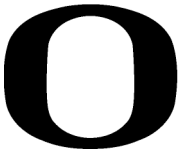

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Five Domains of Information Technology Governance for Consideration by Boards of Directors

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Abstract

for

Five Domains of Information Technology Governance

for Consideration by Boards of Directors

This study provides boards of directors of publicly traded companies with checklists for assessing the practice and structure of their boards in the area of IT governance. IT governance is an integral part of overall enterprise governance (ITGA, 2003) and as such, is the responsibility of boards and executive managers. Five IT governance domains are examined, including IT Strategic Alignment, IT Value Delivery, IT Resource Management, IT Risk Management, and IT Performance Management.

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Chapter I - Purpose of Study

Brief Purpose

The purpose of this study is to develop a set of responsibilities checklists (Brancato & Plath, 2003) of board of directors (board) practice (Brancato & Plath, 2003) and structure (Varallo & Dreisbach, 1996). The focus of the responsibilities checklist is to define the concept of information technology (IT) governance, with focus on five information technology domains (ITGI, 2003). Domains are used as a framework for building an IT governance program.

This responsibilities checklist (Brancato & Plath, 2003) is intended to assist directors of publicly traded companies in identifying effective board practices (Brancato & Plath, 2003) and structures (Varallo & Dreisbach, 1996) within the five IT governance domains identified by the IT Governance Institute (ITGI) (2003) including IT Strategic Alignment, IT Value Delivery, IT Resource Management, IT Risk Management, and IT Performance Management.

This study is intended to provide essential considerations for directors who need to make educated decisions as to how to approach the practice (Brancato & Plath, 2003) and structure (Varallo & Dreisbach, 1996) of their boards, in order to provide IT governance programs as an integral part of overall enterprise governance. High-profile corporate governance failures in the United States have led to new laws and regulations designed to force improvement in organizational governance, security, controls and transparency

(ITGI, 2006). Atkinson and Leandri (2005) describe the impact of this corporate reform legislation on organizational structure,

> "Traditional organizational structure is crumbling under the weight of ever-increasing regulations that drive greater accountability and transparency. Smart companies are on the forefront of building new and improved structures that support and enhance this new compliance environment, and best practices are emerging" (p. 37).

This study is designed as a literature review (Leedy & Ormrod, 2005) in which literature is collected, assessed, and organized for further analysis. Literature published between July 2002 and May 2006 is collected that addresses board practice (Brancato & Plath, 2003) and structure (Varallo & Dreisbach, 1996). Collected literature is then organized by aligning selections with the five domains of IT governance (ITGI, 2003).

Selected literature is analyzed using a conceptual analysis strategy, described by the Colorado State Writing Lab (2006). The goal of the conceptual analysis is to identify elements of IT governance that affect board practice (Brancato & Plath, 2003) or structure (Varallo & Dreisbach, 1996). In this case, the "elements" are defined by words, word groups, phrases and ideas relevant to a pre-defined set of concepts, based on the five IT governance domains (ITGI, 2003). Related concepts, described through sets of words, word groups, phrases and ideas are also identified beyond the pre-defined set of concepts, through contextual reading, as emergent concepts. Specific details of the coding process are presented in the Methods chapter, under Data Collection and Analysis.

Results from the conceptual analysis process are presented in a series of tables, and then re-formatted into a set of requirements checklists, for presentation to the board. Checklists are prefaced by cover letters (Brancato & Plath, 2003). Each cover letter explains the overarching goal of each checklist in summary fashion, in relation to each IT governance domain (ITGI, 2003). Cover letters highlight the most important factors that directors need to know for use in determining if their boards might need to adopt new practices (Brancato & Plath, 2003) or structures (Varallo & Dreisbach, 1996) in order to build an effective IT governance program.

Full Purpose

For many companies, the strategic application of information technology (IT) is the deciding factor between survival and extinction (Williams, 2001, par. 6). Despite the significant role IT plays in business, most boards of directors (boards) have remained largely in the dark when it comes to IT strategy and governance (Nolan & McFarlan, 2005, p.96). However, according to McCollum (2006), the Sarbanes-Oxley Act of 2002 (SOX) has awakened directors and executive managers to their organization's dependence on IT, and the subsequent need to make IT governance a top priority (p. 49).

The purpose of this study is to provide directors (ITGI, 2003) of publicly traded companies with a responsibilities checklist (Brancato & Plath, 2003) for assessing the practice (Brancato & Plath, 2003) and structure (Varallo & Dreisbach, 1996) of their boards in the area of IT governance (ITGI, 2003). Brancato and Plath (2003) describe the responsibilities checklist as an evolving compendium of board responsibilities (p. 106) that is updated annually to reflect changes in regulatory requirements, authoritative guidance and evolving oversight practices (p. 106). The evolving nature of the responsibilities checklist (Brancato & Plath, 2003) makes it well suited for the purpose of defining key factors of IT governance, which is an area of governance that is constantly emerging in new forms of complexity (Peterson, 2004, p.1). To mitigate this complexity, a cover letter (Brancato & Plath, 2003) prefaces each checklist. Cover letters (Brancato & Plath, 2003) are used to interpret the data in relation to the needs of board, and as they reflect on any change to board practice or structure (Varallo & Dreisbach, 1996) needed to build an effective IT governance program.

The Information Technology Governance Institute (ITGI) (2003), (a research think tank with a mission to be the leading reference on IT-enabled business systems governance), describes the overall objective of IT governance thusly: "…to understand the issues of and strategic importance of IT, so that the enterprise can sustain its operations and implement the strategies required to extend its activities into the future" (p.7). Rau (2004) defines IT governance as the way senior management interacts and communicates with IT leaders to ensure that technology investments enable the achievement of business strategy in an effective and efficient manner (p. 35).

Ultimately, IT governance concerns can be framed by two larger overarching goals: 1) the ability of IT to deliver value to the business, which is driven by the strategic alignment of IT with business, and 2) the mitigation of IT risks, which is driven by embedding accountability into the enterprise (ITGI, 2003, p. 19). Within these two larger goals, five domains (focus areas) of IT governance are identified, three of which are drivers and two are outcomes (ITGI, 2003, p. 19). Drivers include IT Strategic Alignment, IT Resource Management, and IT Performance Management. Outcomes include IT Risk Management and IT Value Delivery (ITGI, 2003).

IT governance is an integral part of overall enterprise governance (ITGA, 2003), and as such, is the responsibility of boards and executive managers (ITGI, 2003; Brown & Nasuti, 2005; Nolan & McFarlan, 2005). However, according to Peterson (2004), within the traditional corporate governance structure, directors routinely delegate, avoid, or ignore IT decisions (p.3). This opinion is supported by an IT industry survey that shows that half of all IT executives surveyed believe their boards provide inadequate

oversight of their company's IT activities (Boards of Directors Will Sharpen Focus on IT, 2004).

This lack of attention by boards to IT matters has become a serious problem as, over the last twenty years, IT has moved from providing largely back-office support to becoming the prime facilitator and enabler of the total business (ITGI, 2005, p. 7). IT continues to grow in importance to organizations, both operationally and as a competitive advantage (Damianides, 2005, p.77). For example, today, the reliability of financial reporting is heavily dependent on a well-controlled IT environment (ITGI, 2004, p.5).

The positions of chief executive officer (Hoffman, 2004), chief information officer (Rau, 2004), and chief financial officer (Hoffman, 2004) are all identified as essential to IT governance leadership. These professionals must provide the leadership, organizational structures, and processes that are needed to ensure that IT governance becomes an integral part of overall enterprise governance (ITGI, 2003, p.6). However, the ultimate responsibility for directing a publicly traded company lies with the board (Brancato & Plath, 2003, p. 10) and IT governance should be addressed as any other strategic item on the board's agenda (ITGI, 2003, p.11). Therefore, this study is written for directors on the boards of publicly traded companies because, not only is IT governance ultimately their responsibility, but because they, along with executive managers, are also the most likely champions of corporate governance change within their organizations (Brancato & Plath, 2003, p. 9).

Walt and Ingley (2003) describe boards as "…a mix of competencies and capabilities that collectively represents a pool of social capital for their organization" (p.

218). However, Nadler (2004) acknowledges that in the past boards have been gentleman's-club-era relics of characterized by ceremony and conformity (p. 104). In contrast, for the purpose of this study, boards are characterized as seats of challenge and inquiry as described by Nadler (2004, p. 104).

To successfully integrate IT governance as an integral part of overall enterprise governance, directors must first fully understand their responsibilities (ITGI, 2003). This study is intended to provide a responsibilities checklist (Brancato & Plath, 2003, p. 10) for directors who need to better understand their role and responsibilities in building practice an effective IT governance program. To that end, this study is designed as a qualitative literature review (Leedy & Ormrod, 2005) of changes that have taken place within the boards of publicly traded companies since the passage of the Sarbanes-Oxley Act (SOX) in July 2002. With the passage of SOX in 2002, the notion of IT governance has become a major issue for business practitioners and academics (Brown and Grant, 2005, Abstract). Literature written since July 2002 is collected with a focus on resources that describe board practice (Brancato & Plath, 2003) and structure (Varallo & Dreisbach, 1996).

An eight-step conceptual analysis strategy described by the Colorado State Writing Lab (2006) guides the data analysis process, designed to identify board practices and structures as these align with the five domains of IT governance (ITGI, 2003) listed above. Data analysis begins with the development of an annotated classification of all of the selected materials used in the literature review, categorized in relation to the five domains of IT governance, including IT Strategic Alignment, IT Value Deliver, IT Resource Management, IT Risk Management and IT Performance Management. Then,

materials are coded based on a pre-defined set of coding terms derived from words, word groups, and phrases and ideas used to describe the principles of each IT governance domain (ITGI, 2003). The IT governance domains are chosen as categories for content analysis (Colorado State Writing Lab, 2006) because ITGI (2003) has identified them as a suitable framework for building an IT governance program.

Once coding is complete, raw data is presented in a set of five tables (see Tables 1 – 5) that list the instances of the pre-defined set of coding terms – one table per each IT governance domain (ITGI, 2003). Then the results are further analyzed, and framed as a set of five requirements checklists, each introduced to directors by a cover letter (Brancato & Plath, 2003). Brancato and Plath (2003) observe that quality materials should be provided to boards that effectively explain the situation of the company. Feedback mechanisms should be useful, timely and appropriate of depth. Cover letters are identified as an appropriate feedback mechanism for directors because they highlight the most important issues that directors should be informed of (p. 15). For this reason, cover letters are selected as an artifact most useful in providing directors with feedback on the topic of this study, in partnership with the five requirements checklists.

Each cover letter (Brancato & Plath, 2003) highlights important issues, detailed in the pertinent requirements checklist, relating to board practice (Brancato & Plath, 2003) and structure (Varallo & Dreisbach, 1996), conforming to each IT governance domain. The following five cover letters (Brancato & Plath, 2003) are designed:

- **A cover letter addressing the IT Strategic Alignment requirements checklist.** This letter focuses on how board practice (Brancato & Plath, 2003) and structure

(Varallo & Dreisbach, 1996) can ensure the enterprise's IT investment is aligned with strategic objectives and IT operations are aligned with current enterprise operations (ITGI, 2003, p. 22)

- **A cover letter addressing the IT Value Delivery requirements checklist.** This letter focuses on how board practice (Brancato & Plath, 2003) and structure (Varallo & Dreisbach, 1996) can ensure that IT deliverables are on-time, within-budget, of appropriate quality and deliver the benefits that were promised (ITGI, 2003, 24)

- **A cover letter addressing the IT Risk Management requirements checklist**: This letter focuses on how board practice (Brancato & Plath, 2003) and structure (Varallo & Dreisbach, 1996) can ensure that an effective system of internal controls is in place to manage risks and that risk management is embedded in the operation of the enterprise (ITGI, 2003, p. 27)

- **A cover letter addressing the IT Resource Management requirements checklist:** This letter focuses on how board practice (Brancato & Plath, 2003) and structure (Varallo & Dreisbach, 1996) can ensure the optimal investment, use and allocation of IT resources (people, applications, technology, facilities, data) (ITGI, 2003, p.28)

- **A cover letter addressing the IT Performance Measurement requirements checklist:** This letter focuses on how board practice (Brancato & Plath, 2003) and structure (Varallo & Dreisbach, 1996) can ensure that IT performance is effectively measured (ITGI, 2003, p. 30)

Significance of Study

"The Enron Bankruptcy, accompanied by the WorldCom debacle and other corporate scandals, has caused a sea change in the attention given corporate governance and in how directors are viewed by the public, shareholders, employees, and the courts (Brancato & Plath, 2003, p.7)." These high-profile corporate governance failures have led to new laws and regulations designed to force improvement in organizational governance, security, controls and transparency (ITGI, 2006). As a result of this new legislation, there has been a shake-up in the preexisting roles and responsibilities of directors (Eisenman, 2005. p.4) as well as the structure and function of boards (Orlikoff, 2005, p.3).

More than any other regulation, SOX has created an upheaval in publicly traded companies that has led to the review of organizational structures in order to determine the best framework for supporting ongoing compliance efforts (Atkinson & Leandri, 2005, p. 37). Bostrom (2003) describes the passage of SOX as a means of addressing the failures of traditional corporate governance structures, including the failure of boards to effectively oversee organizational management (Olson and Adams, 2004). Although aspects of board practice (Brancato & Plath, 2003) and structure (Varallo & Dreisbach, 1996) may be mandated by SOX and other reform legislation, the effective function of boards cannot be (Orlikoff, 2005, p. 3). Companies must make efforts to develop responsible, cost-efficient and effective compliance processes and establish accountability structures to ensure a proper level of oversight (Atkinson & Leandri, 2005, Abstract).

To establish a truly sustainable compliance model, not just for SOX but for the range of compliance challenges facing organizations today, companies must decide on the optimal organizational structure to support the work flow, risk controls and communication necessary for effective governance (Atkinson & Leandri, 2005, p. 38). Nadler (2004) observes that the key to better corporate governance lies in the working relationships between boards and executive managers, in the social dynamics of board interaction, and in the competence, integrity and constructive involvement of individual directors (p. 102). Peterson (2004) identifies similar organizational logic for IT governance, which is based on collaboration (abstract).

Change to corporate governance tends to come from two sources: 1) an individual director or executive manager who is a governance champion, or 2) a crisis (Brancato and Plath, 2003, p.9). A crisis has occurred. The high-profile corporate governance failures of companies such as Adelphia, Enron, Tyco and WorldCom brought about a crisis of trust between investors and corporate America (Tapscott and Ticoll, 2003, p. 3). The addition of transparency is identified as the driving force for restoring trust (Pagano & Pagano, 2004; Tapscott and Ticoll, 2003) and IT governance is identified as the driver of transparency across the organization (Richards, 2006). In the wake of this crisis, boards are challenged to develop a governance framework that establishes clear responsibilities and objectives and allows participation from all interested parties (ITGI, 2003). ITGI (2003) identifies the five domains of IT governance as a framework for building an IT governance program.

According to *Board Briefing on IT Governance* (ITGI, 2003), boards understand the strategic importance of IT and have put IT governance firmly on their agenda. However,

there is little advice available to boards on practical IT governance (p.7). Nolan and McFarlan (2005) suggest an even greater absence of information in this area by stating no comparable body of knowledge and best practice exists, and as a result, directors frequently lack the fundamental knowledge needed to ask questions about not only IT risk and expense but also competitive risk (p.98).

Major changes to boards are so complex that many companies don't know where to begin (Nadler, 2004, p. 104). The best mechanisms for addressing the issues of purpose, resources and effectiveness are annual self-assessments (Nadler, 2004, p.104). This paper addresses changes to board practice (Brancato & Plath, 2003) and structure (Varallo & Dreisbach, 1996) as they relate to each of the five IT governance domains (ITGI, 2003). A self-assessment mechanism is offered in the form of a responsibilities checklist (Brancato & Plath, 2003).

Limitations to the Research

In July 2002, the passage of SOX fundamentally changed the business and regulatory environment in America and led organizations to recognize the vital role IT plays in the compliance process (ITGA, 2004, p. 12). For this reason, literature collected for this study is published between July 2002 and May 2006.

By using a time frame based on the passage of SOX, significant work previous to SOX that is synonymous with the current understanding of IT governance (Brown & Grant, 2005, Abstract) is absent in the data. Therefore, this study does not claim to provide a complete framework for assessing the practice (Brancato & Plath, 2003) and

structure (Varallo & Dreisbach, 1996) of boards within the five domains of IT governance (ITGI, 2003).

The time frame limitation for this study may be based on the passage of SOX, but limitations for the examination of governance within the IT organization is not. Limiting this study within the parameters of SOX would focus the examination of IT governance at the control object level (ITGI, 2004). Such a level of examination is more suitable for the study of IT governance related to specific aspects of financial reporting or internal controls. A broader of examination at a higher level is needed for studying the relationships between boards and IT governance.

This study is limited to the broader concepts of IT governance as they are defined within the five domains of IT governance provided by the Information Technology Governance Institute (2003). Domains include: IT Strategic Alignment, IT Value Delivery, IT Resource Management, IT Risk Management, and IT Performance Management. These domains are examined in relation to board practice (Brancato & Plath, 2003) and structure (Varallo & Dreisbach, 1996). This broad limitation is chosen for three reasons: 1) IT is becoming the prime facilitator and enabler of the total business (ITGI, 2005, p. 7), 2) IT governance is considered an integral part of overall enterprise governance (ITGA, 2003), and 3) the board is tasked with managing the total enterprise (Varallo & Dreisbach, 1996, p.1). Since the five IT governance domains (ITGI, 2003) provide such a broad conceptual framework, no additional categories are added during coding to describe IT governance.

For the purpose of this study, "board practice" is defined as the board activities described by Carolyn Kay Brancato and Christian A. Plath in *Corporate Governance Best Practices: A Blueprint for the Post-Enron Era*. Brancato and Plath (2003) state that historically, board practices involve the basic legal requirements, as well as "management" skills of individual directors and the board as a whole in the areas of loyalty, care, leadership, disclosure and management of the total enterprise – these requirements and skills are often described as oversight. Board structure is defined by the factors described by Gregory V. Varallo and Daniel A. Dreisbach in *Fundamentals of Corporate Governance*. These factors include: board size, makeup, the composition and function of committees and efforts to create boards in which directors can readily assert their actual independence from corporate management.

This study is designed as a literature review (Leedy & Ormrod, 2005) and uses a conceptual analysis strategy (Colorado State Writing Lab, 2006). Selected literature consists of articles and research related to board practice (Brancato & Plath, 2003) and structure (Varallo & Dreisbach, 1996). To align resource material with the five domains of IT governance (ITGI, 2003) a set of pre-defined terms relative to each domain is created for the purpose of coding (Colorado State Writing Lab, 2006). The pre-defined terms are derived from the descriptions of the domain that are found in *Board Briefing on IT Governance* (2003).

A literature review (Leedy & Ormrod, 2005) is chosen as the research method because it provides a systematic approach to identifying factors of board practice (Brancato & Plath, 2003) and structure (Varallo & Dreisbach, 1996) that affect IT governance as they appear in selected literature. A conceptual analysis strategy, described

by the Colorado State Writing Lab (2006), was chosen to provide procedures that collectively act as a scientific tool (Krippendorff, 2004, p.18) to quantify a pre-defined set of IT governance concepts during the literature review (Leedy & Ormrod, 2005). Due to the evolving nature of IT governance (Peterson, 2004) concepts related to the topic may not be described in the same terms in different pieces of literature. For this reason, a content analysis approach is most valuable to this study because rules of translation can be established (Colorado State Writing Lab, 2006), which allow different terms with the same meaning to be categorized as a single term.

There is no one size fits all solution to IT Governance (Rau, 2004, p. 35). For this reason, this study does not attempt to provide strategies for IT governance planning and implementation; but only to summarize concepts that can assist the reader in making educated decisions as to how the practice (Brancato & Plath, 2003) and structure (Varallo & Dreisbach, 1996) of their boards can best build effective IT governance programs.

Brancato and Plath (2003) observe that the effectiveness of the board ultimately depends on the quality and timeliness of the information directors have at their disposal (p. 14) Cover letters, tied to a set of requirements checklists, are identified as a best practice feedback mechanism for highlighting the most important issues that directors should know (Brancato & Plath, 2003, p. 15). Cover letters act as a tool for this researcher to provide a narrative of the raw data, initially presented through tables, in the context of a business issue.

The responsibilities checklists (Brancato & Plath, 2003) provided by this study are not intended to be a complete reference for aligning board practice (Brancato & Plath,

2003) and structure (Varallo & Dreisbach, 1996) with IT governance initiatives. The terms, concepts and ideas expressed and defined within the responsibilities checklists are limited only to the data retrieved from the literature. It is the goal of this researcher that the responsibilities checklists will provide directors, lacking IT experience, with an initial understanding of how factors of IT governance impact their oversight responsibilities and the structure of their boards.

This study is limited only to the boards of publicly traded companies in the United States and abroad that are reporting companies (i.e. that have registered equity or debt securities with the S.E.C. under the Exchange Act) (Lander, 2004, p. 2). Issues addressed in this study may also be relevant to the boards of non-profits and foreign companies that are not reporting companies. However, the boards of those companies are not required to comply with SOX. Since SOX is used to establish time frame and context of this study, only boards impacted by the legislation are included.

Problem Area

Although the term "IT governance" is a relatively new addition to the syntax of academic research (Brown & Grant, 2005, Abstract), the fundamental concepts of IT governance were first addressed in the 1960s (Brown & Grant, 2005, p. 698). In 1963, *Harvard Business Review* published the findings of a survey (Garrity, 1963) that was conducted to study organizational factors leading to increased return on technology investment (Garrity, 1963; Brown & Grant, 2005). The survey included questions that resemble the current notion of IT governance, including the following questions that

address the quality of executive leadership (Garrity, 1963 p. 10; Brown & Grant, 2005, p. 698):

- Does top management devote time to computer systems in proportion to its cost and potential?
- Does top management review plans and follow up on computer systems results?
- How many levels below the chief executive is the computer executive (i.e. the executive to whom the computer systems manager reports).
- Is the computer executive in the financial-accounting department?

Garrity (1963) found that in companies with the highest returns on technology investment the time executive management dedicated to computer systems was proportional to the cost and potential of the systems (p. 10). Garrity (1963) also found that these executives focus their time on reviewing plans for computer systems and then following up on the results achieved (p. 10).

Since Garrity (1963), research of IT governance follows two areas of study that run parallel to each other (Brown & Grant, 2005): 1) IT governance forms and 2) IT governance contingency analysis.

The study of IT governance forms deals with the decision-making structures adopted by IT organizations (Brown & Grant, 2005, 2005, p. 699). Early studies in this area focused on the notion of centralized and decentralized decision-making frameworks (Brown & Grant, 2005, p. 699). Subsequent research provided a more sophisticated understanding of these frameworks, which led to a direct association between IT

governance and the underlying decision-making structures adopted by individual IT organizations (Brown & Grant, 2005, p. 699).

Researchers of IT governance contingency analysis try to understand the effective factors of IT governance frameworks to determine which options may be the best fit for an organization (Brown & Grant, 2005, p. 703). So far, researchers are unanimous in their opinion that a universal best IT governance structure does not exist (Brown & Grant, 2005, p. 703). The unanimous agreement of previous researchers to the idea of no universal best IT governance existing (Brown & Grant, 2005, p. 703) lends credence to the utility of a literature review (Leedy & Ormrod, 2005) as an effective methodology for providing multiple perspectives on this topic.

This study is similar to an IT governance contingency analysis in that it provides practical factors of effective IT governance in the areas of board practice (Brancato & Plath, 2003) and structure (Varallo & Dreisbach, 1996). However, this study cannot be categorized as an IT governance contingency analysis because no single organization is the focus of research and any IT governance framework described within is limited in scope to the practice and structure of boards.

Galliers and Leidner (2003) observe that the most important result of using computer technology as a tool for business is the growing realization that technology itself cannot solve problems (p. 19). Instead, the impact of technological change depends on why and how technology is used (Galliers & Leidner, 2003, p. 19). As management now has a decision-making role in the use of technology, these decisions can be evaluated within the context of business and organizational choices (Galliers &

Leidner, 2003, p. 19). For this reason, companies have adopted a planned approach to their information systems, which is commonly referred to as "strategic system planning" (Galliers & Leidner, 2003, p. 19). Today, IT governance can be framed within the larger field of strategic system planning (Galliers & Leidner, 2003) as corporations direct their focus from compliance as a necessary evil to compliance as a competitive advantage (Damianides, p. 77, 2005).

On July 30, 2003, exactly one year after the passage of SOX, William Donaldson, Chairman of the U.S. Securities and Exchange Commission, spoke before the National Press Club about the relationship between compliance and competitive advantage:

> "…if companies view the new laws as opportunities – opportunities to improve internal controls, improve the performance of the board, and improve their public reporting – they will ultimately be better run, more transparent, and therefore more attractive to investors. (S.E.C., 2003)"

Garrity (1963) demonstrates that the relationship between IT governance and competitive advantage is not a recent phenomenon. By the mid-1980s a new strategic role had emerged for computers as they were moved out of the back room and into the "sharp end" of the business (Galliers & Leidner, 2003, 19). Researchers and practitioners began pointing towards the need to link information systems with business and connect business strategy with information system strategy (Galliers & Leidner, 2003, p. 20).

Like Garrity (1963), Weil and Ross (2004) have studied the profitability of IT governance and found that companies with effective IT governance programs have

profits that are 20% higher than other companies pursuing similar strategies (p. 1). The survey conducted by Weil and Ross (2004) also aligned with Garrity (1963) in finding that leading companies have senior business leaders making the major IT decisions (Abstract).

The strategic value of IT governance merits that it be treated like any other strategic item on the boards agenda (ITGA, 2003, p. 11). This means that boards must be clear on their own responsibilities and those of management (ITGA, 2003, p. 11). From Garrity (1963) to Weil and Ross (2004), the relationship between IT governance and competitive advantage has been established. Ultimately, boards should not consider IT governance as a matter of compliance, but within the larger concern of competitive advantage (ITGA, 2003, p. 13). Herein lies the problem area that places the purpose of this study in a larger context as described by Ide and Balloon (2005), "…despite fundamental changes in the marketplace and attitudes towards corporations generally, most directors have not transitioned their thinking to the requirements of this new era and incorrectly assume that what has been done in the past is adequate for today" (p. 2).

Chapter II – Review of References

The review of references provides an annotated bibliography of key references used to frame and develop this study. References are presented in alphabetical order. Each review describes how the reference was used in the study and the criteria upon which the credibility of the reference is established.

Board Briefing on IT Governance (2003). Information Technology Governance Institute. Retrieved March 28, 2006 from http://www.itgi.org/Template_ITGI.cfm?Section=Best_Practices&CONTENTID=15994&TEMPLATE=/ContentManagement/ContentDisplay.cfm

This paper specifically addresses boards of directors and provides a framework of domains that can be used to conceptualize IT governance. The authors of the reference discuss IT governance as a responsibility of boards that is integral to enterprise governance. The authors stress the importance of directors understanding the issues of and strategic importance of IT within their organizations. The underlying theme and purpose of this reference is that directors should understand their IT governance responsibilities, as well as management's responsibilities, and develop a system to deliver on these responsibilities.

This reference is the single most important one in the study. It is used both as a reference to support content and as material selected for data analysis. The five domains of IT governance defined by this reference serve as limitations for the conceptual scope of IT governance within this study. These domains provide the pre-defined content areas

and coding terms used in the data analysis. The data presentation of this study provides outcomes framed by the domains through a set of cover letters and responsibility checklists. Furthermore, within the Purpose and Significance of Study, this reference is used to define IT governance and describe the IT governance oversight responsibilities of boards.

The Information Technology Governance Institute (ITGI) was established in 1998 to advance international thinking and standards in directing and controlling information technology. By hosting conferences and offering original research and case studies, ITGI assists enterprise leaders and boards of directors in their responsibilities regarding IT governance. ITGI helps ensure that IT is aligned with business objectives, delivers value, is measured, mitigates risks and is properly allocated (CIO Spotlight: Information Security, n.d).

ITGI is referenced in peer-reviewed articles about IT governance that are located through the Business Source Premier database, including Damiandes (2005). Marios Damianides is the author of technical and business articles that focus on IT security and enterprise systems management. In 2003, Damianides was elected international president of the Information Systems Audit and Control Association (ISACA); a standards and professional organization for information governance, control, security and audit professionals (Marios Damianides Elected International President of ISACA, 2003).

Brancato, C. K. & Plath, C.A. (2003). Corporate Governance Best Practices: A Blueprint for the Post-Enron Era. New York: The Conference Board.

Brancato and Plath describe a "sea change" in the attention given to corporate governance and boards since the bankruptcy of Enron. Based on the assumption that significant change has indeed taken place, this reference provides a framework for board practice that can be adopted in order for boards to be more responsive to new levels of exposure, scrutiny and compliance requirements.

Board practices, as described by Brancato and Plath, are used to frame the Limitations of board practice for the purpose of this study. These practices are based on the changes that are necessary in the "Post-Enron Era" as well as two basic requirements that shape the fiduciary role of directors:

- the *duty of care* to be informed and exercise appropriate diligence in making decisions and to oversee the management of the corporation; and
- the *duty of loyalty* to put the interests of the corporation before those of the individual director.

Besides Limitations, Brancato and Plath significantly shape the presentation of data in this study. This reference describes the role of cover letters and responsibilities checklists as best practice feedback mechanisms and educational resources for boards. Since the objective of this study is to educate directors on their IT governance oversight responsibilities, these documents are selected as outcomes for presenting results.

This reference is published by the Conference Board, which is a non-profit organization founded in 1916 and dedicated to studying the interaction of corporations with their communities in areas such as environment, health, safety and sustainability. Brancato serves as the Director of the Conference Board's Global Corporate Governance

Research Center, which is an online resource for the Wharton School of the University of Pennsylvania (Centers & Networks, n.d.).

Brown, A.E. & Grant, G.G. (2005)**.** Framing the Frameworks: A Review of IT Governance Research. Communications of AIS. 15. 696-712. Retrieved March 28, 2006 from Business Source Premier database.

Brown and Grant describe the evolution of IT governance research through a literature review of existing research. This review helps to qualify the time-frame limitation to this study, by establishing that significant research of IT governance, synonymous with the current understanding of the concept, began as early as 1963. The time-frame addressed in this study begins July 2002 with the passage of the Sarbanes-Oxley Act of 2002. Therefore, this study does not claim to provide a complete historical framework for assessing IT governance concepts related to board practice and structure. The evolution of IT governance research described by Brown and Grant is also used to frame the Problem Area of this study in a larger historical context that describes the relationship between IT governance and competitive advantage.

Grant earned a Ph.D. in Information Systems at the London School of Economics and Political Science. He is currently an Associate Professor of Information Systems at the Eric Sprott School of Business, Carleton University in Ottawa, Canada. Allen is a Ph.D. candidate in management at Eric Sprott School of Business.

Colorado State Writing Lab (2006). Steps for Conducting Conceptual Analysis. Colorado State University. Retrieved April 4, 2006 from: http://writing.colostate.edu/guides/research/content/pop3b.cfm

This reference is used to guide the development of the research design of this study. The Colorado State Lab, an online resource of Colorado State University, provides a discussion of eight steps that can be followed to code a text during conceptual analysis. Each of these steps, an overview of the methodology, and a set of key terms is used to describe and construct the Purpose and Method of this study. The University of Oregon's Applied Information Management Program recommends this resource as a research procedure for conceptual analysis.

Damianides, M. (2005). Sarbanes-Oxley and IT Governance: New Guidance on IT Control and Compliance. Information Systems Management. 22. 77-85. Retrieved March 28, 2006 from Computer Source database

This reference presents an IT governance framework designed to meet raised expectations for information asset security and information reporting. The framework is based on a case study of Charles Schwab & Co., a financial services corporation. The reference includes a series of questions directors could ask to evaluate the level of their IT organization. These questions and other areas of the case study are selected to be used as part of the data set for content analysis.

Damianides recognizes that the focus on IT governance will only grow as the role of IT grows in importance operationally and competitively for organizations. However,

Damianides also recognizes that some organizations no longer see compliance as a necessary evil, but as a competitive advantage. These observations are used in the Purpose and Problem Area, respectively, to identify competitive advantage as the larger concern of IT governance.

Marios Damianides is the author of technical and business articles that focus on IT security and enterprise systems management. In 2003, Damianides was elected international president of the Information Systems Audit and Control Association (ISACA); a standards and professional organization for information governance, control, security and audit professionals (Marios Damianides Elected International President of ISACA, 2003).

Enterprise Value: Governance of IT Investments. The ING Case Study. (2006). Information Technology Governance Institute. Retrieved April 26, 2006 from http://www.itgi.org/AMTemplate.cfm?Section=Deliverables&Template=/ContentManagement/ContentDisplay.cfm&ContentID=24260

This reference forms part of the VAL IT™ initiative of the Information Technology Governance Institute (ITGI). The purpose of the VAL IT™ initiative is to assist organizations in optimizing the value of their IT investments. A case study of ING, a financial services company, is used to study the portfolio management of IT investments and analyze ING's approach in the context of the VAL IT framework. Best practices are offered based on an analysis of methods used to measure, monitor and optimize the business value from investment in IT.

Concepts of the VAL IT™ related to value delivery are shared by IT governance. Furthermore, the elements of board practice and structure are described in the case study. For these reasons, this reference selected as one entry in the data set for content analysis. ITGI, the publisher of this reference, is a research think tank established in 1998 to advance international thinking and standards in directing and controlling information technology through original research, case studies and the hosting of conferences(CIO Spotlight: Information Security, n.d).

Information Security Governance: Guidance for Boards of Directors and Executive Management (2006). Information Technology Governance Institute. Retrieved March 28, 2006 from http://www.itgi.org/ContentManagement/ContentDisplay.cfm?ContentID=24384

The Information Technology Governance Institute (ITGI) has published this reference to assist directors and executive managers in better understanding elements of information security governance and their oversight responsibilities in this area. The authors describe information security governance as the leadership, organizational structures and processes that safeguard information. Information security governance must be an integral part of enterprise governance and aligned with the IT governance framework. For this reason, this reference is selected as one entry in the data set for content analysis. Coding reveals any presence of concepts describing IT governance and information security governance.

ITGI is a research think tank established in 1998 to advance international thinking and standards in directing and controlling information technology through original research, case studies and the hosting of conferences(CIO Spotlight: Information Security, n.d).

Tapscott, D. & Ticoll, D. (2003). The Naked Corporation: How the Age Transparency Will Revolutionize Business. New York: Free Press

This is a key reference for conceptualizing IT governance within the larger context of transparency. Tapscott and Ticoll contend that transparency is the most important issue in today's business environment. Transparency is defined as going beyond the obligation of a corporation to disclose information, but to also include the ability of the public, stakeholders and other organizations to scrutinize corporations using the Internet and other tools. Tapscott and Ticoll believe transparency should be embraced by corporations not just as a matter of integrity or legality, but also out of economic necessity. Examples are given of corporations optimizing transparency to become more competitive and profitable.

This reference serves the larger contextual framework of this paper in two areas. First as a matter of reform, Tapscott and Ticoll describe the Sarbanes-Oxley Act of 2002 (SOX) as the largest leap in corporate transparency since the securities laws of 1932. IT governance has been as the driver of transparency across the organization. Secondly, Tapscott and Ticoll describe the relationship between transparency and improved business value. This characterization of transparency aligns with characterizations of IT governance supporting improved business value. By using this reference in the

Significance of the Study to place IT governance within the larger context of transparency, IT governance can be described as a tool for business reform and competitive positioning within the Problem Area.

Tapscott and Ticoll have written several books on emerging business trends and have published articles in the Harvard Business Review, Forbes, Business 2.0, Intelligent Enterprise and the Wall Street Journal,

Varallo, G.V. & Dreisbach, D.A. (1996). Fundamentals of Corporate Governance. Chicago. American Bar Association.

Varallo and Dreisbach provide a guide for directors on fundamental issues of corporate governance. Although this reference was published prior to the passage of the Sarbanes-Oxley Act of 2002 (SOX), Varallo and Dreisbach recognize that institutional investors and the emerging global marketplace "…will powerfully exert transformative pressure on corporate governance structures (p. xi)." Board structural issues are identified as the cause of much public scrutiny, especially in the area board independence.

Limitations of "board structure" are set for the purpose of this study by characteristics of board structure described by Varallo and Dreisbach. Citations used by the authors for referencing elements of board structure include Federal laws, New York Stock Exchange manuals, business law reviews and the Wall Street Journal. Varallo and Dreisbach have published several books and numerous articles on corporate governance matters. They are both attorneys specializing in business law.

Chapter III – Method

The Larger Method of Study

The research method chosen for this study is literature review (Leedy & Ormrod, 2005). There is no one size fits all solution to IT Governance (Rau, 2004, p. 35). Because of this, a qualitative approach (Leedy & Ormrod, 2005) is chosen as the most suitable. This approach enables the collection of literature providing multiple perspectives on the topic. A qualitative approach also serves the purpose of revealing the nature of certain processes, relationships and systems that are included in the framework of IT governance and boards, as revealed in the literature (Leedy & Ormrod, 2005, p. 134).

The purpose of the study is to collect and analyze literature related to the role of information technology (IT) within IT governance, concerning both the practice (Brancato & Plath, 2003) and structure (Varallo & Dreisbach, 1996) of boards of directors (boards). A literature review method (Leedy & Ormrod, 2005) is well suited for addressing this purpose because it enables the collection and review of current perspectives. The currency of literature is essential for this study in order to support the effectiveness of factors today, as provided in the final set of responsibilities checklists (Brancato & Plath, 2003).

Literature Collection

The first step taken in the data collection process is to search academic databases and the World Wide Web in order to gain confidence that this topic could be studied through a literature review. Preliminary searches reveal an acceptable amount of

literature on which to base a literature review. More thorough searches are conducted for material published between July 2002 and March 2006 and relevant specifically to sources addressing the relationship between IT governance and boards in publicly traded American companies.

During this stage of research, literature is reviewed for use as source material, along the following selection criteria:

- Material describing traditional or emerging board structures, profiles and/or management practices;
- Material articulating the relationship between IT governance and boards; and
- Material describing how boards deal with change.

Sources emerge that serve to frame the research problem and also to comprise the data pool for content analysis. These sources include the following books serving as key resources, obtained from the University of Oregon libraries:

Brancato, K.B. & Plath, C.A. (2003). Corporate Governance Best Practices: A Blueprint for the Post-Enron Era. New York: The Conference Board.

Varallo, G.V. & Dreisbach, D.A. (1996). Fundamentals of Corporate Governance. Chicago, American Bar Association.

Academic databases used to collect literature are accessed from the University of Oregon Libraries (http://libweb.uoregon.edu/) include: Business Source Premier, Computer Source, Hein Online and Google Scholar. The following key search terms are used to collect articles and other research material for use in this study:

- "IT governance" + "boards"
- "IT governance" + "corporate governance"
- "management practices" + "boards"
- "structure" + "boards"
- "organization" + "boards"
- "change management" + "boards"
- "Sarbanes-Oxley" + "boards"
- "Sarbanes-Oxley" + "Enron"

Searches that produce the most relevant articles include the term "IT governance." Without including this specific field of governance within searches, articles pertaining to board practice (Brancato & Plath, 2003) and structure (Varallo & Dreisbach, 1996) will describe characteristics within the broad spectrum of corporate governance.

A review of online resources leads to websites maintained by organizations that provide material with a high degree of relevance to this study and help to frame the research problem. For the purpose of this study, resources made available through the website of the Information Technology Governance Institute (ITGI) were most useful. The resources provided by ITGI include IT governance articles, research papers, best practices and case studies related to board practice (Brancato & Plath, 2003) and structure (Varallo & Dreisbach, 1996). Similar resources were located through the website maintained by the Center for Information Systems Research (CISR), which is part of the

Sloan School of Management at the Massachusetts Institute of Technology (MIT). The mission of CISR is to develop concepts and frameworks that help executives address IT-related challenges.

The following figure (see Figure 1: Relevant Websites) documents the websites that are used to collect literature:

Information Technology Governance Institute	www.itgi.org
Sarbanes-Oxley	www.sarbanes-oxley.com
Securities and Exchange Commission	www.sec.gov
Directorship	www.directorship.com
Corporate Governance	www.corpgov.net
Center for Information Systems Research	www.mitsloan.mit.edu
Information Systems Audit and Control Association	www.isaca.org

Figure 1. Relevant Websites

Data Collection and Analysis

A final set of references for use as the data analysis set is obtained, consisting of eleven sources. Sources in the data set are listed in Appendix D.

Selected literature is analyzed using an eight-step conceptual analysis strategy described by the Colorado State Writing Lab (2006). This strategy is chosen because it provides the researcher with the tools to record the existence of varied relevant concepts that describe the relationship between IT governance and the practice (Brancato & Plath, 2003) and structure (Varallo & Dreisbach, 1996) of boards. An explanation of how each of the eight steps is applied in this study follows.

1. Decide the Level of Analysis:

For the purpose of this study, the level of analysis is focused on five key concepts that are based on the domains of IT governance (ITGI, 2003). Each concept is amplified by a definition and a preliminary list of specific coding terms. Definitions and coding terms are derived from the *Board Briefing on IT Governance,* which provides a description of each IT governance domain based on the principles of the domain.

2. Decide how many concepts to code for:

Pre-defined concepts that act as categories for content analysis are based on the five domains of IT governance (ITGI, 2003): IT Strategic Alignment, IT Value Delivery, IT Risk Management, IT Resource Management, and IT Performance Management. The IT

governance domains are chosen as categories for content analysis (Colorado State Writing Lab, 2006) because ITGI (2003) has identified them as a suitable framework for building an IT governance program. Since the five IT governance domains (ITGI, 2003) provide a broad conceptual framework, no additional categories are added during coding to describe IT governance.

3. Decide whether to code for existence or frequency:

Based on principles used to describe each of the five IT governance domains (ITGI, 2003), a set of coding terms in established. Terms are coded for existence. This means that no matter how many times a word, word group, or phrase appears in the text it is counted only once (Colorado State Writing Lab, 2006).

4. Decide how you will distinguish among concepts:

A level of generalization (Colorado State Writing Lab, 2006) is provided that allows sets of words, word groups, phrases and ideas to be recorded as the same even when they appear in different forms, yet still seem to concern one of the pre-defined terms. This level of generalization is necessary when analyzing concepts related to IT governance, which remains an ephemeral and "messy" phenomenon (Peterson, 2004, p.1).

An example of generalization in this study would be the concept of "alignment" being described as "harmony." At this point, the researcher applies translation rules (Colorado State Writing Lab, 2006) to determine if the two words mean radically different things or if they can be coded as the same thing, i.e. "words describing IT strategic alignment" (Colorado State Writing Lab, 2006).

5. Develop rules for coding your text:

The following translation rules (Colorado State Writing Lab, 2006) are developed to manage the consistency of coding and level of generalization:

- Each instance of generalization is evaluated on a case by case basis, through careful review of context;
- If the concept being coded can be categorized within the pre-defined set of coding terms for the larger category, then generalization is acceptable;
- If the concept being coded cannot be categorized within the pre-defined set of coding terms for the larger category, then the concept is excluded;
- If an emergent concept is identified, relevant to the coding terms and the larger coding concept; then the concept is included in a separate table.

6. Decide what to do with "irrelevant" information:

Since IT governance is a field that is always constantly evolving (Peterson, 2004), all information is regarded as relevant if it meets the criteria described in Step 5. New information may be used to reexamine, reassess, and perhaps even alter the coding scheme (Colorado State Writing Lab, 2006). However, irrelevant information is not tracked for the purposes of this study.

7. Code the texts:

This researcher conducts coding by reading through the text and manually writing down occurrences of the pre-defined and related coding terms (Colorado State Writing Lab, 2006). The coding of terms initially takes place directly in the literature piece, through a customized form of notation. Coding results are then entered into an Excel

spreadsheet. An example of the coding template, which is designed for each pre-defined content category, can be seen below, in Figure 2. Column one lists the domain in question, a definition of the domain provided by ITGI (2003), and the pre-defined coding terms. These coding terms are derived from principles noted by ITGI (2003) to describe each domain. The principles of each domain are located in Figure 3. Column two of Figure 2 references the literature source. Columns three and four provide factors concerning the integration of each domain with board practice (Brancato & Plath, 2003) and structure (Varallo & Dreisbach, 1996) respectively.

IT Domain #1: IT Strategic Alignment			
Definition: Focus on aligning IT with the business and collaborative solutions.			
Pre-defined Coding Terms	**Source**	**Factors Relating to Integration in Board Practice**	**Factors Relating to Integration in Board Structure**
• alignment			
• business strategy			
• competitive advantage			
• enterprise strategy			
• IT strategy			

Figure 2: Coding Template

	Principles of Domain (ITGI, 2003)
Domain **IT Strategic Alignment**	• IT investment aligned with strategic objectives (p.22) • IT operations are aligned with enterprise operations (p.22) • IT strategy supports enterprise strategy (p.22) • To be better aligned than competitors (p.22)
Domain **IT Value Delivery**	• Deliverables achieve the benefits that were promised (p.24) • Deliverables provide appropriate quality (p.24) • Deliverables are on-time (p.24) • Deliverables are within-budget (p.24)
Domain **IT Risk Management**	• Accept - Formally acknowledge that the risk exists and monitor it (p.27) • Mitigate – Implement controls (p.27) • Transfer – Share risk with partners or transfer to insurance coverage (p.27)
Domain **IT Resource Management**	• Align and prioritize existing IT services that are required to support business operations (p.28) • Management of the life cycle of hardware, software licenses, service contracts, and permanent and contracted human resources (p.28) • Organize IT resources optimally so that the required (p.28) • Oversee and monitor both internal and outsourced IT services (p.28)
Domain **IT Performance Management**	• Define clear goals and good measures that unequivocally reflect the business impact of IT goals (p.30)

Figure 3: Principles of IT Governance Domains

Data Presentation

8. Analyze your results:

Once coding is complete and data initially identified as "irrelevant" have been reanalyzed, data are examined to draw whatever conclusions and generalizations are possible, as suggested by Palmquist (Colorado State Writing Lab, 2006). Results from the conceptual analysis process are initially presented in a set of five tables, representing each of the IT governance domains (ITGI, 2003) domains. A template for the design of these tables is presented above, in Figure 2: Coding Template. Tables are used to list the definition of each domain, along with factors related to the integration of this domain within board practice and board structure. Finished tables (see Tables 1 – 5) are presented in Appendix A – Results Tables.

Results tables are a raw outcome and do not explain data within any business context. For this reason, tables are then re-formatted into a set of responsibilities checklists (Brancato & Plath, 2003) to provide directors with a compendium of board responsibilities in each IT governance domain (see Appendix C).

As an additional outcome used to supplement each checklist, cover letters (Brancato & Plath, 2003) are used. The purpose of cover letters is to provide a clear and concise narrative overview (npguides, 2006) of the findings in each IT governance domain as it affects the practice (Brancato & Plath, 2003) and structure (Varallo & Dreisbach, 1996) of boards. Cover letters are intended to summarize the results of the data analysis by highlighting the most important factors in each IT governance domain (ITGI, 2003) that directors should be aware of. Brancato and Plath (2003) state that cover letters are a

useful feedback mechanism for explaining issues to directors (p. 15). Discussion of the checklists and cover letters is presented in the Conclusion chapter of this paper.

Operationally, this researcher intends that before a board begins any IT governance planning, the cover letters (Brancato & Plath, 2003) and responsibilities checklists (Brancato & Plath, 2003) should be distributed to directors as educational tools. Cover letters provide a narrative to describe key factors of how board practices (Brancato & Plath, 2003) and structures (Varallo & Dreisbach, 1996) function in order to build effective IT governance programs. The responsibilities checklists translate factors initially listed in the results tables and then described in the cover letters into responsibilities that the board should adopt in order to meet their IT governance oversight requirements.

Chapter IV – Analysis of Data

This chapter introduces the results of the conceptual analysis of 11 references (see Appendix A) on the subjects of IT governance and its impact on the practice (Brancato & Plath, 2003) and structure (Varallo & Dreisbach, 1996) of boards of directors (boards). Conceptual analysis methodology is based on the eight-step method described by the Colorado State Writing Lab (2006) and outlined in the Data Collection and Analysis.

The conceptual analysis for this study uses a set of pre-defined concepts based on the five domains of IT governance (ITGI, 2003): 1) IT Strategic Alignment, 2) IT Value Delivery, 3) IT Risk Management, 4) IT Resource Management, and 5) IT Performance Management. References are coded using pre-defined terms that are derived from the principles of these domains as noted in ITGI (2003). The coding process also provides this researcher with the opportunity identify emergent factors (see Appendix A) related to the initial set of five coding concepts that are not part of the pre-defined set of coding terms.

A table for each pre-defined coding concept (i.e., the five domains) is presented in Appendix A to display the raw data from the conceptual analysis. Tables are then reformatted into a set of requirements checklists (Brancato & Plath, 2003) as described in the Data Presentation section of the Method chapter. Each requirements checklist is prefaced by a cover letters (Brancato & Plath, 2003). These final artifacts, examined in the Conclusions chapter of this paper, are designed as educational tools that can be used by directors to better understand their IT governance oversight responsibilities.

Coding begins as a manual process by highlighting predefined terms within the text of each reference. Pre-defined terms are coded only in instances where they describe the impact of IT governance on the practice (Brancato & Plath, 2003) or structure (Varallo & Dreisbach, 1996) of boards. For example, a reference describing IT strategic alignment as a competitive advantage without establishing a relationship between IT strategic alignment and boards would not be coded. A reference describing the role of the board in overseeing the development of IT strategic alignment to achieve competitive advantage would be coded.

The manual coding process also includes coding of any emergent concepts within each reference. An emergent concept is a new concept that is relevant to the pre-defined coding terms and the larger coding concept. An example of an emergent concept is that IT resource management can lead to the development of a company's intellectual assets. This concept is considered to be emergent because the ITGI (2003) only describes IT resource management in terms of IT and human resources.

During the initial coding process, translation rules are further defined. For example, the term "IT strategy committee" is identified as equal in its relationship to the pre-defined terms as the term "board." IT strategy committees may be comprised entirely of board members, but they may also include executive managers and external IT experts. The role of the IT security committee is to provide guidance to the board on its IT oversight responsibilities. Coding reveals that the terms "IT security committee", "IT governance committee" and "IT steering committee" are used interchangeably

throughout the references, sometimes within a single reference. Within of the final outcomes of this study the term “IT strategy committee” is used.

Once manual coding is complete, terms coded from the text are transferred to excel spreadsheets, taking care to maintain the concept or phrase in which they exist. A spreadsheet is created for each concept category. Within each spreadsheet the coding results for the pre-defined terms are listed followed by any emergent factors that were located related to the concept category. Within the spreadsheet, terms coded from the text are also bolded to highlight their relationship to pre-defined coding terms or the concept category. Figure 4 displays the distribution of pre-defined coding terms within each reference.

To present results as final outcomes, tables are reformatted into a set of requirements checklists (Brancato & Plath, 2003). To determine which concepts and phrases should be considered requirements, this researcher examines the coding tables and identifies key concepts and phrases that were coded from the text.

To be considered a requirement, a coded phrase or concept must describe a high-level oversight responsibility of the board. If the concept or phrase describes a board activity that implements an oversight responsibility, that concept or phrase is described in the cover letter (Brancato & Plath, 2003) that prefaces the requirements checklist Brancato & Plath, 2003). For example, the following requirement is identified for IT risk management:

- Monitor the effectiveness of internal controls

The cover letter prefacing the responsibilities checklists for IT risk management identifies business process control standards, which could be used to implement and monitor internal controls.

When a concept is identified in more than one reference, but phrased differently, this researcher must determine how the concept can best be translated as a requirement. For example, the following phrases are used to describe IT strategic alignment:

- Technology investment decisions are aligned with business goals (ITGI, 2004, par.22)
- IT strategy becomes a fully integrated part of business strategy, thus maximizing alignment (ITGI, 2006, p.13)

Within the responsibilities checklist for IT strategic alignment, this research consolidates both phrases to create the following requirement:

- Ensure that IT strategy is aligned with business strategy

Results

The purpose of this section is to summarize the report of data in the responsibilities checklists (Brancato & Plath, 2003). Summaries include the presence or absence of factors in each domain and what these factors address.

Domain #1: IT Governance Strategic Alignment

Coding of the IT strategic alignment domain reveals the presence of more pre-defined terms than any of the other concept categories. All of the references used to form the content analysis data set for this study include at least two of the pre-defined terms for IT strategic alignment.

The goal during this coding process is to identify discussion of IT in support of business strategy. The alignment between the pre-defined coding terms "IT strategy" and "business strategy" appear in ten of the eleven references. And while the presence of the pre-defined coding term "competitive advantage" does not appear in the context of this specific alignment, competitive advantage is examined in relation to compliance processes. Therefore, "competitive advantage" is coded as an emergent concept.

Coding results reveal that board responsibilities for the alignment of IT and business not only exist as a strategic concern, but also as an investment concern. Two references describe the alignment between IT investment decisions and business goals. Monitoring of the strategic importance of IT within the organization is also coded for.

Alignment is also revealed as a concept of board structure. Two references respectively describe the alignment of the IT strategy committee with the business strategy committee and the audit committee. The role of a board-level IT strategy committee is to provide governance over IT. Coding results reveal the presence of the IT committee in all five concept categories.

Domain #2: IT Value Delivery

The goal during this coding process is to identify discussion of IT in support of value added to the business. Coding results reveal that alignment is noted when IT can deliver value to the business. Six of the eleven references coded describe the responsibility of the board to ensure management has put processes and practices in place that deliver provable value to the business.

As a factor of board structure, coding results reveal that the IT strategy committee should partner with the business strategy committee on value delivery and alignment with IT. Once alignment between IT and the value deliver aspects of the business has been established, coding results reveal that monitoring of IT investments for adequate returns is a related responsibility of the board.

Board oversight for the delivery of value lies in two areas: The first area is IT architecture, which consists of the software, hardware and legacy systems of the IT organization. In this area, coding results reveal the board's oversight responsibilities are aligned with the pre-defined terms "appropriate functionality" and "intended results." The second area for board oversight is IT project management. In this area, coding results reveal the board's oversight responsibilities that are aligned with the terms "on-time" and "within-budget." No emergent concepts are identified for this domain.

Domain #3: IT Risk Management

The goal during the coding processes is to identify discussion of IT risk using the pre-defined terms of "acknowledgement", "control", and "mitigation" through the "sharing" or "transfer" of risk. Coding results reveal terms aligned with the pre-defined concept of board acknowledgement of IT risks. The acknowledgement of risks is often described as the assessment of risk.

No reference suggests that the responsibility of boards is to oversee the establishment of a risk-free IT organization. Instead, coding results reveal that once risks are acknowledged, it is the responsibility of the board to mitigate risks by establishing a framework of controls. Five references that describe the concept of board acknowledgement of risk also include concepts of controls and/or mitigation of risk as the responsibility of the board. However, no reference describes the mitigation of risk through the pre-defined terms "insurance coverage" or "share risk". Only *Board Briefing on IT Governance* (ITGI, 2003) reveals the concept of partnering as a factor of the board structure between the IT strategy committee and the audit committee over matters of major IT risks.

Endorsing the development and implementation of a comprehensive information security program is coded as an emergent concept and additional responsibility of boards. Information security governance is aligned with the five domains of IT governance. *Information Security Governance* (ITGI, 2006) provides a framework by which proper security management of IT assets can produce outcomes in each of the five domains of IT governance.

Domain #4: IT Resource Management

Coding results of the IT resource management domain reveal alignment between IT resources and business objectives in four of the eleven references. These references describe the responsibility of the board to oversee the alignment of IT resources in order to optimize business returns. As a factor of board structure, alignment is reflected in the coding results as the partnering between the IT strategy committee and the finance committee on major resource investments.

Boards are expected to understand the overall architecture of the IT organization's application portfolio. This is an emergent concept and is aligned with the coding results of the IT value delivery domain. As a responsibility of the board, this emergent concept would need to precede any board oversight responsibility to align IT resources with business objectives.

The concept of board oversight responsibility for IT assets throughout their economic life cycle is coded in two references. Two emergent concepts, asset management strategy and IT investment portfolio, are identified as practices for facilitating management over IT resources. Furthermore, the intangible assets of knowledge management and intellectual assets are identified as emerging concepts that would be considered part of IT resource management.

Board Briefing on IT Governance (ITGI, 2003) describes the outsourcing IT services as the greatest IT resource management challenge currently faced by boards. However, there were no coding results for this concept in any other reference.

Domain #5: IT Performance Management

Coding of the IT performance management domain reveals the presence of less fewer pre-defined terms than any of the other concept categories. However, seven of the eleven references describe the concept that the board is responsible for developing and monitoring key metrics of IT performance. The IT balanced scorecard is coded as an emergent concept for measuring alignment between IT and the business. As a factor of board structure, alignment is reflected in the coding results as the partnering between the IT strategy committee and the compensation committee on matters of employee performance measurement.

DOMAIN (Pre-defined Coding Concept)	IT Strategic Alignment	IT Value Delivery	IT Risk Management	IT Resource Management	IT Performance Management
SOURCE	Terms Coded	Terms Coded	Terms Coded	Terms Coded	Terms Coded
Bushell, Getting the Big Guns Onside, 2003	**2**	**1**	**1**	**2**	**2**
Damianides, Sarbanes-Oxley and IT Governance: New Guidance on IT Control and Compliance. 2005	**2**	**2**	**3**	**0**	**1**
Entrust, Implementing Information Security Governance (ISG) A Case Study: Entrust, 2004	**2**	**1**	**2**	**1**	**0**
Hoffman, IT Oversight Gets Attention at Board Level, 2004	**2**	**1**	**2**	**0**	**0**
Huff, Maher & Munro, Adding value: The case for adding IT-savvy directors to the board, 2005	**4**	**0**	**1**	**0**	**1**
ITGI, Board Briefing on IT Governance, 2003	**3**	**2**	**3**	**3**	**1**
ITGI, COBIT and IT Governance Case Study: Allstate	**3**	**0**	**2**	**2**	**0**
ITGI, Enterprise Value Governance of IT Investments. The ING Case Study, 2006	**3**	**1**	**2**	**2**	**1**
ITGI, Information Security Governance, 2006	**2**	**1**	**3**	**1**	**1**
ITGI, IT Governance Executive Summary, 2006	**3**	**1**	**1**	**0**	**2**
Nolan & McFarlan, Information Technology and the Board of Directors, 2005	**2**	**3**	**3**	**2**	**1**

Figure 4 –Distribution of Pre-defined Coding Terms within Selected References

Chapter V – Conclusions

Damianides (2005) describes the need to align IT with the overall business strategy as one of the main concepts of IT governance (p.80). The results of this study support this observation by describing concepts of alignment between IT and the business related to two aspects of the role of board of directors within an organization – board practice and board structure. Analysis is conducted within each of five IT governance domains, defined by the IT Governance Institute (ITGI, 2003), including IT Strategic Alignment, IT Value Delivery, IT Resource Management, IT Risk Management, and IT Performance Management. The overarching alignment objective of the IT Strategic Alignment domain in terms of board practice, to "Ensure that IT strategy is aligned with business strategy", represents the cumulative effect of the alignment of practices and processes within each of the other four IT governance domains.

Data analysis reveals that responsibilities of boards of directors (boards) exist at three levels: 1) first, related to understanding; 2) next related to leadership; and 3) finally related to at oversight. First, the board has the responsibility to understand or acknowledge particular domain concepts. For example, the board must understand the IT architecture of their organization and acknowledge the inherent risks of IT. The board also has the responsibility to determine if the formation of an IT strategy committee is necessary in to establish oversight over IT governance.

The second level of board responsibility is to provide the leadership required to establish the practices and processes identified in each domain to achieve alignment between IT and the business. No single domain is identified in this study as the "best"

starting point for board leadership. Rather, the interconnectedness of the five domains suggests the board may provide high-level direction to more than one domain at any time. Board leadership may begin at the point a business or IT strategy item is addressed on the board's agenda (ITGI, 2003, p.11). However, no strategy decision should be final until the board has ensured practices and processes exist to manage resources, control risks, deliver value, measure performance and ultimately further align IT with the business.

The third level of general board responsibility for IT governance is to monitor the results of practices and procedures that have been put in place. It is important to note that monitoring is defined as a continuous and point-in-time assessment processes (ITGI, 2003). Considering the speed at which change occurs in the IT organization, the board will be challenged to fulfill their monitoring responsibilities.

To summarize board responsibilities in each of the examined five IT governance domains, the following responsibilities checklists (Brancato & Plath, 2003) are provided and prefaced by cover letters (Brancato & Plath, 2003).

- **A cover letter addressing the IT Strategic Alignment requirements checklist**: This letter focuses on how board practice (Brancato & Plath, 2003) and structure (Varallo & Dreisbach, 1996) can ensure the enterprise's IT investment is aligned with strategic objectives and IT operations are aligned with current enterprise operations (ITGI, 2003, p. 22)

- **A cover letter addressing the IT Value Delivery requirements checklist:** This letter focuses on how board practice (Brancato & Plath, 2003) and structure (Varallo & Dreisbach, 1996) can ensure that IT

deliverables are on-time, within-budget, of appropriate quality and deliver the benefits that were promised (ITGI, 2003, 24)

- **A cover letter addressing the IT Risk Management requirements checklist:** This letter focuses on how board practice (Brancato & Plath, 2003) and structure (Varallo & Dreisbach, 1996) can ensure that an effective system of internal controls is in place to manage risks and that risk management is embedded in the operation of the enterprise (ITGI, 2003, p. 27)

- **A cover letter addressing the IT Resource Management requirements checklist:** This letter focuses on how board practice (Brancato & Plath, 2003) and structure (Varallo & Dreisbach, 1996) can ensure the optimal investment, use and allocation of IT resources (people, applications, technology, facilities, data) (ITGI, 2003, p.28)

- **A cover letter addressing the IT Performance Measurement requirements checklist:** This letter focuses on how board practice (Brancato & Plath, 2003) and structure (Varallo & Dreisbach, 1996) can ensure that IT performance is effectively measured (ITGI, 2003, p. 30).

Source detail for the responsibilities checklists is presented in Appendix B. Cover letters and related checklists are intended to be used by boards of directors as educational tools and should be distributed to the board prior to any IT governance planning.

IT Strategic Alignment Part I -- Cover Letter to the Board

IT governance delivers value through the alignment of IT investment with strategic objectives throughout the enterprise (ITGI, 2003, p.22). The board must maximize opportunities for alignment by providing high-level direction for collaborative solutions between IT and the business (ITGI, 2006, p.28). However, as enterprise goals continue to change, alignment is never completely achieved (ITGI, 2003, p.22). Board members must understand that alignment is a moving target and that the objective is to be moving in the right direction in order to stay ahead of competitors (ITGI, 2003, p.22).

The goal of IT strategic alignment begins with the board first recognizing the current alignment of IT and the business (Nolan & McFarlan, 2005, p.96). By understanding the current position of alignment the board can make decisions regarding the level of board involvement in IT decisions (Nolan & McFarlan, 2005, p.97) and the level of IT expertise that will be needed by the board (Nolan & McFarlan, 2005, p.99).

Board members do not have to become IT experts, but they do need to have a high-level understanding of the alignment of IT and business strategies within their organization in order to provide oversight and direction (Nolan & McFarlan, 2005, p.96). Just as boards assign committees to oversee other critical areas, an IT strategy committee can be established to determine how the board can best provide high-level direction for IT strategic alignment (Bushell, 2003, par.15). In lieu of an IT governance committee, an independent director who is an IT expert should be appointed to the board (Huff, Maher & Munro, 2005, p.2).

To initiate IT strategic alignment the board will need to provide the leadership necessary to develop a shared governance approach. This approach ensures that potential technology solutions are examined with the broader, cross-business, unit perspective necessary for enterprise strategy optimization (ITGI, 2004, par.18). Boards can initiate the IT strategic alignment process by endorsing and overseeing the development of a strategy map to work top-down from the organization's key value proposition offered to customers, to critical investments in IT and human resources that support the organization's ability to position itself in the market place (Damianides, 2005, p.80).

IT Strategic Alignment Part II – Board Responsibilities Checklist

BOARD RESPONSIBILITIES CHECKLIST **IT STRATEGIC ALIGNMENT**
Responsibilities: Practice
1. Ensure that IT strategy is aligned with business strategy.
2. Ensure that IT strategy is aligned with business strategy.
3. Ensure that technology investment decisions are aligned with business goals.
4. Provide high-level direction to create competitive advantages that parallel compliance processes.
5. Monitor strategic importance of IT within the organization.

Responsibilities: Structure
6. If necessary, oversee the formation of an IT strategy committee to establish governance over IT.
7. Appoint independent directors to the IT strategy committee and include at least one IT expert. The chairperson does not have to be an IT expert, but must have demonstrated the use of IT to gain strategic advantage in another organization
8. Oversee the alignment of the IT strategy committee with the audit committee. They should share at least one member in common.
9. Ensure that the IT strategy committee partners with the business strategy committee, on value delivery and alignment.

IT Value Delivery Part I -- Cover Letter to the Board

Business value is generated by what organizations do with IT rather than by the technology itself (ITGI, 2006, p.8). Boards must ensure that the right governance and management processes are in place for IT investments to deliver value to the enterprise that is on time, with appropriate functionality and achievement of intended results (ITGI, 2003, p.26).

Boards must provide strategic direction for the selection of IT investments and then the management of the investments throughout their economic life cycle (ITGI, 2006, p.8). The value of IT investments must be regularly evaluated based on reliability, quality, security and maintenance (Nolan & McFarlan, 2005, p.99). As IT value delivery

evolves within the organization, the board should position IT to provide not only efficiency and productivity gains, but value creation and business effectiveness as well (Damianides, 2005, p.77).

An IT strategy committee can be established to maximize business value from IT by confirming that the IT/business architecture is aligned (ITGI, 2003, p.50) and by monitoring IT projects (Nolan & McFarlan, p.96). The committee should partner with the business strategy committee to create value delivery through alignment (ITGI, 2003, p.55).

IT Value Delivery Part II – Board Requirements Checklist

BOARD RESPONSIBILITIES CHECKLIST **IT VALUE DELIVERY**
Responsibilities: Practice
1. Ascertain that management has put processes and practices in place that ensure IT delivers provable value to the business.
2. Ascertain that management has put processes and practices in place that ensure IT delivers provable value to the business.
3. Ensure that the budgets of IT investments are acceptable.
4. Monitor IT investments for adequate returns.

Responsibilities: Practice
5. Ensure that IT plans proceed on schedule.
6. Ensure the completeness, quality, and reliability of IT investments.
Responsibilities: Structure
7. Form IT strategy committee to confirm that IT/business architecture is designed to drive maximum business value from IT.
8. Ensure that the IT strategy committee partners with the business strategy committee, on value delivery and alignment.

IT Risk Management Part I -- Cover Letter to the Board

In today's regulatory environment, boards are explicitly responsible for establishing, evaluating, and monitoring the effectiveness of controls over financial reporting and disclosure (Damianides, 2005, p.78). IT plays a crucial role in achieving this objective.

IT investments represent a balance of risk and benefits and the board must understand and acknowledge the IT risks within their organization (ITGI, 2003). To manage IT risks, the board must ensure that appropriate measures exist for managing and mitigating risks and reducing potential impacts on information resources to an acceptable level (ITGI, 2006, p.11). The IT strategy committee should partner with the audit committee to meet these objectives (ITGI, 2003, p.55).

To implement internal control frameworks within their organizations, boards should provide oversight of an information security programme and the adoption of business process control standards such as COBIT, COSO and ISO 17799. By successfully implementing an internal control framework, the board can ensure that risk management is embedded in the operation of the enterprise (ITGI, 2003).

To oversee IT risk management on a quarterly basis. the board should require a summary report to assess risk levels and monitor improvements (Entrust, 2004, p.13). On an annual basis the board should review security practices and IT disaster recovery capabilities (Nolan & McFarlan, 2005, p.105).

IT Risk Management Part II – Board Responsibilities Checklist

BOARD RESPONSIBILITIES CHECKLIST **IT RISK MANAGEMENT**
Responsibilities: Practice
1. Acknowledge IT risks.
2. Monitor the effectiveness of internal controls.
3. Ensure IT risks are mitigated.
4. Ensure that the IT strategy committee partners with the audit committee on major IT risks.

IT Resource Management Part I – Cover Letter to the Board

Successful IT resource management can only be achieved through the optimal investment, use and allocation of IT resources (people, applications, technology, facilities, and data) (ITGI, 2003, p.29). Today, the greatest resource management challenge facing boards is determining where and how to outsource IT services and assets (ITGI, 2003, p.29).

IT investments must be managed as a portfolio of investments (ITGI, 2006, p.9). This means that each asset has a distinct economic life cycle (ITGI, 2006, p.9). As these life cycles ebb and flow the board must provide high-level direction for the proper balance of IT investments necessary for sustaining and growing the enterprise (ITGI, 2003, p.50). The board must ensure that management knows what information systems exist, the condition they are in, and the role they play in generating revenue (Nolan & McFarlan, 2005, p.99).

The board should receive regular updates of IT architecture and review asset management practices to prevent hardware, software and legacy systems from becoming obsolete (Nolan & McFarlan, 2005, p.104). Through a greater understanding of the IT investment portfolio, the board can ultimately provide leadership to develop new assets, solutions and the initiatives to which they will be applied (Allstate, 2004, par.18). An IT strategy committee can be established to track IT investments, set priorities, and allocate scarce resources (ITGI, 2003, p.16). The committee should partner with the finance

committee on major IT investments (ITGI, 2003, p.55).

IT Resource Management Part II – Board Responsibilities Checklist

BOARD RESPONSIBILITIES CHECKLIST IT RESOURCE MANAGEMENT
Responsibilities: Practice
1. Understand the overall architecture of the company's IT applications portfolio as well as its asset management strategy.
2. Establish business priorities and oversee the allocation of resources to enable effective IT performance.
3. Provide high-level direction for sourcing.
4. Ensure management practices are in place to prevent hardware, software, and legacy systems from becoming obsolete.
Responsibilities: Structure
5. Form IT strategy committee to focus on tracking IT investments, setting priorities, and allocating scarce resources.
6. Ensure that the IT strategy committee partners with the finance committee on major resource investments.

IT Performance Management Part I – Cover Letter to the Board

IT value delivery is largely based on intangible assets, which cannot be measured through traditional financial means (ITGI, 2003, p.16). To ensure that IT is delivering value to the business, boards should direct the utilization of a balanced scorecard or IT dashboard approach to establish and measure IT performance indicators. The board should asses IT performance measurements on an annual basis (Nolan & McFarlan, 2005, p.105)

The purpose of the IT dashboard process is provide transparency on IT-related costs and selected IT operational performance indicators (ITGI, 2006, p.14). Through this process the board will be able to answer key IT governance questions (ITGI, 2006, p.14):

- How much are we spending on IT?
- Should we be spending more or less?
- How do our costs and operational performance compare with our peer group?
- How does our IT investment impact our business performance?

The IT balanced scorecard is considered one of the most effective tools for to achieve IT and business alignment (ITGI, 2006, par. 44). The goal of the IT balanced scorecard is to measure relationships and knowledge-based assets in four perspectives: 1) financial objectives, 2) customer needs, 3) internal business processes, and 4) the ability to learn and grow (ITGI, 2003, p.29). Based on the interconnectedness of these four perspectives, the IT balanced scorecard is considered the more holistic approach to IT performance management (ITGI, 2003, p.29).

IT Performance Management Part II – Board Requirements Checklist

BOARD RESPONSIBILITIES CHECKLIST IT PERFORMANCE MANAGEMENT
Responsibilities: Practice
1. Oversee the development of key IT performance metrics, then monitor.
Responsibilities: Structure
2. Ensure the IT strategy committee partners with the compensation committee on performance measurement.

APPENDIX A – Results Tables

Table 1 -- IT Domain #1: IT Strategic Alignment			
Definition: Focus on aligning IT with the business and collaborative solutions.			
Pre-defined Coding Terms	**Source**	**Factors Relating to Integration in Board Practice**	**Factors Relating to Integration in Board Structure**
• **alignment** • **business strategy** • **competitive advantage** • **enterprise strategy** • **IT strategy**	Bushell, Getting the Big Guns Onside, 2003	• IT practices are **aligned** with **business** objectives (par.6) • integrate board's role in IT and **business strategy** (par. 15)	
	Damianides, Sarbanes-Oxley and IT Governance: New Guidance on IT Control and Compliance. 2005	• need to **align IT** with the overall **business strategy** (p.80)	
	Entrust, Implementing Information Security Governance (ISG) A Case Study: Entrust, 2004	• ensure that the level of investment in information security is **consistent** with **organizational strategies** (p.8)	
	Hoffman, IT Oversight Gets Attention at Board Level, 2004	• **alignment of IT and business strategies** (p.12) • IT's potential for **competitive** positioning (p.2)	• establish **IT strategy** committee (par.15)
	Huff, Maher & Munro, Adding value: The case for adding IT-savvy directors to the board, 2005	• ensure **IT vision** is **consistent** with overall **corporate strategic direction** (p.2)	• establish **IT governance** committee (p.2) • in lieu of **IT governance** committee, a "point person for IT issues should be identified (p. 2)

IT Domain #1: IT Strategic Alignment (continued)			
Definition: Focus on aligning IT with the business and collaborative solutions.			
Pre-defined Coding Terms	**Source**	**Factors Relating to Integration in Board Practice**	**Factors Relating to Integration in Board Structure**
• **alignment** • **business strategy** • **competitive advantage** • **enterprise strategy** • **IT strategy**	ITGI, Board Briefing on IT Governance, 2003	• ratify the **aligned business and IT strategy** (p. 50)	• form **IT strategy** committee to establish governance over IT (p.53) • the **IT strategy** committee partners with the **business strategy** committee, on value delivery and **alignment** (p.55) • **IT strategy** committee should include several board and non-board members and ex-officio representation of key executives (p.56)
	ITGI, COBIT and IT Governance Case Study: Allstate, 2004	• **technology investment decisions** are **aligned** with **business goals** (par.22)	
	ITGI, Enterprise Value Governance of IT Investments. The ING Case Study, 2006	• **IT strategy** becomes a fully integrated part of **business strategy**, thus maximizing **alignment** (p.13)	
	ITGI, Information Security Governance, 2006	• ensure information security is **aligned** with **organization strategy** and risk profile (p.8)	

IT Domain #1: IT Strategic Alignment (continued)			
Definition: Focus on aligning IT with the business and collaborative solutions.			
Pre-defined Coding Terms	**Source**	**Factors Relating to Integration in Board Practice**	**Factors Relating to Integration in Board Structure**
• **alignment** • **business strategy** • **competitive advantage** • **enterprise strategy** • **IT strategy**	ITGI, IT Governance Executive Summary, 2006	• **alignment of IT** and **business strategies** (par.20)	• set up **IT strategy** committee (par. 24)
	Nolan & McFarlan, Information Technology and the Board of Directors, 2005	• look for technology-based **competitive** opportunities (p.101) • monitor **strategic** importance of **IT** within the organization (p. 104)	• establish board-level **IT governance** committee made up of independent directors, which includes at least one IT expert (p.101) • chairperson does not have to be an IT expert, but must have demonstrated the use of **IT** to gain **strategic advantage** in another organization (p. 101) • the **IT governance committee** should be closely aligned with the audit committee and they should share at least one member in common (p. 101)

IT Domain #1: IT Strategic Alignment - Emergent Factors			
Definition: Focus on aligning IT with the business and collaborative solutions.			
Summary List of Emergent Factors	**Source**	**Emerging Factors Relating to Integration in Board Practice**	**Emerging Factors Relating to Integration in Board Structure**
• alignment with the compliance process **• cross-business** **• position** **• shared governance approach**	Damianides, Sarbanes-Oxley and IT Governance: New Guidance on IT Control and Compliance. 2005	• use a strategy map to work top-down from the organization's key value proposition offered to customers, to critical IT investments in IT and human resources that will support its ability to **position** itself in the marketplace (p.80) • create competitive advantages that **parallel** the **compliance process** (p.81)	
	ITGI, COBIT and IT Governance Case Study: Allstate, 2004	• a **shared governance approach** ensures that potential technology solutions are examined with the broader, **cross-business**, unit perspective necessary for enterprise strategy optimization (par.18)	
	Nolan & McFarlan, Information Technology and the Board of Directors, 2005	Recognize firm's **position** (p.96)	

Table 2 -- IT Domain #2: IT Value Delivery			
Definition: Concentrate on optimizing expenses and proving the value of IT.			
Pre-defined Coding Terms	**Source**	**Factors Relating to Integration in Board Practice**	**Factors Relating to Integration in Board Structure**
• **appropriate quality** • **intended results** • **on-time** • **value** • **within-budget**	Bushell, Getting the Big Guns Onside, 2003	• must ensure that IT deliver appropriate **value** to the business (par.6)	
	Damianides, Sarbanes-Oxley and IT Governance: New Guidance on IT Control and Compliance. 2005	• ensure **expectations** of IT are met (p.78) • require IT to deliver business **value** (p.77)	
	Entrust, Implementing Information Security Governance (ISG) A Case Study: Entrust, 2004	• investments in cyber security should be tied to actual business risk in order to achieve maximum **value** (p.3)	
	Hoffman, IT Oversight Gets Attention at Board Level, 2004	• monitors IT investments for adequate **returns** (abstract)	

IT Domain #2: IT Value Delivery (continued)			
Definition: Concentrate on optimizing expenses and proving the value of IT.			
Pre-defined Coding Terms	**Source**	**Factors Relating to Integration in Board Practice**	**Factors Relating to Integration in Board Structure**
• **appropriate quality** • **intended results** • **on-time** • **value** • **within-budget**	ITGI, Board Briefing on IT Governance, 2003	• ascertain that management has put processes and practices in place that ensure IT delivers provable **value** to the business (p.50) • ensure that the **budgets** of IT investments are acceptable (p.50)	• establish IT strategy committee to confirm that IT/business architecture is designed to drive maximum business **value** from IT (p.50) • the IT strategy committee partners with the business strategy committee, on **value** delivery and alignment (p.55)
	ITGI, Enterprise Value Governance of IT Investments. The ING Case Study, 2006	• formulate and implement sustainable **value** delivery (p.13)	
	ITGI, IT Governance Executive Summary, 2006	• provide high-level direction and control about the **value** IT Needs to deliver (par. 24)	
	ITGI, Information Security Governance, 2006	• review the **return** of IT investments (p.9)	
	Nolan & McFarlan, Information Technology and the Board of Directors, 2005	• oversee IT plans proceed **on schedule** (p.98) • oversee IT plans proceed **on budget** (p.98) • determine adequate **return** on IT investments (p.99)	• establish IT governance committee to control project **costs** (p.96)

Table 3 -- IT Domain #3: IT Risk Management			
Definition: Address the safeguarding of IT assets and disaster recovery.			
Pre-defined Coding Terms	**Source**	**Factors Relating to Integration in Board Practice**	**Factors Relating to Integration in Board Structure**
• **acknowledge risk** • **transfer to insurance coverage** • **controls** • **mitigate** • **monitor** • **partner** • **share risk**	Bushell, Getting the Big Guns Onside, 2003	• ensure IT risks are **mitigated** (par.6)	
	Damianides, Sarbanes-Oxley and IT Governance: New Guidance on IT Control and Compliance. 2005	• ensure risks are **mitigated** (p. 78) • establishing, evaluating, and **monitoring** the effectiveness of internal **controls** over financial reporting (p.78)	
	Entrust, Implementing Information Security (ISG) A Case Study: Entrust, 2004	• **assess risk** areas (p. 3) • **monitor** security improvements (p. 13)	
	Hoffman, IT Oversight Gets Attention at Board Level, 2004	• **examine the legal risks** that IT investments pose under the financial reporting requirements of the Sarbanes-Oxley Act (SOX) (par.4) • risk **mitigation** plans (par.14)	
	Huff, Maher & Munro, Adding value: The case for adding IT-savvy directors to the board, 2005	• position to add **value** (p.1)	

IT Domain #3: IT Risk Management (continued)			
Definition: Address the safeguarding of IT assets and disaster recovery.			
Pre-defined Coding Terms	**Source**	**Factors Relating to Integration in Board Practice**	**Factors Relating to Integration in Board Structure**
• **acknowledge risk** • **transfer to insurance coverage** • **controls** • **mitigate** • **monitor** • **partner** • **share risk**	ITGI, Board Briefing on IT Governance, 2003	• be **aware of risk** exposure (p. 50) • assure there are appropriate and effective processes to **monitor** risk (p.14)	• the IT strategy committee **partners** with the audit committee, on major IT **risks** (p.55)
	ITGI, COBIT and IT Governance Case Study: Allstate, 2004	• provide a **risk assessment** framework (par.7) • review the effectiveness of internal **controls** (par.18)	
	ITGI, Enterprise Value: Governance of IT Investments. The ING Case, 2006	• establish the governance, **monitoring** and **control** framework (p.10)	
	ITGI, Information Security Governance, 2006	• review comprehensive **risk assessments** (p. 21) • establish **measures** to **mitigate** risks (p.79)	
	ITGI, IT Governance Executive Summary, 2006	•start **asking** tough questions about **risks** (par.23)	
	Nolan & McFarlan, Information Technology and the Board of Directors, 2005	• **recognize IT risks** (abstract) • **monitor** other companies that have a reputation for effective use of leading-edge technology applications (p. 101) • review IT internal **control** practices (p.105)	

IT Domain #3: IT Risk Management – Emergent Factors			
Definition: Address the safeguarding of IT assets and disaster recovery.			
Summary List of Emergent Factors	**Source**	**Emerging Factors Relating to Integration in Board Practice**	**Emerging Factors Relating to Integration in Board Structure**
• COBIT **• COSO** **• global risk profile** **• information security programme**	Entrust, Implementing Information Security (ISG) A Case Study: Entrust, 2004	• ISO 17799 (**security** standard) (p.3) • Committee of Sponsoring Organizations of the Treadway Commission **(COSO)** (p.4)	
	ITGI, Enterprise Value: Governance of IT Investments. The ING Case, 2006	• key management practices cross-referenced to **COBIT** key controls (p.9)	
	ITGI, Information Security Governance, 2006	• become informed about information **security** (p.24) • define **global risk profile** (p.24) • endorse the development and implementation of a comprehensive **information security programme** (p.49)	

Table 4 -- IT Domain #4: IT Resource Management			
Definition: Optimize investment, use and allocation of IT resources (people, applications, technology, facilities, data) in servicing the needs of the enterprise			
Pre-defined Coding Terms	**Source**	**Factors Relating to Integration in Board Practice**	**Factors Relating to Integration in Board Structure**
• **business operations** • **hardware** • **human resources** • **internal IT services** • **IT resources** • **life cycle** • **outsourced IT services** • **service contracts** • **software licenses**	Bushell, Getting the Big Guns Onside, 2003	• ensure alignment of IT **resources** with an enterprise's **business** objectives (p.9)	
	Entrust, Implementing Information Security Governance (ISG) A Case Study: Entrust, 2004	• make information security an integral part of core **business operations** (p.5)	
	ITGI, Board Briefing on IT Governance, 2003	• provide high-level direction for the use of **IT resources** (p.50) • establish **business** priorities and allocate **resources** to enable effective IT performance (p. 51) • provide high-level direction for **sourcing** (p.50)	• establish IT steering committee focuses on tracking IT investments, setting priorities, and allocating **scarce resources** (p.16) • the IT strategy committee partners with the finance committee, on major **resource** investments (p.55)
	ITGI, COBIT and IT Governance Case Study: Allstate, 2004	• existing **assets** and solutions are leveraged where appropriate and that new **assets** and solutions (par.19)	

IT Domain #4: IT Resource Management (continued)			
Definition: Optimize investment, use and allocation of IT resources (people, applications, technology, facilities, data) in servicing the needs of the enterprise			
Pre-defined Coding Terms	**Source**	**Factors Relating to Integration in Board Practice**	**Factors Relating to Integration in Board Structure**
• **business operations** • **hardware** • **human resources** • **internal IT services** • **IT resources** • **life cycle** • **outsourced IT services** • **service contracts** • **software licenses**	ITGI, Information Security Governance, 2006	• **resource** management by utilizing security knowledge and infrastructure efficiently and effectively (p.11)	
	ITGI, Enterprise Value: Governance of IT Investments. The ING Case Study, 2006	• **assets** selected, managed and monitored to optimize business return (p.9) • IT-enabled investments will be managed through their full economic **life cycle** (p.9)	
	Nolan & McFarlan, Information Technology and the Board of Directors, 2005	• ensure management practices are in place to prevent **hardware**, **software** and **legacy systems** from becoming obsolete (p. 104)	

IT Domain #4: IT Resource Management – Emergent Factors			
Definition: Optimize investment, use and allocation of IT resources (people, applications, technology, facilities, data) in servicing the needs of the enterprise			
Summary List of Emergent Factors	**Source**	**Emerging Factors Relating to Integration in Board Practice**	**Emerging Factors Relating to Integration in Board Structure**
• asset management strategy **• IT architecture** **• IT investment portfolio** **• intellectual assets** **• knowledge management**	ITGI, Enterprise Value: Governance of IT Investments. The ING Case , 2006	• **VAL IT™ framework** is intended to respond to the need for organizations to optimize the realization of value from IT investments (p.6) • In the same way that a traditional equity investment needs active management, so does an **IT investment portfolio** (p.14)	
	ITGI, Information Security Governance, 2006	• set direction for a policy of **knowledge management** and resource utilization (p.26)	
	Nolan & McFarlan, Information Technology and the Board of Directors, 2005	• needs to understand the overall **architecture** of the company's IT applications **portfolio** as well as it's **asset management strategy** (p.99) •ensure that its company has the right IT infrastructure and applications in place to develop **intellectual assets** (p.99)	

Table 5 -- IT Domain #5: IT Performance Management			
Definition: Track project delivery and monitoring IT services			
Pre-defined Coding Terms	**Source**	**Factors Relating to Integration in Board Practice**	**Factors Relating to Integration in Board Structure**
• **business impact** • **measures** • **performance**	Bushell, Getting the Big Guns Onside, 2003	• **measurable** and controllable **performance** indicators (par.4)	
	Entrust, Implementing Information Security (ISG) A Case Study: Entrust, 2004	• adoption of information security governance also resulted in positive **impact** on the bottom line (p.18)	
	Huff, Maher & Munro, Adding value: The case for adding IT-savvy directors to the board, 2005	• reporting requirements and **measures** are in place (p.5)	
	ITGI, Board Briefing on IT Governance, 2003	• work with the executive to define and monitor high-level IT **performance** (p.50)	• IT strategy committee partners with the compensation committee, on **performance** measurement (p.55)
	ITGI, Enterprise Value: Governance of IT Investments. The ING Case Study, 2006	• value delivery practices will define and monitor key **metrics** (p.9)	ITGI, Enterprise Value: Governance of IT Investments, 2006

Table 5 -- IT Domain #5: IT Performance Management (continued)			
Definition: Tracking project delivery and monitoring IT services			
Pre-defined Coding Terms	**Source**	**Factors Relating to Integration in Board Practice**	**Factors Relating to Integration in Board Structure**
• **business impact** • **measures** • **performance**	ITGI, Information Security Governance, 2006	• annual information security evaluations and **performance** reports to the board of directors (p.51)	
	ITGI, IT Governance Executive Summary, 2006	• **measure** IT **performance** (par. 20)	
	Nolan & McFarlan, Information Technology and the Board of Directors, 2005	• review internal IT assessment **measurements** (p.105)	

IT Domain #5: IT Performance Management – Emergent Factors			
Definition: Tracking project delivery and monitoring IT services			
Summary List of Emergent Factors	**Source**	**Emerging Factors Relating to Integration in Board Practice**	**Emerging Factors Relating to Integration in Board Structure**
• IT balanced scorecard **• IT dashboard**	ITGI, IT Governance Executive Summary	• an **IT balanced scorecard** is one of the most effective means to aid the IT strategy committee and management to achieve IT and business alignment (par.42)	
	ITGI, Enterprise Value: Governance of IT Investments. The ING Case Study, 2006	• the original purpose of the **IT dashboard** was to provide transparency on IT-related costs and selected IT operational performance indicators (p.14)	

APPENDIX B – Responsibilities Checklists: Source Details

BOARD RESPONSIBILITIES CHECKLIST **DOMAIN #1: IT STRATEGIC ALIGNMENT**
Responsibilities: Practice
5. **Ensure that IT strategy is aligned with business strategy** (ITGI, Board Briefing on IT Governance, 2003; Bushell, Getting the Big Guns Onside, 2003; ITGI, Enterprise Value Governance of IT Investments. The ING Case Study, 2006; Hoffman, IT Oversight Gets Attention at the Board Level, 2004; Huff, Maher & Munro, Adding Value: The Case for adding IT-savvy directors to the board, 2005; ITGI, IT Governance Executive Summary, 2006).
6. **Ensure that technology investment decisions are aligned with business goals** (ITGI, COBIT and IT Governance Case Study: Allstate, 2004; Entrust, Implementing Information Security (ISG) A Case Study: Entrust, 2004).
7. **Provide high-level direction to create competitive advantages that parallel compliance processes** (Damianides, Sarbanes-Oxley and IT Governance: New Guidance on IT Control and Compliance, 2005).
8. **Monitor strategic importance of IT within the organization** (Nolan & McFarlan, Information Technology and the board of Directors, 2005, p.104).

BOARD RESPONSIBILITIES CHECKLIST **DOMAIN #1: IT STRATEGIC ALIGNMENT (continued)**
Responsibilities: Structure
9. If necessary, oversee the formation of an IT strategy committee to establish governance over IT (ITGI, Board Briefing on IT Governance, 2003; Bushell, Getting the Big Guns Onside, 2003; Hoffman, IT Oversight Gets Attention at the Board Level, 2004; Huff, Maher & Munro, Adding Value: The Case for adding IT-savvy directors to the board, 2005; ITGI, IT Governance Executive Summary, 2006; Nolan & McFarlan, Information Technology and the Board of Directors, 2005).
10. Appoint independent directors to the IT strategy committee and include at least one IT expert. The chairperson does not have to be an IT expert, but must have demonstrated the use of IT to gain strategic advantage in another organization (Nolan & McFarlan, Information Technology and the Board of Directors, 2005).
11. Oversee the alignment of the IT strategy committee with the audit committee. They should share at least one member in common (Nolan & McFarlan, Information Technology and the Board of Directors, 2005).
12. Ensure that the IT strategy committee partners with the business strategy committee, on value delivery and alignment (ITGI, Board Briefing on IT Governance, 2003).

BOARD RESPONSIBILITIES CHECKLIST **DOMAIN #2: IT VALUE DELIVERY**
Responsibilities: Practice
1. **Ascertain that management has put processes and practices in place that ensure IT delivers provable value to the business** (ITGI, Board Briefing on IT Governance, 2003; Bushell, Getting the Big Guns Onside, 2003; Damianides, Sarbanes-Oxley and IT Governance: New Guidance on IT Control and Compliance, 2005; Enterprise Value Governance of IT Investments. The ING Case Study, 2006; Entrust, Implementing Information Security Governance (ISG) A Case Study: Entrust, 2004; Huff, Maher & Munro, Adding Value: The Case for adding IT-savvy directors to the board, 2005; ITGI, IT Governance Executive Summary, 2006).
2. **Ensure that the budgets of IT investments are acceptable** (ITGI, Board Briefing on IT Governance, 2003; Nolan & McFarlan, Information Technology and the Board of Directors, 2005).
3. **Monitor IT investments for adequate returns** (Damianides, Sarbanes-Oxley and IT Governance: New Guidance on IT Control and Compliance, 2005; Hoffman, IT Oversight Gets Attention at the Board Level, 2004; Information Security Governance, 2005; Nolan & McFarlan, Information Technology and the Board of Directors, 2005).

BOARD RESPONSIBILITIES CHECKLIST **DOMAIN #2: IT VALUE DELIVERY (continued)**
Responsibilities: Practice
4. **Ensure that IT plans proceed on schedule** (Nolan & McFarlan, Information Technology and the Board of Directors, 2005).
5. **Ensure the completeness, quality, and reliability of IT investments** (Nolan & McFarlan Information Technology and the Board of Directors, 2005).
Responsibilities: Structure
6. **Form IT strategy committee to confirm that IT/business architecture is designed to drive maximum business value from IT** (ITGI, Board Briefing on IT Governance, 2003; Nolan & McFarlan, Information Technology and the Board of Directors, 2005).
7. **Ensure that the IT strategy committee partners with the business strategy committee, on value delivery and alignment** (ITGI, Board Briefing on IT Governance, 2003).

BOARD RESPONSIBILITIES CHECKLIST **DOMAIN #3: IT RISK MANAGEMENIT**
Responsibilities: Practice
1. **Acknowledge IT risks** (ITGI, Board Briefing on IT Governance, 2003; ITGI, COBIT and IT Governance Case Study: Allstate; ITGI, Enterprise Value Governance of IT Investments. The ING Case Study, 2006; Hoffman, IT Oversight Gets Attention at the Board Level, 2004; Entrust, Implementing Information Security Governance (ISG) A Case Study: Entrust, 2004; ITGI, Information Security Governance, 2006; ITGI, IT Governance Executive Summary, 2006; Nolan & McFarlan, Information Technology and the Board of Directors, 2005).
2. **Monitor the effectiveness of internal controls** (Damianides, Sarbanes-Oxley and IT Governance: New Guidance on IT Control and Compliance, 2005; ITGI, COBIT and IT Governance Case Study: Allstate, 2004; ITGI, Enterprise Value: Governance of IT Investments. The ING Case Study, 2006; Nolan & McFarlan, Information Technology and the Board of Directors, 2005).
3. **Ensure IT risks are mitigated** (Bushell, Getting the Big Guns Onside, 2003; Hoffman, IT Oversight Gets Attention at the Board Level, 2004; ITGI, Information Security Governance, 2006).
Responsibilities: Structure
4. **Ensure that the IT strategy committee partners with the audit committee on major IT risks** (ITGI, Board Briefing on IT Governance, 2003).

BOARD RESPONSIBILITIES CHECKLIST **DOMAIN #4: IT RESOURCE MANAGEMENT**
Responsibilities: Practice
1. **Understand the overall architecture of the company's IT applications portfolio as well as it's asset management strategy** (Nolan & McFarlan, Information Technology and the Board of Directors, 2005)
2. **Establish business priorities and oversee the allocation of resources to enable effective IT performance** (ITGI, Board Briefing on IT Governance, 2003; Bushell, Getting the Big Guns Onside; 2003; Entrust, Implementing Information Security Governance (ISG) A Case Study; COBIT and IT Governance Case Study: Allstate, 2004; Enterprise Value: Governance of IT Investments, 2006).
3. **Provide high-level direction for sourcing** (ITGI, Board Briefing on IT Governance, 2003).
4. **Ensure management practices are in place to prevent hardware, software, and legacy systems from becoming obsolete** (ITGI, Enterprise Value: Governance of IT Investments. The ING Case Study, 2006; Nolan & McFarlan, Information Technology and the Board of Directors, 2005).

BOARD RESPONSIBILITIES CHECKLIST **DOMAIN #4 IT RESOURCE MANAGEMENT (continued)**
Responsibilities: Structure
5. **Form IT strategy committee to focus on tracking IT investments, setting priorities, and allocating scarce resources** (ITGI, Board Briefing on IT Governance, 2003).
6. **Ensure that the IT strategy committee partners with the finance committee on major resource investments** (ITGI, Board Briefing on IT Governance, 2003).

BOARD RESPONSIBILITIES CHECKLIST **DOMAIN #5: IT PERFORMANCE MANAGEMENT**
Responsibilities: Practice
1. **Oversee the development of key IT performance metrics and monitor** (Bushell, Getting the Big Guns Onside, 2003; Entrust, Implementing Information Security (ISG) A Case Study: Entrust, 2004); Huff, Maher & Munro, Adding Value: The Case for adding IT-savvy directors to the board, 2005; ITGI, Board Briefing on IT Governance, 2003; ITGI, Enterprise Value: Governance of IT Investments. The ING Case Study, 2006; ITGI, Information Security Governance, 2006; ITGI, IT Governance Executive Summary, 2006; Nolan & McFarlan, Information Technology and the Board of Directors, 2005).
Responsibilities: Structure
2. **Ensure the IT strategy committee partners with the compensation committee on performance measurement** (ITGI, Board Briefing on IT Governance, 2003).

APPENDIX C - Definitions

Board of Directors –a group of individuals chosen by the stockholders of a company to promote their interests through the governance of the company. Board members in most legal jurisdictions have specific fiduciary duties, whereby they act for the benefit of others (Wikipedia, 2006).

Board Practice –involves the basic legal requirements, as well as "management" skills of individual directors and the board as a whole in the areas of loyalty, care, leadership, disclosure and management of the total enterprise, which is often described as oversight (Brancato & Plath, 2003)

Board Structure – includes board size, makeup, the composition and function of committees and efforts to create board structures in which directors can readily assert their actual independence from corporate management (Varallo & Dreisbach, 1996).

Care – The duty of the board to be informed and exercise appropriate diligence in making decision and to oversee the management of the cooperation (Brancato & Plath, 2003, p. 10).

COBIT – *Control Objectives for Information and Related technology*, is an internationally accepted IT control framework (ITGI, 2006, p.26)

Content analysis – A detailed and systematic examination of the contents of a particular body of material (e.g. television shows, advertisements, textbooks)or the purpose of identifying patterns, themes, or biases within that material (Leedy & Ormrod, 2005, p. 108).

Corporate Governance – the method by which a corporation is directed, administered or controlled. It includes the laws and customs affecting that direction, as well as the goals for which it is governed. The principal participants are the shareholders, management and the board of directors. Other participants include regulators, employees, suppliers, partners, customers, constituents (for elected bodies) and the general community (Wikipedia, 2006).

COSO - *the Committee of Sponsoring Organizations of the Treadway Commission,* is an internal control framework (Entrust, 2004, p. 4).

Cover Letter – A letter used to highlight the most important issues of materials presented at boards of directors meetings (Brancato & Plath, 2003, p.15).

Disclosure – the duty of the board to oversee financial reporting and all other public disclosures. (Brancato & Plath, 2003, p. 54).

Enterprise Governance – is the set of responsibilities and practices exercised by the board and executive management with the goal of providing strategic direction, ensuring the objectives are achieved, ascertaining that risks are managed appropriately and verifying that the enterprise's resources are used responsibly (ITGI, 2006, p.11).

Financial Reporting – covers the preparation of reliable financial statements and other financial information (Brancato & Plath, 2003, p. 54).

Independence (director) – not receiving fees from the company other than for board service and being otherwise affiliated with the company and subsidiaries (Brancato & Plath, 2003, p. 70).

Information Security Governance (ISG) – is a subset of enterprise governance that provides strategic direction, ensures that objectives are achieved, manages risks

appropriately, uses organizational resources responsibly, and monitors the success or failure of the enterprise security programme (ITGI, 2006, p. 18).

Information Technology (IT) Governance – consists of the leadership and organizational structures and processes that endure the organization's IT sustains and extends the organizations strategies and objectives (ITGI, 2003, p. 10).

Internal Controls – processes designed to provide reasonable assurance that an organization is achieving its objectives (Brancato & Plath, 2003, p. 54).

ISO 17799 – is an internal control framework written solely for information security practices (Entrust, 2004, p. 4).

IT Security Governance (ISG) – Consists of the leadership, organizational structures and processes that safeguard critical information assets (ITGI, 2006, p.49)

Life Cycle – A series of stages that characteristic the course of existence of an organizational investment (ITGI, 2006, p.27)

Literature Review – describes theoretical perspectives and previous research findings regarding the problem at hand (Leedy & Ormond, 2005, p. 64).

Loyalty – the duty of the board to put the interests of the corporation before those of the individual director (Brancato & Plath, 2003, p. 10).

Monitoring – covers the oversight of internal control by management through continuous and point-in-time assessment processes (ITGI, 2004, p. 55).

Responsibilities checklist – as the compendium of board responsibilities, provides authoritative guidance and evolving oversight practices (Brancato & Plath. 2003, p.106).

Risk Assessment – involves the identification and analysis by management of relevant risks to achieve predetermined objectives, which form the basis for determining control activities (ITGI, 2004, p. 54).

Sarbanes-Oxley Act of 2002 – was signed into law by President George W. Bush on July 30, 2002 to establish investor confidence by improving the quality of corporate disclosure and financial reporting, strengthen the independence of accounting firms, and increase the role and responsibility of corporate officers and directors in financial statements and corporate disclosures (Bost, 2003, p.1)

Transparency – Accessibility of information to stakeholders of institutions, regarding matters that affect their interests (Tapscott & Ticoll, 2003, p. 22).

APPENDIX D – References Used for Data Analysis

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