IMPACT OF INFORMATION TECHNOLOGY GOVERNANCE STRUCTURES ON STRATEGIC ALIGNMENT

by

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Abstract

This dissertation is a study of the relationship between Information Technology (IT) strategic alignment and IT governance structure within the organization. This dissertation replicates Asante (2010) among a different population where the prior results continue to hold, the non-experimental approach explored two research questions but include two moderating variables industry type and organization size. The model used in this study was Luftman (2003) Strategic Alignment Model (SAM) which was validated through previous research. This research used web-based surveys to collect the data from multiple organizations which include IT executives and managers, and addresses the missing link between IT governance and strategic alignment of different industries. The sampling frame were about 3000 business professionals from medium and large sized companies in the United States of which 138 responded in the time allotted for data collection. The study tested four hypotheses which were measured using statistical correlation including Kruskal-Wallis one-way analysis of variance (ANOVA), Mann-Whitney *U* test and logistics regression. The study finds that there is not significant relationship between IT strategic alignment and levels of IT governance structure and federal IT governance structure within the organization.

Dedication

I dedicate this dissertation to my family. First, I would like to say thank you to my wife Nickeshia, who toiled with me during those long nights, weeks and months in getting the dissertation to completion. Second, to my four children Abigaille, Aaron, Alec-Raive, Antoinne who sacrificed and tolerated daddy during this period, Third, my Mom, who continued to encourage me during this period. Fourth, to my mother-in-law and sister-in-law who continuously rooted for me during my period of stress and pressure. Finally, my dad who knew I started this journey, but passed away. But most importantly my Lord and savior Jesus Christ for giving me the strength to continue even when I was down and almost out.

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CHAPTER 1. INTRODUCTION

Introduction to the Problem

Recently, new legislation relating to governance and the benefits promised from implementation of such legislations, are high on the agenda of many corporate boards (De Haes & Grembergen, 2008). Information Technology (IT) governance is now attracting board level attention (Guldentops, 2004; Ward & Peppard, 2002; Kacperczyk 2009). As the role of IT expands, its visibility is elevated and the planning and management of information technologies are increasingly integrated into all organizational planning. Damianides (2005) supports this claim by emphasizing that "90 percent of corporate board members are regularly informed about IT issues, two thirds of the same boards approve IT strategy, but only 10 percent make an inquiry about IT" (p.80).

Moreover, Guldentops (2004) states, "with IT being so pervasive in the business environment and so critical for the success and survival of enterprises" (p.2), greater focus is now placed on the planning and implementation of IT across organizations. Key developments in the body of literature suggest that implementation of an IT governance framework now frequently play an important role in establishing and maintaining the organizations goals and objectives. In achieving these objectives participation of leadership and keen management attention to processes will ensure success (Damianides, 2005).

According to Robinson (2005), IT governance supports three main objectives: "(a) regulatory and legal compliance, (b) operational excellence, and (c) optimal risk management" (p.93). Robinson also stated that poor IT performance is commonly the result of failed IT projects, poor budget management, poor time management and return on investment (ROI).

Consequently, the need for any type of governance is evident if organizations are to function optimally by establishing transparency and accountability.

The term *IT governance* as described by Loh and Venkatraman (1992), outlined the mechanisms used to ensure the enablement of the business by necessary IT function capabilities as a strategic alignment between technology and the business where a resulting increased value is achieved for the business. De Haes and Grembergen (2007) posits that the Alignment include an iterative process for decisions relating to "goals, processes, people, business and technology" (p.37). But despite these clear and specific descriptions, an extensive use of the term IT governance emerged with multiple meanings in the late 1990's when Brown (1997) popularized the term. As a result of the increased use of the term IT governance, information technology relationships and methods to do business made a fundamental change to how business processes and business engagement approach threats that affect the organization both internally and externally. Additionally, for IT governance to be effective, the decision makers must consider the right mix of IT security experts and business managers with a comprehensive view of organization risk appetite.

The IT Governance Institute (2003) purports that "IT governance is designed to give this perspective and to provide decision makers with a cost-effective approach to address information security related business risks". IT governance in itself embodies risk management and the protection of information assets, and also falls under the ownership of the board of directors and executives.

Rockart, Earl, and Ross (1996) submit that for an organization to have a successful track record in IT, it must pursue to have a good business relationship with all business units. IT activities infiltrate different areas of the organization such as personnel departments and research

and development offices, so as to ensure business and technology partnership. Furthermore, because of this increase expectation of success IT executives are considering strategic alignment more carefully. To support Rockart's idea Damianides (2005) states, "It is an integral part of enterprise governance and consists of leadership and organizational structures and processes that ensure that the organization's IT sustains and extends the organization's strategies and objectives" (p.80).

Grembergen (2002) emphasized, "IT governance is a combination of factors including leadership, structure, and processes that ensure that the organization achieves integration of business and IT" (p.20). The focus of the study will be on the structure element of IT governance. As an integral element of corporate structure, understanding how IT governance structure can function optimally is of keen interest to practitioners and scholars alike. To date, there is little available guidance in the literature, and this study will provide foundational insight into the workings of IT governance to contribute to the body of knowledge.

This research will explore the relationship between IT governance structure and IT-business strategic alignment in organizations. The research also take into consideration how recent legislations such as *Sarbanes Oxley (SOX) 2002* and *Control Objectives for Information Technology and related technology (COBIT),* has impacted the recent implementation of IT governance in organizations.

Background of the Study

The relationship that exists between IT governance structures and IT strategic alignment is important to achieve the goals of organizations (IT Governance Institute, 2003). Research done by BJorne-Andersen (2010) revealed that IT governance structure comes in two forms, namely, IT Governance Institute model and a model submitted by Weill and Ross (2004) which

introduced *IT governance archetypes*. The IT governance model according to ITGI (2006) simply states (a) Strategic alignment between business and IT, (b) Value generation from IT to business, (c) Management of the IT- resources, (d) Management of risks, security and rules (e)Performance monitoring of IT-function while the Weill and Ross model states (a) IT principles, (b) IT architecture (c) IT infrastructure (d) Business Application Needs (e) IT investment prioritization.

Peterson (2004) also identified that IT governance structure includes the distribution of IT decision-making rights among different parties in the organization and these IT decision-making rights include business alignment with IT through IT governance structures, and the organizations maturity level (Luftman, 2003). Furthermore, IT governance ensures that different stakeholders work together in a synergistic way to make sure that the benefits of any IT implementation will be maximized throughout the different business units and a strategic alignment with the business should then permeate each level of the organization (De Haes & Grembergen, 2005).

Previous research from seminal and recent IT governance authors provides a background into the literature. The use of the term IT governance became prevalent in the 1990s and prior to this, researchers and practitioners used terms such as "IT decision making" (Boynton, Jacobs, & Zmud,1992; Loh & Venkatraman, 1992), IS organizational structure (Simson, 1995). Information technology principles (Kayworth & Sambamurthy, 2000), and IT decision making (Boynton et al., 1992), to describe IT governance structures. With the failures and successes of implementation of Governance structures and the formalization and achievement of enhanced IT strategic alignment, researchers such as Grembergen, De Haes and Guldentops (2004), Weill and Ross (2005) have cited these prominent researchers in subsequent IT governance literature.

Well-known features and use of the term, however, was made by the Brown (1997), and Sambamurthy and Zmud (1999) articles where the term "IT governance framework" was initially used.

Similiarly, the evolution of IT governance structures has been highlighted in recent literature. Green (2007) states that "in order to implement IT governance effectively, a holistic approach needs to be adopted" (p.44). This argument was also supported by Weill (2004). Weill and Ross (2005) then extended the original structure of centralized, decentralized and federal to include IT governance archetypes such as business manager monarchy, IT monarchy, feudal, federal, IT duopoly, and anarchy. Despite these research, studies and applications of IT governance, notable authors have discussed the inconsistent application of IT governance to achieve IT strategic alignment (Reich & Benbasat, 1996; Grembergen, 2003) and to date the literature does not specifically address the relationship between IT strategic alignment processes and IT governance structures.

Statement of the Problem

Over the past two decades researchers have been contributing varied versions of IT governance structural arrangements. The bulk of these researches on IT governance have focused primarily on structural planning, such as differences between centralized, decentralized and federal governance structures. However, these researchers did not exploit the relationships that exist between IT governance structure and the levels of IT strategic alignment (Brown & Magill, 1994; Peterson, 2004).

Researchers during this period, who advocated for hybrid governance structures have since then introduced an extended version of the governance hierarchy (Weill & Ross, 2004; Weill & Ross, 2005). Authors such as Ko and Fink (2010) submit that IT governance is a fairly

new research domain. Brown and Grant (2005) admit that exploration and research is "incomplete and encourage academics and practitioners alike" to do further research to find a suitable mechanism to govern IT decisions.

However, Peterson (2004) states that despite the initial existence of IT governance activities, there still exists the need to measure the relationship between IT governance and IT strategic alignment. The extant literature did not take into account factors such as maturity levels of the firm which are understandably reasonable nominal measurements. This research seek to resolve the problem of how a firm's maturity level and IT governance structure impacts IT strategic alignment by including the moderators industry type and organization size.

Purpose of the Study

The purpose of this quantitative correlation study was to test the extent to which IT strategic alignment relates to the IT governance structure and federal IT governance structure within the organization. Further analysis also measured the degree of the impact between these variables.

The independent variable IT governance structure was defined as a combination of factors including leadership, structure and processes that ensures that IT governance achieves integration of business and IT (Grembergen, 2002). The dependent variable IT strategic alignment was defined as the "combined engagement of all IT units' strategic, plans processes, investments and decision to support the overall functionality and purpose of the organization goals and objectives" (Khadem, 2007) , and the control and intervening variable include centralized, decentralized and federal governance structures that contributes to IT planning and decision making through various committees such as the IT governance, steering and standard committees.

The researcher believes that with the inclusion of Luftman (2003) strategic alignment model (SAM), which is the basis of this research, organizations will demonstrate improvements in strategic alignment of the business and functions in IT. This study then explored selected IT firms made up of business and IT professionals who make decisions regarding the organization and therefore provide a point of reference for further research and business applications.

Rationale

Research shows that organizations with effective IT governance structures tend to have better performance by directing, controlling, and coordinating IT activities (Sambamurthy & Zmud, 1999). A review of the literature shows that inadequate research has been conducted to address the IT governance structures and maturity models within organizations, and how the knowledge of IT governance structure and alignment may impact a firm's strategic alignment (Brown & Magill, 2004; Ko & Fink, 2010). The extant literature also revealed IT governance is an important component of organizational IT capability, and organizations found to generate substantial returns on IT investments have implemented effective IT governance structures (Weill & Ross, 2004). According to Weill and Ross (2004), IT investment is now greater than 4.2% of annual revenue and represents 50% of total annual capital investment in many organizations. As a result, few organizations are now addressing this issue by modifying or implementing IT governance structures that will focus on IT spending as a strategic priority. This research will therefore extract and explore data that impact IT strategic alignment based on the IT governance structure employed, using a maturity model in selected organizations within the U.S.

Miller (2006) asserts that organizations must measure their current states by assessing not only their capabilities but also their requirements such as compliance demands and service-level

agreements through an IT governance framework. Furthermore, Weill and Ross (2004) suggest that effective IT governance structures enable some organization to outperform others because effective governance structures encourage appropriate IT behaviors. With this in mind, this research provided meaningful data that will impact researchers and businesses alike on the effect of IT governance on IT strategic alignment through this quantitative study.

Research Questions

In reviewing the literature, it is observed that there exists a gap between IT governance structures and IT alignment models with varying maturity levels within organizations. According to Reich and Benbasat (2000) there are organizations that are not aware of factors that contribute to the alignment of IT functions and because of them not being aware, this in turn affects their level of alignment. However, this ultimately lead into disorganized units because of a lack of alignment between business units and information technology (IT) strategy that cause an increase in operation costs and erosion of the organization's competitive advantage (Sage, 2006). The intent of this dissertation is to examine and test the effects of these relationships. The primary questions proposed are:

Research Question 1: What type of relationship exists between IT governance structure and IT-business strategic alignment?

IT governance speaks to the organizations capacity as a unit to specify decision making rights within the firm to encourage desirable behavior (Weill & Ross, 2004). IT governance has a combination of factors including leadership, structure and processes that ensures that IT governance achieves integration of business and IT (Grembergen, 2002). Ko and Fink (2010) states, "IT governance structure is the single most important predictor of whether an organization

will derive value from IT" (p. 664). There are three basic forms of this governance structure, centralized, decentralized and federal. The following research will expound on these structures.

$H1_0$: There is no relationship between IT governance structure and IT-business strategic alignment.

H1a: There is a positive relationship between IT governance structure and IT-business strategic alignment.

Research Question 2: What type of relationship exists between federal IT governance structure and IT-business strategic alignment?

According to Luftman (2003), the federal governance structure is combination of centralized and decentralized models. Asante (2010) also submitted that the federal mode is the process where central corporate management makes decision through an IT unit regarding central systems while the functional unit decides the authority and responsibility regarding resources.The research questions developed will seek to identify the relationship between each factor, and the survey instrument will be delivered to the appropriate IT professionals based on the target population.

The research hypotheses and null hypotheses for the second question are:

$H2_0$: There is no relationship between federal IT governance structure and IT-business strategic alignment.

H2a: There is a positive relationship between federal IT governance structure and IT-businessstrategic alignment.

In addition to these hypotheses, contributing variables will be studied to discover the relationship between, industry types, organization size. These hypotheses are:

$H3_0$: The relationship between IT governance structure and IT-business maturity level remains the same regardless of industry type.

H3a: The relationship between IT governance structure and IT-business maturity level varies by industry type.

$H4_0$: The relationship between IT governance structure and IT-business maturity level remains the same regardless of organization size.

H4a: The relationship between IT governance structure and IT-business maturity level varies by organization size.

Significance of the Study

The significance of this study is to contribute to the literature how a firm's IT strategic alignment is related to the firm's IT governance structures by testing the hypotheses of the relationship between the variables. The study also investigates relationships associated with industry type and organizations size and how this affect different decision making structures within the organization. Hirschheim and Sabherwal (2001) research underlined the importance to note that a shift and increased interest has been placed on IS alignment mainly because, not only does the IS unit succeed but the organization succeed also.

Nevertheless, sufficient research are not available to indicate an achievement and sustenance of alignment over a period of time, and consequently, which industries are more likely to adapt to changes as organizations enter virtual or cloud computing and extensive technological awareness (Hirschheim & Sabherwal, 2001). Therefore emphasis in these factors was enhanced by replicating Asante (2010) study by including maturity level as a variable to IT strategic alignment. Furthermore, an analysis of the findings presented to researchers and U.S industries the relationship that can be revealed between IT strategic alignment and IT

governance. The most significant observation is that Asante (2010) research which also uses Luftman (2003) instrument will demonstrate that strategic alignment is not a one-time occurrence but a process of continuing refinement that include some adjustment and transformation of business processes.

Definition of Terms

Chief executive officer. The Chief executive officer (CEO) is the highest ranking executive in the organization who oversees the operation of the entire organization. In educational organizations the CEO will be equivalent to the President of the institution (Lance,2006)

Chief information officer. The Chief information officer (CIO) is the highest ranking executive with the responsibility for Information and related technology in the organization. He oversees the information technology and technology infrastructure of the organization (Lance, 2006)

Control objectives for information technology and related technology. Control objectives for information technology and related technology (COBIT) was originally released as an IT process and control framework linking IT to business requirements. It is an open standard for control over IT and is an independent framework of the underlying technologies within an organization. "COBIT is maintained and refreshed on a four-year cycle by the IT Governance Institute" (ITGI, 2006).

Information technology. Information technology (IT) is the structure and backbone of computer and related technologies, these include, hardware, software and data related infrastructure within the organization.

Information technology infrastructure library. Information technology infrastructure library (ITIL) sets a formal standard for service management and service delivery. The ITGI (2004) defines ITIL as "the level of alignment between IT services and actual business needs". They also posit that "The core operational processes of IT service management are described within the two ITIL publications of Service Support and Service Delivery" (ITGI, 2004).

IT governance. According to Peterson (2004), IT governance (ITG) "is the distribution of IT decision-making rights and responsibilities among different stakeholders in the enterprise" (p.20), ITG also establish processes and mechanism for the oversight of IT strategic decisions. (Peterson, 2004). In other words, IT governance is the mechanism to ensure that organizational strategic processes in place sustains and extends the organizations goals and objectives.

IT governance structure. This is the combination of factors including leadership, structure and processes that ensures that ITG integration of both business and IT is achievable. (Grembergen, 2002). Organizations choose from a set IT governance structures or archetypes including the "basic centralized, decentralized or federal IT governance structures" (Weill & Ross, 2005).

IT strategic alignment. This is a combination of activities that encompasses each IT unit activity within the enterprise including processes and investment decisions that enables the organization goals and objectives (Khadem, 2007). Chan and Reich (2007) define this as a systemic execution and integration of the organizations business needs with its IT resources.

Sarbanes-Oxley act. Sarbanes-Oxley Act (SOX) constitutes a legal framework regarding the mandatory disclosure of public companies large or small in how they conduct business, including retention of records in the interest of the shareholders and customers (ITGI, 2006).

Strategic alignment maturity. Strategic alignment maturity (SAM) is a continual process where an organization IT, business processes and governance within all departments are effectively merged to achieve the organizations goals and objectives (Luftman, 2003). For an organization to sustain a high alignment maturity, the organization must be able to operate and assess its communications, competence, value measurements, governance, partnerships, technology and skills (Luftman & Kempaiah, 2007).

Assumptions and Limitations

The problem put forward assumes that practitioners are willing to divulge information to the researcher and the questions submitted will be answered truthfully and completely. It is also assumed that practitioners will respond to the questions in a timely manner to ensure the research is current and is addressing its audience appropriately. It is further assumed that the selected instrument for this study is valid, reliable, and appropriate to the study's focus.

To narrow the focus of the study, a few selected industries were used along with selected areas of the industry. This research direct their attentions to firms that implement IT governance processes and include CIO, executives and professionals who are part of the decision are making process in the implementation of IT governance within the organization. This researcher also includes those professionals who are in a non-managerial role from both IT and business but who contribute adequately to the research. The target population was from the private and public sector workers who had the requisite qualification to give a more accurate assessment.

Given this narrow focus, the results of this study cannot be expected to generalize to other industries or populations. Another limitation is the fact that some participants do not have the full understanding of IT governance frameworks, and therefore they may not be able to complete study's questionnaires, which will result in lower response rates for some questions.

Nature of the Study

The research will use a correlative quantitative analysis using a non-experimental approach to answer the research question. Non-experimental studies follow a process of understanding relationships or the correlation between variables (Swanson & Holton, 2005; Creswell, 2003; Creswell, 2007). The research will be designed to conduct web-based surveys in collecting the data from multiple organizations which include IT executives and managers, and will address the missing link between IT governance and strategic alignment of different industries, thus making it exploratory. Independent and dependent variables will be measured using an existing instrument. According to Swanson and Holton (2005), quantitative study is a research approach that often starts with a developed theory that leads to hypothesis, specific statistical testing and strict analysis. Creswell (2003) added that a "quantitative research often exemplifies experimental or non-experimental strategy of inquiry that often follows a pre and posttest measures of attitudes or actions" (p.153). This research therefore presents a conceptual model that is a representation of the prospective correlation under investigation (see Figure 1)

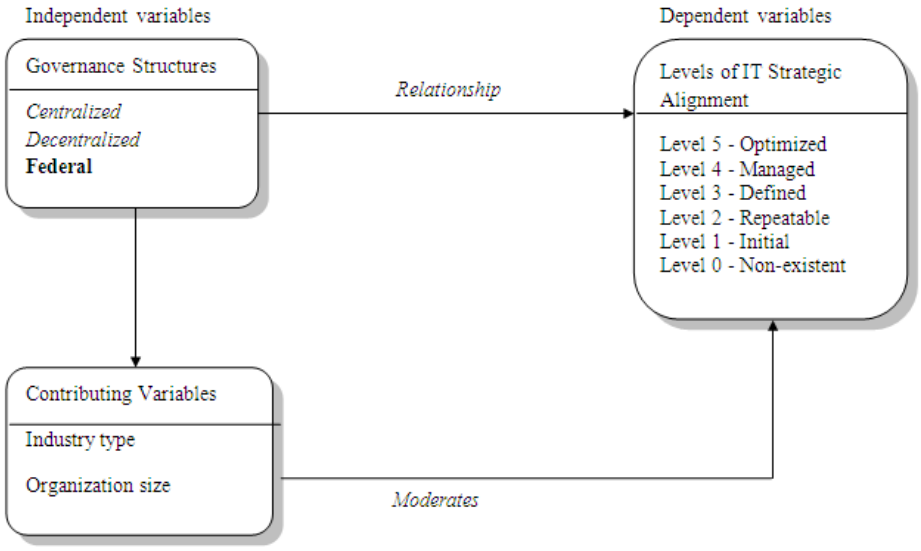

Figure 1. Conceptual Model for IT governance Independent and dependent variables

The emphasis of this study is to substantiate the relationships that exist between IT governance and levels of IT Strategic Alignment as presented in Asante (2010) study. The two primary hypotheses that was used, is similar in nature to the original Asante (2010) study and measures IT-business strategic alignment levels. In addition, two hypotheses were added that is relevant to the study that will measure industry type and organizations size. The sampling group will be CEOs, CIOs, business executives and professionals who are in a non-managerial role from both IT and business but can contribute adequately to this research. The distribution of the instrument was a similar method as in the original study, and was distributed to members of the IT Governance Institute and by way of the institute's research online portal. The research goals were to elicit information relating to the effectiveness of IT and business communication, measurement of the competency and value of IT, Governance, Partnership, Scope & architecture of the IT infrastructure and skills.

Organization of the Remainder of the Study

This consists of five chapters: Chapter 1 provided an overview of the study including an introduction to the problem and, relevant background. The research questions were presented and the nature of the study was discussed, as well as the limitations and assumptions that will undergird the study. A statement of significance was provided and relevant terminology was defined. Chapter 2 presents a detailed review of the literature. The role of information technology in contemporary business settings is discussed in relation to IT governance, maturity level, and the relationship to the strategic alignment of IT. A detailed explanation of the research methodology is presented in chapter 3. The variables for the study are presented in conjunction with the guiding hypotheses.

The instrument is also discussed in detail and the strategies for data collection and analysis are presented. Protection for human subjects is also assured. Chapter 4 presented findings and results, and chapter 5 presented the discussion, implications, and recommendations.

CHAPTER 2. LITERATURE REVIEW

Introduction to the Literature

This review covers research relating to the phenomenon of Information Technology (IT) governance usage and IT strategic alignment based on a maturity model. Luftman and Brier (1999) strategic alignment theory suggests that the harmonious synergy between business and IT to achieve business strategy and objectives. The term IT governance became prevalent in the 1990s, prior to this, researchers and practitioners used the terms "IT decision making" (Boynton, Jacobs and Zmud, 1992), and computer system control (Garrity, 1963).The literature focal point was on existing and past streams of research that converge to give a practical explanation to the varying use and effective strategic alignment styles of organizations (Weill & Ross, 2004). Luftman (2003) identified six factors, "communications, competency or value of IT, governance, partnerships, scope and architecture and finally, the skills of the human resources involved" (p.10), to demonstrate the strategic alignment model (SAM). The research used the aforementioned factors to help determine ways to help organizations improve from their present states to one of mature strategic IT-Business alignment (Lance, 2006).

De Haes and Grembergen (2008) as revealed by Luftman and Rajkumark (2007) in a recent publication agreed that alignment is vital to an effective implementation of IT governance and that its success is hinged on convergence, harmony, integration, link and synchronization. Weill and Ross (2004) in their literature also revealed that IT governance is tied in with strategic alignment and an organizations return on investment (ROI).

This research will look on two frameworks based on review of literature; first, the Weill and Ross (2004) Governance areas for decision making:

- IT principles

- IT architecture
- IT infrastructure
- Business application needs
- IT investment prioritization

Second, the ITGI governance areas (Brown & Grant, 2005; Guldentops, 2004; ITGI, 2006):

- Strategic alignment between business and IT
- Value generation from IT to business
- Management of the IT- resources
- Management of risks, security and rules
- Performance monitoring of IT-function

Information Technology Governance Research

An examination of previous research revealed that there is evidence of a relationship between IT governance and alignment (De Haes & Grembergen, 2008). The review of the literature also points out that little research is done on the relationship between IT strategic alignment and IT governance structures in organizations. This argument was supported by Chan and Reich (2007) who also stated "more research and exploration is required into the means or antecedents of alignment"(p.297). As evidenced by De Haes and Grembergen (2007) a lack of research exists that deals with implementation of IT governance as well, and research done by Hirschheim and Sabherwal (2001) agrees on the lack of study on alignment and how it is achieved and sustained. An analysis of Hirschheim and Sabherwal research revealed that the adoption of the business topologies, prospectors, defenders and analyzers as the chosen framework to measure and describe information technology alignment strategies, implied that

these measures fit an aligned behavior, but according to Das, Zahra, and Warkentin, (1991) this explanation is unsatisfactory and they reasoned that IS strategy are measured by results while business practices are process oriented. These business topologies are described as:

1. Prospectors. These organizations entrepreneurial problems include finding new market opportunities. The prospectors organizations are considered innovative in their operations and are more decentralized in their administrative responsibilities.
2. Defenders. These organizations function best in stable markets. Hence faced with the problem of maintaining a stable market share. They are specialists in their area and are centralized in their administrative responsibilities.
3. Analyzers. These organizations collaborates among different departments, this is done by keeping a balance exploiting new markets while maintaining their existing market share. They maintain a balance between prospector and defender.

Weill and Ross (2004) provided a simple definition to capture the essence and simplicity of its meaning, "Specifying the decision rights and accountability framework to encourage desirable behavior in the use of IT" (p. 8). Webb et al. (2006) gave a similar definition of IT governance, by stating that "IT governance is the strategic alignment of IT with the business, such that maximum business value is achieved through the development of effective IT control, accountability, and risk management". Muller (2009) stated that although little research exists that is specific to measuring how IT governance impact the different attributes of IT strategic alignment, executives of organizations are still pushing IT governance to the forefront of business decisions. Similar research by Guldentops (2004) posits that framework including Control Objectives for Information and Related Technologies (COBIT) and Information

Technology Infrastructure Library (ITIL) assist in the implementation of IT governance and will enforce a clear set of goals and directions.

The implementation of IT governance can be affected by a variety decision-making activities, and the combination of these activities is aligned to ensure that the enterprise streamline the rules, procedures and process that ensures strategic alignment through the governance structures. (Huang, 2006; Weill & Ross, 2004; Brown & Grant, 2005). This alignment according to (Weill, 2004) "encourages desirable behavior in the use of IT" (p.3).

Information Technology Governance Theories

Information Technology units within organization are challenged constantly to produce and be efficient with additional responsibilities and expanding statutory and legal requirements while fasting constraints in their budgets. One of the opportunity organizations have in reducing costs is to go through on action of standardization of processes. Information technology governance is put in perspective when factors that affect governance structures are classified into categories (Agarwal & Sambamurthy, 2002; Boddy et al., 2005). IT governance follow two streams of research, the first focused on single factor such as firm size, and secondly research using the principles of contingency theory to identify a grouping of factors that impact IT governance decisions as seen in Table 1(Brown & Grant, 2005; Muller, 2007).

Table 1

Primary Sources and Key Ideas by Stream.

IT Decisions	Stream One – IT Governance Forms	Research Outcome
Basic Locus of IT Decision Making	Thompson, 1957, Jelinek, 1977, Burlingame, 1961, Golub, 1975, Olson and Chervany, 1980,	Research on traditional IT organizational structures

Table 1 (cont.)

Primary Sources and Key Ideas by Stream.

IT Decisions	Stream One – IT Governance Forms	Research Outcome
	Keen, 1981, Jenkins and Santos, 1982, Wetherbe, 1988, Von Simson, 1990	
Expanded IT Decision Making Structures	Ein-Dor and Segev, 1978, Rockart et al., 1978, King, 1983, Zmud et al., 1986, Boynton and Zmud, 1987	Research on vertical and horizontal expansion of the traditional IT organizational structures
	Stream Two – IT Governance Contingency Analysis	
Individual and Multiple Contingencies for Uniform Governance Frameworks	Olson and Chervany, 1980, Ein-Dor and Segev 1982, Tavakolian, 1987, Dixon and John,, 1989 Ahituv et al., 1989, Allen and Boynton, 1991, Boynton et al., 1992, Henderson and Venkatraman, 1992, Clark 1992, Venkatraman, 1997	Research on the individual and multiple contingencies affecting traditional IT organizational structure decisions
Complex Analysis For Non-Uniform Governance Frameworks	Brown, 1997, Brown and Magill, 1998, Brown, 1999, Sambamurthy and Zmud, 1999	Research on the individual and multiple contingencies affecting expanded (vertically and horizontally) IT organizational structure decisions

According to Brown and Grant (2005), stream one initial research in this area deals with the focused idea that IT governance and decision making is either centralized or decentralized (see Table 1). This idea was the subject of IT researchers even in the late 1980's (Olson &

Chervany, 1980). On the other hand, authors such as Brown & Magill (1994) put to rest this singularity of IT governance research and discussed a second stream of contingency that focuses on the why and how of IT governance establishment in the firm. The multiple contingency theories as described by Brown and Grant came up with multiple proposals that "include organizational structure, business strategy, industry and firm size" (p.697), to determine an appropriate setting for decision making.

Ideally, effective IT governance can be seen to be the most constant predictor of the value the organization gets from IT. As shown in Figure 2, the IT Governance Institute identify five main areas of focus that are driven by stakeholders value namely, strategic alignment, resource management and performance management these are considered drivers and the other two areas which are value delivery and risk management are called outcomes.

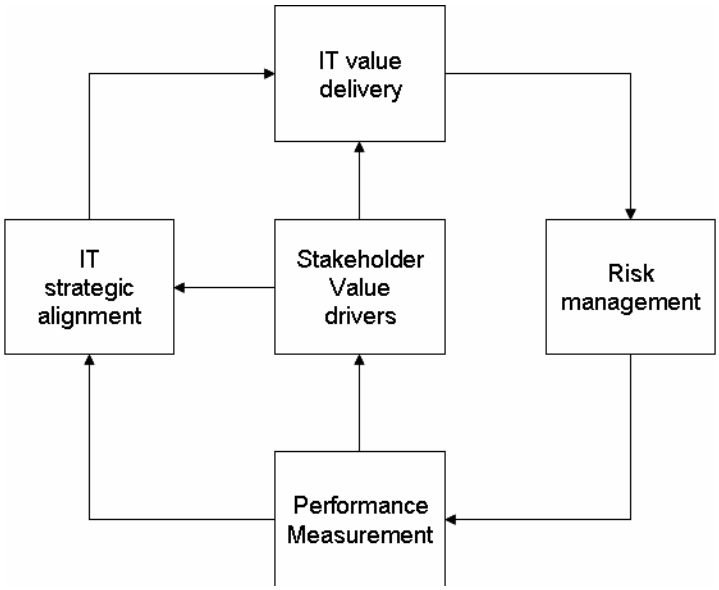

Figure 2.The stakeholder value as main driver for IT governance

Information Technology Governance Structures

The notion of decision-making responsibilities evolved from a series of independent assessments and choices within the different business-units of the enterprise, to an expansion of

multilateral and multidimensional decision-making (Huang, 2006). Boynton and Zmud (1987) explored some of the basic governance structures being centralized or decentralized decision making. Each of these structures have their own advantages and disadvantages, and as Boynton and Zmud explain, the functional operation of the enterprise necessitates "providing centralized direction and coordination while recognizing the value of increased discretion regarding IT decision making on the part of managers throughout the organization" (p.61).

Within the centralized decision-making structure economies of scale becomes a direct focus, and a primary IT unit sets, mandates and have decision making authority for the infrastructure, architecture while setting standards for the organization wide business units; but at times ignore the freedom of these units and may increase frustration because of added bureaucracies (Huang, 2006; Luftman, 2003). Within the decentralized decision-making structure customer customization and faster integration of changed processes is the main focus. This structure assumes authority for their IT infrastructure (Peterson, 2004), but on the other hand cause duplication and fragment IT products and services because of a multiple operation of units doing the same processes (Huang, 2006).

An extension of these structures also include an hybrid combination of both decision loci that address the varied array of IT decision types that is made in an organization by Brown (1997). This hybrid decision called a federal mode and proposed by Zmud, Boynton and Jacobs (1986) was used to combine decision making responsibilities. Huang (2006) proposed that the application of the federal mode was to find a way to separate decision rights for different types of activities. Huang stated that "core IT decision making such as IT infrastructure and IT investments would be centralized to ensure enterprise wide consistency and then decisions

relating to business applications would be decentralized" (p.15). This allows the organization to operate more efficiently in both IT and the business unit's decision making hierarchy.

Table 2

IT Governance Structural Tradeoffs and the Best of Both

IT Strategic Alignment Drivers	Centralized IT Governance	Decentralized IT Governance	Federal IT Governance
IT Synergy	+	-	+
IT Standardization	+	-	+
IT specialization	+	-	+
Business Responsiveness	-	+	+
Business Ownership	-	+	+
Business Flexibility	-	+	+

Note. Taken from Asante, 2010; Peterson, 2004; Brown and Magill, 1998 and Rockart et al., 1996.

Recent literature now embraces these three modes to show the relational mechanism that exists within the organization (Brown & Magill, 1998; Peterson, 2004). According to Luftman (2003) the centralized and decentralized structure combined to form the federal structure and the usage and implementation of these structures are adapted to bring support within the firm's alignment perspective as seen in table 2. Further research by Weill and Ross (2004) unveiled a set of classifications that further expand the variations of decision making-structures relating to IT governance. These structures are taken from political archetypes and include business monarchy, IT monarchy, feudal, federal, IT duopoly, and anarchy. These archetypes put emphasis on allocation pattern, with the business monarchy and feudal archetype having business executives and business unit managers making IT decisions as equal partners, while the federal archetype have the business unit and corporate management making IT decisions. With the IT monarchy, IT decisions are made by the head of IT unit only, while the IT duopoly have

the duo of IT executive and the business leader making decisions, and finally anarchy do not have an IT governance mechanism in place.

In summary, figure 3 shows the different governance structures evolution which also reflects the decision making span for each selected type.

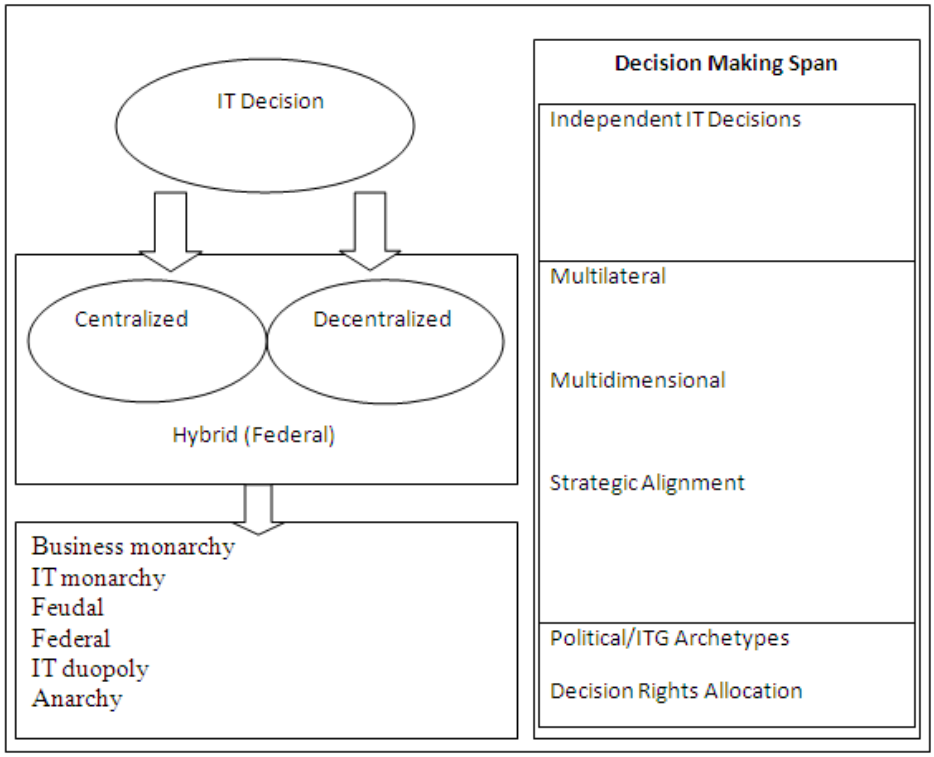

Figure 3. Current IT Governance Structures decision making span.

Information Technology Governance Archetypes

A study done at Harvard business school by Weill and Ross (2004) investigated 256 enterprises to highlight how high performing firms allocate their decision rights using political archetypes. Weill and Ross demonstrated a set of successful patterns of governance performance using archetypes based on their research, and then suggested 3 effective IT governance questions (a)What decision must be made? (*decisions class*); (b) Who should make this decision? (*structures*); (c) How will we make and monitor these decisions? (*process and criteria*). In Table

1, the archetypes are further compartmentalized into decision classes to further emphasize the mix of appropriate decision rights within the organization.

Wu (2007) argued this point by implying that "no single governance archetype provides a one-size-fits-all pattern for security decision making" (p.3), Wu then emphasized his point by suggesting that IT security and hence risk management affects the entire technology infrastructure by expanding the original archetypes to include a discussion of a set of critical success factors (CSF) which supports Weill and Ross five IT decisions class.

These IT decision classes include:

1. IT principles – Identifying the business role of IT and setting security strategies by maintain a security baseline that exceeds industry standard (Wu, 2007, p.5).
2. IT architecture – Defining standards and integration based on the company's business strategy and setting these standards by following best practices (Weill & Ross, 2004).
3. IT infrastructure – These are shared and enabling services that are used by various applications (Weill & Ross, 2004, p.6), but must include a security infrastructure (Wu, 2007, p.7) to protect the components of the computing platforms using hardware and software as detection mechanisms such as firewalls and encryption devices.
4. Business application needs – Enforcing standardization so that the architectural integrity can be preserved, while ascertaining and satisfying business users' security needs (Weill & Ross, 2004, p.6).
5. IT investment and prioritization – Information security investment is now a major element of executives' interest in IT decisions, and according to Wu (2007)

companies are starting to use Net present value (NPV) and Return on investments (ROI) to make security decisions (p.7).

Through the alignment process, business unit (BU) and IT develop a synergistic force in the IT governance process, and these decision classes are modeled in table 1 to illustrate the ownership of the various decisions.

Table 3

The Potential Decision Making Patterns of Governance Performance using the Weill & Ross Archetypes

Archetype/Style	Decision Rights or ownership	Decision Class 1	Decision Class 2	Decision Class 3
Business monarchy	Top Managers		IT Investments	IT Principles IT Investments IT Infrastructure IT Architecture
IT monarchy	IT specialists	IT Infrastructure IT Architecture	IT Infrastructure IT Architecture	
Feudal	Each BU making independent decisions			
Federal	Combined C-level Execs. & BU with or without IT input.	Business application needs		Business application needs
IT duopoly	IT & one other group (Managers or Business Units)	IT Principles IT Investments	IT Principles Business application needs	
Anarchy	Isolated individual or small groups	No Governance	No Governance	No Governance

Note: Adapted from "IT Governance: How Top Performers Manage IT Decision Rights for Superior Results" Weill, P. & Ross, J. (2004), *p. 27-29. Harvard Business School Press.*

From a strategic alignment perspective, effective IT governance requires a significant amount of management time and attention. Table 3 shows the committee structure that made decisions relating to IT governance (Weill & Ross, 2004).

Table 4

Sample IT committee structures that govern the enterprise.

IT Steering Committee	IT Governance Committee	Standards Committee
Governed by Senior Managers/Execs.	Chaired by Chief Information Officer	Run by top architects who reports to the CIO and members of the Governance committees.
Approve key investments decisions	Enforces steering committee mandates related to designs	Determine which specific standards have become obsolete.
Ensures reliability, cost effectiveness, consistent customer service and easy access	Enforces implementation and management of IT architecture	Refers decision to governance committee
The Chief Information Officer is a member	Enforce Architectural standards but allowing flexibility Top IT leaders are members	

Note: Adapted from "IT Governance: How Top Performers Manage IT Decision Rights for Superior Results" Weill, P. & Ross, J. (2004), *p. 14-29. Harvard Business School Press.*

A study shared by Weill and Ross showed that UPS transformed IT from a strategic liability to a strategic advantage through IT governance. With expenses on information technology increasing and in some cases exceeding 50% of capital expenditure, executives are now refining the IT governance processes and spending time on "strategic priorities" (p.14). An observation of Figure 4 shows the iteration process and collaboration needed in making IT governance decisions. Wu (2007) defends this position and argues that this iterative process

involves different factors and scenarios. Weill and Ross agrees and their theory suggests that all three committees and in some cases ends with the IT steering committee which is headed by senior management and which the CIO is a member. The decisions to be made in the alignment process are then either referred or reported to the next committee based on the conversation or communication on hand. Weill and Ross (2004) also stated that the IT governance matrix allows decision making at multiple organizational levels, where this result in desirable behaviors.

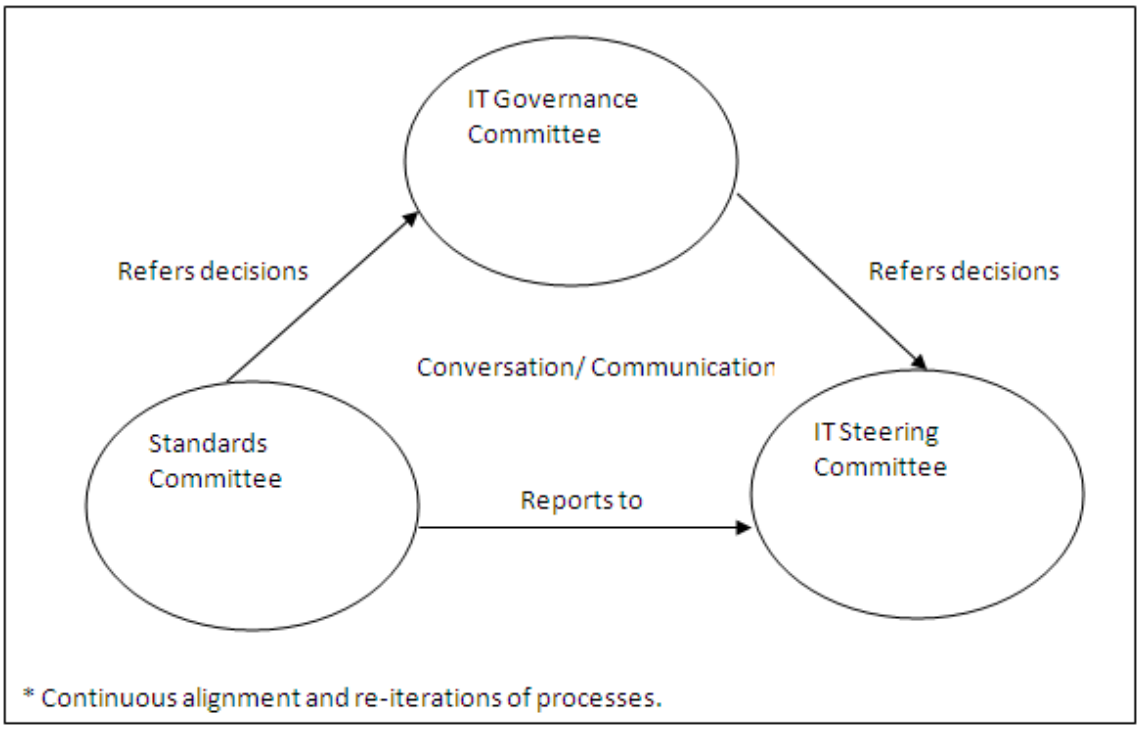

Figure 4. IT governance collaborations: continuous alignment and re-iterations of processes from a decision making standpoint.

Methodology for Researching IT Governance and IT-Business Alignment

According to Miles and Snow's (as cited in Sabherwal and Chan, 2001) the "seminal work on typology of Defenders, Prospectors and Analyzers" (p.11) set the stage for the discussion of strategic alignment along with Porter (1980) work on strategy and competitive advantage. Absent in these research however, is the integration of business and IT within a

holistic context. Nonetheless, prominent authors have drawn on their research to lay a foundation of the IT-business alignment discussion (Sabherwal & Chan, 2001; Hirschheim & Sabherwal, 2001). Through this timeline Weill and Broadbent (1993) in their empirical study "*Improving business and information strategy alignment: Learning from the banking industry*" investigated banks in Australia to identify why and how practices within the banks were an enabler or inhibitor for the attainment of business -IT strategic alignment. The Weill and Broadbent (1993) survey was done by interview survey instrument and revealed in the literature the early research on business- IT strategic alignment was mostly through qualitative methods (see also table 1.). Supporting this trend is the Luftman and Brier (1999) qualitative research, that surveyed business executives representing over 500 firms in 15 industries where they investigated the reasons organizations had difficulties in achieving IT strategic alignment and concluded that "there exist six enablers and six inhibitors that affected the success of IT strategic alignment of which the most prominent were IT governance through executive support and decision making, understanding the business, IT and business relations, and leadership" (Asante, 2010).

The problems associated with these researches then led Luftman (2003) to prepare a study and develop and quantitatively addressed the issues of the inability to identify the lack of IT-business integration issues effectively through a qualitative mode. The new model developed addressed the organizations communications maturity, competency and value maturity, governance maturity, partnership, technology and skill maturity (see table 6). Segars and Grover (1999) and Sage (2006) also contributed a solution to this concern earlier, where Segar an Grover employed a multivariate analysis by using a methodology that examined data from 253 organizations and eventually suggested that "five distinct profiles of strategic planning can be identified based on dimensions of comprehensiveness, formalization, focus, flow, participation

and consistency" (Segars and Grover, 1999), while Sage (2006) looked on the lack of IT-business strategic alignment and what are the dysfunctional effects of such lack of alignment and the survey instrument were sent to CIOs from 116 federal agencies and 96 participated in the study.

Therefore, a study on business-IT strategic alignment relationship with IT governance framework is essential to understand the extent to which an alignment maturity model such as Luftman (2003) will have an impact to organizations. As a result of Luftman research, other researchers identified gaps in the extant literature and sought to avail findings as a result of the business-IT strategic alignment area. Asante (2010) in his study argued that missing from the literature is the correlation between IT strategic alignment and IT governance. He then conducted research on the exploration of "Information Technology (IT) strategic alignment and how is this impacted by IT governance structural elements based on an alignment maturity model and an IT governance framework" (Asante, 2010, p. 46). Asante (2010) did not prove a correlation within the maturity framework for the centralized and decentralized mode of IT governance structure. The participants invited for the study was over 4000 business and IT executives and middle managers with a response sample size of 300. He also recommended further research to identify factors that are involved in the governance decisions making process by board members. These decisions by the board will also include the span of control of managers. Sage (2006) supports this recommendation but states that the research must include the most relevant of predictor of alignment which is communications between IT and business executives and non-government organizations.

Recent IT Governance Implementations Studies

Current research into the management of technology practices found in a great number of corporations around the globe has shown that most organizations are not generating optimal value from their IT investments (Ross & Weill, 2002). According to Doyle, Ge, and McVay, (2007), "The most important factor distinguishing top performing from substandard-performing organizations is the level of leadership by business and senior managers in a handful of key IT decisions"(p.199). Ross and Weill also states that an "efficient and effective information infrastructure can enhance shareholder value" (p.87). Conversely, they argue that the image of the organization can be affected with failures in IT in an "interconnected economy" (p.89), resulting in an ever increasing drive to ensure controls are in place internally.

Fortunately, Boards of directors can transition into IT governance framework according Klamm and Watson (2009); these frameworks are by various standards and most are already existing and are well established sound practices that also provide the necessary guidance and support materials that enable the organization to adapt and establish an inaugural ground for governance structure. Beneish, Billings and Hodder (2008) offered that each governance framework has its own strength and weaknesses, and while they have been developed to serve different purposes, many share similar functions in achieving the desired objective. In supporting this claim current literature suggests that ongoing research initiatives are being put together and integrate the leading frameworks to achieve greater compatibility (Hammersley et al., 2008; Beneish et al., 2008; Klamm & Watson, 2009). There are currently three leading frameworks in use today are; (1) Control Objectives for Information and related Technology (COBIT) which was originally released as an IT process and control framework linking IT to business requirements. The ITGI (2006) states that "COBIT is an open standard for control over

information technology and is independent of the software and hardware platform" additionally it is maintained and refreshed on a four-year cycle by the IT Governance Institute". (2) Information Technology Infrastructure Library (ITIL) which is used as the standard for service management and delivery. It defines IT quality as the level of alignment between IT services and actual business needs. (3) The Code of Practice for Information Security Management (ISO/IEC 17799: 2000) which is a widely accepted set of guidelines and controls for information security (Robinson, 2005).

Hammersley, Myers and Shakespeare (2008) suggested that a large volume of studies using SOX data has emerged, primarily investigating the characteristics of firms reporting material weakness (MW) and the effect of internal control reports on market conditions. Ge and McVay (2005) added that firms reporting MWs are normally smaller in size, have complex operations and financially weaker (Ge & McVay 2005; Doyle et al.,2007; Klamm & Watson 2009). Boards should then be aware that the stock-price reaction to reports of MWs is negative, especially for those reports that are severe (Hammersley et al.,2008; Beneish et al.,2008; Klamm & Watson, 2009). Carr (as cited in Kordel, 2004) argued that while business capitalize on opportunities derived from IT, these advantages are slowly dissipating; in some instances these are overestimation of the strategic benefit, hence can lead to an over expenditure on technology. Carr also argued that management should understand the importance of IT risk management by having a strategic plan to highlight vulnerabilities and ensure the business executives also focus on potential technological vulnerabilities to ensure success in the organization (Kordel, 2004).

Cook, Probert and Martin (2009) emphasized that "by maintaining operational effectiveness, revenue streams and profitability are more consistent, resulting in improved financial forecasting and investor confidence" (p.23); they argued that most businesses today

need an IT unit to achieve success. With the advent an effective IT office, new revenue streams and opportunities can be pursued. Customers can be won because of new innovation and performance by the company and hence an increased value on the organization based on stakeholder perception (Cook, Probert and Martin, 2009).

IT Strategic Alignment

Information technology and business strategy has become an interwoven process into today's businesses. This occurs because of the pervasive nature of IT within the operations of most organizations today; whether they are private sector, public traded companies or government agencies (Damianides, 2005). Damianides observed that "boards are now putting emphasis on the governance and control over IT on their agendas, and executives and managers are focusing increased attention on the topic" (p. 78). Hamaker and Hutton (2004) endorsed this argument and stated that IT governance should be a reflection of the organization, because the activities of the IT unit touch every area of importance.

Recently, IT strategy and planning became a major component for business alignment, this have been a growing factor in the IT governance program. Hamaker and Hutton (2004) added that this occurred mostly because of the fact that "IT is requiring more technical personnel and insight than other disciplines to understand. Furthermore, IT enables the enterprise, creates risks, and gives rise to new opportunities" (p.93). On the other hand, Damianides (2005) disputed this idea and noted that IT has conventionally been seen as a separate function from the business, and when combined with global complexity, measuring value is difficult for the firm. Whitman and Mattord (2006) agreed, and disclosed that "efforts to achieve alignment between IT strategies and the business are not always successful and often go astray" (p.77). Whitman and Mattord (2006) made this observation on the basis that the alignment of business and IT

strategies "is not an event, but a process of continuous adaption and change" (p.54); whereby technology can create new or modify business practices at a fast rate. This argument is further supported by Luftman (2003) who states that IT strategic alignment is a combination of factors that include all its units working together.

Further analysis by Damianides (2005), addressed some of the key success factors for control and governance of IT in a three strep process:

*Step (1)*Formation of an IT strategy and IT steering committees, Damianides (2005) observed that within the organization an IT strategy committee of which the board of directors are a critical component will ensure that the IT strategy is in alignment to the business strategy, and that management processes are delivering this strategy. Additionally, the IT steering committee of which the C-level executives and senior management is a member, ensures that IT priorities, goals of the organization and effective allocation of resources are achieved, while examining success and return on investments for the business and IT initiatives. Brown and Nasuti (2005) agreed that the role of both committees is now an important factor in the organization as the awareness of IT governance has grown. Additionally, both committees work together to lead the expansion and coherence of participating business decisions that leads to a strategic direction for investment priorities and optimization of IT.

Step (2) Aligning IT and the business in strategy and operations, according to Damianides (2005), is of importance to organizations. Kang (2010) supported this argument and added that establishing and maintaining interdependence between the business and IT, can make a commercial and technical success of IT projects and also foster an alignment in the integration of business and IT strategy.

Step (3) Cascading of IT goals and strategy down into the organization, according to Damiandes (2005), ensures that the proliferation of these goals will be linked to a measurement system that will then feed the performance of the actors back to management.

Luftman (2003) used a five-level approach to measure the firm Strategic Alignment Maturity model. Each user chooses a level that best represents his or her organization. The levels are represented as follow; "Level 1 Initial/ad-hoc process, Level 2 Committed process, Level 3 Established focused process, Level 4 Improved/managed process, Level 5 Optimized process. These levels are then represented in six areas 1) Effectiveness of IT and Business Communications 2) Measurement of the Competency 3) Governance of IT 4) Partnerships between IT and Business Functions 5) Scope and Architecture of the IT Infrastructure and 6) Skills" (p.10).

Kordel (2004) argued that the ownership of IT by the business is not mature, but business managers can take control and lead the decision making process. With this continuum the business leaders gain more control and experience over IT assets that affect their units, and in the long term manage and invest in technology so as to cut the costs of IT and have increase participation as business leaders in the management of IT. Interviews conducted by Jeffery and Leliveld (2004) found the following:

> Some business leaders, in an effort not to expose their ignorance of IT, wasted resources by deciding on initiatives without IT consultation, and then demanded that IT groups manage the projects well or take the blame. Meanwhile, some CIOs thought keeping business leaders technologically uninformed translated to job security and thus took little initiative to bridge the divide. Forty-six percent said business leaders didn't understand that ROI is not always applicable. For example, a manufacturing company's CIO recalled

how, until auditors finally expressed their concern; fellow executives continually dismissed project proposals for security and disaster-recovery assets because they couldn't see immediate bottom-line benefits. (p.46)

Maturity Models

Leigh (2006) proposed that it is important to be able to develop established process of tracking organizations effectiveness. An important factor in this process is the ability to employ a self-assessment and benchmarking for processes. A model suggested by Leigh (2006) "Carnegie Mellon's capability maturity model integration (CMMi) is defined with five levels of maturity and is a good example of how most maturity models are organized" (p.15). Figure 3 lists the maturity models along with a description of each. The maturity level of the firm addresses the firm's capability to address selected business practices. The tool also has six maturity categories: communication maturity, competency/value measurement maturity, governance maturity, partnership maturity, technology scope maturity, skills maturity along with the five levels of measurement already mentioned.

Within the COBIT framework management guidelines, there exists critical success factors (CSF), key performance indicators (KPI), key goal indicators (KGI) and maturity models (IT Governance Institute, 2004). Based on the IT Governance Institute maturity models this refers to business requirements and control capabilities at different levels (see table 5). The difference within the organization is measurable and can be recognized as a profile for the enterprise as it relates to IT governance and control which then can be used as a "support for gap analysis to determine what needs to be done to achieve a chosen level of maturity" (IT Governance Institute, 2004). IT Governance Institute (2007) outlined the following:

0 Non-Existent. Complete lack of any recognizable processes. The organization has not even recognized that there is an issue to be addressed.

1 Initial. There is evidence that the organization has recognized that the issues exist and need to be addressed. There are however no standardized processes but instead there are ad hoc approaches that tend to be applied on an individual or case by case basis. The overall approach to management is disorganized.

2 Repeatable. Processes have developed to the stage where similar procedures are followed by different people undertaking the same task. There is no formal training or communication of standard procedures and responsibility is left to the individual. There is a high degree of reliance on the knowledge of individuals and therefore errors are likely.

3 Defined. Procedures have been standardized and documented, and communicated through training. It is however left to the individual to follow these processes, and it is unlikely that deviations will be detected. The procedures themselves are not sophisticated but are the formalization of existing practices.

4 Managed. It is possible to monitor and measure compliance with procedures and to take action where processes appear not to be working effectively. Processes are under constant improvement and provide good practice. Automation and tools are used in a limited or fragmented way.

5 Optimized. Processes have been refined to a level of best practice, based on the results of continuous improvement and maturity modeling with other organizations. IT is used in an integrated way to automate the workflow, providing tools to improve quality and effectiveness, making the enterprise quick to adapt. (p. 19)

Table 5

Maturity Model Summary Definition and Descriptions: An executive view of IT Governance.

Level	Maturity	Description
0	Non existing	No senior management oversight.
1	Initial/Ad hoc	Control processes are non-existent or ad hoc.
2	Repeatable and Intuitive	Basic management processes are established and repeatable.
3	Defined process	The control process is documented, standardized, and integrated into a standard management process for the organization.
4	Managed and Measurable	Detailed measurements of internal control processes and product quality are collected. Both process and products are quantitatively understood and controlled.
5	Optimizing	Continuous process improvement is enabled by quantitative feedback from the control processes.

Note: Adapted from "Board Briefing on IT Governance (2nd ed*)" IT Governance Institute (2003)*

The IT governance maturity model presents a scale that allows comparison within the model, the model which is called a maturity attribute table is not industry specific or always applicable and the nature of the business will determine an appropriate level for insight. The model has six dimensions and is explained in table 6.

- Understanding and awareness
- Training and communications
- Process and practices
- Techniques and automation
- Compliance
- Expertise

Table 6

Maturity attribute table. (ITGI, 2007;Beveridge, n.d)

Understanding and Awareness	Training and Communication	Process and Practices	Techniques and Automation	Compliance	Expertise /Skills
1 Recognition	Sporadic communication on the issues	Ad-hoc approaches to process/ practices			
2 Awareness	Communication on the overall issue and need	Similar processes emerge; largely intuitive.	Common tools are emerging	Inconsistent monitoring in isolated areas	
3 Understand need to act	Informal training supports individual initiative	Existing practices defined, standardized and documented ; sharing of the better practices	Currently available techniques are used; minimum practices are enforced; tool set becomes standardized	Inconsistent monitoring globally, measurement processes are emerged; IT Balance Scorecard ideas are being adopted, root cause analysis	Involve IT specialist
4 Understand full requirements	Formal training supports a managed program	Process ownership and responsibilities assigned; process is sound, best practices applied	Mature techniques applied; standard tools enforced; limited, use of technology	IT Balanced Scorecards implemented in some areas with exceptions noted by management; root cause analysis being standardized	Involve all internal domain experts
5 Advanced forward looking understanding	Training and communication support external best practices and use of leading edge concepts/techniques	Best external practices applied.	Sophisticated techniques are deployed; extensive optimized use of technology	Global application of IT Balanced Scorecard and exceptions are globally and consistently noted by management	Use of external experts and industry leaders for guidance

Leigh (2006) concluded that the based on the requirements of SOX, organizations are willing to establish internal control so as to attain a level 3 or higher on key control activities to satisfy audit requirements.

Information Technology Governance Frameworks (Processes)

Control Objectives for Information and Related Technology (COBIT)

According to Lainhart (2000), COBIT in its management guidelines publication states "COBIT is an open standard for control over information and related technology for security development and promoted by the IT Governance Institute" (p.5). The framework has 34 IT process that are used to assist in its implementation along with 318 well detailed control objectives for audit guidelines. COBIT also provides an extensive IT security component that allow for safe practices to support management decision processes in their organization (Lainhart, 2000, p.65). COBIT is now being seen as the main model for IT Governance; accordingly, the IT Governance Institute has further built on this leading edge research in cooperation with world with industry expert's analysts and academics, which resulted in a management guideline for COBIT (ITGI, 2000, p. 5). COBIT has been revised multiple times and additional publications can be found at the IT Governance Institute website. The framework assists the enterprise to achieve its goal by adding value, while balancing risks and returns through the lens of the business.

According to Hawkins, Alhajjaj, and Kelly, (2003), COBIT looks at IT from the business perspective and places IT as part of the evaluation for meeting business strategy, with the goal to identify how IT can best contribute to the achievement of the business objective (Hawkins, Alhajjaj, & Kelly, 2003, p.22).

Hawkins et al (2003) also states that, COBIT provides the process and structure that IT management can use to assess, manage and minimize risk across every aspect of an organization.

In the integration of such a control framework is the critical success factor (CSF) that enables the organization to ensure that quality service delivery are consistently being delivered to customers (Lainhart, 2000, p.56). The CSF includes:

1. Representing the most important things to do to increase the probability of success of the process.
2. They are observable, usually measurable characteristics of the organisation and process.
3. Are either strategic, technological, organizational or procedural in nature.
4. A focus on obtaining, maintaining and leveraging capability and skills.
5. Are expressed in terms of the process, not necessarily the business.

Businesses are now capitalizing on the value that IT brings; departments within the organization are now challenged to perform based on the business goals, while simultaneously satisfying external requirements such as Sarbanes-Oxley (SOX).

To implement an IT governance framework within the organization, it can be an important step in generating value for technology. Successful COBIT implementation will allow businesses to see an improvement in conformance as well as statutory requirements. According to Lainhart (2000) "COBIT can easily be combined with other best practices frameworks and standards in any organization" (p.57). Information Technology is deeply entrenched within an organization financial information because the need arise for storage, processing and management of financial data and document (ITGI, 2000). Thus organizations are mandated to

have effective controls for IT in place. The US SEC (Securities and Exchange Commission) has mandated the use of a recognized internal control framework.

Two controls that exist are: Define service levels and ensure systematic security. These two are essential imperatives and goes a far way in the development of the COBIT for the organization (Lainhart, 2000). COBIT recognizes 34 IT processes that are grouped into four domains. The four domains are:

1. Plan and Organize
2. Acquire and Implement
3. Deliver and Support
4. Monitor and Evaluate

Information Technology Infrastructure Library (ITIL)

The second framework under investigation is the Information Technology Infrastructure Library (ITIL) as shown in figure 8, originated in the United Kingdom and is now being recognized by the global community on IT governance (Jafaar & Jordon, 2009). The ITIL framework consists of an eight section library that is process-oriented. In comparing two frameworks, Behr et al. (2004) summarizes that COBIT takes the perspective of audit and control, while ITIL takes the perspective of service management (see figure 5). Symon (2005) also states that putting both frameworks in perspective will reveal that they are complementary in nature to build an ITG framework.

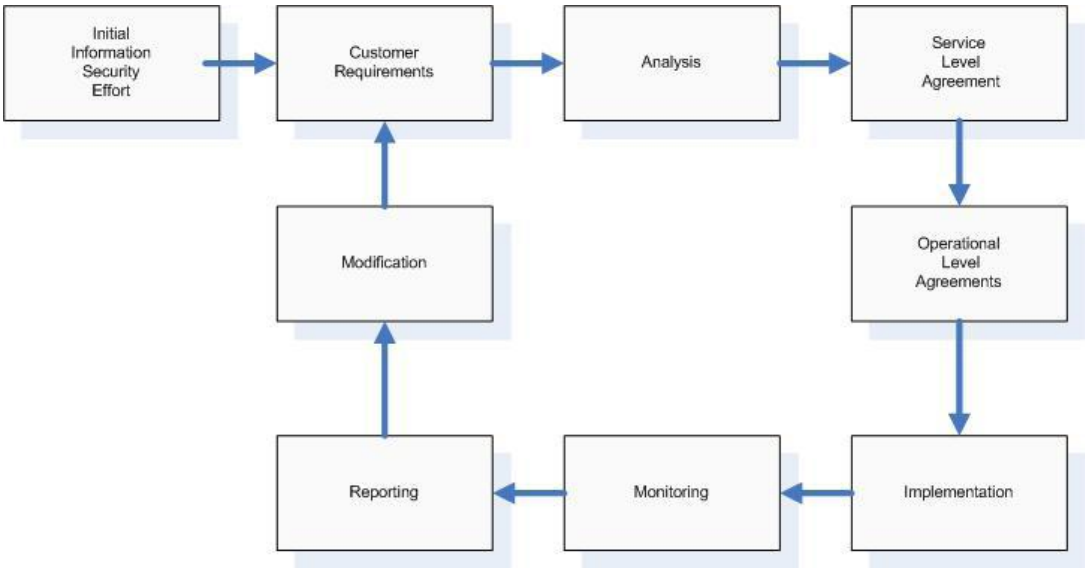

Figure 5. Information security process in the ITIL framework (Weill, 2004)

International Standards Organization (ISO) 17799

The third major governance framework developed by the International Organization for Standardization (ISO) in December 2000, and is based on the British Standard 7799. The focus of this standard is security and will also complement a complete IT governance framework (Jafaar & Jordon, 2009).

Information Security Role in IT Governance

Information security (InfoSec) plays a part in IT governance and compliance and in most cases makes a successful IT governance plan possible. A properly implemented security program include confidentiality, integrity and availability, those in charge of this environment ensures that only those who are authorized have access to sensitive information and that the information is processed correctly and is available when needed (Killmeyer, 2006).

The InfoSec architecture includes areas that have the necessary policies, standards and procedures integrated with a compliance framework.

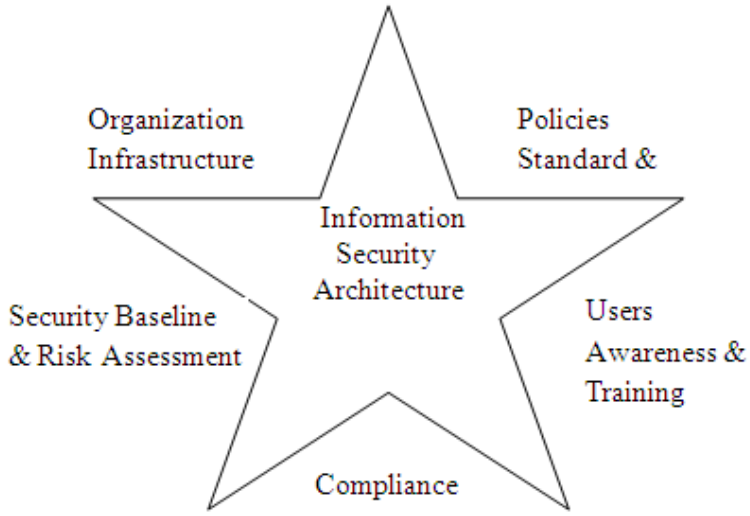

Figure 6. InfoSec Architecture (ISA)

As it is with InfoSec, IT governance requires a starting point for assessment, within the information security architecture (ISA) paradigm (see figure 6), when a new system is implemented, a preliminary assessment called security baseline need to be performed (Killmeyer, 2006). The baseline provides a starting point to measure changes in configuration and improvement to the system. Killmeyer (2006) in his assessment revealed "Research indicates that understanding the firm mission and vision and inclusion of departmental unit and goals are important to the maturity level of the firm" (p.140). The streamlining of the firm functions and process from 0 -5 on the maturity model suggests that their need to be a stable plan in place (see figure 6 maturity model). Large organizations that have business unit operating independently should develop a line of business (LOB) security plan that is being used as a baseline document to understand process environment.

Information Technology Governance Security Regulations

With the increasing discussion on technology governance and compliance with industry and federal requirements, previous research points out that their need to be a framework for strategic risk management needs and their also is a need for integration so that various area of

strategic business plan can be linked to their overall goals. In having an overall view, the application of strategic activities within the enterprise can also create strategic risk in other area of the organization.

Table 7

Recent laws and regulations in the U.S.

Regulation	Legislative action	Source
Digital Millennium Copyright Act (DMCA)	Created a global copyright infringement law including intellectual properties, and included a Vessel Hull Design Protection Act to safeguard all oceans going ships.	1998 (Walton, 2002, p.153)
Economic Espionage Act (EEA)	Makes the theft or use of a organizations trade secret a federal crime.	1996 (Walton, 2002,p.153)
Government Information Security Reform Act (GISRA)	Requires security reviews of all U.S. governmental computer networks.	2002 (Walton, 2002, p.153)
Gramm-Leach-Bliley	Repealed the Glass-Steagill Act, and opened the banking and finical markets so they could go into other sectors.	1999 (GLBA) (p.3)
Health Insurance Portability and Accountability Act of 1996 (HIPAA)	Protects the health insurance coverage for workers and strengthens the security and privacy of health data.	1996 (HIPAA) (p.3)
Homeland Security Act	U.S. governmental department that who's primary focus is anti-terrorism. Also combined several other departments from other governmental agencies.	2002 (p.3)
Sarbanes-Oxley Act(SOX)	Created new or enhanced standards for all U.S. publically traded companies.	2002 (p.3)
USA Patriot Act	Gave the U.S. Law enforcement more power to fight terrorism.	2001 (p.3)

Note. Adapted from ": What you should know about legislation affecting our business" Business Protection Systems International, Inc. by Goldman J. 2003. *Continuity Magazine.*

Industry experts such as Jack Goldman of Business Protection Systems International Inc, shared a detailed review of legislation affecting businesses (see table 7).

The impact of SOX Legislation (Outcome)

The Sarbanes-Oxley Act of 2002 (SOX) was passed in the United States in response to a series of significant failures in corporate governance, including Enron (Brown & Nasuti, 2005) and other institutions such as Arthur Andersen, HealthSouth, Tyco and WorldCom (Moules & Larsen, 2003;Alkhafaji, 2006 *).* The series of irregularities in these companies sent an overflow of anomalies to other areas of enterprise support unit more-so Information Technology (IT). Brown and Nasuti argued that the purpose of SOX is to ensure that investors are protected by an improvement in the reliability and accuracy in financial reporting standards by Securities and Exchange Commission (SEC) registrants from such anomalies. These include all United States public companies, some private companies that are registered with SEC and foreign companies trading on the U.S. stock exchange (Cohen & Qaimmaqami, 2005). Supporting this initiative is the Securities and Exchange Commission (SEC) and the Public Company Accounting Oversight Board (PCAOB), the governing bodies controlling the auditing standards of SOX these institutions have been revising the internal control auditing standards since the passage of the Act according to Leigh (2006) and Ampofo (2004).

While Damianides (2005) suggests integration between financial reporting and information technology (IT); with the emergence of Sarbanes-Oxley Act, the auditing and process controls for information technology governance as increased. Leigh (2006) argued that, "The Act requires auditors to publicly report on corporate control processes pertaining to financial reporting and to report to shareholders exactly what control processes are in place and to what extent they are being followed"(p.13).

The Sarbanes-Oxley Act promises to pay attention to the enhancement of corporate governance by ensuring companies adhere to internal checks and balances and, ultimately, strengthen corporate accountability (Damianides, 2005; Sutton & Arnold, 2005). According to Klamm and Watson (2009) this new awareness for good governance is now more than ethical business practices, but as made its way into law; IT will be crucial in playing a part in the establishing the foundation for a sound internal control environment. The researchers methodologies showed that the Sarbanes–Oxley Act legislation has created a greater need for businesses to have IT controls in place (Damianides, 2005). Klamm and Watson (2009) agreed with this position and also submit that ensuring the reliability of financial data and simultaneously maintaining ethical compliance is now prudent, and businesses must be able to put in place the right technology to ensure compliance is possible.

Brown and Nasuti (2005) in their article, "What ERP systems can tell us about Sarbanes-Oxley" made salient points regarding of the legislation. They wrote that key sections of the Act relating to IT include sections 302, 404, 409 and 802:

> Section 302: requires the officers of the company to make representation related to the disclosure of internal controls, procedures, and assurance from fraud.
>
> Section 404: requires an annual assessment of the effectiveness of internal controls.
>
> Section 409: requires disclosures to the public on a “rapid and current bases” of material changes to the firm’s financial condition.
>
> Section 802: requires authentic and immutable record retention. (p. 313)

Damianides (2005) purported that, within this framework, Under Section 302, chief executive officers (CEOs) and chief financial officers (CFOs) of public companies must

personally certify financial statements and the existence and effective operation of disclosure controls and procedures, he also states that those executives providing the assurance and accuracy of the reports must also disclose to their audit committee and auditors all significant control deficiencies and material weakness. Other proponents of SOX legislation, argued that the scope of the impact is not limited to the CEO, CFO, and auditor, nor is it limited to local or international companies registered with the SEC (Brown & Nasuti, 2005; Hall & Liedtka, 2007; Klamm & Watson, 2009), they insists that other executives such as the CIO and senior level staff involved in decision making can be held responsible for internal control deficiencies.

Recent studies have shown that firms investing in corporate social responsibility (CSR) and use this as a strategy to increase corporate social performance (CSP) shows a positive relationship between CSR and the firms performance in the long term (Kang, 2010). While Kang suggests that the firm investing in these social issues build trust, build image and improve relationships in the eyes of stakeholders. Freeman (1984) argued that earning trust and building brands take time within most organization, and during the financial debacle with Enron (Brown & Nasuti, 2005) followed by the advent of SOX of 2002, research now shows that investor's confidence is being rebuilt as a consequence of the SOX regulation, these theories are confirmed by authors such as Currall and Epstein (2003), Freeman (1984) and Kacperczyk (2009). Prior to SOX, some organizations did not have concerns about IT steering committee, quality assurance and compliance. With SOX legislation now a mandate, public companies and foreign companies trading on the United States Stock Exchange are now giving more attention to compliance and transparency in their reporting.

Leigh (2006) identifies two categories of changes that occur in IT project management as a result of Sarbanes Oxley implementation. The first impact is identified as a primary impact and

the other, he called secondary effect. He identified primary impact as changes to IT related projects that are directly associated with SOX and Secondary effects are those changes resulting from the primary impact. The primary impact as identified by Leigh remains consistent in the literature (Damianides, 2005; Cook, Probert & Martin, 2009; Kang, 2010), where it is observed that there is "increase in process formalization, an increase in project duration, and a need to use project management software to support audit activities" (p. 24). The secondary effects include "increase in process maturity, an increase in IT staff, and a breaking down of large projects into more, smaller projects" (p. 24). Based on this observation, SOX becomes a major enabler to lend confidence towards a more mature development process in the integration of IT strategic alignment and the business as demonstrated by Leigh (2006), and supported by Cook, Probert and Martin (2009).

The integration of SOX within the business processes mandates that projects have a checklist that must be followed; Section 404 requires an annual assessment of the effectiveness of those controls, while Section 302 requires the officers of the company to make representation related to the disclosure of internal controls and procedures as revealed by Brown and Nasuti (2005). The duration of project implementation as increased, before the passage of Sarbanes-Oxley 2002, Leigh argued that "there was no need to formally review every project by an outside committee; Now, additional time is required to prepare a project proposal with the necessary information, so the IT steering committee will be able to evaluate the merits of the request" (p.25).

Other proponents of SOX implementation such as Grant, Miller and Alali (2008) also argued that prior to the introduction of SOX; little information exists for firms as it relates to understanding control deficiencies in financial reporting. An increase in recent management

reporting to the Securities and Exchange Commission (SEC) now provides large amount of data to measure the impact of control deficiencies. Smith and Wendell (as cited in Grant et al. 2008) reasoned that these new assessments are forcing companies to locate the issues relating to IT control deficiencies and fix them. Likewise, other studies based on SOX, identify the impact of IT control deficiencies on financial reporting (Tseu, 2005), bears a common theme among major auditing firms that includes "lack of access controls, excessive access to systems and databases, improper change management, inadequate segregation of duties; and lack of a self-assessment process" (p.18).

The impact of SOX as also affected Information technology workers as described by Cook, Probert & Martin (2009). New requirements and increased documentation affects IT workers at all levels, from line technicians to executives in the organization who has a responsibility that affect corporate processes and accounting. Schneider and Bruton (2007) contended that SOX has provided new opportunities for IT professionals, but may require additional training to assist organizations with compliance. These new requirements prescribed by SOX section 404 include segregation of some duties that were the responsibility of one individual is now divided into multiple people. For example Cook et al. stated:

> Prior to SOX, the IT worker in charge of supporting a software application that tracks sales orders would have created user accounts as part of his or her daily responsibilities. Post SOX implementation, that IT worker must obtain permission and approvals to create the user account and then turn over the account creation to be done by a separate IT group. Once that group creates the user and notifies the IT worker, the IT worker can then notify the user that the account was created. The task that required one worker prior to the implementation of SOX now requires three workers. Similarly, developers writing

application code must now turn the code over to another worker to put the code into production. (p. 24)

With these exhaustive documentation now required by SOX implementation, the fines involved for noncompliance with SOX requirements include criminal and civil charges against the organization and its executives (Alkhafaji, 2007 ; Cook et al., 2009; Grant et al., 2008; Leigh, 2006).

Strategies for the Chief Information Officers (CIOs)

The requirements of Sarbanes-Oxley legislation are to rebuild shareholders confidence; this is done by enhancing internal controls and timely disclosures to stakeholders and should be a tool for the CIO. Complying with SOX however, does not completely guarantee non-compliance in some areas of the process and when this occurs; companies are required to document material weaknesses in their process (Alkhafaji, 2007; Damianides, 2005; Klamm & Watson, 2009; Sutton & Arnold, 2005).

Research carried out by Damianides (2005), asserted that the Chief Information Officer (CIO) should consider turning compliance into competitive advantage by going parallel with the compliance process, this can be done by building a strong internal control programs within IT units that will help to, enhance overall IT governance understanding, align project initiatives with business requirements and make quality decisions that helps the compliance process. The two most important components the CIO should also consider in the SOX legislations are sections 404 and 409 (Sutton & Arnold, 2005, p. 120). “Section 404 requires management to report on the effectiveness of its internal controls over financial reporting.”, and section 409 states that the real-time disclosure of certain material events should be made available.

The CIO should retain an IT control subcommittee that ensures that IT compliance program assigns accountability and responsibility to individuals of this committee. ITGI (2006) suggests that the subcommittee be a subset of a steering committee and it should oversee the IT Sarbanes-Oxley compliance process which includes communication and integration with the overall Sarbanes-Oxley project. Sutton and Arnold (2005) agrees with this process, and with the passage of the Sarbanes-Oxley Act of 2002, this legislation will alter the CIO's position and previous knowledge relating to IT governance.

Sutton and Arnold (2005) revealed that the Sarbanes-Oxley Act will now equip the CIO with new responsibilities such as regulatory reporting and internal control documentation. The change in these responsibilities will reflect in the emerging corporate environment (Bassellier & Benbasat, 2004; Bassellier, Benbasat, & Reich 2003). Weill (2004) added that an alignment with the business and IT will lead to transparency and measurement supported by a control framework. This key factor will ensure a better delivery system and ensure performance that supports management's and the board's control responsibilities.

The CIO should also consider alternatives as described by Hall and Liedtka (2007), that uncertainty and inconsistency regarding the use of IT outsourcing still exists. The research concluded that, "a survey of 261 corporate decision makers by the consulting firm Meta Group found that 25% had no way of determining the appropriate IT sourcing response to SOX; 21% intended to outsource more in response to SOX; and 19% intended to outsource less. The same survey found an additional 17% did not expect SOX to have an effect, positive or negative, on current IT outsourcing levels" (p. 96).

The benefit of a governance framework as suggested by Cook, Probert and Martin (2009), is that it will force management to properly perform in the interest of its shareholders. On

the other hand, if the company does not have this governance structure in place, then it leaves the organization vulnerable to manipulation by its management. Orcutt (2009) proposed that the CIO must be able to identify, understand and evaluate the internal control systems for the generation of financial reports. This will then disclose material weaknesses as described in the Internal Control Financial Report (ICFR) as described by Section 404 of SOX legislation and agreed to by a number of researchers (Alkhafaji, 2007; Damianides, 2005; Klamm & Watson, 2009; Sutton & Arnold, 2005; Nolan & McFarlan, 2005).

Some of the intended benefits of SOX implementation involved a broad range of corporate governance reforms that were meant to improve investors' protection. Additionally, this also increases the efficiency of the U.S. public securities markets, primarily by increasing the disclosure requirements of reporting companies and establishing stronger standards.

Orcutt (2009) articulated that nobody knows whether mandatory internal control requirements such as Section 404 of SOX are valuable regulatory machinery, they insists that this legislation need to be proven. The issue with this concept is the lack of a cost benefit analysis; it would have been useful to understand the benefits that one should expect to flow from Section 404, if it worked as intended. Orcutt (2009) also suggested that SOX legislation appear to have created a basis for companies to improve the efficiency of financial management. The strategy employed by the CIO will either enhance direct cost or improved loss avoidance, through enhanced security and safeguards. Section 404 also exists to ensure companies develop Enterprise Risk Management (ERM) programs, which address all sources of risk, not just financial reporting (Sutton & Arnold, 2005). Xue, Liang and Boulton (2008) supported this argument which points out that there need to be a framework for strategic risk management. In their agreement they also endorsed Orcutt arguments, stating a need for integration so that

various facets of strategic business risk can be linked with the overall goals of the business where one aspect of the enterprise may be creating strategic risks analysis for another part of the business.

Hall and Liedtka (2007) concluded that there are potential benefits of large-scale IT outsourcing. These facts they say are well known because IT service vendors are aggressively marketing the idea that they have the time and resources to handle complex SOX implementation. The benefits to the client include, focus on core business, improved IT performance, reduced IT cost and finally special arrangement that include the sale of the clients IT unit that will bring large cash influx to the client. Cook, Probert, and Martin (2009) rejected the assumption of prosperity and contended that the long term effect can be devastating on the wider economy; they argued that although the IT industry has rebounded and is projected to be the fastest growing economy between 2002 to 2012, the threats of outsourcing and off shoring of IT jobs is present in the minds of many IT professionals at all stages. They even goes further to say that this is an irreversible trend that will continue to increase.

Discussion

The contribution to the literature domain is to identify how a firm's IT governance structure and IT-business alignment are affected based on the levels of IT strategic alignment. The aim of this research was to present a framework that demonstrates improvements in strategic alignment of the business and functions in IT and to respond to a gap based on previous IT governance research. This quantitative study therefore extract and explore data that impacted IT governance structure and IT strategic alignment using the Luftman (2003) model and replicating the Asante (2010) study. Miller (2006) supports Luftman (2003) study by suggesting that alignment of IT governance with strategic alignment helps organizations measure their current

state of capabilities. However, Luftman and Brier (1999) research indicated a distinct difficulty that faced organizations is the problem of achieving IT strategic alignment. Luftman (2003) then identified these capabilities as maturity models and the conclusion of this research yield the answers for strategic alignment level of a company's maturity. In addition to a discussion by Luftman and Kempaiah (2007), organizations must be able to operate and assess its communication, competence, value measurement, governance, partnerships, technology and skills and hence bring about a direct connection between IT governance structure and IT-business alignment.

In addition to maturity levels of the organization, the study adds two moderating variables, industry type (Kotey, 2007) and organization size (Gupta, 2010), which are represented in hypotheses 1–4 and are also significant in the research when considering business entities such as limited liability company, corporation and government sector while looking at the number of employees and the span of control within the organization (Gupta, 2010).

Finally, for the effective completion of an IT governance process, controls are required to be in place. Every process has a purpose or objectives, and inputs and outputs. It also has a risk of objectives not being met. The controls may reduce the probability of an event occurring, or mitigate the impact of these threats if materialized. The objective of the IT Governance and IT governance frameworks such as COBIT and ITIL is to generate a comprehensive risk and control profile.

Literature Review Summary

The integration between information technology governance (ITG) and corporate governance systems are becoming more complex, especially with the advent of WorldCom, Enron, and Tyco scandals. Regulators found it necessary to reduce the misuse and the abuse of

company's resources by executives. The literature revealed that honest and capable boards are needed to implement and maintain a good governance environment.

Governance framework such as Sarbanes-Oxley (SOX), remind executives that officers of the corporation is liable for misuse of resources and any actions taken; and shareholders are now seeing accountability from decision makers in corporations. Alkhafaji, research articulated that "with corporation complying with Sarbanes-Oxley act a positive implication of corporate governance resolution and with legislative acts being put into place, corporations have a chance to gain positive image again by obeying the regulations and practicing good business ethics" (p.201).

The evolution of SOX will no doubt help companies meet the stringent governance regulations, since the generation of accurate and transparent reports is in effect meeting the requirements of SOX. Companies in compliance with SOX will see the benefits, this starts with the fact that IT issues are now on the agenda of the board meetings and IT issues are dealt with as important business issues. The literature revealed that the CIO and CFO will have to work together to comply with SOX requirements, they end up creating a mutually beneficial approach that integrates both divisions and ensures that IT controls are updated as necessary to financial reporting processes (Hardy, 2006). Accordingly Hardy states, organizations will never be 100% free from threats, additionally these organization application of legislation will not guarantee complete IT assurance and privacy. However, "building a strong governance model within IT that is designed to ensure accountability and responsiveness to business requirements can lead to more efficient and effective operations" (p.60) which include an improved organizational understanding of IT governance among non-IT executives, these executives in effect produce timely information that will align the IT initiatives with business goals.

CHAPTER 3. METHODOLOGY

Purpose of the Study

The purpose of this quantitative correlation study was to test the extent to which levels of IT strategic alignment (Dependent variable) relates to the IT governance structure (Independent variable) within the organization, focusing on the study of the federal IT governance structure. Further analysis also measured the degree of the impact between these variables.

The independent variable IT governance structure was defined as a combination of factors including leadership, structure and processes that ensured that IT governanceachieves integration of business and IT (Grembergen, 2002). The dependent variable levels of IT strategic alignment was defined as the combined engagement of all IT units' strategic, plans processes, investments and decision to support the overall functionality and purpose of the organization goals and objectives (Khadem, 2007) , and the contributing variables included IT principles, IT architecture, IT infrastructure, business application needs and IT investment prioritization that contributes to IT planning and decision making through various committees such as the IT governance, steering and standard committees.

The researcher believes that with the inclusion of Luftman (2003) strategic alignment model (SAM), organizations will demonstrate improvements in strategic alignment of the business and functions in IT. The research explored selected IT firms made up of businesses and IT professionals who made decisions regarding the organization and therefore provide a point of reference for further research and business applications.

Research Questions and Hypotheses

Two research questions and associated hypotheses were derived from theory and past research to determine if there was a relationship between federal IT governance structure and levels of IT strategic alignment. Each hypothesis had an alternative and null statement. An alternative hypothesis statement (H1a and H2a) indicated a significant mean difference between the variables while null hypothesis statement ($H1_0$, and $H2_0$) indicates no difference between the variables.

In reviewing the literature it was observed that there exists a gap between IT governance structures and IT alignment models with varying maturity levels within organizations. According to Reich and Benbasat (2000) there still exists organizations that are not aware of factors that contribute to the alignment of IT functions and because of them not being aware, this in turn affects their level of alignment. This in turn may lead to disorganized units because of a lack of alignment between business units and information technology (IT) strategy that then cause an increase in operation costs and erosion of the organizations competitive advantage (Sage, 2006). The intent of this dissertation was to examine and test the effects of these relationships. The questions proposed were:

Research Question 1: What type of relationship exists between IT governance structure and IT-business strategic alignment?

IT governance speaks to the organizations capacity as a unit to specify decision making rights within the firm to encourage desirable behavior (Weill & Ross, 2004). IT governance has a combination of factors including leadership, structure and processes that ensures that IT governance achieves integration of business and IT (Grembergen, 2002). Ko and Fink (2010) states, "IT governance structure is the single most important predictor of whether an organization

will derive value from IT" (p. 664). There are three basic forms of this governance structure, centralized, decentralized and federal, the research expound on these structures.

Research Question 2: What type of relationship exists between federal IT governance structure and IT-business strategic alignment?

According to Luftman (2003) the federal governance structure is combination of centralized and decentralized models. Asante (2010) also submitted that the federal mode is the process where central corporate management makes decision through an IT unit regarding central systems while the functional unit decides the authority and responsibility regarding resources. The research questions developed identified the relationship between each factor, and the survey instrument was delivered to the appropriate IT professionals based on the target population.

The main research hypotheses and null hypotheses therefore reads:

$H1_0$: There is no relationship between IT governance structure and IT-business strategic alignment.

H1a: There is a positive relationship between IT governance structure and IT-business strategic alignment.

$H2_0$: There is no relationship between federal IT governance structure and IT-business strategic alignment.

H2a: There is a positive relationship between federal IT governance structure and IT-business strategic alignment.

In addition to these hypotheses, contributing variables will be studied to discover the relationship between, industry type, organization size. These hypotheses are:

$H3_0$: The relationship between IT governance structure and IT-business maturity level remains the same regardless of industry type.

H3a: The relationship between IT governance structure and IT-business maturity level varies by industry type.

$H4_0$: The relationship between IT governance structure and IT-business maturity level remains the same regardless of organization size.

H4a: The relationship between IT governance structure and IT-business Maturity level varies by organization size.

Conceptual Framework

A conceptual framework is a graphical depiction of the constructs and the variables associated with these constructs that eventually guide the research presented. The research therefore presents a conceptual model that is a representation of the prospective correlation under investigation (see Figure 8)

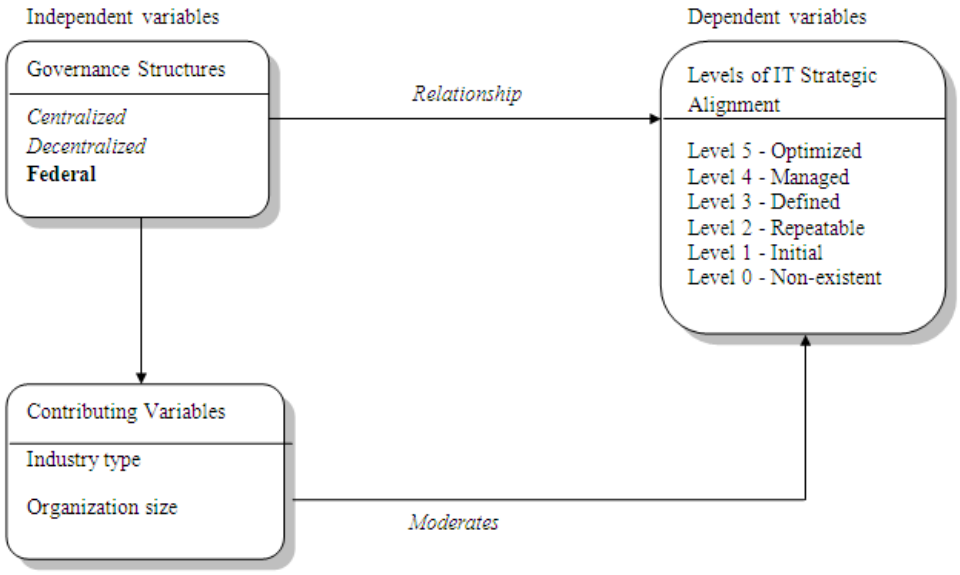

Figure 8. Conceptual Model for IT governance independent and dependent variables

Instrumentation

The data for this research was gathered using an existing instrument on how IT strategic alignment impact IT governance structure (Asante, 2010), and will be adapted with modifications to include Luftman (2003) strategic alignment model (SAM) and ITG archetypes research by Weill and Ross (De Haes & Gremebergen, 2007; Weill & Ross, 2004; Wu, 2007; Ross et al. 2006). Permission was obtained from Luftman to use the instrument.

Operationalization of variables

The following section identified the variables mentioned in the hypotheses, and is then followed by how these variables were operationalized. Appendix B then showed each variable frequency using the Luftman questionnaire. The study uses three types of variables; independent measuring governance structures, dependent variables measuring IT-business alignment and moderating variables measuring industry type and organization type. Demographic information was also collected using this instrument.

Independent Variable

The independent variable is a construct that predicts the dependent variable by measuring governance structures. The independent variable was measured by using the survey questions as displayed in table 8. The governance structure centralized, decentralized and federal governance structures were the variables for the hypotheses structures.

Table 8

IT Governance Structures

How is IT organized in your company (Q3)	Centralized
	Decentralized
	Federated/Hybrid

Dependent Variables

According to Ampofo (2004), a dependent variable is a construct that is determined by another construct called the independent variable. The dependent variable measuring IT-business alignment levels; optimized, managed, defined, repeatable, initial, non-existent was done by using the survey questions as displayed in table 9, the survey instrument is shown in appendix A.

The dependent variables were measured at the interval nominal, and interval level respectively while the independent variables were measured at the interval level. The instrument was uploaded to a commercial web-survey hosting page, which was used to measure the independent and dependent variables. Before distribution of the research instrument, Institutional Review Board (IRB) approval was secured and included through the appropriate processes and permission was included from the authors for the use of the instrument (see Appendix A). The use of the instrument by Asante was first administered by Luftman (2000) and again in 2003 and 2005 (Luftman, 2003; Sledgianiwski & Luftman, 2005; Luftman, 2005) where he measured over 50 Global 500 companies (Asante, 2010; Luftman, 2003) by using the instrument to assess the maturity of an organization's IT, business strategic alignment; thereby supporting the content validity and face validity.

Table 12 provides a summary of each hypothesis with its associated dependent variable, independent variable, moderating variable, levels of measurement, description of each variable and statistics that was used.

To measure IT-Business alignment, Table 9 displays the varying levels of alignment and instrument survey questions as suggested by Luftman (2003).

Table 9

IT-Business alignment

Measurement of the Competency and Value of (Q10-17)	Alignment
IT Governance (Q18-24)	Optimized
Partnerships between IT and Business Functions (Q 25-30)	Managed
	Defined
	Repeatable
	Initial
	Non-existent

Moderating Variable

Industry type and organization size are contributing variables in the study (see Table. 10 and Table 11). A test of interaction was conducted between the variables using the two-way interaction which is the relationship between an independent variable (IV) and dependent variable (DV), moderated by a third variable (Norusis, 2008). Whereas, the relationship that exist with the effect of independent variable (X) on dependent variable (Y) depends on the level of another variable (Z), and is called an *interaction*. And is represented as;
Regression Model will be: Y = a + bX+ cZ. It was also recommended the independent variable and contributing variables are standardized before calculation of the product term, although this is not essential. For example, Ha: The relationship between IT governance structure (X) and IT-business maturity level (Y) varies by industry (Z)

According to Norusis (2008), this is done by studying the effect of*a* plus*b*, plus *c* interacting with X, where *a* = mean score, b = teaching method effect, and *c* = student type

effect, the result is "12 independent groups of students, one for each combination of teaching method and student type" and *Y* becomes the predicted score (p. 338). However, if there is no *interaction* between the methods tested, it makes no sense in studying the *main effect* of the methods under investigation. Therefore, "when there is no interaction, the user can predict average score" for each method (p. 339). On the other hand, when the test presents an interaction, it becomes more difficult to interpret and at this point a term is needed for the combination of each method. The researcher then tested the two hypotheses using an analysis-of-variance around the population values. Each contributing variable is then broken down with associated hypotheses:

1. Industry type. This term refers to a legal business entity that operates for-profit or not for-profit to achieve a set objective (Kotey, 2007).To measure this variable a 7-point likert scale was used where (1) Government/Military, (2) Finance/Banking/Insurance, (3) Manufacturing, (4) Healthcare/Medical (5) Biotech, (6) Telecommunications, (7) Other and will inform the research of the legal structure used (Asante, 2010). The study then tested the following hypotheses H3a: The relationship between IT governance structure and IT-business maturity level varies by industry type. $H3_0$: The relationship between IT governance structure and IT-business maturity level remains the same regardless of industry type.

Table *10*

Moderating variable measuring Industry Type

Industry Type/ As a legal business entity	Government/Military Finance/Banking/Insurance Manufacturing Healthcare/Medical Biotech Telecommunications Other

2. Organization size. This is determined by the number of employees, the size of the firms operations and its span of control within its operations, where the span of control relates to the number of employees reporting to a specific manager (Gupta, 2010). To measure this variable a 5-point likert scale was used where (1) represents smallest number of employees (less than 1,000) and (5) is considered largest (more than 50,000), and will indicate the size the organization is currently at. The study then tested the following hypotheses H4a: The relationship between IT governance structure and IT-business maturity level varies by organization size. H40: The relationship between IT governance structure and IT-business maturity level remains the same regardless of organization size.

Table 11

Moderating variable measuring Organization size

Organization size/	1 represents (less than 1,000) employees
By number of employees	2 represents (1,000-5,000) employees
	3 represents (5,000-10,000) employees
	4 represents (10,000-50,000) employees
	5 represents (more than 50,000-) employees

Demographics Questions

Questions relating to the company's revenue and percentage allocated to Information Technology along with IT executive reporting relationships, organization of IT, participants department, age group, educational level, career level, industry type, years of relevant work experience and size of organization were asked in Section 1.

Table 12

Operationalized constructs

Variables	Type	Measure	Description
IT Governance Structure	(IV)	Nominal	This is the organizations capacity as a unit to specify decision making rights within the firm to encourage desirable behavior (Weill & Ross, 2004).
Federal IT Governance Structure	(IV)	Nominal	This is a combination of centralized and decentralized models (Luftman, 2003).
IT Business Maturity Level	(DV)	Ordinal	Assessment of the maturity level using (ITGI, 2003).
Industry Type	(Mod)	Category	legal business entity, that is for-profit or not-for-profit (Kotey, 2007).
Organization Size	(Mod)	Category	The number of employees, the size of the firms operations and its span of control within its operations (Gupta, 2010).

Table 13

Relationship between the Research Hypotheses and the Survey Questions

Research Hypotheses	How Survey Questions was Analyzed	Survey Questions
$H1_0$: There is no relationship between IT governance structure and IT-business strategic alignment.	Kruskal-Wallace one-way ANOVA was used to ascertain the relationship between IT governance structure and IT-business strategic alignment by looking on the effectiveness of IT and business communications, governance and partnership between IT-business functions.	*Questions* 4-9,18-24, 25-30 and 31-35
$H2_0$: There is no relationship between federal IT governance structure and IT-business strategic alignment.	Mann-Whitney U test was used to ascertain the relationship between federal IT governance structure and IT-business strategic alignment by looking on the effectiveness of IT and business communications, governance and partnership between IT-business functions.	*Questions* 4-9,18-24, 25-30 and 31-35

Table 13 (cont.)

Relationship between the Research Hypotheses and the Survey Questions

$H3_0$: The relationship between IT governance structure and IT-business maturity level remains the same regardless of industry type.	Ordinal regression was used to indicate what relationship exists between IT governance structure and IT-business maturity levels among industry type by looking on the participants demographic data, IT governance attitude and partnership with the business.	*Questions* Section 1
$H4_0$: The relationship between IT governance structure and IT-business maturity level remains the same regardless of organization size.	Ordinal Regression was used to indicate what relationship exists between IT governance structure and IT-business maturity levels among organization by looking on their size and comparing the participants demographic data, IT governance attitude and partnership with the business.	*Questions* Section 1

Research Design

The methods and design used to explore the problem was a quantitative analysis using a non-experimental approach. A non-experimental design means that participants are not randomly assigned to groups; hence, randomization is not used to select the sample nor distribute participants into unique test groups. Non-experimental studies follow a process of understanding relationships or the correlation between variables as well as the effect of one variable has on another (Swanson & Holton, 2005; Creswell, 2003).

According to Creswell (2003) quantitative research serves to be a tangible derivative of realistic data, Creswell also stated that with this positivist approach observation will then be seen as physical elements. The research design will examine the possible relationships between the variables in the study. Likewise Burns and Grove (2003) states "Inferences about relationships among variables are made from any determined variations between the studied variables" (p.210)

To support Creswell, Johnson & Onwuegbuzie (2004) states "The major characteristics of traditional quantitative research are a focus on deduction, confirmation, theory/hypothesis testing, explanation, prediction, standardized data collection, and statistical analysis" (p. 18).The basic design of this non-experimental study led to identifying the relationship between IT strategic alignment and organizational governance factors. The research is suggestive because the research does not control the participants or the variables used.

The attitude of the sample population was already formed; their behavior, expectations and attitude were assumed to be constant. The researcher will not influence the participant's opinion.

Appropriateness of Design

A quantitative non-experimental study will focus on the relationship between IT governance structure and IT strategic alignment; this design enables the collection of data from a large population. Additionally, a high number of participants from the population will be needed to represent an adequate sample size from a specific demographic.

According to Creswell (2003), the non-experimental approach is used in this study; this approach allows the study to see comparisons among the variables presented. In addition a single researcher can accomplish much more in a short time-frame because the variables were gathered at the phenomenological level, versus a longitudinal study which will not suffice since it requires the researcher to gather data over an extended time period. The aim of the study was to focus on the firms IT governance structure, namely centralized, decentralized and federal IT governance structures. The two constructs (IT Governance structure, IT Strategic alignment) are viewed as somewhat stable and measurable at any given point in time without any differences in result

within that time-frame. The research will then apply closed ended question from the Luftman (2003) instrument to test relationships between the variables.

According to Swanson and Holton (2005), these variables in most cases evolve and change over extended time period, but the hypotheses were deduced to be evaluated within a specific time-frame regardless of when this time-frame occurs. Moreover, the survey data was collected at the interval and ordinal levels which mean that inferential statistics along with specific analysis were employed to analyze the research questions.

Survey Design

The data was gathered through a web-based collection method. The instruments design encapsulated some of the survey questions used by Luftman (2003) model for IT governance structures and also included Luftman's strategic alignment model (SAM) to answer the research questions. The resulting response was used to analyze the research responses from the participants. Using a web-based survey was more efficient and cost effective especially as it relates to geographical locations of the participants. It was also expected that more responses will be generated using this medium of survey. A summary of the questions relating to strategic alignment area is represented in Table 14.

Table 14

Summary of the questionnaire from the instrument

Section	Area	Questions
Section 1	Participants demographic survey	1-3
Section 2	Questionnaire	
Component 1	Effectiveness of IT and Business Communications	4-9

Table 14 (cont.)

Summary of the questionnaire from the instrument

Component 2	Measurement of the Competency and Value of IT	10-17
Component 3	Governance	18-24
Component 4	Partnerships between IT and Business Functions	25-30
Component 5	Scope and Architecture of the IT Infrastructure	31-35
Component 6	Skills	36-42

Population and Sample

The foundation of this research was to examine relationships that exist between IT governance structures and IT strategic alignment in the organization. This was done by examining firms that implement IT governance processes by sourcing data from their CEOs, CIOs, business executives and IT professionals who played a part in the implementation of IT governance within the organization. The research also included those professionals who were in a non-managerial role from both IT and business but can contribute adequately to this research. The target population was from the private sector personnel who hold the requisite qualification to give an accurate assessment.

The sampling frame contained about 3000 business professionals from medium and large sized companies in the United States and the power analysis will identify the number of survey response needed. The target population was reached through an online distribution for the research, these were members of the governance organization, Information Technology Governance Institute (ITGI) whose membership include IT governance professionals who are familiar with IT Governance implementations.

Sample Size

To calculate the sample size the level of significance needed to reject the null hypotheses, the effect size of the sample under investigation were considered for the power analysis. In addition, Cohen (1988) suggests that "an expected effect" was an estimate measurement of the strength of the relationship, in most research the statistical level of .05 is the norm. This confidence level suggests the resulting research can be replicated with the probability being equal to .05 which is the significance level also called alpha (p.278).

Cohen (1988) submitted five factors for power analysis significance level or criterion, effect size, desired power, estimated variance and sample size; "he states that the objective of the analysis is to calculate an adequate sampling size so as to optimize as opposed to maximizing sampling effort within the constraint of time and money" (p.367).

To achieve the calculated sample size of 88; a random sample was used to ensure no sampling bias affecting the integrity of the survey participants (Swanson & Holton, 2005). This subset was a representation of the population and ensures that each participant have the same probability of being selected.

Validity and Reliability

The validity and reliability of the study's instrument was proven by several researchers (Luftman, 2003; Sledgianiwski & Luftman, 2005; Luftman, 2005). Evidence of the instruments validity and reliability can be seen in recent work of several researchers on the topic who investigated ITG structures and IT strategic alignment (Asante, 2010; Luftman, 2003; Nash, 2006; Dorociak, 2007). A study should have supported construct validity and reliability to be acknowledged as a grounded scientific research (Creswell, 2003). Prior to distribution of the survey, instrument checks were put in place to eliminate redundancy and duplicate entries.

Additionally this process was analyzed in the pilot test. Presenting a research to an audience is stating that the research findings are truthful and valid. The result of the study should also answer whether the research can be used by another group or this study irrespective of the population size. Additionally, Robson (2002) states that "Reliability is concerned with the repeatability of the study; that is, whether the same results can be produced if the same data collection and analysis methods are employed in a new study" (p. 93). Validity according to Cooper & Schindler (2003) deals with whether the measurements provide the information needed to answer the question under investigation; Robson (2002) states it more simply as "whether the findings are 'really' about what they appear to be about" (p. 93).

Data Collection Procedures

Data collection for this research was based on existing instruments, which was distributed using an online web-based survey. It was incumbent on this researcher to clearly define the target population. "The population is defined in keeping with the objectives of the study" Stat Pac (2007). The data that was collected by the commercial website was coded and linked through a secure link on their web server, so as to keep participants privacy as required by the IRB. Approvals granted by the IRB were provided by a link on the first page of the questionnaire. The sample reflected the characteristics of the population from which it was drawn. All data that was collected was uploaded into SPSS for further examination and the data then removed from the contracted site to maintain confidentiality.

Data Analysis

Data analysis was done using SPSS version 20.0 for Windows (IBM, 2010). Results for the study were presented in Chapter 4. The collection of data from the sample was distinct categories that were aligned with the variables presented. Chapter 4 covered data coding,

descriptive statistics, data analysis and results, moderating hypothesis and summary sections. The data coding section included the number of respondents to the survey and information for missing data. The descriptive statistics included the summary for the presented hypotheses linked to the dependent and independent variables and also showed its relationship to the research question and how these questions were answered. The data analysis and results section presented each hypothesis statistical application and any assumptions that surround each case presented, and finally the results from these applications. The summary results section reviewed the study and the design of the study including results and what should be the expectations found in chapter 5.

Statistical techniques were employed to display where applicable descriptive statistics. Additionally, graphs were presented to give a graphical overview of the results. A zero-order correlation table and logistic regression tables and supporting figures were displayed showing the relationship and effect. Additional techniques such as Kruskal-Wallis and Mann-Whitney *U* test was conducted with a significant level of .05 to ascertain the level of responses, in addition an ordinal logistic regression was computed on the moderating hypotheses to determine if the independent and dependent variable are affected by these moderation. To identify research participants, characteristics representing variables were used to profile participants; these variables include age, years of experience and education level and were presented in tables.

To identify outliers and missing data, samples were collected along with frequency counts using SPSS; if a case was presented but cannot be statistically part of the sample it was removed. In cases where 5 percent or more of the item were missing they were removed.

To identify patterns with the study group, demographic data was inputted then additional statistical application was presented and tested. Further, normality was evaluated to ensure parametric assumptions are met.

Kruskal-Wallis, Mann-Whitney *U* test and ordinal regression analyses was run to determine the type of relationship that existed between the IT strategic alignments (Dependent variable), IT governance structure (Independent variable), with a focus on federal IT governance structure. Finally, a look on how the two moderating variables, industry type and organization size affect these relationships.

Assumptions and Limitations

The problem put forward assumes that practitioners are willing to divulge information to the researcher and the questions submitted was answered truthfully and completely. It was also assumed that practitioners were responding to the questions in a timely manner to ensure the research is current and is addressing its audience appropriately. It was further assumed that the selected instrument for this study was a valid, reliable, and appropriate to the study's focus.

To narrow the focus of the study, a few selected industries were used along with selected areas of the industry. The research direct their attentions to firms that implement IT governance processes and include CIO, executives and professionals who are a part of the decision making process in the implementation of IT governance within the organization. This researcher also includes those professionals who are in a non-managerial role from both IT and business and who are members of a specific group and demographics, but contributes adequately to the research. The target population was within the United States and may constitute response from both private and public sector personnel that hold the requisite qualification to give accurate assessment.

Given this narrow focus, the results of this study cannot be expected to generalize to other industries or populations. Another limitation is the fact that some participants do not have the full understanding of IT governance frameworks, and therefore they may not be able to complete study's questionnaires, which will result in lower response rates for some questions.

Another fundamental limitation was the lack of funding and time factor available for respondents to complete the research instrument.

Ethical Considerations

As required by the Institutional Review Board (IRB), participants who complete an online survey also need to understand the guidelines set by such board before entering information in the survey. These guidelines are developed by various professional organizations and regulatory agencies so as to eliminate potential harm to research subjects. Kvale (1996) found that "ethical issues that involve research such as informed consent, confidentiality and consequences for the interviewee should be taken into account with any research" (p.110). Persons involved in research was informed about the purpose of the investigation and the main features of the research design; they were also informed about what they are getting into and with some degree of understanding of how this information will be stored and used (Zikmund, 2003). During the research process, the question of informed consent was answered. According to Weijer, Goldsand, Emanuel (1999) this is a mechanism that help with the assurance process that enable people to have an understanding of the research process and what their involvement means.

Using informed consent can categorically be considered as one of the most important features of the research process. This process goes beyond a form that is signed on a piece of paper by an individual, but represents inclusion of an ethics committee and includes approval

processes and procedures to proceed in the research. Accordingly, “an informed consent form is appropriate for all research especially when participants may be exposed to risks” (National Institutes of Health, 1979).

Summary

This chapter described the methodology with which the researcher conducted an exploratory research on IT governance structures relationship with IT strategic alignment using an existing instrument design. The surveys were conducted online and require a pilot test to ensure an efficient instrument. The researcher will provide a basis for future research on the topic.

CHAPTER 4. RESULTS

Introduction

This chapter provides an analysis using a non-experimental approach on data collected as described in chapter 3. The analysis is supported by quantitative statistical tables and figures to describe the results. The purpose of this quantitative correlation study is to test the extent to which IT strategic alignment relates to the IT governance structure and federal IT governance structure within the organization. Further analysis also measured the degree of the impact between these variables.

Data Coding

One hundred and thirty-eight individuals responded to the survey. The data was entered into SPSS 20 for analysis. Data was screened for accuracy and quality. Missing answers of more than 5 percent were removed from analysis. Frequencies and percentages were conducted on IT governance structure, federal IT governance structure, industry type, and IT-business strategic alignment**.** The assumption of each analysis was examined prior to conducting the analysis.

The use of frequency distribution allowed responses to be measured and determined if value were within reasonable scope for measurement; no cases were removed for inaccuracy. An examination of values was evaluated for inconsistent data with each case, initially, all cases remained. The occurrence of outliers was tested by the creation of *z* scores. *Z* scores were created for previous years' revenue and IT budget as a percentage of revenues and responses were examined for outliers. Three cases were then removed. The responses from 135 participants were included in the final data analysis.

Descriptive Statistics

Of the 135 participants; Fifty or 37% said that the CIO reported to the CEO, president, or chairman of the company. Table 15 shows the following frequencies and percentages for reporting relations.

Table 15.

Reporting relations

Characteristic	*n*	%
CIO reports to:		
CEO, president, chairman	50	37
CFO	13	10
COO	21	16
Business unit executive	44	33
Other	7	5

Note. Percentages column may be over or under 100%.

When asked how IT is organized, 66 participants, or 49%, selected centralized and 35 participants, or 26%, indicated federated or hybrid. Table 16 shows the following frequencies and percentages for IT organizational structure.

Table 16

IT organizational Structure

Characteristic	*n*	%
IT organization		
Centralized	66	49
Decentralized	22	16
Matrixed	4	3
Networked	8	6
Federated/hybrid	35	26

Note. Percentages column may be over or under 100%.

Participants were asked to report their hierarchical distance from CEO and many participants indicated 3–4 levels Fifty-One or 38%, followed by 1 – 2 levels 28%, and greater than 4 levels 21%. Eighteen or 13% participants indicated that they are the CEO. Table 17 shows the following frequencies and percentages for Hierarchical distance from CEO.

Table 17

Frequencies and Percentages for hierarchical distance from the CEO

Characteristic	*n*	%
Hierarchical distance from CEO		
CEO	18	13
1 – 2 levels	38	28

Table 17 (cont)

Frequencies and Percentages for hierarchical distance from the CEO

Characteristic	*n*	%
3 – 4 levels	51	38
More than 4 levels	28	21

Note. Percentages column may be over or under 100%.

Thirty-eight or (28%) participants indicated they work in the IT department, followed by thirty-one or (23%) in business units and corporate thirty or (22%): It is important to note that under the category "Others", the respondents indicated micro-finance and financial consultants had Seven or (5%) contribution to the study. Table 18 shows the following frequencies and percentages for department.

Table 18

Frequencies and Percentages for department

Characteristic	*n*	%
Department		
Business unit	31	23
IT	38	28
Finance	19	14
HR	10	7
Corporate	30	22
Other	7	5

Note. Percentages column may be over or under 100%.

Many participants indicated they are 35–45 years old representing Forty-five or 33%, followed by ages 45–55 representing Thirty-eight or 28%. Twenty participants (14%) indicated they fell in the age range > 55. Table 19 shows the Age frequencies and percentages.

Table 19

Frequencies and Percentages for Age

Characteristic	*n*	%
Age		
< 25	13	10
25 – 35	19	14
35 – 45	45	33
45 – 55	38	28
> 55	20	15

Note. Percentages column may be over or under 100%.

Those respondents with a Bachelor's degree Fifty-four or 40%, was the most frequent education level, followed by MBA/Master's degree holders Forty-four or 33% and holder of PhD/Doctorate, Nine or 7%; Respondents indicating other degree was One representing 1% are holders of professional certification in their field of work. Table 20 shows the following frequencies and percentages for educational level.

Table 20

Frequencies and Percentages for Educational level

Characteristic	*n*	%
Education		
Some college	18	13
Bachelor's degree	54	40
MBA/master's degree	44	33
Post master's degree	7	5
Ph. D./Doctorate	9	7
Post doctorate	2	2
Other	1	1

Note. Percentages column may be over or under 100%.

Thirty-six participants or 33% identified staff as their career level followed by Executives at Thirty (5%) and Senior Managers (11, 8%), indicating that 5% of the 135 respondents are a part of senior management and above. Table 21 shows the following frequencies and percentages for career level.

Table 21

Frequencies and Percentages for Career level

Characteristic	*n*	%
Career level		
Entry	2	2
Staff	36	27

Table 21 (cont.)

Frequencies and Percentages for Career level

Characteristic	*n*	%
Career level		
Supervisor	23	17
Manager	18	13
Mid-level manager	15	11
Senior manager	11	8
Executive	30	22

Note. Percentages column may be over or under 100%.

Forty-Five respondents or 33%, indicated they work in the finance, banking, or insurance industry followed by Healthcare/Medical Sector with Thirty-Two respondents (24%) and Government/Military with Twenty-six respondents (19%). Table 22 shows the following frequencies and percentages for industry.

Table 22

Frequencies and Percentages for Industry

Characteristic	*n*	%
Industry		
Government/military	26	19
Finance/banking/insurance	45	33
Manufacturing	7	5

Table 22 (cont.)

Frequencies and Percentages for Industry

Characteristic	*n*	%
Industry		
Healthcare/medical	32	24
Biotech	7	5
Telecommunications	11	8
Other	7	5

Note. Percentages column may be over or under 100%.

When asked about years of experience, thirty-four participants or 25% indicated they have 6 – 10 years of industry experience, while only four participants or 3% had less than 3 years' experience. Table 23 shows the following frequencies and percentages for industry experience.

Table 23

Frequencies and Percentages for Years of industry experience

Characteristic	*n*	%
Years of industry experience		
< 3	4	3
3 – 5	21	16
6 – 10	34	25
11 – 15	31	23

Table 23 (cont.)

Frequencies and Percentages for Years of industry experience

Characteristic	*n*	%
Years of industry experience		
16 – 25	27	20
>25	18	13

Note. Percentages column may be over or under 100%.

Sixty participants or 44% indicated their company is comprised of less than 1,000 employees while inversely, three participants or 2% indicates they have over 50,000 employees. Table 24 shows the following frequencies and percentages for number of employees.

Table 24

Frequencies and Percentages for Number of Employees

Characteristic	*n*	%
Number of employees		
< 1,000	60	44
1,000 – 5,000	36	27.
5,000 – 10,000	27	20
10,000 – 50,000	9	7
> 50,000	3	2

Note. Percentages column may be over or under 100%.

Eighty-two participants or 60% represents a majority of the respondents, said they have less than 100 employees in the IT department followed by 100–250 with Thirty-Three or 24%. Table 25 shows the following frequencies and percentages for employees in IT.

Table 25

Frequencies and Percentages for Number of IT employees

Characteristic	*n*	%
Number of employees in IT		
< 100	82	61
100 – 250	33	24
250 – 500	11	8
500 – 1,000	8	6
> 1,000	1	1

Note. Percentages column may be over or under 100%.

Last years' revenues for the companies ranged from $200,000 to $8,600,000,000 with a mean of $223,996,679.40. IT budget as a percentage of revenue ranged from 0.25% to 15.00% with a mean of 3.21%. Means and standard deviations for last years' revenues and IT budget as a percentage of revenue are presented in Table 26.

Table 26

Means and Standard Deviations for Revenues and IT Budget as a Percentage of Revenues

Characteristic	*M*	*SD*
Revenue	223,996,679.40	823,151,372.40
IT budget as a percent of revenues	3.21	2.54

Table 27 depicts respondents' breakdown of how IT is organized in companies. Centralized organizations accounts for almost 49% of this allocation, while decentralized are represented by 16.3%.

Table 27

How is IT organized in your company?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Centralized	66	48.9	48.9	48.9
	Decentralizxed	22	16.3	16.3	65.2
	Matrixed	4	3.0	3.0	68.1
	Networked	8	5.9	5.9	74.1
	federated/hybrid	35	25.9	25.9	100.0
	Total	135	100.0	100.0	

Data Analysis and Results

Hypothesis One

$H1_0$: There is no relationship between IT governance structure and IT-business strategic alignment.

H1a: There is a positive relationship between IT governance structure and IT-business strategic alignment.

To assess hypothesis one and to determine what type of relationship exists between IT governance structure and IT-business strategic alignment, a Kruskal-Wallis one-way analysis of variance (ANOVA) was conducted. Prior to conducting the Kruskal-Wallis, the assumptions were examined. The assumptions include that samples were drawn from the population at

random, the cases of each are independent, and the data must be at least ordinal in measure. The assumptions were met.

The Kruskal-Wallis one-way ANOVA for differences in IT business strategic alignment by IT governance structure (centralized, decentralized, federated and other) was not significant, χ^2 (3) = 1.64, p = .650, suggesting that no significant differences exist on IT business strategic alignment by IT governance structure. The null hypothesis indicates that no relationship exists between IT governance structure and IT-business strategic alignment and it must be accepted. The results of the Kruskal-Wallis test are presented in Table 28.

Table 28

Kruskal-Wallis Test on IT Business Strategic Alignment by IT Governance Structure

	Centralized	Decentralized	Federated	Other	χ^2(3)	p
Group	Mean Rank	Mean Rank	Mean Rank	Mean Rank		
IT governance structure	68.08	67.09	64.21	80.29	1.64	.650

Hypothesis Two

$H2_0$: There is no relationship between federal IT governance structure and IT-business strategic alignment.

H2a: There is a positive relationship between federal IT governance structure and IT-business strategic alignment

To assess research question two, and to determine what type of relationship exists between federal IT governance structure and IT-business strategic alignment, a Mann-Whitney *U* test was conducted. Prior to analysis, the assumptions of the Mann-Whitney *U* test include random samples from the population. IT governance structure and IT-business alignment were independently observed, where both variables had at minimum an ordinal scale of measurement (Brace, Kemp & Sneglar, 2006); the assumptions were met.

The Mann-Whitney *U* test conducted on IT business strategic alignment by federal IT governance structure was not significant, $U = 1617.50$, $p = .490$, indicating there is not a significant difference on IT business strategic alignment by federal IT governance structure. The null hypothesis ($H2_{0)}$, shows there is no relationship between federal IT governance structure and IT-business strategic and therefore it must be accepted. The results of the Mann Whitney *U* tests are summarized in Table 29.

Table 29

Mann-Whitney U Test for IT Business Strategic Alignment by Federal IT Governance Structure

			IT business strategic alignment	
U Test	*U*	*p*	Mean Rank	Sum of Ranks
Federated	1617.50	.490	69.33	6932.50
Not federated	-	-	64.21	2247.50

Moderating Hypotheses

Hypothesis Three

$H3_0$: The relationship between IT governance structure and IT-business maturity level remains the same regardless of industry type.

H3a: The relationship between IT governance structure and IT-business maturity level varies by industry type.

To assess research hypothesis three, and to determine if IT governance structure and industry type predicts IT-business maturity level, an ordinal logistic regression was conducted. An ordinal logistic regression is similar to a binary logistic regression, but used in situations when the categorical outcome variable has more than two levels and is ordered. The predictor variables are IT governance structure (centralized, decentralized, federated/hybrid, networked, matrixed, and other) and industry type (government/military, finance/banking/insurance, manufacturing, healthcare/medical, biotech, and telecomm). The dependent variable is IT-business maturity level (level 1, level 2, level 3, level 4, and level 5). Level 5 of the dependent categorical variable is left out and used as the reference category; much like normal dummy-coding is done. Additionally, the predictor variables are dummy coded because they are categorical. A code of "1" indicates inclusion in the category, and a code of "0" indicates non-inclusion in the category.

The significance for the ordinal logistics regression model was observed by the means of the effects of IT governance structure and industry type which is presented with a χ^2 coefficient. If the overall model was significant then we would have used Wald test where it is then calculated by estimation from a model. Additionally, the prediction of an event occurring for *(p)* which is the *probability* is determined by the Exp (*B*) or OR (odds ratio). If a significant

predictor has a positive *B* value, then for every one unit increase in the predictor variable, the odds of the being in one level compared to the reference level increases by Exp (*B*) percent. If a significant predictor has a negative *B* value, then for every one unit increase in the predictor variable, the odds of the being in one level compared to the reference level decreases by 1 - Exp (*B*) percent (Tabachnick & Fidell, 2012). The assumptions of logistic regressions include no outliers in the data, absence of multicollinearity, and adequate sample size.

Prior to analysis, the assumptions of a logistic regression–sample size, absence of mutlicollinearity, and absences of outliers-were assessed. LeBlanc and Fitzgerald (2000) wrote, "Large sample sizes ($n > 30$ per predictor) are required" (p. 345). With a sample size of 135, the required minimum sample size of 60 for a logistic regression was met; however the sample size of 566 for the log linear analysis could not be achieved and therefore ordinal regression analysis were conducted in place of the log linear analysis. According to LeBlanc and Fitzgerald (2000), large sample size is required (greater than 30 predictor) with two predictor variables the recommended minimum sample size is 60. To assess for multicollinearity among the independent variables, Variance Inflation Factors (VIF) values were created. According to Stevens (2009), VIF values which give a number more than 10 show the presence of mulitcollinearity. None of the VIF values were above 4.0, indicating the assumption was met. To assess for outliers, standardized residuals (*z* scores) were created within the data set prior to conducting any analyses, and three cases were removed as outliers. There are no outliers in the data set. For purposes of this analysis, the predictor variables were recoded. The original predictor variables were IT governance structure that consists of six categories: centralized, decentralized, and federated/hybrid, networked, matrixed, and other. For use in the regression model, the original categories were recoded so that matrixed and networked were included in the

'other' category, and the revised categories were centralized, decentralize, federated/hybrid, and other. Industry type was originally composed of government/military,finance/banking/insurance, manufacturing, healthcare/medical, biotech,and telecomm. For use in the regression analysis, the original variable levels were recoded so that biotech was combined with healthcare and the levels were: government/military, finance/banking/insurance, manufacturing, healthcare/medical/biotech,and telecomm.

The regression analysis was conducted with IT governance structure and industry type predicting IT-business maturity level. The result of the test was not significant, χ^2 (7) = 13.74, p =.056, indicating with IT governance structure and industry type do not significantly predict IT-business maturity level. The null hypothesis ($H3_0$) states the relationship between IT governance structure and IT-business maturity level varies by industry type and therefore must be accepted. The result of the regression is presented in Table 30.

Table 30

Ordinal Regression with IT Governance Structure and Industry Type predicting IT-Business Maturity Level

Variable	Estimate	S.E.	OR	95% C.I.for OR		Wald	*P*
				Lower	Upper		
[Level 1]	-2.30	0.78	0.10	-3.84	-0.77	-3.84	.003
[Level 2]	-0.49	0.75	0.61	-1.97	0.98	-1.97	.514
[Level 3]	1.03	0.76	2.81	-0.45	2.51	-0.45	.172
[Level 4]	2.90	0.81	18.13	1.30	4.49	1.30	.001
Centralized	-0.83	0.58	0.44	-1.97	0.32	-1.97	.156

Table 30 (cont.)

Ordinal Regression with IT Governance Structure and Industry Type predicting IT-Business Maturity Level

Variable	Estimate	S.E.	OR	95% C.I.for OR		Wald	*P*
				Lower	Upper		
Decentralized	-0.98	0.67	0.38	-2.29	0.33	-2.29	.143
Federated/hybrid	-0.81	0.61	0.44	-2.01	0.39	-2.01	.185
Government/military	0.93	0.67	2.53	-0.38	2.23	-0.38	.164
Finance/banking/insurance	1.33	0.61	3.80	0.13	2.54	0.13	.030
Manufacturing	-0.49	0.89	0.62	-2.23	1.26	-2.23	.585
Healthcare/medical/biotech	0.35	0.62	1.42	-0.87	1.57	-0.87	.573

Note. χ^2 (7) = 13.74, p =.056. Level 5, other, and telecomm were reference categories.

Table 31

The demonstrated contribution that the IT function has made to the organization's strategic goals

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very weak	4	3.0	3.0	3.0
	somewhat weak	24	17.8	17.8	20.7
	neither weak or strong	25	18.5	18.5	39.3
	somewhat strong	52	38.5	38.5	77.8
	very strong	26	19.3	19.3	97.0
	na or dk	4	3.0	3.0	100.0
	Total	135	100.0	100.0	

According to the Table 31, 38.5% of the respondents said that the demonstrated contribution that the IT function has made to the accomplishment of the organization's strategic goals issomewhat strong.

Hypothesis Four

$H4_0$: The relationship between IT governance structure and IT-business maturity level remains the same regardless of organization size.

H4a: The relationship between IT governance structure and IT-business maturity level varies by organization size.

To assess research hypothesis four, and to determine if IT governance structure and organization size predicts IT-business maturity level, an ordinal logistic regression was conducted. An ordinal logistic regression is similar to a binary logistic regression, but used in situations when the categorical outcome variable has more than two levels and is ordered. The predictor variables is IT governance structure (centralized, decentralized, federated/hybrid, networked, matrixed, and other) and organization size (l,000 employees or less, 1,001 – 5,000 employees, more than 5,000 employees). The dependent variable is IT-business maturity level (level 1, level 2, level 3, level 4, and level 5). Level 5 of the dependent categorical variable is left out and used as the reference category; much like normal dummy-coding is done. Additionally, the predictor variables are dummy coded because they are categorical. A 1 will indicate inclusion in the category and a 0 will indicate non-inclusion in the category.

The overall model significance for the ordinal logistic regression is examined by the collective effect of IT governance structure and organization size, presented with a χ^2 coefficient. Individual predictors are assessed by the Wald coefficient, if the overall model is significant. Predicted probabilities of an event occurring is determined by the Exp (*B*) or OR

(odds ratio). If a significant predictor has a positive *B* value, then for every one unit increase in the predictor variable, the odds of the being in one level compared to the reference level increases by Exp (*B*) percent. If a significant predictor has a negative *B* value, then for every one unit increase in the predictor variable, the odds of the being in one level compared to the reference level decreases by 1 - Exp (*B*) percent (Tabachnick & Fidell, 2012). The assumptions of logistic regressions include no outliers in the data, absence of multicollinearity, and adequate sample size.

Prior to analysis, the assumptions of a logistic regression – sample size, absence of mutlicollinearity, and absences of outliers - were assessed. According to LeBlanc and Fitzgerald (2000), large sample sizes ($n > 30$ per predictor) are required. With a sample size of 135, the required minimum sample size of 60 was met. To assess for multicollinearity among the independent variables, VIF values were created. According to Stevens (2009), VIF values greater than 10 indicate the presence of mulitcollinearity. None of the VIF values were above 4.0, indicating the assumption was met. To assess for outliers, standardized residuals (*z* scores) were created within the data set prior to conducting any analyses, and three cases were removed as outliers. There are no longer outliers in the data set. For purposes of this analysis, the predictor variables were recoded. The original predictor variables were IT governance structure that consists of six categories: centralized, decentralized, federated/hybrid, networked, matrixed, and other. For use in the regression model, the original categories were recoded so that matrixed and networked were included in the 'other' category, and the revised categories were centralized, decentralize, federated/hybrid, and other. The original levels of organization size were: <1,000, 1,000 - 5,000, 5,000 - 10,000, 10,000 - 50,000,and > 50,000. Data for organization size were recoded to be: < 1,000, 1,000 - 5,000,and 5,000 or more.

The regression analysis was conducted with IT governance structure and organization size predicting IT-business maturity level. The result of the test was not significant, χ^2 (5) = 4.05, p =.543, indicating with IT governance structure and organization size do not significantly predict IT-business maturity level. The null hypothesis ($H4_0$) states the relationship between IT governance structure and IT-business maturity level varies by organization size and therefore it must be accepted. The result of the regression is presented in Table 32.

Table 32

Ordinal Regression with IT Governance Structure and Organization size predicting IT-Business Maturity Level

Variable	Estimate	S.E.	OR	95% C.I.for OR		Wald	*p*
				Lower	Upper		
[Level 1]	-2.88	0.60	0.06	-4.06	-1.70	22.87	.001
[Level 2]	-1.16	0.55	0.31	-2.24	-0.08	4.43	.035
[Level 3]	0.27	0.54	1.31	-0.79	1.33	0.24	.621
[Level 4]	2.11	0.61	8.24	0.91	3.31	11.85	.001
Centralized	-0.24	0.60	0.79	-1.41	0.93	0.16	.689
Decentralized	-0.38	0.67	0.68	-1.69	0.92	0.33	.566
Federated/hybrid	-0.55	0.61	0.57	-1.76	0.65	0.81	.367
1000 or less	-0.63	0.40	0.53	-1.40	0.15	2.48	.116
1001 – 5000	-0.35	0.43	0.71	-1.19	0.50	0.65	.420

Note. χ^2 (5) = 4.05, p =.543., Level 5, other, and 5,000 or more employees were used as reference categories.

Summary

Table 33 summarizes the hypotheses testing results. To assess hypothesis one, a Kruskal-Wallis one-way ANOVA was conducted to determine what type of relationship exists between IT governance structure and IT-business strategic alignment. The results of the Kruskal-Wallis one-way ANOVA were not significant, indicating that no statistically significant differences exist on IT business strategic alignment by IT governance structure. The null hypothesis cannot be rejected.

To assess hypothesis two, a Manny-Whitney *U* test was conducted to determine what type of relationship exists between federal IT governance structure and IT-business strategic alignment. The results of the Mann-Whitney *U* test were not significant, indicating that no statistically significant differences exist on IT business strategic alignment by federal IT governance structure. The null hypothesis cannot be rejected.

To assess hypothesis three, an ordinal logistic regression was conducted to determine if IT governance structure and industry type effectively predict IT-business maturity level. The predictor variables are IT governance structure (centralized, decentralized, federated/hybrid, networked, matrixed, and other) and industry type (government/military, finance/banking/insurance, manufacturing, healthcare/medical, biotech, and telecomm). The dependent variable is IT-business maturity level (level 1, level 2, level 3, level 4, and level 5). The results of the regression were not significant, indicating that IT governance structure and industry type do not significantly predict IT-business maturity level. The null hypothesis cannot be rejected.

To assess hypothesis four, an ordinal logistic regression was conducted to determine if IT governance structure and organization size effectively predict IT-business maturity level. The results of the regression were not significant, indicating with IT governance structure and organization size do not significantly predict IT-business maturity level. The null hypothesis cannot be rejected.

Table 33

Summary of Research Hypotheses

Hypothesis	Null hypothesis	Statistical analysis	Outcome
$H1_0$	There is no relationship between IT governance structure and IT-business strategic alignment.	Kruskal-Wallis one-way ANOVA	The null hypothesis cannot be rejected
$H2_0$	There is no relationship between federal IT governance structure and IT-business strategic alignment	Mann-Whitney *U* test	The null hypothesis cannot be rejected
$H3_0$	The relationship between IT governance structure and IT-business maturity level remains the same regardless of industry type.	Ordinal logistic regression	The null hypothesis cannot be rejected
$H4_0$	The relationship between IT governance structure and IT-business maturity level remains the same regardless of organization size.	Ordinal logistic regression	The null hypothesis cannot be rejected

CHAPTER 5. DISCUSSION, IMPLICATIONS, RECOMMENDATIONS

Introduction

This chapter discusses the results of the research as well as implications in the field of IT governance. The challenges associated with IT governance and strategic alignment was also investigated and will be discussed further. In addition, recommendations will be given on the subject.The aim of the study was to test the extent to which IT strategic alignment relates to the IT governance structure and federal IT governance structure within the organization. Further analysis measured the degree of the impact between these variables. To substantiate the relationships that exists between IT governance and levels of IT Strategic Alignment as presented in Asante (2010) study, two primary hypotheses was used. In addition, two hypotheses were added that is relevant to the study that will measure industry type and organizations size.

The independent variable IT governance structure was defined as a combination of factors including leadership, structure and processes that ensures that IT governance achieves integration of business and IT (Grembergen, 2002). The dependent variable IT strategic alignment as defined by (Khadem, 2007) states that "the combined engagement of all IT units' strategic, plans processes, investments and decision to support the overall functionality and purpose of the organization goals and objectives", and the control and intervening variable include centralized, decentralized and federal governance structures that contributes to IT planning and decision making through various committees such as the IT governance, steering and standard committees. This quantitative non-experimental research design was chosen because it allows the collection of data from a large number of participants fitting a particular demographic profile. As discussed in the limitations section only 135 participants responded to the questionnaire in time for this research from an original target sample of 3000 business

professionals from medium and large sized companies in the United States. A non-experimental design for this study enabled the researcher to identify differences within the variables presented and make notation relating to those differences with some confidence.

Two primary research questions were:

1: What type of relationship exists between IT governance structure and IT-business strategic alignment?

2: What type of relationship exists between federal IT governance structure and IT-business strategic alignment?

These questions were uploaded to a website and the questionnaire administered by the IT Governance Institute (ITGI) to members located inside the United States of America. The questions investigated, Effectiveness of IT and Business Communications, Measurement of the Competency and Value of IT, Governance, Partnerships between IT and Business Functions, Scope and Architecture of the IT Infrastructure and skills.

Discussion of Results

$H1_0$: There is no relationship between IT governance structure and IT-business strategic alignment.

The Kruskal-Wallis one-way ANOVA for differences in IT business strategic alignment by IT governance structure (centralized, decentralized, federated, other) was not significant, suggesting participants did not respond statistically differently to the question on IT business strategic alignment based upon their governance structure. The null hypothesis indicated that no relationship exists between IT governance structure and IT-business strategic alignment; therefore it cannot be rejected in favor of the alternate hypothesis. The assumptions were met. The research also show that at 33% of the participants says that their organization are at level 3

Established focused process, while only 6% are at the optimized level in appendix C. In addition, most of the respondents say senior and mid-level IT managers have a good understanding of the business which suggests that decision making are mostly done by employees who understand how the business operates. When asked about how metrics and processes are used to measure IT's contribution to the business, 27% of the respondents states they formally assess technical and cost efficiency using traditional financial measures, such as return on investment (ROI) and activity based costing (ABC), they also states that they put formal feedback processes in place to review and take action based on the results of the measures, while 11% say these procedures are purely technical (Appendix C).Therefore decision making process for IT governance and strategic alignment can only be successful if the organization has a management buy-in and IT decision making should be a shared practice between both business and IT managers (Sambamurthy & Zmud, 1999).

$H2_0$: There is no relationship between federal IT governance structure and IT-business strategic alignment.

To assess research question two, and to determine what type of relationship exists between federal IT governance structure and IT-business strategic alignment, a Mann-Whitney *U* test was conducted. Prior to analysis, the assumptions of the Mann-Whitney *U* test include random samples from the populations, IT governance structure and IT-business strategic alignment were independently discussed, where both variables had at minimum an ordinal scale of measurement (Brace, Kemp & Sneglar, 2006); the assumptions were met, meaning there were no significant differences in responses to IT business strategic alignment by Federal IT governance structure (federated vs. not federated).

The Mann-Whitney *U* test conducted on IT business strategic alignment by federal IT governance structure was not significant, The value of the *U* test was 1617.50, which was not significant with $p = .490$, indicating there is not a significant difference on IT business strategic alignment by federal IT governance structure which supports Luftman (2003). When asked how is IT organized in your company? Thirty-five participants or 25.9% stated that they are in a federated/hybrid organization.

To assess research hypothesis three, and to determine if IT governance structure and industry type predicts IT-business maturity level, an ordinal logistic regression was conducted. Prior to analysis, the assumptions of a logistic regression – sample size, absence of mutlicollinearity, and absences of outliers - were assessed. According to LeBlanc and Fitzgerald (2000), "large sample sizes ($n > 30$ per predictor) are required"(p.345). With a sample size of 135, the required minimum sample size of 60 was met. To assess for multicollinearity among the independent variables, Variance Inflation Factors (VIF) values were created. According to Stevens (2009), VIF values in excess 10 shows the presence of mulitcollinearity. None of the VIF values were above 4.0, indicating the assumption was met. To assess for outliers, standardized residuals (*z* scores) were created within the data set prior to conducting any analyses, and three cases were removed as outliers. There are no outliers in the data set.

The regression analysis was conducted with IT governance structure and industry type predicting IT-business maturity level. The result of the test was not significant, χ^2 (7) = 13.74, $p = .056$, indicating with IT governance structure and industry type do not significantly relate to IT-business maturity level.

To assess research hypothesis four, and to determine if IT governance structure and organization size predicts IT-business maturity level, an ordinal logistic regression was

conducted. Prior to analysis, the assumptions of a logistic regression – sample size, absence of mutlicollinearity, and absences of outliers - were assessed. As indicated earlier LeBlanc and Fitzgerald (2000), "large sample sizes are required" (p.345). With a sample size of 135, the required minimum sample size of 60 was met. To assess for multicollinearity among the independent variables, VIF values were created. According to Stevens (2009), VIF values greater than 10 indicate the presence of mulitcollinearity. None of the VIF values were above 4.0, indicating the assumption was met. To assess for outliers, standardized residuals (*z* scores) were created within the data set prior to conducting any analyses, and three cases were removed as outliers. There are no longer outliers in the data set.

The regression analysis was conducted with IT governance structure and organization size predicting IT-business maturity level. The result of the test was not significant, χ^2 (5) = 4.05, p =.543, indicating with IT governance structure and organization size do not significantly predict IT-business maturity level. Additionally, According to the Table 31, almost 39% of the respondents said that the demonstrated contribution that the IT function has made to the accomplishment of the organization's strategic goals is somewhat strong and 19.3% says very strong, this means that majority of businesses now see IT as an enabler. With IT viewed as an enabler in the business, Table 21 showed that30% of the respondents are senior management or executive, IT governance buy-ins and practices are endorsed at the senior level within the organization.

Theoretical Implications

Theoretically, factors that affect governance structures follow two streams of research, the first focused on single factor such as firm size and look on traditional IT organizational structures (Agarwal & Sambamurthy, 2002; Boddy et al., 2005). In addition, stream one continues to investigate expanded IT decision making structures by including research on vertical and horizontal expansions of the traditional IT governance structures. Stream two uses the principles of multiple contingency as seen in Table 1; This principle identifies a grouping of factors that impact IT governance decisions (Brown & Grant, 2005; Muller, 2007), and look on multiple contingencies for a uniformed governance framework. Stream two was further investigated theoretically to look on complex analysis for non-uniform governance frameworks by identifying how the individual and multiple contingencies affect IT organizational structure decisions as outlined in the responses from this research. This research contributed to theory by investigating contingencies that look on factors such as effectiveness of IT and business communications, measurement of the competency and value of IT, governance, partnerships between IT and business functions, scope and architecture of the IT infrastructure and skills (Table 17).

Practical Implications

Practitioners who are looking forward for an adaptation toward strategic alignment can apply principles set out in this research. By examining Figure 4, various committees such as the standards committee, IT steering committee and IT governance committee, reveals that to work towards alignment an iteration process that involves collaboration is needed to make governance decisions by committee members. Currently, various industry standards and frameworks such as

Control Objectives for Information and related Technology (COBIT) (This is an IT process and control framework linking IT to business requirements) are available to boards of directors which can be used as a transition to apply industry practices (ITGI, 2006; Klamm & Watson, 2009). A practical application of these standards will therefore require adherence to policies and procedures because in different areas, reporting authorities impose fees and fines to ensure that compliance are met.

Limitations and Assumptions

There are limitations to the study which hinder the researcher from being able to collect the appropriate sample size. Sample size collected was 135 and hence an ordinal logistic regression was used to conduct statistical analysis on H3 and H4.Other limitations include the time factor as it relates to the sample group to access and complete the instrument online as well as funding to keep the site going during a specific period of time. The research did go in depth of standards and frameworks relating to IT governance and strategic alignment, but an understanding of the different terminologies were provided to sufficiently edify the reader. It was assumed that the selected population is willing to divulge information truthfully and completely. The research also assumes all participants are free from bias and have adequately taken the time to read each question and answer appropriately.

Recommendation for Future Research

An area of future research is to determine how C-level executives (CEO, CIO, COO, CTO) weighs in on IT governance and Strategic alignment decisions for industries investigated in this research. In addition, a qualitative replication of this research can prove to answer questions, such as Effectiveness of IT and Business Communications, Measurement of the Competency and Value of IT, Governance, Partnerships between IT and Business Functions,

Scope and Architecture of the IT Infrastructure and skills; a qualitative research may be able to adopt a iterative process, that were not able to be given from the quantitative format presented in this research. Additionally, an investigation into how industry type and organization size correlates to the levels of maturity.

Finally, a longitudinal research that will investigate the organization from the initial stage of governance to final implementation of IT governance framework and standards, such as the (1) Control Objective for Information and Related Information Technologies (COBIT), (2) Information Technology Infrastructure Library (ITIL) which is used as the standard for service management and delivery and (3) The Code of Practice for Information Security Management (ISO/IEC 17799: 2000).

Conclusions

IT governance and strategic alignment should be seen as a pursuit for strategic planning for the organization. IT standards, IT frameworks and IT investments, after being implemented and must be managed to enable return on investments. The IT Governance Institute (ITGI) and other bodies such as ITIL put in place structures and best practices to assist in the monitoring and controlling of the governance process. According to Robinson (2005), IT governance supports three main objectives: (a) regulatory and legal compliance, (b) operational excellence, and (c) optimal risk management. Robinson also stated that poor IT performance is commonly the result of failed projects, missed deadlines, budget overruns, and poor returns on investment (ROI). Consequently, the need for governance is evident if organizations are to function optimally by establishing transparency and accountability.

This research contributed to the body of knowledge to examine the relationship between IT Governance structure and IT-business strategic alignment. The assumptions for research

question one were met. While differences in IT business strategic alignment by IT governance structure (centralized vs. decentralized vs. federated vs. other) was not significant and suggests no significant differences exist on IT business strategic alignment by IT governance structure. The findings did not support the rejection of null hypothesis. Therefore, no relationship exists between IT governance structure and IT-business strategic alignment and cannot be rejected. For the second research question, the assumptions were met as well and the analysis for IT business strategic alignment by federal IT governance structure was not significant, indicating there is not a significant difference on IT business strategic alignment by federal IT governance structure.

For the moderating hypothesis three indicated, the regression analysis was conducted with IT governance structure and industry type predicting IT-business maturity level. The results revealed; IT governance structure and industry type do not significantly predict IT-business maturity level. However, after carefully looking on the individual results of the moderating variables; ordinal regression on IT governance structure and industry type predicting IT-business maturity level showed three levels of significance (see table 30), these were level 1 - *initial* , level 4 - *managed* and *finance and banking*.

For the moderating hypothesis four indicated, the regression analysis was conducted with IT governance structure and organization size predicting IT-business maturity level. The result of the test was not significant, indicating with IT governance structure and organization sizes do not significantly predict IT-business maturity level. However, after detailed results of the moderating variables; ordinal regression on IT governance structure and organization size predicting IT-business maturity level showed three levels of significance (see table 32), these were level 1 - *initial*, level 2 – *repeatable* and level 4 *managed*.

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APPENDIX A. RESEARCH INSTRUMENT

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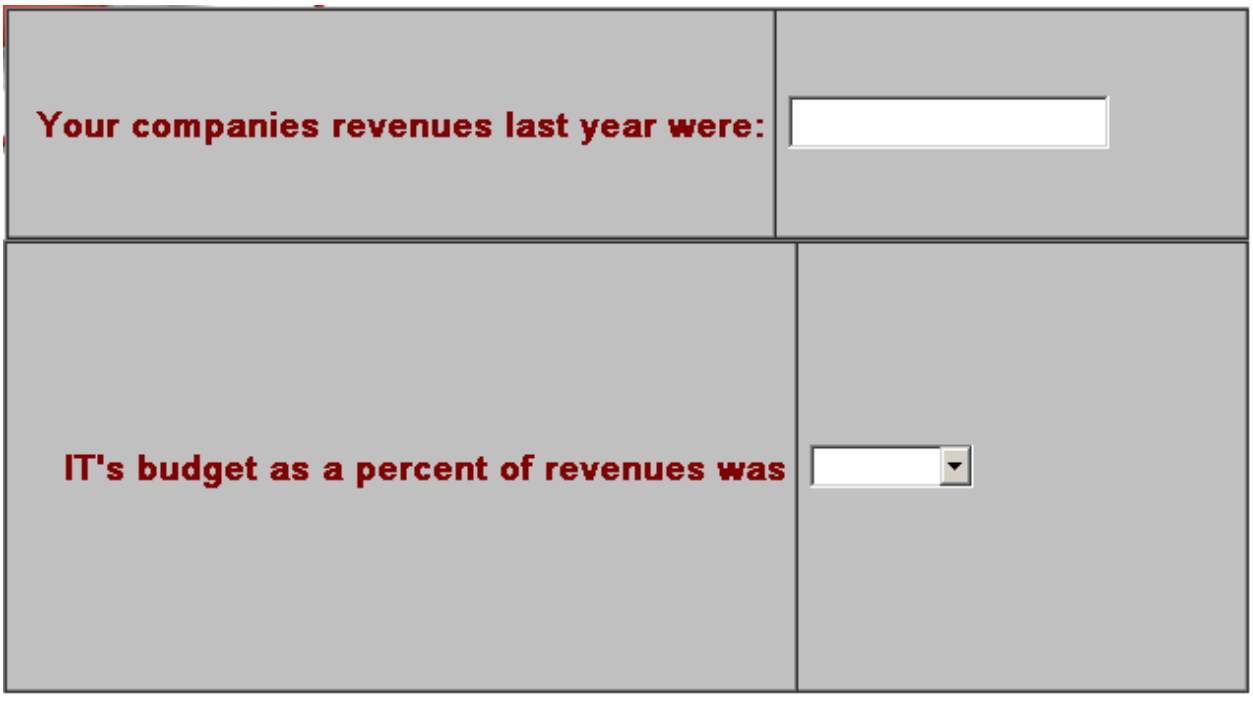
Instructions

The information you provide will not be used to identify your company. Where two answers are possible in a question, select the one answer that most influence business and technology strategic alignment effectiveness in your organization. ***PLEASE SELECT ONLY ONE ANSWER PER QUESTION FOR EACH QUESTION.*** *Some questions presented are multiple choice formats with answers that have boxes that can be checked and unchecked by double clicking on the box while answers to some questions are on different scales measurement such as disagree to agree.*
Additionally, the answer you provide should indicate your opinion of the behavior or effectiveness of your organizations management practices concerning strategic alignment decision as they relate to IT governance. If the answer to a question is not known or unclear or the question is simply not applicable to your organization, please select the 'don't know box' N/A or Neutral.
Kindly proceed to the survey questions below. You are allowed to take the survey once from each computer. Again, thank you very much and your participation is greatly appreciated.

SECTION 1: PARTICIPANTS DEMOGRAPHIC SURVEY



2. Does your CIO (highest IT Executive) report to:

1 ○ **CEO, President, Chairman**
2 ○ **CFO**
3 ○ **COO**
4 ○ **Business Unit Executive**
5 ○ **Other**

3. How is IT organized in your company:

1 ○ **Centralized**
2 ○ **Decentralized**
3 ○ **Matrixed**
4 ○ **Networked**
5 ○ **Federated/Hybrid**
6 ○ **Other**

4. Hierarchical distance from CEO
Ceo, 1-2 levels 3-4 levels > 4 levels

5. Please indicate Department
Business Unit (BU) IT, Finance, HR, Corporate, Other–Please state _____

6. Your age group
< 25, 25 – 35, 35 – 45, 45 – 55, > 55

7. Education level (Highest level completed)
GED/High School
Some College
Bachelors Degree
MBA/Masters
Post Masters
Ph.D / Doctorate
Post Doctorate
Other (Please specify) _____

8. Career Level
Entry Level
Staff
Supervisor
Manager

Mid Level Manager
Senior Manager
Executive
Other (Please specify)_____

9. Please indicate industry
Government/Military
Finance/Banking/Insurance
Manufacturing
Healthcare/Medical
Biotech
Telecommunications
Other, (Please specify) _____

10. Years of industry relevant experience
Less than 3 years
3 – 5 years
6 – 10 years
11 – 15 years
16 – 25 years
More than 25 years

11. Please indicate number of employees (Size of organization)
< 1,000, 1,000 – 5,000, 5,000 – 10,000, 10,000 – 50,000, > 50,000

12. Number of employees in IT department
< 100, 100 – 250, 250 – 500, 500 – 1,000, > 1,000

SECTION 2: QUESTIONNAIRE

COMPONENT 1: EFFECTIVENESS OF IT AND BUSINESS COMMUNICATION

1. Alignment Maturity Areas:

- Communication
- Competency
- Governance
- Partnership
- Technology
- Skill

2. Explanation of Strategic Alignment Maturity:
A level 1 alignment maturity means that a company lacks the process within all six identified maturity areas above needed to attain alignment. In a level 5 company, IT and all other business functions (marketing, finance, R&D, etc.) adapts their strategies together

using fully developed processes that includes external partners and customers with all 6 maturity areas.

3. After quickly reviewing the preceding *Strategic Alignment Maturity Summary* which level of strategic alignment maturity do you believe best represents your organization today?

Level 1 Initial/ad-hoc process

Level 2 Committed process

Level 3 Established focused process

Level 4 Improved/managed process

Level 5 Optimized process

The next six questions assess the maturity/effectiveness of the elements comprising IT and Business Communications.

4. To what extent does IT understand the organization's business environment (e.g., its customers, competitors, processes, partners/alliances):

- Senior and mid-level IT managers do not understand the business.
- Senior and mid-level IT managers have a limited understanding of the business.
- Senior and mid-level IT managers have a good understanding of the business.
- Understanding of the business by all IT members is encouraged and promoted by senior managers.
- Understanding of the business is required (e.g., tied to performance appraisals) throughout the IT function.
- N/A or don't know.

5. To what extent do the business organizations understand the IT environment (e.g., its current and potential capabilities, systems, services, processes):

- Senior and mid-level business managers do not understand IT.
- Senior and mid-level business managers have a limited understanding of IT.
- Senior and mid-level business managers have a good understanding of IT.
- Understanding of IT by all employees is encouraged and promoted by senior management.

Understanding of IT is required (e.g., tied to performance appraisals) throughout the business.

N/A or don't know.

6. The following statements pertain to methods (e.g., intranets, bulletin boards, education, meetings, e-mail) in place to promote organizational education/learning (e.g., of experiences, problems, objectives, critical success factors). Organizational learning occurs primarily through:

Ad-hoc/casual methods (employee observation, anecdote sharing, peer meetings, etc.)

Informal methods (newsletters, bulletin board notices, computer reports, group e-mail, fax, etc.)

Regular, clear methods (training, e-mail, phone-mail, intranet, department meetings, etc.) from mid-level management

Formal, unifying, bonding methods from senior and mid-level management

Formal, unifying, bonding methods from senior and mid-level management, with feedback measures to monitor and promote effectiveness of learning

N/A or don't know.

7. The following question pertains to communications protocol. The IT and business communication style (e.g., ease of access, familiarity of stakeholders) tends to be:

One-way, from the business; formal and inflexible

One-way, from the business; moderately informal and moderately flexible

Two-way; formal and inflexible

Two-way; moderately informal and moderately flexible

Two-way; informal and flexible

N/A or don't know.

8. The following statements pertain to the extent in which there is knowledge sharing (intellectual understanding and appreciation of the problems/opportunities, tasks, roles, objectives, priorities, goals, direction, etc.) between IT and business:

Knowledge sharing is on an ad-hoc basis.

Knowledge sharing is somewhat structured and/or structure is beginning to be created.

There is structured sharing around key functional unit processes.

There is formal sharing at the functional unit level and at the corporate level.

There is formal sharing at the functional unit level, at the corporate level, and with business partners/alliances.

N/A or don't know.

9. The following statements pertain to the role and effectiveness of IT and business liaisons:

We do not use liaisons, or if we do, we do so on an ad-hoc, as needed basis.

We regularly use liaisons to transfer IT knowledge to the business and business knowledge to IT. They are the primary contact point for interactions between IT and the business. Liaisons are not usually used to facilitate relationship development.

We regularly use liaisons to transfer IT knowledge to the business and business knowledge to IT. They occasionally facilitate relationship development.

We regularly use liaisons to facilitate the transfer of IT knowledge to the business and business knowledge to IT. Their primary objective is to facilitate internal relationship development.

We regularly use liaisons to facilitate the transfer of IT knowledge to the business and external partners and business knowledge to IT. Their primary objective is to facilitate relationship development across the business and its external partners.

N/A or don't know.

COMPONENT 2: MEASUREMENT OF THE COMPETENCY AND VALUE OF IT

The next eight questions assess the maturity/effectiveness of the elements comprising

Competency/Value Measurements.

10. The following statements pertain to the metrics and processes used to measure IT's contribution to the business.

The metrics and processes we have in place to measure IT are primarily technical (e.g., system availability, response time).

We are equally concerned with technical and cost efficiency measures. We have limited or no formal feedback processes in place to review and take action based on the results of our measures.

We formally assess technical and cost efficiency using traditional financial measures, such as return on investment (ROI) and activity-based costing (ABC). We are starting to put formal feedback processes in place to review and take action based on the results of our measures.

We formally assess technical, cost efficiency, and cost effectiveness using traditional financial measures (e.g., ROI, ABC). We have formal feedback processes in place to review and take action based on the results of our measures.

We use a multi-dimensional approach with appropriate weights given to technical, financial, operational, and human-related measures. We have formal feedback processes in place to review and take action based on the results of our measures. These measures are extended to our external partners (e.g., vendors, outsourcers, customers).

N/A or don't know.

11. The following statements pertain to the use of business metrics to measure contribution to the business.

We do not measure the value of our business investments, or do so on an ad-hoc basis.

We are concerned with cost efficiency measures at the functional organization level only. We have limited or no formal feedback processes in place to review and take action based on the results of our measures.

We formally use traditional financial measures, such as return on investment (ROI) and activity-based costing (ABC), across functional organizations. We are starting to have formal feedback processes in place to review and take action based on the results of our measures.

We formally measure value based on the contribution to our customers. We have formal feedback processes in place to review and take action based on the results of our measures and to assess contributions across functional organizations.

We use a multi-dimensional approach with appropriate weights given to technical, financial, operational, and human-related measures. We have formal feedback processes in place to review and take action based on the results of our measures. These measures are extended to our external partners (e.g., vendors, outsourcers, customers).

N/A or don't know.

12. The following statements pertain to the use of integrated IT and business metrics to measure IT's contribution to the business.

We do not measure the value of our IT business investments, or do so on an ad-hoc basis.

The value measurements for IT and business are not linked. We have limited or no formal feedback processes in place to review and take action based on the results of our measures.

The value measurements for IT and business are starting to be linked and formalized. We are also starting to have formal feedback processes in place to review and take action based on the results of our measures.

We formally link the value measurements of IT and business. We have formal feedback processes in place to review and take action based on the results of our measures and to assess contributions across functional organizations.

We use a multi-dimensional approach with appropriate weight given to IT and business measures. We have formal feedback processes in place to review and take action based on the results of our measures. These measures are extended to our external partners (e.g., vendors, outsourcers, customers).

N/A or don't know.

13. The following statements pertain to the use of service level agreements (SLAs):

We do not use SLAs or do so sporadically.

We have SLAs which are primarily technically oriented (response time, length of computer downtime, etc.), between the IT and functional organizations.

We have SLAs which are both technically oriented and relationship-oriented (user/customer satisfaction, IT's commitment to the business, etc.) that are between the IT and functional organizations and also emerging across the enterprise.

We have SLAs which are both technically-oriented and relationship-oriented, between the IT and functional organizations as well as enterprise wide.

We have SLAs which are both technically-oriented and relationship-oriented, between the IT and functional organizations as well as at enterprise wide and with our external partners/alliances.

N/A or don't know.

14. The following statements pertain to benchmarking practices. Informal practices are such things as informal interviews, literature searches, company visits, etc., while formal practices are such things as environmental scanning, data gathering and analysis, determining best practices, etc.

We seldom or never perform either informal or formal benchmarks.

We occasionally or routinely perform informal benchmarks.

We occasionally perform formal benchmarks and seldom take action based on the findings.

We routinely perform formal benchmarks and usually take action based on the findings.

We routinely perform formal benchmarks and have a regulated process in place to take action and measure the changes.

N/A or don't know.

15. The following statements pertain to the extent of assessment and review of IT investments.

We do not formally assess and/or review.

We assess and/or review only after we have a business or IT problem (i.e., failed IT project, market share loss).

Assessments and/or reviews are becoming routine occurrences.

We routinely assess and/or review and have a formal process in place to make changes based on the results.

We routinely assess and/or review and have a formal process in place to make changes based on the results and measure the changes. Our external partners are included in the process.

N/A or don't know.

16. The following statements pertain to the extent to which IT-business continuous improvement practices (e.g., quality circles, quality reviews) and effectiveness measures are in place.

We do not have any continuous improvement practices in place.

We have a few continuous improvement practices in place, but no effectiveness measures are in place.

We have a few continuous improvement practices in place and the use of effectiveness measures is emerging.

We have many continuous improvement practices in place and we frequently measure their effectiveness.

We have well established continuous improvement practices and effectiveness measures in place.

N/A or don't know.

17. The demonstrated contribution that the IT function has made to the accomplishment of the organization's strategic goals is:

Very weak

Somewhat weak

Neither weak nor strong

Somewhat strong

Very strong

N/A or don't know.

COMPONENT 3: IT GOVERNANCE

The next seven questions assess the maturity/effectiveness of the elements comprising IT

Governance

18. The following statements pertain to strategic business planning with IT participation.

We do no formal strategic business planning or, if it is done, it is done on an as-needed basis.

We do formal strategic business planning at the functional unit level with slight IT participation.

We do formal strategic business planning at the functional unit levels with some IT participation. There is some inter-organizational planning.

We do formal strategic business planning at the functional unit and across the enterprise with IT participation.

We do formal strategic business planning at the functional unit, across the enterprise, and with our business partners/alliances with IT participation.

N/A or don't know.

19. The following statements pertain to strategic IT planning with business participation.

We do no formal strategic IT planning or, if it is done, it is done on an as-needed basis.

We do formal strategic IT planning at the functional unit level with slight business participation.

We formally use traditional financial measures, such as return on investment (ROI) and activity-based costing (ABC), across functional organizations. We are starting to have formal feedback processes in place to review and take action based on the results of our measures.We do formal strategic IT planning at the functional unit levels with some business participation. There is some inter-organizational planning.

We do formal strategic IT planning at the functional unit and across the enterprise with the business.

- We do formal strategic business planning at the functional unit, across the enterprise, and with our business partners/alliances.
- N/A or don't know.

20. The following statements pertain to IT budgeting. Our IT function is budgeted as a:

- Cost center, with erratic/inconsistent/irregular/changeable spending
- Cost center, by functional organization
- Cost center with some projects treated as investments
- Investment center
- Profit center, where IT generates revenues
- N/A or don't know.

21. The following statements pertain to IT investment decisions. Our IT investment decisions are primarily based on IT's ability to:

- Reduce costs.
- Increase productivity and efficiency as the focus.
- Traditional financial reviews. IT is seen as a process enabler.
- Business effectiveness is the focus. IT is seen as a process driver or business strategy enabler.
- Create competitive advantage and increase profit. Our business partners see value.
- N/A or don't know.

22. The following statements pertain to IT steering committee(s) with senior level IT and business management participation.

- We do not have formal/regular steering committee(s).
- We have committee(s) which meet informally on an as-needed basis.
- We have formal committees, which meet regularly and have emerging effectiveness.
- We have formal, regular committee meetings with demonstrated effectiveness.

- We have formal, regular committee meetings with demonstrated effectiveness that include strategic business partners sharing decision-making responsibilities.
- N/A or don't know.

23. The following statements pertain to how IT projects are prioritized. Our IT project prioritization process is usually:

- In reaction to a business or IT need.
- Determined by the IT function.
- Determined by the business function.
- Mutually determined between senior and mid-level IT and business management.
- Mutually determined between senior and mid-level IT and business management and with consideration of the priorities of any business partners/alliances.
- N/A or don't know.

24. The ability of the IT function to react/respond quickly to the organization's changing business needs is:

- Very weak
- Somewhat weak
- Neither weak nor strong
- Somewhat strong
- Very strong
- N/A or don't know.

COMPONENT 4: PARTNERSHIP

The next six questions assess the maturity/effectiveness of the elements comprising IT and

Business Partnership.

25. IT is perceived by the business as:

- A cost of doing business
- Emerging as an asset
- A fundamental enabler of future business activity

- A fundamental driver of future business activity
- A partner with the business that co-adapts/improvises in bringing value to the firm
- N/A or don't know.

26. The following statements pertain to the role of IT in strategic business planning.

- IT does not have a role.
- IT is used to enable business processes.
- IT is used to drive business processes.
- IT is used to enable or drive business strategy.
- IT co-adapts with the business to enab/e/drive strategic objectives.
- N/A or don't know.

27. The following statements pertain to the sharing (by IT and business management) of the risks and rewards (e.g., bonuses) associated with IT-based initiatives (i.e., a project is late and over budget because of business requirement changes).

- IT takes all the risks and does not receive any of the rewards.
- IT takes most of the risks with little reward.
- Sharing of risks and rewards is emerging.
- Risks and rewards are always shared.
- Risks and rewards are always shared and we have formal compensation and reward systems in place that induce managers to take risks.
- N/A or don't know.

6

28. The following statements pertain to formally managing the IT/business relationship. To what extent are there formal processes in place that focus on enhancing the partnership relationships that exist between IT and business (e.g., cross-functional teams, training, risk/reward sharing):

- We don't manage our relationships.
- We manage our relationships on an ad-hoc basis.
- We have defined programs to manage our relationships, but IT or the business does not always comply with them. Conflict is seen as creative rather than disruptive.
- We have defined programs to manage our relationships and both IT and the business

comply with them.

- We have defined programs to manage our relationships, both IT and the business comply with them, and we are continuously improving them.
- N/A or don't know.

29. The following statements pertain to IT and business relationship and trust.

- There is a sense of conflict and mistrust between IT and the business.
- The association is primarily an "arm's length" transactional style of relationship.
- IT is emerging as a valued service provider.
- The association is primarily a long-term partnership style of relationship.
- The association is a long-term partnership and valued service provider.
- N/A or don't know.

30. The following statements pertain to business sponsors/champions. Our IT-based initiatives:

- Do not usually have a senior level IT or business sponsor/champion.
- Often have a senior level IT sponsor/champion only.
- Often have a senior level IT and business sponsor/champion at the functional unit level.
- Often have a senior level IT and business sponsor/champion at the corporate level.
- Often have a senior level IT and the CEO as the business/sponsor champion.
- N/A or don't know.

COMPONENT 5 : SCOPE & ARCHITECTURE OF THE IT INFRASTRUCTURE

The next five questions assess the maturity/effectiveness of the elements comprising Scope and Architecture of IT Infrastructure.

31. The following statements pertain to the scope of your IT systems. Our primary systems are:

- Traditional office support (e.g., e-mail, accounting, word processing, legacy systems)
- Transaction-oriented (e.g., back office support)
- Business process enablers (IT supports business process change)

- Business process drivers (IT is a catalyst for business process change)
- Business strategy enablers/drivers (IT is a catalyst for changes in the business strategy)
- N/A or don't know.

32. The following statements pertain to the articulation of and compliance with IT standards. Our IT standards are:

- Non-existent or not enforced
- Defined and enforced at the functional unit level but not across different functional units
- Defined and enforced at the functional unit level with emerging coordination across functional units
- Defined and enforced across functional units
- Defined and enforced across functional units, and with joint coordination among our strategic business partners/alliances
- N/A or don't know.

33. The following statements pertain to the scope of architectural integration. The components of our IT infrastructure are:

- Not well integrated
- Integrated at the functional unit with emerging integration across functional units
- Integrated across functional units
- Integrated across functional units and our strategic business partners/alliances
- Evolving with our business partners
- N/A or don't know.

34. The following statements pertain to the level of disruption caused by business and IT changes (e.g., implementation of a new technology, business process, merger/acquisition). Most of the time, a business or IT change is:

- Not readily transparent (very disruptive)
- Transparent at the functional level only
- Transparent at the functional level and emerging across all remote, branch, and mobile locations

- Transparent across the entire organization
- Transparent across the organization and to our business partners/alliances
- N/A or don't know.

35. The following statements pertain to the scope of IT infrastructure flexibility to business and technology changes. Our IT infrastructure is viewed as:

- A utility providing the basic IT services at minimum cost
- Emerging as driven by the requirements of the current business strategy
- Driven by the requirements of the current business strategy
- Emerging as a resource to enable fast response to changes in the marketplace
- A resource to enable and drive fast response to changes in the marketplace.
- N/A or don't know.

COMPONENT 6: SKILLS

The next seven questions assess the maturity/effectiveness of the elements comprising Human

Resources/Skills.

36. The following statements pertain to the extent the organization fosters an innovative entrepreneurial environment. Entrepreneurship is:

- Discouraged
- Moderately encouraged at the functional unit level
- Strongly encouraged at the functional unit level
- Strongly encouraged at the functional unit and corporate levels
- Strongly encouraged at the functional unit, corporate level, and with business partners/alliances
- N/A or don't know.

37. The following statements pertain to the cultural locus of power in making IT-based decisions. Our important IT decisions are made by:

- Top business management or IT management at the corporate level only
- Top business or IT management at corporate level with emerging functional unit level influence

Top business management at corporate and functional unit levels, with emerging hared influence from IT management

Top management (business and IT) across the organization and emerging influence from our business partners/alliances.

Top management across the organization with equal influence from our business partners/alliances.

N/A or don't know.

38. The following statements pertain to your organization's readiness for change.

We tend to resist change.

We recognize the need for change and change readiness programs are emerging.

Change readiness programs providing training and necessary skills to implement change are in place at the functional unit level.

Change readiness programs are in place at the corporate level.

Change readiness programs are in place at the corporate level and we are proactive and anticipate change.

N/A or don't know.

39. The following statements pertain to career crossover opportunities among IT and business personnel.

Job transfers rarely or never occur.

Job transfers occasionally occur within the functional organization.

Job transfers regularly occur for management level positions usually at the functional level.

Job transfers regularly occur for all position levels and within the functional units.

Job transfers regularly occur for all position levels, within the functional units, and at the corporate level.

N/A or don't know.

40. The following statements pertain to employee opportunities to learn about and support services outside the employee's functional unit (e.g., programmers trained in product/service production functions, customer service trained in systems analysis) using programs such as cross training and job rotation. The organization:

Does not provide opportunities to learn about support services outside the employee's functional unit.

- Opportunities are dependent on the functional unit.
- Formal programs are practiced by all functional units.
- Formal programs are practiced by all functional units and across the enterprise.
- Opportunities are formally available across the enterprise and with business partners/alliances.
- N/A or don't know.

41. The following statements pertain to the interpersonal interaction (e.g., trust, confidence, cultural, social, and political environment) that exists across IT and business units in our organization.

- There is minimum interaction between IT and business units.
- The association is primarily an "arm's length" transactional style of relationship.
- Trust and confidence among IT and business is emerging.
- Trust and confidence among IT and business is achieved.
- Trust and confidence is extended to external customers and partners.
- N/A or don't know.

42. The following statements pertain to the IT organization's ability to attract and retain the best business and technical professionals.

- There is no formal program to retain IT professionals. Recruiting demands are filled ineffectively.
- IT hiring is focused on technical expertise.
- IT hiring is focused equally on technical and business expertise. Retention programs are in place.
- Formal programs are in place to attract and retain the best IT professionals with both technical and business skills.
- Effective programs are in place to attract and retain the best IT professionals with both technical and business skills.
- N/A or don't know.

Thank you for your participation

APPENDIX B. ADDITIONAL FREQUENCY STATISTICS

FREQUENCY TABLES

Statistics

		Industry	VAR00001	Alignment maturity areas
N	Valid	135	135	135
	Missing	0	0	0

How is IT organized in your company?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	centralized	66	48.9	48.9	48.9
	decentralizxed	22	16.3	16.3	65.2
	matrixed	4	3.0	3.0	68.1
	networked	8	5.9	5.9	74.1
	federated/hybrid	35	25.9	25.9	100.0
	Total	135	100.0	100.0	

Please indicate industry:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	government/military	26	19.3	19.3	19.3
	finance/banking/insurance	45	33.3	33.3	52.6
	maufacturing	7	5.2	5.2	57.8
	healthcare/medical	32	23.7	23.7	81.5
	biotech	7	5.2	5.2	86.7
	telecomm	11	8.1	8.1	94.8
	other	7	5.2	5.2	100.0
	Total	135	100.0	100.0	

Strategic Alignment Maturity Levels

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	level 1 initial/ad-hoc process	14	10.4	10.4	10.4
	level 2 committed process	38	28.1	28.1	38.5
	level 3 established focused process	45	33.3	33.3	71.9
	level 4 improved managed process	30	22.2	22.2	94.1
	level 5 optimized process	8	5.9	5.9	100.0
	Total	135	100.0	100.0	

IT Business Alignment Maturity Components

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	communication	16	11.9	11.9	11.9
	competency	14	10.4	10.4	22.2
	governance	45	33.3	33.3	55.6
	partnership	28	20.7	20.7	76.3
	technology	25	18.5	18.5	94.8
	skill	7	5.2	5.2	100.0
	Total	135	100.0	100.0	

The demonstrated contribution that the IT function has made to the accomplishment of the organization's strategic goals is:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very weak	4	3.0	3.0	3.0
	somewhat weak	24	17.8	17.8	20.7
	neither weak or strong	25	18.5	18.5	39.3
	somewhat strong	52	38.5	38.5	77.8
	very strong	26	19.3	19.3	97.0
	na or dk	4	3.0	3.0	100.0
	Total	135	100.0	100.0	

number of employees

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<1000	60	44.4	44.4	44.4
	1000 - 5000	36	26.7	26.7	71.1
	5000 - 10000	27	20.0	20.0	91.1
	10000 - 50000	9	6.7	6.7	97.8
	>50000	3	2.2	2.2	100.0
	Total	135	100.0	100.0	

APPENDIX C. SURVEY RESPONSE FREQUENCY

The next six questions assess the maturity/effectiveness of the elements comprising IT and Business Communications.

To what extent does IT understand the organization's business environment (e.g., its customers, competitors, processes, partners/alliances):	Response Percent	Response Total
Senior and mid-level IT managers do not understand the business.	2.96%	4
Senior and mid-level IT managers have a limited understanding of the business.	25.19%	34
Senior and mid-level IT managers have a good understanding of the business.	33.33%	45
Understanding of the business by all IT members is encouraged and promoted by senior managers.	25.93%	35
Understanding of the business is required (e.g., tied to performance appraisals) throughout the IT function.	11.11%	15
N/A or don't know.	1.48%	2

Total # of respondents **135**.
Statistics based on **135** respondents; **0** filtered; **0** skipped.

To what extent do the business organizations understand the IT environment (e.g., its current and potential capabilities, systems, services, processes):	Response Percent	Response Total
Senior and mid-level business managers do not understand IT.	5.19%	7
Senior and mid-level business managers have a limited understanding of IT.	22.96%	31
Senior and mid-level business managers have a good understanding of IT.	30.37%	41
Understanding of IT by all employees is encouraged and promoted by senior management.	30.37%	41
Understanding of IT is required (e.g., tied to performance appraisals) throughout the business.	9.63%	13
N/A or don't know.	1.48%	2

Total # of respondents **135**.
Statistics based on **135** respondents; **0** filtered; **0** skipped.

The following statements pertain to the metrics and processes used to measure IT's contribution to the business.	Response Percent	Response Total
The metrics and processes we have in place to measure IT are primarily technical (e.g., system availability, response time).	11.11%	15
We are equally concerned with technical and cost efficiency measures. We have limited or no formal feedback processes in place to review and take action based on the results of our measures.	21.48%	29
We formally assess technical and cost efficiency using traditional financial measures, such as return on investment (ROI) and activity-based costing (ABC). We are starting to put formal feedback processes in place to review and take action based on the results of our measures.	26.67%	36
We formally assess technical, cost efficiency, and cost effectiveness using traditional financial measures (e.g., ROI, ABC). We have formal feedback processes in place to review and take action based on the results of our measures.	25.19%	34
We use a multi-dimensional approach with appropriate weights given to technical, financial, operational, and human-related measures. We have formal feedback processes in place to review and take action based on the results of our measures. These measures are extended to our external partners (e.g., vendors, outsourcers, customers).	14.07%	19
N/A or don't know.	1.48%	2