hierarchical organizational structures between IT and business executives at 4-year universities.

Sub-objectives for the qualitative phase:

• To explore how IT and business executives think about organization structure and relationships at 4-year universities.

• To explore other factors that may have a greater affect on reporting relationships between the IT and business executives at 4-year universities.

Central guiding research question:

• To determine the reporting relationships and then explore IT and business executives thoughts on these relationships at 4-year universities.
Quantitative Research Discussion

To recap, in the phase 1 of the study, an exploratory factor analysis (EFA) was performed followed by a categorical principal components analysis (CATPCA). The two analysis attempted to explore relationships between the variables in hierarchical organizational structures to examine the factors and correlations. After the two analyses, models of organizational structure were formed using simple statistics.

**Exploratory factor analysis (EFA) discussion.** The purpose of utilizing the EFA was to explore relationships between the data that were not clearly visible when manually shuffling through a collection of organizational charts. The variables selected for the EFA were based off Damanpour (1991), Pugh, et al. (1968), Miller (1987)'s studies on organizational structure, which also used a similar analysis, principal components analysis. All three studies found varying dimensions of organizational structures through factors suggesting that certain attributes of an organization could be interpreted based on the factor loadings. In comparison, the EFA within university structure found only two factors. This was to be expected since the number of variables used in the analysis was lower than that of the other three key studies.

The first factor could suggest that the place the CIO resided within the organizational structure was a dimension of university organizational structure. The two variables, CIO Category and CIO's supervisor, are related to this overall factor. However, since all of the original variables could not be examined in the EFA, the matrix only ended up with two variables highly loaded to create this factor. This could be creating an assumption based on too few variables.

The second factor suggested that the vertical levels between the CIO and CFO were somehow interrelated to the university organization structure. Looking towards Mintzberg (1980) and Tannenbaum, et al. (1974), the hierarchical levels of organization structure are present and
loaded together in this EFA matrix. This could also suggest the interrelation between business and IT and the importance of alignment (Chan, 2002; Luftman, 2004).

**Categorical principal components analysis (CATPCA) discussion.** The second categorical principal components analysis allowed for a greater exploration of the relationships between variables because all the collected variables were able to be used within this analysis. Referring again to Pugh, et al. (1968), the CATPCA again found two factors in the first analysis. Even though simple structure was not achieved, the student population and institution type variables clearly loaded together suggesting that there may be a relationship between these two variables within university organizations. This is suggested by Birnbaum (1988) in his modeling of the four separate types of universities. Each university has its own purpose. Size and type are suggested to be part of the factor within the type of university with the private universities appearing smaller and more focused while the research institutions are depicted as larger.

The second analysis—which left out the student population and institution type—explored further loadings between the CIO and CFO variables within the university organization. Two factors again emerged, but this time, the CIO variables—the CIO level, the CIO category, CIO's supervisor—correlate negatively with the exec committee variable. This loading was interesting as it could further support the idea that the CIO reporting relationships are impacted by not having a presence on the executive committee (Evan, 1993; Luftman & Kempaiah, 2003). The higher the level and category of the CIO indicates that the CIO will most likely not be present on the executive committee. The further down the organizational structure the CIO positions move, the less likely it is that they will have a voice at the executive level. The other factor noted that the CFO level variable correlated negatively with the other committees variable. This was a confusing loading because it suggests that when the CFO moves down in the organizational structure this affects the CIO's voice on the executive committee—the CIO is less
likely to be present on an executive committee. Both factors point towards Theme 4 which emerged in the the qualitative portion of the study, which attests to the importance of the CIO on the executive committee.

One of the confusing aspects between the EFA and CATPCA was the fact that the loadings were different, particularly between the CIO and CFO levels. This was unexpected. The researcher anticipated running the second model and gaining more insight into the original factors. Instead, two other factors emerged from the second analysis. Since more variables were included in the second analysis, the researcher tended to lean towards the second model as more valid. However, the first analysis, EFA, is a more widely accepted method of analysis while the second, CATPCA, is just gaining traction.

**Modeling the university organization structure discussion.** Noting that the levels of the CIO and CFO were a clear factor in the EFA and that the placement of the CIO emerged as a second factor, models were created by utilizing frequency and response patterns. Referencing the initial data collection of N = 62, the CIO position was consistently at a lower level (75.8%) than that of the CFO (96.8%). Exact figures calculate that the CIO position occurred at a level 3 or lower 75.8% of the time while the CFO resided at level 2 at 96.8% of the time. Since a model with the CFO at a value lower than 2 would provide less than 4% of the total, the CFO was held at a consistent level 2 to produce the top three occurring models in the university organization sample.

Although CATPCA did not show a strong relationship between the university type, the models were illustrated separately by private and public. Disregarding the type would have produced the exact same models with different percentages. By keeping the types separate, the researcher was able to further explore whether or not the university type was a factor of importance during the qualitative interviews. Not surprisingly, the models—regardless of type—
showed that most of the time, the CIO was at level two and either reported to the CFO position or the Academic Affairs position.

Weingartner (2011) emphasizes, “To what position a given officer reports significantly affects the way in which his or her responsibilities are discharged” (p. 16). Although explored further in the qualitative section—lending further evidence that mixed methods was the correct methodology—an idea of significance is that the way the CIO functions within the organization is heavily influenced by the reporting officer. Looking back at the top three models in the public university system, the CIO reports directly to the CFO one-fourth of the time and to the academic side one-fourth of the time. Taking into account the conflict between the business model of the university versus the academic model, the influence on technology between these two models at the university could prove a difference between support for the academic mission versus support for a balance sheet in the black (Farrow & Kasarda, 2009; Galbraith, 1972; Habib & Victor, 1991; Rhoades & Slaughter, 2004). The fairly new study by Banker, et al. (2011) supports the idea that different structures provide different strategies. In private industry, the focus has either been on finances with a CFO reporting structure or customer service with a CEO reporting structure. In the university, it would not be a stretch to assume that three base models are present depending on the university's strategy: a CFO reporting structure based on finances, a Provost reporting structure based on an academic strategy and a CEO reporting structure based on customer service. This idea is explored further in the combined discussion section later in this chapter.

One other factor explored in the models was that of the executive committee and whether or not the CIO had a place at an executive level committee. In this study, the percent of CIOs that were not on the executive team was high at 71 percent. This means that only 29 percent of the time the CIO was actively participating as a part of the overall university executive team. Luftman and Kempaiah (2007) suggest that the CIO should be present at the executive table in order to create an effective IT and business team. The low percentage at the executive table
shown in this study suggested that perhaps the IT and business team needed a better formal or informal structure for reporting relationships.

**Quantitative objectives discussion.** As related to the objectives in the quantitative phase, relationships between variables within university organization structure were compared through the EFA and CATPCA. These relationships re-enforced the idea that the university structure should be modeled based on category and level. The second quantitative objective to model the university organization structure was achieved through the cross tabulation frequency and response tables created through the simple statistics.

**Qualitative Research Discussion**

In phase 2 of this study, a qualitative interview process followed phase 1 to attempt to further explore the relationships found in the EFA and CATPCA. This part of the study also sought to explore any other pertinent factors relating to this portion of university organization structure and relationships.

**Theme 1 discussion.** The first theme within this phase of the analysis re-emphasized the original idea that IT needs to be a part of the entire organization strategy in order to be effective (Irani, 2002; Kearns & Lederer, 2003). One CFO said that “technology permeates all aspects” implying that IT needs high involvement with the executive level. In Miles and Snow (1978), an organization's structure should be adapted depending on the strategy. Miles and Snow also emphasized that not all organizations fit within one predefined category. However, Sabherwal and Chan (2001) attempted to redefine these categories in order to create a fit for business and IT within an organization. Although the university was not a type of organization placed into one of the categories, the comments from the CIOs and CFOs clearly state that the IT role at the
university is “complicated” fraught with many decisions. The university may be a business typology that needs to be defined with a matching business strategy or within several matching strategies.

Other comments from the CIOs and CFOs stated that IT “had to be a part of strategy.” They argued that technology could not be separated from what was trying to be accomplished at the university and so needed to be on a top priority list with the “strategic objectives.” Although this study concentrated on structural alignment, Chan (2002) placed a heavy emphasis on the fact that structural alignment coexisted with strategic alignment. This alignment was suggested as a meshing of business and IT strategy. At the university, the comments were made clear that the university business needed to be intertwined with its technology counterpart.

**Theme 2 discussion.** The second theme centered around the fact that IT was not previously an essential part of the university. Only within the past few years has IT made such strides as to become inseparable from the university mission. Thus, the role and function of IT has changed over the years. The participants emphasized this theme through comments made using keywords like “operations” and “keep the lights on” implying that IT was considered an aspect of facilities. Bess and Dee (2008) and Weingartner (2011) mentioned operations and finance as one of the top divisions within a university; IT is not mentioned as being at the top level. To describe the change that has happened over the last decade, one CFO made the poignant statement, “My role is comprehensive. IT is the entire university.” Although this may seem uniquely different from John Henry Newman's original idea of the university as one of academia and gaining knowledge, IT has become the new conduit of information.

Venkatraman (1989) first started looking at how the role of IT had dramatically changed and how businesses needed to reimagine and reincorporate this role to stay competitive. This has further been an underlying mechanism behind much of the business-IT alignment research.
Luftman (2000, 2004) supported the idea of the changing role in the SAM and again with the SAMM. The research in this study supports that the role of IT has indeed changed and that the university—like private industry—is trying to figure out the correct reporting relationships between IT and business.

**Theme 3 discussion.** The idea that horizontal relationships stretching across the campus were needed for IT was found over and over again in the participants' comments. This theme emphasized that IT needs collaborative relationships with not only internal university users but that external relationships are highly valued, as well (de Leede, et al., 2002; Evan, 1993). Heckscher (1994) talks about the importance of cross-connects within an organization and criticizes bureaucratic structures because of their inflexibility. Because IT stretches across the university from the top to the bottom, directly touching the students, IT cannot isolate itself from any one department. In fact, most of the CIOs stated that they wanted to establish more meetings and create more interconnections with the Deans, the library and public relation departments on-campus. This cross communication is emphasized with ideas that informal structure is paramount and relationships are key to gain trust between different areas like business and IT (Chan, 2001; Huang & Hu, 2007; Wong, Chiang, & McLeod, 2009). In both phases of this study, the informal structure was found to have influence over the reporting relationships. In the qualitative portion of this study, emphasis was again placed on the importance of informal structure. However, unlike Chan's study, the informal structure was not emphasized over the visible, formal structure. Although the participants said that communication between departments was key, access through the formal structure to the executive team was also stressed. Two participants also stressed the idea that formal reporting structure helps connect departments to IT, such as the library and teaching and learning. These two participants also stressed that these formal reporting connections were highly valued among faculty and staff on their respective campuses.
In addition to on-campus relationships, some of the CIOs and CFOs mentioned the importance of an external advisory committee. Evan (1993) stressed the utmost importance and benefit that external relationships can have on the executive level of an organization like a university. One CFO in particular emphasized, “How do you bring expertise and guidance to somebody who's the smartest one on staff and technology?” He went on to state that forming an external committee to provide guidance was the answer to this problem. The advisory committee not only suggests that IT needs external relationships but it also ties to the important element that technology has become within the university. Weiss and Thorogood (2011) support that IT needs external relations perhaps above internal relationships in order to be successful. Before the prevalence of IT, the president of the university would normally obtain an advisory council to obtain guidance from alumni and stakeholders (Weingartner, 2011). The importance noted here is that IT seems to have been lifted up in status to express that IT needs an advisory council similar to that of the president.

Theme 4 discussion. With the importance of IT emphasized, many CFOs and CIOs expressed concern about IT's voice being heard. The only way that admittedly assured IT's voice to be heard was not shouting loudly but finding a chair at the executive table. At many universities, this chair was also referred to as the president's leadership team. Although executive power is not necessarily needed, Fiske (2004) and Goodwin (2003) stress that effective leadership needs to be encompassed with authority. One CIO clearly used words like “buried” and “lessening of effectiveness” to described that his power was not as great when at a lower level. Another CIO agreed that if she was not given a place at the executive table she would be attempting to elevate her level on the organizational chart. This coincides with Evan (1993) and Parsons (1960) assertions that a higher elevated place on the organizational chart implies
authority and power which is needed to carry out the mission of an organization. The benefits of sitting at the executive table and listening to ideas were also on par with Evan (1993).

Many of the CIOs and CFOs said communication was the answer and tried to down play the significance of an organization structure chart. They claimed that as long as the right people were present and communication flowed, any type of structure would work. However, when asked what an ideal structure would be, they resoundingly stated that the CIO deserved a place at the executive table. This draws similarities to Luftman and Kempaiah (2007) who also found that the best reporting structure appeared to be when the CIO reported directly to the CEO. When the CIO reported to the CFO or COO, the CIO was not as effective or efficient. Although there were no preferences about the direct supervisory roles, the CIO participants in this study all agreed that in order for their voices to be heard, they must be present within the president's leadership team. Kearns and Sabherwal (2007) and Boyle (1994) also suggest that the CIOs need a voice on the executive management level in order to express strategies and ideas. Knowledge sharing is seen as an important aspect when examining reporting relationships between business and IT (Kearns & Lederer, 2003). If IT's voice cannot be heard, knowledge cannot be shared (Clampitt, 2005; Khaiata & Zualkernan, 2009; Smith & Mounter, 2008). Although an ideal structure was not suggested by the participants aside from a presence on the executive team, Birnbaum (1988) states that the boxes on an organization's chart imply importance while the lines imply the information flow. In this case, if the CIO was at a level below the executives and did not have a voice at or a dotted line to the leadership table, IT may not be as effective.

**Theme 5 discussion.** This theme centered around the idea that the academic environment of the university is unique. As noted by Bess and Dee (2008), the division of business and finance within the university often encompassed not only budgeting and finance but operations as well. One CIO made a note that this was distinctly different from private industry in that the CFO and
COO were very separate positions with uniquely different objectives. He also stated that at the university, this can place a lot of power in the hands of the CFO to hold both kingdoms of finance and operations. Galinsky, et al. (2003) and Keltner, et al. (2003) found that people holding this much power can influence others simply by controlling the resources. Having control of both finances and operations would make the CFO at the university capable of limiting access to resources in order to get a desired result.

Since IT was also noted by the participants as being a large expense that was sometimes hard to justify, IT may not be adequately funded. This was implied by one of the participants when he said that IT needed adequate funding and administrative support in order to succeed. He also indicated that the funding was sometimes hard to attain. Since IT was extolled previously as a strategic objective, a circular effect can be seen with inadequate funds equaling ineffective IT, which might lead to IT being left out of the strategy. This is similar to alignment issues described and explored in previous business-IT alignment models (Avison et al., 2004; Khaiata & Zualkernan, 2009; Luftman, 2000, 2004; Maes, et al., 2000). All the while, with the combined position held by the CFO, the CFO could be key in creating more efficient IT teams with adequate funding.

The other major difference in a university is that of the academic side which includes the varying expertise of the faculty. One CIO likened the varied, spread-all-over expertise of the university to “trying to put socks on an octopus.” This additional component is uniquely different from private business and may make IT within the university unique, as well. One CFO felt so strongly about the uniqueness of academia that he thought the CIO and all the executive members needed to have a strong academic background. He described having an academic background as being able to look through a different lens, which would provide a different focus. Birnbaum (1988) and Weingartner (2011) stress over and over again about the uniqueness of the university and how the leadership and components within higher education need different management
methods than that of private industry. Drawing on these references and referring to the fact that IT is a clear component of the university system, IT within higher education may need a different management or reporting relationship model than that of private industry. Another supporting component of this notion is that two of the six models found in this study depict a clear academic component not present in private industry.

**Theme 6 discussion.** The last theme that emerged was that IT needed to have a better source of funding. If IT was underfunded, the resounding opinion was that IT was seen as a constant negative in the balance sheet. With IT seen as something that is “the whole university,” there seems to be a disconnect that adequate funding needs are not met. Although Luftman (2004, 2010) listed budgetary controls as one of the many items underneath the governance of IT, there is not a lot said about how to tackle the monetary needs of IT. One CIO said that the structure could be a barrier when direct reporting to the CFO because the balance sheet is always at the forefront. Another CFO said that this was a situation where IT needed an executive seat because the president might be willing to assume the risk of an IT project where the CFO was not. The use of the word risk in this situation was interesting as it implies that IT is not seen as an established cost cycle where money is continually invested. Xue, et al. (2012) explored this idea and came to the conclusion that IT must either concentrate on cost efficiencies implying profit and loss or on innovations, which implies risk. Perhaps the university still sees IT as an innovative risk which could also be part of the reason that it is contributing to the idea of a red letter item in the budget. This could be directly compared to the idea of the faculty and the abstract idea of research, which might explain the view of the university and IT. When trying to fit academic research into a business model, expending time and energy on abstract ideas oftentimes does not sit well with CFOs who wants to see concrete, money-making ideas that place black on the balance sheet (Garland, 2009).
**Qualitative objective discussion.** As related to the objectives in the qualitative phase, the organization structure and relationships were explored from the viewpoints of both the CIOs and CFOs at varying universities. Other factors like IT as a cost, the higher education environment, and IT as a strategy were also explored. In relation to the themes, the objectives for the qualitative phase were met.

**Overarching Discussion of Quantitative and Qualitative Results**

Since the study focused on an explanatory mixed methods design, the overarching goal was to try and use the qualitative data to explain the results of the quantitative. This was also emphasized through the main objective of the study which stated that reporting relationships were to be determined within the university and then explored through the thoughts of business and IT executives. The study also had a main theoretical framework that incorporated aspects from both organizational studies and business-IT alignment. Looking through this lens of interpretation, six main points of discussion were found.

The first point of discussion is that the qualitative themes emphasized the seat at the executive table over the formal structure—although having an executive seat could be considered as aspect of structure. In the quantitative analysis, where four of the seven variables centered around structure, as the CIO role and level within the organization was lowered, the presence of the CIO on the executive committee was negligible. Also, within this same theme the CIOs and CFOs felt the structure aspect was negligible and the real effort should be concentrated on informal connections or dotted lines with IT (Boyle, 1994; Kearns & Sabherwal, 2007; Luftman & Kempaiah, 2007). These dotted lines and informal connections also indicated a seat at the executive table in 11 out of the 12 interviews. This idea that a presence at the executive level is
important was also echoed in the framework of the study through Evan (1993) and Parsons (1960).

The second point is that the qualitative themes in phase 2 appeared to create distance from the sole vertical, structural aspect of the quantitative, phase 1. A number of the CIOs felt that since IT played such a large part in the campus environment that cross departmental meetings needed to happen. The CIOs also felt that informal communications were a must in order to communicate with the students. This indicates that the heavy concentration on vertical spans, categories and reporting supervisor needs to be revisited. Other factors such as culture, focused work activities and scarce resources can create informal groupings outside of vertical structure (Ouchi, 1979; Strange & Banning, 2001). Although the researcher feels that the vertical data were not a waste to collect, other organizational aspects to measure the horizontal communications need to be put into place. Within the framework, Chan (2002) emphasized that reporting relationships between business and IT were more complex than a static model suggests. The need to include and define more informal relationship aspects within organizational structure should be examined.

The third point is that the qualitative themes could point to new variables to be used within the quantitative portion of a future, expanded study. The themes in the qualitative study placed emphasis on key factors like the changing role of IT, the horizontal communications between IT and internal departments, students and external stakeholders. Miller (1987) and Damanpour (1991) used other similar variables like these to define better dimensions. By finding a way to measure these aspects and create variables and then analyzing, new light could be shed on how relationships should be fostered at the university to create an efficient integration of IT into the environment.

The fourth point is that the qualitative themes re-emphasized the idea to limit the study to higher education institutions. Many of the CFOs and CIOs talked about how the higher education
environment was unique because of the emphasis on the students. Miller (1987) and Damanpour (1991) both iterated in their studies that common dimensions between different types of organizations were hard to pinpoint and that there may be too much generalizations made. There were also comments surrounding the idea that the customers may be different from other businesses. The customer at the university is not just the student but also the faculty and staff that need to provide services to the students. The faculty are a unique component in and of itself at the university (Nelson, 2010). Comparing the faculty and the risks of research to the tangles and risk of IT might be an interesting idea to further model (Shatock, 2002). These complexities make the university a unique environment which implies that a unique strategy on the reporting relationships between business and IT may be needed.

The fifth and final point is that this study attempted to determine the reporting relationships between business and IT in light of the wide array of research done on the subject within private industry (Chan 2002; Henderson & Venkatraman, 1999; Luftman, 2010; Reich & Benbasat, 2000). However, due to the uniqueness of the academic environment (Cole, 2004), a need to define the Provost's place in relation to business and IT is needed. The role of the CFO at an academic institution is different than that of private industry (Bess & Dee, 2008; Weingartner, 2011) and became apparent during the qualitative portion of the study. In relation to the framework, Chan (2002) brought up the importance of having a dynamic environment with informal relationships, but Parsons (1960) and Evan (1993) also bring up the importance of having all the key players aligned at the executive level. Since the mission of the university is centered around academics, the idea that IT must be tied to both business and academia is not far-fetched.

Finally, in looking at the three models, three types of business models and strategies appear to emerge within the university (Habib & Victor, 1991; Sabherwal & Chan, 2001). The CIO reporting directly to the President appeared to create a more customer-service oriented model
This was reiterated in the qualitative interviews with CFOs and CIOs in the appropriate models reporting a more student-oriented focus. The CEO also appeared to have a more technology-oriented focus in this model. In the model where the CIO reported to the CFO, budget was brought up as an overarching concern, which seemed to dictate strategy (Garland, 2009). Both the CFO and CIO made comments about the IT investment and risk taken with IT. Finally, in the third model, where the CIO reported to the academic side, the focus appeared to be fuzzy. Although the participants made comments about academics driving the university, one of the CFOs felt that the CIO would be better off reporting to the finance side or having more executive involvement. The focus on technology driving or partnering with academics seemed to be lacking. The structure, with the CIO reporting to academics, would have expected to focus on academics based on Banker, et al. (2011) and Habib and Victor (1991). However, no direct connection to any one strategy was found.

Limitations

Limitations to the study were that the number of universities studied was 62. Although this was done to target a specific class of university and reduce variation, restraints could be lifted to produce a larger sample size for the exploratory factor analysis (EFA) and categorical principal components analysis (CATPCA). When looking at the total number of universities in the United States, the sample size here reflects approximately two-percent of the population. Although within this class of universities, the sample is well-represented and assumptions can be made, assumptions could be made regarding the entire university population with a larger sample size.

As suggested in the previous overarching discussion, more variables could be added and explored in the EFA and CATPCA. The EFA and CATPCA were built to examine large sample sizes. So exploring more variables should produce better clustering and relationships analysis. These variables could take the form of other variables explored by Pugh, et al. (1968) or other
variables suggested by the qualitative results of this study.

One other limitation of this study was that the full population within the sample size was not studied. As a result, 62 out of a potential 68 universities were fully studied. Three universities were left out because the organizational chart was not up to date and recent news articles indicated a structure change. Another university was not included because the institution was completely online and had no physical presence. The researcher felt that this might skew the data. The other two universities did not have enough adequate information in the form of organizational charts or similar documents to make a determination about the levels or placement on executive committees.

**Recommendations and Conclusion**

One idea in this study was that institutions cannot ignore the IT component of the university, but instead, must embrace it and integrate it into their mission and strategy. Failing to integrate IT as part of the executive strategy appears to affect everyone at the university including the students. One CFO extended this idea to the potential students that they are trying to recruit. He felt that if the university was not united in IT, the university would fail to be competitive. This was similar to studies done in private industry where IT was used to gain a competitive advantage. However, universities need to be aware of the codependence that IT appears to have on strategy and structure. If the strategy is to be changed to concentrate more on customer service, research shows that the structure should also morph to accommodate. The answer for institutions does not appear to be one single structure, but instead seems somewhat dependent upon the university's strategy.

Recommendations for future research were suggested by some participants in the qualitative portion of the study. One CIO suggested an exploration of outsourcing in relation to the impact on IT groups and business at the university. He says, “Years ago I would have thought
so but a lot of these organizations that people are looking at to outsource have become really savvy and they have actually stolen a lot of people from higher education to work for them.” He suggested that although IT may be downsized at the university, there would still be a high need for some physical presence. However, the impact on the relationships with outsourcing in play within the university system has not been widely researched.

Another CFO also made the suggestion during the qualitative phase that budgeting for IT at the university needed to be explored in relationship to the entire university. Because the university can be such a large, diverse institution, it is hard to unite a central IT strategy with all groups and keep everyone united under the same purpose and mission. Exploring overall strategy at the university in relation to IT would be interesting.

One last idea for future study would be to include the provost position when performing the qualitative research. The focus of this study was on the CFOs and CIOs within the university. However, focusing on these positions leaves out a third and important position—the provost—that emerged in the models. This position also emerged again in the themes in that the university is highly unique because of the academic portion. The provost may have insight and other technology visions that were out of the scope of this study.

The overarching theme to takeaway from this study is that IT does need access or some sort of presence on the executive team. This presence is not merely an expression of authority but an expression of a partnership between the mission and strategy of the university with IT. Although one set structure is not recommended, the structure does seem to influence the strategy. A university should be aware that a more customer-oriented strategy versus a more cost-oriented strategy may need a different structure with the changing role of IT.
REFERENCES


empirical study using the balanced bootstrap.


APPENDIX A

Typical Hierarchical University Organizational Chart – Chapter 2

President of State University East

Vice President, Enrollment Management
- Admissions
- Financial Aid
- Registrar

Vice President, Administration & Finance
- Human Resources
- Accounting & Purchasing
- Bursar
- Campus Police
- Food Service
- Facilities & Maintenance
- Computing Services

Vice President, Academic Affairs
- Research & Grants Office
- Research Centers
- Library
- Institutional Research
- Continuing Education
- Academic Support Services

Vice President, Student Affairs
- Residence Life
- Health Services
- Counseling & Career Services
- Athletics
- Student Activities
- Multicultural Center

Vice President, External Relations
- Development Office
- Alumni Affairs
- Community & Government Relations

School of Arts and Sciences
- School of Nursing
- School of Education
- School of Law
- School of Management

Department of Teacher Education
Department of Counseling Psychology
Department of Educational Leadership

Note. Adapted from Bess and Dee (2008) “Understanding college and university organizations: Theories for effective policy and practice (Vol. I – The state of the system)”, p. 24. Depicts typical university organizational chart. Note that administration and finance are combined (operations and finance) and the presence of IT (computing services) on level 3 underneath administration and finance.
APPENDIX B

Codes and Descriptions of Administrative Officers

KEY
(01) = category
Bold text like this = title
- text like Directs all affairs... = description

(01) Chief Executive Officer (President/Chancellor) - Directs all affairs and operations of a higher education institution.
(02) Chief Executive Officer Within a System (President/Chancellor) - Directs all affairs and operations of a campus or an institution which is part of a university-wide system.
(03) Executive Vice President - Responsible for all or most functions and operations of an institution under the direction of the Chief Executive Officer.
(04) Administrative Assistant to the President - Senior administrative assistant to the Chief Executive Officer.
(05) Chief Academic Officer - Directs the academic program of the institution. Typically includes academic planning, teaching, research, extensions and coordination of interdepartmental affairs.
(06) Registrar - Responsible for student registration, scheduling of classes, examinations and classroom facilities, student records and related matters.
(07) Director of Admissions - Responsible for the recruitment, selection and admission of students.
(08) Head Librarian - Directs the activities of all institutional libraries.
(09) Director of Institutional Research - Conducts research and studies on the institution including design of studies, data collection, analysis and reporting.
(10) Chief Financial/Business Officer - Directs business and financial affairs including accounting, purchasing, investments, auxiliary enterprises and related business matters.
(11) Chief of Operations/Administration - Responsible for administrative functions that are generally non-academic and non-financial.
(12) Director of Branch Campus - Official who is in charge of a branch campus.
(13) Director, Computing and Information Management - Coordinates computing systems and the flow of information to and from computing operations.
(14) Director, Computer Center - Directs the institution’s major data processing facilities and services.
(15) Director, Personnel Services - Administers the institution’s personnel policies and programs for staff or faculty and staff.
(16) Chief, Personnel - Responsible for establishing and directing personnel policies including government related requirements.
(17) Chief, Health Care Professions - Senior administrator of academic health care programs, hospitals, clinic or affiliated healthcare programs.
(18) Chief, Facilities/Physical Plant - Responsible for the construction, rehabilitation and maintenance of buildings and grounds.
(19) Director, Security/Safety - Manages campus police. Responsible for security programs, training, traffic and parking regulations.
(20) Associate Academic Officer - Responsible for many of the functions and operations under the direction of the Chief Academic Officer.
(21) Associate Business Officer - Assists and reports to the Chief Business Officer.
(22) Director, Affirmative Action/Equal Opportunity - Responsible for the institution’s program relating to affirmative action and equal opportunity.
(23) Director, Health Services - Directs the operation of clinics, medical staff and other programs which provide institutional health services.
(24) Director, Educational Media - Responsible for audio-visual services and multimedia learning devices.
(25) Contract Administrator - Conducts administrative activities in connection with contracts and grants.
(26) Chief Public Relations Officer - Directs public relations program. May include alumni relations, publication, marketing and development.
(27) Chief Information Officer - Provides information about the institution to students, faculty, staff and the public.
(28) Director of Diversity - Responsible for the institution’s programs relating to diversity.
(29) Director, Alumni Relations - Coordinates alumni activities between the institution and the alumni.
(30) **Chief, Development** - Organizes and directs programs connected with the fund raising activities of the institution.

(31) **Chief Community Relations Officer** - Directs the educational (usually non-credit), cultural and recreational services to the community.

(32) **Chief Student Life Officer** - Responsible for the direction of student life programs including counseling and testing, housing, placement, student union, relationships with student organizations and related functions.

(33) **Dean of Men** - Directs student life activities solely concerned with male students.

(34) **Dean of Women** - Directs student life activities solely concerned with female students.

(35) **Director, Student Affairs** - Assists Chief Student Life Officer in the non-academic student life activities.

(36) **Director, Student Placement** - Directs the operation of the student placement office to provide career counseling and job placement services to undergraduates, graduates and alumni.

(37) **Director, Student Financial Aid** - Directs the administration of all forms of student aid.

(38) **Director, Student Counseling** - Directs non-academic counseling and testing for students including referral to outside agencies.

(39) **Director, Student Housing** - Manages student housing operations.

(40) **Director, Bookstore** - Responsible for the operation of the bookstore including purchasing, advertising, sales, employment, inventory and related functions.

(41) **Athletic Director** - Manages intramural and intercollegiate programs including employment, scheduling, promotion, maintenance and related functions.

(42) **Chaplain, Director Campus Ministry** - Plans, directs the pastoral ministry and religious activities.

(43) **Director, Legal Services (General Counsel)** - Salaried staff person responsible for advising on legal rights, obligations and related matters.

(44) **Director, Annual or Planned Giving** - Operates the annual giving from all supporters of the institutions.

(45) **Chief Planning Officer** - Directs the long-range planning and the allocation of the institution’s resources.

(46) **Chief, Research and Development (not fundraising)** - Initiates and directs research in using the facilities and personnel in new areas of academic and scientific exploration.

**Dean or Director** serves as the principal administrator for the institutional program indicated:

- (47) **Agriculture**
- (48) **Architecture**
- (49) **Art and Sciences**
- (50) **Business**
- (51) **Continuing Education**
- (52) **Dentistry**
- (53) **Education**
- (54) **Engineering**
- (55) **Evening Division**
- (56) **Extension**
- (57) **Fine Arts**
- (58) **Graduate Programs**
- (59) **Home Economics**
- (60) **Journalism/Communications**
- (61) **Law**
- (62) **Library Services**
- (63) **Medicine**
- (64) **Music**
- (65) **Natural Resources**
- (66) **Nursing**
- (67) **Pharmacy**
- (68) **Physical Education**
- (69) **Public Health**
- (70) **Social Work**
- (71) **Special Session**
- (72) **Technology**
- (73) **Theology**
- (74) **Veterinary Medicine**
- (75) **Vocational/Occupational Education**
- (76) **Allied Health Sciences**
- (77) **Computer Science**
- (78) **Cooperative Education**
- (79) **Humanities**
(80) Government/Public Affairs
(81) Mathematics/Sciences
(82) Political Science/International Affairs
(83) Social and Behavioral Sciences
(87) Summer School/Session
(89) Freshmen Studies
(92) Honors Program
(93) Minority Students
(94) Women’s Studies
(97) General Studies
(106) Online Education/E-learning
(107) Professional Studies

(84) Director, Enrollment Management - Plans, develops, and implements strategies to sustain enrollment. Supervises administration of all admissions and financial aid operations.
(85) Director, Foreign Students - Directs student life activities solely concerned with foreign students.
(86) Director, Government Relations - Coordinates institution’s relations with local, state, and federal government.
(90) Director, Academic Computing - Responsible for operation and coordination of the institution’s various academic computer facilities and labs.
(91) Director, Administrative Computing - Responsible for operation of the institution’s administrative computing facility.
(96) Director of Purchasing - Coordinates purchasing of goods and services.
(100) Chief of Staff - Senior non-secretarial staff assistant to the President/Chancellor. Manages administration and operations of The Office of the President.
(101) Secretary of the Institution/Board of Governors - Responsible for liaison between the Board and the institution. Maintains governance and official Board records.
(102) Director, Foundation/Corporate Relations - Directs institution’s efforts in the area of soliciting grants and gifts from foundations and corporations.
(103) Director, Workforce Development - Directs the institution’s efforts in course development and instruction for students and the community in skills necessary to gain employment.
(104) Director, Study Abroad - Coordinates and advises students and faculty on academic studies conducted internationally.
(105) Director, Web Services - Coordinates the development, operations and content of the institution’s web sites.
(108) Director, Institutional Assessment - Facilitates and directs institution-wide assessment activities for academic programs and non-academic departments.

(88) Use this code for those titles that do not fit the above positions.
(00) President Emeritus

## Visual Diagram of Sequential Explanatory Mixed Methods Design – Chapter 3

<table>
<thead>
<tr>
<th>Phase</th>
<th>Procedure</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Quantitative data collection</td>
<td>Gather organizational chart data (n = 68)</td>
<td>- Organization charts from all universities selected - Numeric levels and category items</td>
</tr>
<tr>
<td>2. Quantitative data analysis</td>
<td>* Item analysis * Exploratory Factor Analysis * Categorical Principal-components analysis * Frequency and response patterns * SPSS software used for above</td>
<td>* Categorical variables * Underlying factors (nominal) * Models of reporting relationships</td>
</tr>
<tr>
<td>3. Selection of case study participants</td>
<td>Select case study participants from IT and business executives randomly making sure that one representative appears in each model</td>
<td>Cases (n = 12)</td>
</tr>
<tr>
<td>4. Qualitative data collection</td>
<td>Interview case study candidates Semi-structured, telephone interviews</td>
<td>Interview transcripts Documents (budget reports, meeting minutes, strategic plans)</td>
</tr>
<tr>
<td>5. Qualitative data analysis</td>
<td>Themes analysis Coding analysis</td>
<td>Emerging codes &amp; themes</td>
</tr>
<tr>
<td>6. Analysis of entire study</td>
<td>Bring together quantitative and qualitative results</td>
<td>Discussion &amp; recommendations</td>
</tr>
</tbody>
</table>
Qualitative Example Email to CIOs as Approved by IRB – Chapter 3

December 1, 2013

University CIO
State University East
1100 University Drive
Nowhere, NE 55555

Dear Mr. University CIO,

I am asking you for help with an important study being conducted for the completion of my dissertation. I want to try and understand the relationships and structures between information technology executives and business executives at the university. I want to try and understand what organizational structures may work and what other factors may enhance good relationships and collaboration between IT and business.

The best way that I have of learning about these issues is to ask chief information officers, like you, to share your thoughts within a 10-minute interview. The interview will be kept conversational and will consist of around 5 open-ended questions. Since the research is focused on a small, specific group of people like you, I hope you will take the time to make my research successful.

The interview will give you an opportunity to express your expert opinion and give you an opportunity to provide insight about the multifaceted world of IT. Participating in the interview may help others understand the complexities of IT in a university system. Participation in this research is completely voluntary and you may choose to withdraw at any time. The responses given during the interview process will be kept confidential and your identity will remain anonymous in the published dissertation.

I am attaching a copy of the informed consent form to this email. This form will provide you with more details regarding the project and will outline all contact information.

I appreciate any willingness to share your thoughts and experiences with me.

Sincerely,

Angela Hollman
Lecturer of Information Networking and Telecommunications
(former Assistant Director of Networking)
University of Nebraska at Kearney
cell: (308) 440-5292
work: (308) 865-8718
APPENDIX E

Qualitative Example Email to CFOs as Approved by IRB – Chapter 3

December 1, 2013

University CFO
State University East
1100 University Drive
Nowhere, NE 55555

Dear University CFO,

I am asking you for help with an important study being conducted for the completion of my dissertation. I want to try and understand the relationships and structures between information technology executives and business executives at the university. I want to try and understand what organizational structures may work and what other factors may enhance good relationships and collaboration between IT and business.

The best way that I have of learning about these issues is to ask business officers, like you, to share your thoughts within a 10-minute interview. The interview will be kept conversational and will consist of around 5 open-ended questions. Since the research is focused on a small, specific group of people like you, I hope you will take the time to make my research successful.

The interview will give you an opportunity to express your expert opinion and give you an opportunity to provide insight about the multifaceted world of IT. Participating in the interview may help others understand the complexities of IT in a university system. Participation in this research is completely voluntary and you may choose to withdraw at any time. The responses given during the interview process will be kept confidential and your identity will remain anonymous in the published dissertation.

I am attaching a copy of the informed consent form to this email. This form will provide you with more details regarding the project and will outline all contact information.

I appreciate any willingness to share your thoughts and experiences with me.

Sincerely,

Angela Hollman
Lecturer of Information Networking and Telecommunications
(former Assistant Director of Networking)
University of Nebraska at Kearney
cell: (308) 440-5292
work: (308) 865-8718
APPENDIX F

Qualitative Informed Consent Form as Approved by IRB – Chapter 3

INFORMED CONSENT FORM

A Study of Structures and Relationships between the IT and Business Executives at Universities

This research project is a mixed-methods study intended to study relationships and structures between the IT (CIOs) and business executives at 4-year universities. Participants must be 19 years or older to participate and in one of the following type of positions: CIO, CIO-type of position, CFO, CFO-type of position, or VP of business and finance-type of position in a higher education environment.

Participation in this study will require approximately 5 - 10 minutes of your time. During this time, an interview will be conducted consisting of 5 open-ended questions. The interview is intended to find out what factors or organizational structure emphasize collaboration and communication between business and IT executives. This interview will be audio taped with your permission.

Participation in this study and the interview process is intended to be pleasing. There is no known risk from participating. The interview will be kept to a conversational tone. The information gained in this study will help me define different organizational executive structures within the university system. The study will also help me better understand what organizational structures or methods tend to enhance relationships and collaboration at the executive level.

Any information obtained in this study which could identify you will be kept strictly confidential. All identifying factors including name and university location will be sanitized so that you will remain anonymous. The digital audio recording from the interview process will be kept secure on a password protected laptop only accessible by me, Angela Hollman. The audio recording will then be transcribed by me in order to obtain results to be published in the results section of my dissertation. The transcription will also be kept secure on my password protected laptop. All audio recordings and transcriptions will be immediately destroyed after my research for the dissertation is complete. The anticipated completion date is May 2014.

Feel free to ask questions and have those questions answered regarding this research before agreeing to participate. You may call me at any time at (308) 440-5292 (cell/voicemail) or (308) 865-8718 (work/voicemail). I can also be easily reached via email at hollmanak@unk.edu. My faculty advisor, Brent Cejda, can also be contacted regarding this study at (402) 472-0989. If you want to speak with someone else, please call Research Compliance Services Office at (402) 472-6929 or email irb@unl.edu.

Participation in this project is completely voluntary. You may choose to withdraw from this study at any time without harming your relationship with the researchers listed or the University of Nebraska at Lincoln.

__________________________  Check if you agree to be audio taped during the interview.

Signature of Research Participant  Date

Investigator:
Angela K. Hollman, MS, Principal Investigator  Cell: (308) 440-5292
Brent Cejda, PhD, Advising Faculty Member  Work: (402) 472-0989
APPENDIX G

Qualitative Interview Questions – Chapter 3

Interviewer: Angela Hollman
Interviewees: 6 each CIOs and CFOs (total of 12 interviewees) within sample of 62 private/public universities.
Interviewees will be randomly selected within small group to ensure representation of all six models collected in Phase 1.
Time: 5 – 10 minutes

The beginning of the interview will be small talk regarding the purpose of the research project, how the information will be handled and making sure that the informed consent form has been signed and delivered to the researcher and interviewee. After all questions have been answered about the research project and the researcher and interviewee feel comfortable, the following questions will be asked:

1. Do you feel that your organizational structure at your university with respect to the CIO (or information technology director) and administration and finance (or CFO or business and finance) positions works well?
   a) Possible prompt questions:
   b) If not, how would you change it?
   c) If so, what works well?
2. Do you think that the CIO reports to the correct executive person?
   a) Possible prompt questions:
   b) If not, what person should the CIO report to?
   c) If so, why do you think this is the correct person?
3. With technology being integral to daily activities and systems, do you think that the voice of technology is well represented at your university?
   a) Possible prompt questions:
   b) How could it be better?
   c) Would communication about technology be better with different reporting structure or does the problem go deeper?
4. Does the CIO serve on a committee with direct executive access (meaning does the CIO have direct access to the executive level including the president)?
   a) Possible prompt questions:
   b) If so, does this serve the university well or do you think it should be different?
   c) If not, do you think the CIO should serve on such a committee?
   d) If not, what would such a committee look like and who would they report to?
5. Do you have any closing thoughts on the position of the CIO and how technology needs and wants might better be communicated?
APPENDIX H

Visual Diagram of Word Cloud from Qualitative Transcription – Chapter 4

Note. Used tocloud.com software to create word cloud. Top repeating words at the top. Word count shown in parentheses beside actual word. Phrases are in red. Single words in green and black.