IT Governance Impact on Business Unit Performance

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ABSTRACT

IT Governance Impact on Business Unit Performance

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The main objective of this thesis is to investigate the impact and role of implementing information technology (IT) governance practices on the business value driven from IT. The proposed research model encompasses the use of configurational theory in order to find different gestalts of IT governance practices. This research also looks at the links between these gestalts and the performance of business units from a financial and non-financial perspective. To test the model, 57 matched surveys were collected from North America and the Middle East.

Different clusters of IT governance practices have emerged from this study with distinct yet significant impact on business unit non-financial performance. However, no significant impact on the business unit financial performance was found.

The findings show that implementing different sets of IT governance practices within organizations can result in different levels of performance at the business unit level in terms of business processes, decision making and legal and ethical compliance.

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Chapter 1: Introduction

Although the past ten to fifteen years have witnessed an increasing complexity in the IT organization and a huge rise in IT investments, CIOs are still struggling to justify and sometimes attain success from such investments.

Due to the lack of IT governance, many organizations have witnessed different types of failures, such as unsuccessful project developments and loss of competitiveness (Ali and Green 2007). However, it has been shown that companies rating above the average on their IT governance have witnessed at least a 20 percent higher return on assets than other companies with weaker governance (Weill and Ross 2004a). A recent study has indicated that appropriate IT governance enhances the performance of IT organizations (Tamim et al. 2012).

Investing in enterprise solutions such as Customer Relationship Management (CRM) systems, Supply Chain Management (SCM) systems, and Enterprise Resource Planning (ERP) systems is taking a big share in the IT portfolio since these systems are becoming inevitable and yet still costly. Therefore, generating business value and return on IT investment is becoming a more pressing issue and IT governance is taking an even greater importance in driving business value and in alleviating risks from substantial IT investments.

Measuring and proving the value delivered from IT as an outcome to implementing IT governance practices is not, however, a straightforward task. An earlier survey by ITGI, surveying 2010 respondents from America, Asia and Europe, showed that the inability to fully determine the value achieved from IT is one of the highly rated problems facing CIOs and IT managers. It also showed that the lack of understanding of how well IT is performing is on top of their concerns (ITGI 2004).

In fact, measuring the IT investments returns and its impact on organizational performance in general has been an ongoing challenge in the MIS literature (Neirotti and Paolucci 2007). Using different perspectives such as the resource based view, researchers have tried to link IT investments to different types of performance measures such as profitability, competitive advantage and sustainable competitive advantage (Wade and Hulland 2004). Furthermore, different studies tried to find an explanation to the productivity paradox initiated by Atwell (1994) and one of these explanations has presented the problem as a measurement issue. For instance, some studies argue that the performance measurement is conducted at the organizational level far from the first-order effects of the implemented IT solutions (Barua et al. 1995) which dilute the IT effect and make it harder to see the real value. This represents a stream of calls for conducting further research to move the performance measurement level from the organizational level to the business unit one.

Other studies provide empirical evidence that IT will increase productivity and consumer surplus but lack the evidence about profitability (Hitt and Brynjolfsson 1996). Peppard (2005) has added to that by highlighting the fact that existing studies are focusing on the short term financial measurement such as return on investment (ROI) while forgetting that some solutions will only make a difference after two or three years. This uncovers another problematic area of measuring only the financial performance while overlooking other performance facets.

Accordingly and in response to these research calls regarding performance measurement and level of analysis, the main objective of this thesis is to compile a set of IT governance practices and investigate the relationship of the different combinations of these practices with performance outcomes; financial and non-financial, at the business unit level instead of the organizational one. Thus, the main research question is:

What are the IT governance configurations that will lead to better business unit performance?

The remainder of this thesis is organized as follows: Chapter 2 contains a literature review of the IT governance as a concept with its main elements. It also includes a categorization and analysis of the existing IT governance studies in order to assess the current situation and highlight the gap. Chapter 3 includes the research model with a description of all the constructs and propositions. Chapter 4 discusses the research methodology including construction of measures, testing the measurement instruments, and the data collection guidelines. Chapter 5 contains the data analysis including the reliability and validity assessment of the measurement and structural model, cluster analysis and statistical validity between the dependent and independent constructs. Chapter 6 entails general discussion of the findings, and finally, Chapter 7 includes the conclusion, the main findings, implications, limitations and future avenues.

Chapter 2: Literature Review

IT governance is becoming one of the most prevalent concerns facing organizations from different industries (ISACA 2008). Many studies have explored IT governance from various angles and perspectives.

In this chapter, a literature review about IT governance is presented. As the most significant contributions to the topic are expected to come from highly rated journals (Webster and Watson 2002), the starting set of articles that served as the basis of this review was generated by searching the following top ranked IS journals: MISQ, ISR, Information & Management, Journal of Management Information Systems (JMIS), Organization Science (ORG), Management Science (MSC), Journal of Information technology. The table of contents for these journals for the past five years was scanned to look for IT governance related titles.

The second set of articles was generated by using the *Proquest* database. An advance search is initiated with the "IT Governance" and "Information Technology Governance" as the keywords. Search was limited to scholarly peer reviewed journals.

The third set of articles emerged from "going backward" and "going forward" as recommended by the Webster and Watson (2002) paper on writing literature reviews.

No prior criteria were set for articles to be included in the study. At first the IT governance topic needed to be explored as a whole. After the first round of reading, categories of IT governance studies started to emerge and accordingly papers were placed in a matrix with the following headers: The focus areas/domains of IT governance, implementation mechanisms for IT governance, outcome and objectives of IT governance and finally the main findings. In addition, all the ITG definitions from the set of selected articles were compiled in a separate table. Similar task is performed for the set of IT governance objectives.

Accordingly, the remainder of this chapter starts by exploring the different IT governance definitions. The next section contains a list of the main IT governance objectives as presented in the literature. The third section analyses and categorizes the existing IT governance studies into different tracks. The fourth section discusses an IT governance success framework; the IT governance balanced scorecard, which might be considered a holistic framework entailing the different types and aspects of IT governance success methods. Finally, the fifth section highlights the existing gaps in order to identify what has been done so far and what still needs to be addressed.

2.1. IT Governance Definitions

Searching in the selected articles from the literature review, many definitions for IT governance were found and compiled in a separate table. Analysis of the different definitions lead to allocating two main streams: One that focuses on accountability and decision-making and another that focuses on processes and the how to; however, it should be noted that they all streamline in the same direction. As a result, the list of IT governance definitions is presented in Table 1. Definitions are categorized according to their orientation; either towards accountability, processes or both.

To reach our own IT governance definition, we think that the ultimate one would be a definition that consolidate and capture both, the accountability aspect which acknowledges the role of structures and who is deciding and planning for IT and the process aspect highlighting the important role of the 'How to' manage, plan and control information technology decisions and activities. Accordingly and based on the existing definitions, IT governance can be defined as a framework of structures, relational mechanisms and a set of processes that will guide organizations in using information technology to support its business objectives.

IT Governance Definition	References
Authority Oriented Definitions	
IT governance arrangements represent patterns of authority related to directing, controlling and coordinating the IT spheres of activities in a firm.	Sambamurthy and Zmud, 1999
IT governance is about who systematically makes the IT decisions, what kind of input does it consider and who is held responsible for the consequences.	Weill and Ross, 2004b
We define IT governance as the framework for decision rights and accountabilities to encourage desirable behaviour in the use of IT.	Weill and Ross, 2004b
IT governance is the 'enterprise management system' through which the portfolio of IT initiatives for the organization is passed, scrutinized and, importantly, controlled.	Wilkin and Riddett, 2009
Process Oriented Definitions	
ITG is a structure of relationships and processes to control the enterprise in order to achieve the enterprise's goals by adding value while balancing risk versus return over IT and its processes.	ITGI, 2003
IT governance is the strategic alignment of IT with the business such that maximum business value is achieved through the development and maintenance of effective IT control and accountability, performance management and risk management.	Webb et al., 2006 cited in Willson and Pollard, 2009
Both Authority and Process Oriented Definitions	
IT governance is the enterprise management system through which an organization's portfolio of IT systems is directed and controlled. IT governance describes the distribution of IT decision–making rights and responsibilities among different stakeholders in the enterprise and defines the procedures and mechanisms for making and monitoring strategic IT decisions.	Peterson, 2004
ITG is the organizational capacity exercised by the board, executive management and IT management to control the formulation and implementation of IT strategy and ensure the fusion of business and IT.	Van Grembergen and De Haes, 2005
The organizational capacity exercised by the board and executive management to control the formulation and implementation of IT strategy and in this way ensure fusion of business and IT.	Van Grembergen, 2002 cited in Wilkin and Riddett, 2009
IT governance is about IT decision-making: The preparation for, making of and implementation of decisions regarding goals, processes, people and technology on a tactical and strategic level.	Simonsson and Johnson, 2006
IT governance is the responsibility of executives and the board of directors, and consists of the leadership, organizational structures and processes that ensure that the organization's IT sustains and extends the organization's strategies and objectives. IT governance involves specifying decision rights and accountabilities for important IT decisions. The goal is to encourage "desirable behaviors" in the use of IT.	ITGI , 2007

Table 1 - IT Governance Definitions

2.2. IT Governance Objectives

Generating business value from IT is the overarching objective for implementing IT governance within organizations and this objective emerges from most of the IT governance studies (Peterson 2004; Brown 2006; Ragupathi 2007; Lee et al. 2008). It also constitutes the main driver for top management in championing IT governance projects. However, zooming in on the current literature, many other types of objectives prevail. For instance, Weill and Ross (2005, p. 26) state that "Effective governance aligns IT investments with overall business priorities, determines who makes the IT decisions and assigns accountability for the outcomes". While this definition focuses on the accountability objective regarding the outcomes from IT investments decisions, other studies focus on the effectiveness and efficiency in using resources and on strategically leading firms to better positions. Accordingly, a list of objectives as stated by individual studies has been compiled and is shown in Table 2.

Looking at the compiled list of objectives from different studies we find that recurring types or categories of these objectives are being identified in most of the studies.

The IT governance Institute (ITGI) developed the CobiT framework as a set of control objectives that supports IT governance within organizations by ensuring that IT is aligned with the business, IT enables businesses to maximize benefits, IT resources are used responsibly, and IT risks are managed appropriately.

Inspired by that, the identified objectives are grouped under the following four main categories: IT alignment, risk management, value delivery, and resource management. These objectives constitute the main drivers behind adopting IT governance

and eventually the drivers for researchers to look deeper inside the black box of IT governance, seeking best methods for using information technology as leverage.

Objective	References
Objective Category 1: IT Alignment	
IT alignment with business	ITGI, 2003; ITGI, 2007; Lee et al., 2008; Van Grembergen and De Haes, 2005
Effective use of IT for growth	Weill and Ross, 2004b
Effective use of IT for business flexibility	Weill and Ross, 2004b
IT enabling the business	ITGI, 2007
Objective Category 2: Risk management	
Risk management	Van Grembergen and De Haes, 2005;ITGI, 2007; ITGI, 2003; Brown, 2006; Ragupathi, 2007; Lee et al., 2008
Maintaining accountability	Brown, 2006; ITGI, 2007; Weill and Ross, 2004b; Weill et al., 2003
Compliance with governmental and industry regulations such as Sarbanes-Oxley Act (SOX)	De Haes and Van Grembergen, 2006
Objective Category 3: Value Delivery	
Value delivery	Van Grembergen and De Haes, 2005; ITGI, 2007; ITGI, 2003
Measurement of ongoing programs and activities	Ragupathi, 2007
Delivering Quality IT on time and within budge	Ragupathi, 2007
Positive impact on financial performance	Lee et al., 2008
Leveraging IT to increase productivity and efficiency	Ragupathi, 2007
Objective Category 4: Resource Management	
Resource management	ITGI, 2003
Cost effective use of IT	Weill and Ross, 2004b
Effective use of IT asset utilization	Weill and Ross, 2004b
IT resources are used responsibly	ITGI, 2007

Table 2 - List of IT Governance Objectives from Existing Literature

2.3. Categorizing and Assessing the Existing IT Governance Studies

As mentioned earlier, a synthesis of the existing IT governance literature is conducted. The purpose of this synthesis is to perform taxonomy of the existing studies according to the topic and research questions they try to address.

The process of taxonomy and clustering of these studies took place after finishing the literature review matrix developed while reading the selected IT governance studies as described at the beginning of this chapter. The taxonomy exercise took into consideration, as a general guideline, the three elements of the DeLone and McLean model (DeLone and McLean 2003): Quality, Usage and, Impact; in addition to the IT artifact issue as discussed in Orlikowski and Iacono (2001).

Projecting the concept of IT artifact on our topic, IT governance prevailed as the issue under investigation (IT artifact) and accordingly different studies that presented frameworks to explain what IT governance is and how it should be designed were grouped together under Track 1 (Figure 1).

Similarly, taking the measures of success presented in the DeLone and McLean model and reflecting it on IT governance, we find that some studies assess the 'Quality' and 'Usage' of IT governance, by conducting empirical research to measure how it is implemented and how successful the implementation is compared to the designed IT governance. This set of studies constituted the second group that is called Track 2.

Finally, projecting the 'Net Benefits' dimension or the 'Impact' dimension from the earlier version of the D&M model, on our topic we find that some of the existing studies are measuring the impact of implementing IT governance on a different set of performance measures. Accordingly, these studies are grouped under Track3.

In summary and based on the above analysis, the existing IT governance studies are grouped under three main tracks as shown in Figure 1. Track 1 is about the contents of IT governance: what is it and how does it function? Track 2 is about its quality and usage: how mature can it be and to what extent it can be fully implemented? Lastly, Track 3 is about its impact on organizations: does it lead to better finances or better alignment? Each of these tracks is described in more details the following sub-sections.

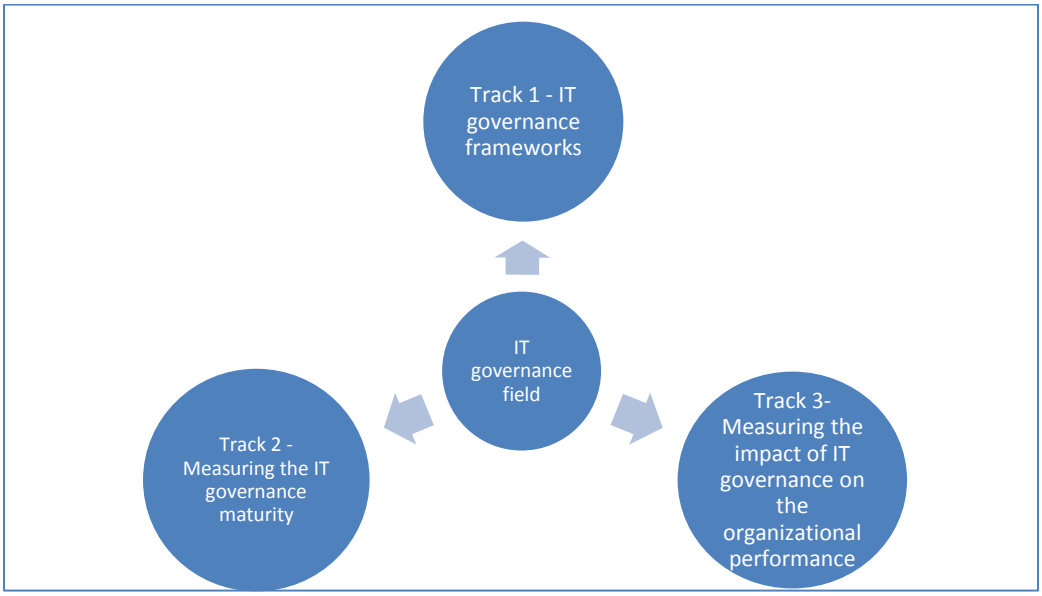


Figure 1 - Classification of IT Governance Studies into Three Tracks

2.3.1. Track 1 - IT Governance Frameworks – The Main Elements

The first track contains studies that provide definitions and frameworks for designing and implementing IT governance.

While the IT governance objectives answer the question *why* -- Why do organizations implement IT governance or Why IT governance is an important issue to be addressed by organizations--the different IT governance frameworks such as Weill and Ross (2004b), and De Haes and Van Grembergen (2006), answer the *what* question--what does IT governance include? What kind of decisions does is tackle? What kind of

organizational domains or focus areas does it entail?--These frameworks also answer the "*who"* question; in other words the accountability part of IT governance. Who is responsible for taking the decisions and giving input to support the different IT initiatives? Finally, some of the IT governance frameworks provide guidelines, with a varying degree of details, on the processes and relational mechanisms necessary to answer the "*how*" question. How can the people accountable and responsible for IT decisions tackle the identified focus areas? All these questions are discussed in the following sub-sections.

2.3.1.1. The Domains and Focus Areas of ITG Frameworks – Answering the *what* Question

Multiple IT governance (ITG) frameworks have been developed in the IT governance literature and by practitioners. Some of them have been constituted as an essential reference and have been used and validated in many other studies in the field, such as Weill and Ross (2004b) and De Haes and Van Grembergen (2006).

The domains or focus areas, as different studies call it, refer to the contents of the decisions and actions that need to be taken. For instance, in one of the earliest IT governance frameworks provided by Sambamurthy and Zmud (1999), it is called spheres of activities which are identified as IT infrastructure, IT use and project management.

Five key IT governance decision domains are also identified by Weill and Ross (2004b) and they are:

1. IT principles: The general and strategic view on how IT is being employed and regarded within the organization.

2. IT architecture: The general technology guidelines to be used for the core business processes and for the information needed for the business.

3. IT infrastructure strategies: Strategies for the generic and shared services that represent the foundation for any specific IT solutions to be implemented within the organization.

4. Business application needs: Decisions about the business needs and the set of IT applications needed to satisfy it.

5. IT investment and prioritization: Decisions regarding allocated budget for IT and criteria for approving and selecting IT projects.

While this is one way of categorizing the core IT issues that need to be handled by IT governance, another type of categorization is presented in the Control Objectives for Information and related Technology (CobiT 4.1) (ITGI 2007).This is a control framework designed for best practices on IT governance, and it includes the following categories as its main domains: strategic alignment, value delivery, resource management, risk management, and performance management. This categorization of the ITG domains is more objective oriented while the ones presented by Weill and Ross and Sambamurthy and Zmud are more operations oriented. Very similar to Weill and Ross domains are the three domains presented by Peterson (2004): Business applications, shared service/architecture, and technology component platform. In a slightly different approach, Ragupathi (2007) presents an ITG model consisting of three stages which can be treated as domains: 1) policies and procedures, 2) interactions and partnerships with customers, suppliers and alliances, and 3) Industry best practices. Another model is also presented by the same study and it has two dimensions: 1-focus: operational vs. strategic, and 2-

drivers: internal vs. external. The framework is the intersection of those elements forming four quadrants.

Whether operations or objectively oriented, all these categorizations of domains determine the scope of IT governance and draw its boundaries.

2.3.1.2. Structures, Processes and Relational Mechanisms of ITG Frameworks -- Answering the *who* and the *how* Question

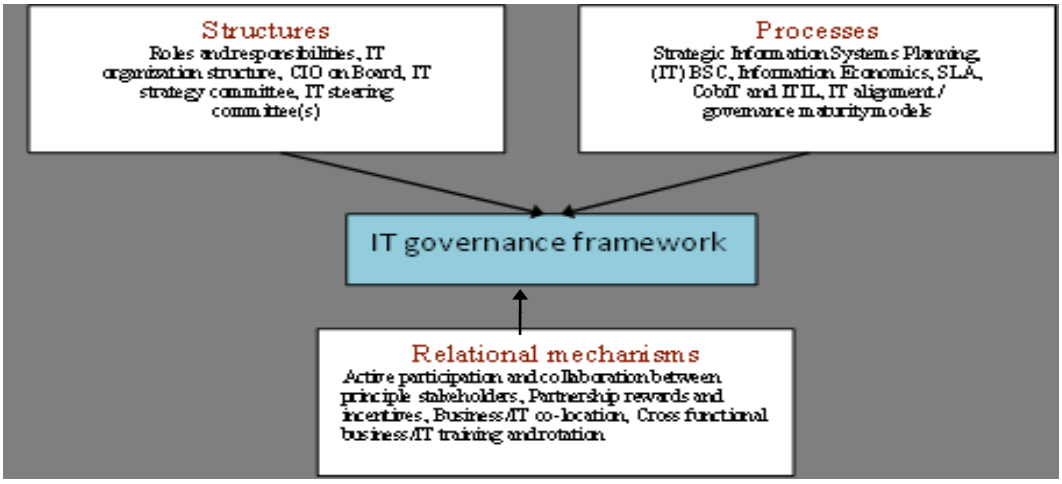


Figure 2 - Necessary Elements of IT Governance Frameworks Adopted from De Haes and Van Grembergen

A mix and interplay between structures, processes and relational mechanisms can constitute an IT governance framework (De Haes and Van Grembergen 2006) as shown in Figure 2.

Structures can be defined as the collection and arrangement of stakeholders who are responsible for making IT decisions. They address the accountabilities and represent the clear stating of roles and responsibilities (Van Grembergen and De Haes 2005). Examples of structures can be a CIO on board, an IT strategy committee, or an IT steering committee. Weill and Ross (2004b) have went a step further in using different

archetypes such as IT Duopoly, IT Monarchy and Business Monarchy which represent a combination of three main groups of stakeholders: CxO Executives, Corporate IT or business unit IT , and business unit leaders. Those are the ones responsible for making and influencing decisions regarding the five main IT domains specified earlier: IT principles, IT architecture, IT infrastructure, business applications need, and IT investment and prioritization. A single firm can map different decision domains against the different archetypes to create a tool specifying who is responsible for what regarding IT decisions across the enterprise (Weill and Ross 2005). For instance, in Business Monarchy, business leaders make the IT related decisions which affect the whole enterprise while in IT Monarchy, IT professionals make the decisions. The main premise in all these structures is that IT governance is not the responsibility of the CIO alone and it is not independent of the corporate governance. It is the responsibility of the whole management team, starting with the CEO and top management team down to the business unit leaders.

Processes can be defined as the set of related tasks performed to execute, manage, and monitor the different activities related to Information Technology**.** Processes are the second main element of an IT governance framework. While Weill and Ross (2004a) did not elaborate on these, CobiT 4.1 (ITGI 2007) has explicitly defined 34 processes grouped under four main areas: Plan and Organize, Acquire and Implement, Deliver and Support, Monitor and Evaluate. Similarly, different processes have been identified by De Haes and Van Grembergen (2006) but in a more general way such as Strategic information system planning, Service level agreements (SLA) and IT Balanced Scorecard (BSC). These processes represent the '*how*' part of the ITG framework. It represents a

good reference for the different stakeholders responsible for managing, monitoring and exerting control over the different activities related to IT within the organization.

Relational Mechanisms, the third element of an ITG framework, are the mechanisms that enable better communication across the organizations such as active participation and collaboration between principle stakeholders, and cross-functional business/IT training and rotation (Van Grembergen and De Haes 2005; Weill and Ross 2004b). According to Maes et al. (2011), this element of IT governance addresses the 'people' aspect such as the trust and respect among stakeholders. Establishing common ground and implementing alignment, which is one of the main objectives of IT governance, need some concrete mechanisms to make it happen and those relational mechanisms provide the necessary guidelines for the different stakeholders on how to keep communication channels open in order to keep all the activities streamlined and aligned across the different business units. On the strategic level, the relational mechanisms keep the IT strategy in harmony with the corporate business strategy.

2.3.2. Track 2 - Measuring the IT Governance Maturity

The second track of IT governance studies tackles the different ways to analyze, measure, and assess the success of implementing the IT governance practices (Lee et al. 2008; Peterson 2004). Some of the studies under this track have used the process maturity model of the CobiT framework in order to evaluate the maturity of the IT processes at the organizational and industry level. For instance, in Tugas (2009), it was found that the food and beverages industry in the Philippines, represented by 22 publicly listed companies, have ranked at 2.0 on the CobiT maturity model, and this means that there are IT processes that are being followed, but they are intuitive and informal. Other studies under this track have identified inhibitors of IT governance success, such as Lee et al.

(2008), where a survey of 96 Korean companies from different industries has shown that some inhibitors and mainly, lack of IT principles and policies are negatively correlated with the ITG success. One study within this track (Peterson 2004) has provided an assessment process model; the ITGAP. This model is developed based on a longitudinal case study of Johnson & Johnson. It provides a structured method of IT governance assessment from four different perspectives: starting with the IT value drivers, then the IT governance complexity in decision-making, followed by assessment of the IT value including the business impact and finally assessment of the different ITG capabilities: Structural, process, and relational. This method of assessment can be also considered as a roadmap for continuous evaluation and improvement of the IT governance situation within organizations.

2.3.3. Track 3 - Measuring the Impact of IT Governance on the Organizational Performance

In the third track, the IT governance studies' objectives are to measure the impact of IT governance practices on organizational performance (De Haes and Van Grembergen 2009; De Haes and Van Grembergen 2009; Neirotti and Paolucci 2007; Simonsson et al. 2010; Weill and Ross 2004b). These studies discuss the link between complying with the IT governance practices and achieving better organizational performance. In other words, they are measuring the business value driven from IT and IT governance, and this is the main focus of this dissertation and the main track that this paper falls under.

Linking IT governance to organizational performance has been tackled in different studies and in different ways. Table 3 contains a summary of studies that have

discussed the issue of measuring the impact of ITG on the performance construct. For each study, the dependent construct, the corresponding independent variable and the main findings are listed and briefly described. These studies are grouped under three main methods for measuring the impact of IT governance: subjective, alignment and quantitative.

Method 1: The IT governance performance is measured subjectively using Weill and Ross (2005)[1] as explained in Table 4, while the organizational performance is measured on profitability, assets, and growth. This empirical study of 256 firms comprises firms from North America, Europe, Asia and large enterprises across different industries. The study analyses the top performers. It classifies top performers as top IT governance performers and top financial performers.

Independent variable (IT governance components)	**Dependent variable/ Constructs to measure the impact on organizational performance**	**Findings**	**Study**
Method 1: Subjective			
Decision-making structures: Centralized, Decentralized or Hybrid	**Governance performance construct** is measured subjectively using the Weill and Ross method as shown in Table 4. The **organizational performance** is measured on profitability, assets and growth.	Different types of IT governance are linked to different types of organizational performance • Centralized →Profit • Decentralized→Growth • Hybrid →Asset utilization	Weill and Ross, 2004b; Weill and Ross 2005
Individual processes as per CobiT maturity model are linked individually to the dependent variable.	**Governance performance construct** is defined as the quality of services that the IT organization delivers as seen from a business point of view and is measured subjectively using Weill and Ross method and as	The processes related to mature quality management, cost allocation, and clearly defined	Simonsson et al., 2010

[1]This method of measuring IT governance will be referred to as the Weill and Ross method

	shown Table 4.	organizational structures and relationships have the strongest positive correlation. Project management, capacity management, and SLA, however, have almost no correlation.	
Method 2: IT Alignment			
Existence of a baseline of eight essential IT governance processes compiled from the existing 34 processes of CobiT.	**IT alignment construct** assessed by an IT alignment instrument (Sledgianowski, Luftman, & Reilly, 2006). The assessment instrument covers 22 questions in six domains: communication, competency and value measurement, governance, partnership, scope and architecture and skills. Each question is rated on a scale from zero to five.	A positive relationship between IT alignment levels and the use of IT governance practices is found.	De Haes and Van Grembergen, 2009
Method 3: Quantitative			
Exploratory study to search for IT governance models by finding similarities and differences among organizations with IT investments and those with high and low productivity.	**Productivity ratio** construct is measured using the following indicators: Net premium written per employee, the loss ratio, the expense ratio.	A set of recommended IT governance practices is found essential to attain higher productivity.	Neirotti and Paolucci, 2007
Four types of IT assets: transactional, informational, strategic, infrastructure. These different classes of assets gives different types of value (lower cost, profit, innovation, market value).	**The Performance construct** is measured in terms of cost of goods sold, profit (net margin), innovation (sales from modified, new and enhanced products/total sales) and Market value	IT savvy firms who have the following IT practices: IT for communication; digital transactions; internet use; firm-wide IT skills; and business management involvement, have above average returns then other firms.	Weill and Aral, 2005

Table 3 - Different Studies Testing ITG Impact Using Different Types of Organizational Performance Measures

A positive correlation is found between the top governance performers and top financial performers. Accordingly, it was found that companies leading on asset utilization used duopoly for all five domains, while companies leading on profit use a more centralized approach. On the other hand, companies leading on growth follow a more balanced approach; for IT principles, firms use business monarchy; for IT investments they use either feudal or business monarchy; for business applications they use business monarchy; and finally, for architecture and infrastructure, there is no dominant approach. It is worth noting that the correlation tested in this study is in fact between the perceived impacts of ITG on different performance outcomes. It is also important to note that the level of measurement in this study was assessed at the enterprise level but Weill and Ross suggested for future research to be conducted at the business unit level as well.

More empirical findings are found in the exploratory study conducted in BankNorth in London (Hoffman and Weill 2007). The study attempted to devise mechanisms while observing the implementation of IT governance. Six months since the start of the study, these mechanisms were tested and the ITG performance was calculated using the same Weill and Ross method and it was found that the bank ranked high (82.5) which is above average, not only within its industry but also more broadly when benchmarked with Weill and Ross (2004b) survey of 256 firms.

Using the same method of measuring the impact of ITG on organizational performance, Simonsson et al. (2010) named the dependent variable: IT governance performance. IT governance performance is defined as "the quality of the services that the IT organization delivers, as seen from a business point of view" (Simonsson et al.

2010, p. 14) and is measured subjectively using the same Weill and Ross method (Table 4). However, the independent variable here is the IT governance maturity instead of the decision-making archetypes. The IT governance maturity was measured using the CobiT 34 processes (ITGI 2007) and its corresponding maturity model and the correlation was investigated at the process level; each process level of maturity (ranging from 0-5) was correlated with the overall IT governance performance. Findings from 35 case studies showed that the processes related to mature quality management, cost allocation, and clearly defined organizational structures and relationships, have the strongest positive correlation with IT governance performance. Project management, Capacity management, and Service level agreements, however, have almost no correlation.

Method 2: The second synthesized method of measuring the ITG impact on organizational performance is IT alignment (De Haes and Van Grembergen 2009). A positive relationship is found between the use of IT governance practices and the IT alignment level. IT alignment, the dependent variable, is measured using a validated alignment maturity assessment instrument (Sledgianowski et al. 2006 cited in De Haes and Van Grembergen 2009). The IT governance practices were synthesized from the existing literature and were categorized under the three groups of structures, processes and relationship mechanisms. Different items of IT governance practices were compiled according to their perceived effectiveness and perceived ease of implementation. The study found that highly aligned businesses have followed the recommended list of IT governance practices versus less aligned organizations.

	Question 1 **How important are the following outcomes for your IT governance? From 1 (not important) to 5 (Very important)**		**Question 2** **How successfully does your IT governance influence these outcomes? From 1 (not successful) to 5 (Very successful)**		
Cost effective use of IT		X		=	
Effective use of IT asset utilization		X		=	
Effective use of IT for growth		X		=	
Effective use of IT for business flexibility		X		=	
Importance Total =			Total=		

Calculated Governance Performance = Total / Importance Total * 20

Table 4 -Calculating the Perceived IT Governance Performance (Weill and Ross 2005)

Method 3: The third method that exists in the current literature for measuring the ITG impact on organizational performance is geared more towards the quantitative side. Productivity is used as an organizational performance indicator in the study of Neirotti and Paolucci (2007) and is evaluated against some IT governance models in firms with high levels of IT investment in an attempt to assess the strategic value of IT. A positive correlation is found between organizational performance in terms of productivity and a list of "essential" IT governance practices. Productivity ratios are calculated quantitatively using three indicators: net premium written per employee, the loss ratio, and the expense ratio. IT governance practices, on the other hand, are compiled by examining similarities and differences among 30 Italian insurance companies who have had business processes changes due to IT investments. One of the major differences highlighted in the study of Neirotti and Paolucci (2007) was the way the different companies consolidated its IT project portfolio, combining new initiatives with old ones. This factor, when performed well, lead to reduction cost, and eventually to more

investments in new technologies in the long run. Weill and Aral (2005) is another study that uses the quantitative measures of performance. In their study, the authors match between the existence of some IT practices (IT savvy firms) and the financial performance of the firm.

The financial performance is assessed depending on the type of IT investment, which is looked at as an investment portfolio comprising of four IT investment categories: Transactional, infrastructure, informational, and strategic. Investing in transactional investments leads to cost reduction and increased productivity. Investments in strategic IT lead to increase in revenues, while investments in infrastructure lead to a combination of both, including a reduction in time to market for new business initiatives. Profitability though might suffer in the short run from investments in IT infrastructure but market valuation will improve in the long run. Firms from different industries have different types of percentages in their IT portfolios. For instance, in the financial industry, top performers have 11% invested on informational IT, 19% on strategic, 12% on transactional, and 58% on infrastructure. However, in the wholesale, retail and transport industries, the figures are as follows: 17% invested on informational II, 17% on strategic, 14% on transactional, and 52% on infrastructure. The study relied on a CISR study of 147 US firms over 5 years. The main findings are that the IT savvy firms have above average returns then other firms. A firm, to be IT savvy, is found to have five common characteristics regarding IT use and IT competencies: IT for communication, digital transactions, internet use, firm-wide IT skills, and business management involvement. A summary of the abovementioned methods for measuring the impact of IT governance on organizational performance is included in Table 3.

2.4. The IT Governance Balanced Scorecard and other Performance Measurement Frameworks

An IT governance balanced scorecard (ITG BSC) was developed by Van Grembergen and De Haes (2005). This framework aims to measure the success of IT governance from different perspectives and hence takes into consideration the different types of measuring the success of IT governance. The IT governance balanced scorecard is built upon the original balanced scorecard (BSC) tool that has been developed to assess the organizational performance and has gained a substantial popularity during the past decade.

This framework is introduced by Kaplan and Norton, originally as a performance tool that emphasizes the fact that performance should not be measured using only traditional financial measures but it should take four perspectives into consideration: 1) Learning and growth perspective, 2) Internal processes perspective, 3) Customer's satisfaction perspective, and 4) Financial perspective. Accordingly, The BSC allows managers and executives to have a more balanced view of their organizational performance.

Van Grembergen and De Haes (2005) have tailored the tool and applied it to the IT governance as shown in Figure 3. The tailored tool is named the "IT Governance Balanced Scorecard" and its main objective is to provide a framework for measuring how well IT governance is doing by assessing it from different perspectives. The original balanced scorecard perspectives are modified to become: 1) Future growth perspective providing measures to assess the success of IT governance in laying the foundations

needed for the success of other perspectives, which are the skills and knowledge of stakeholders and the partnership between IT and business people.

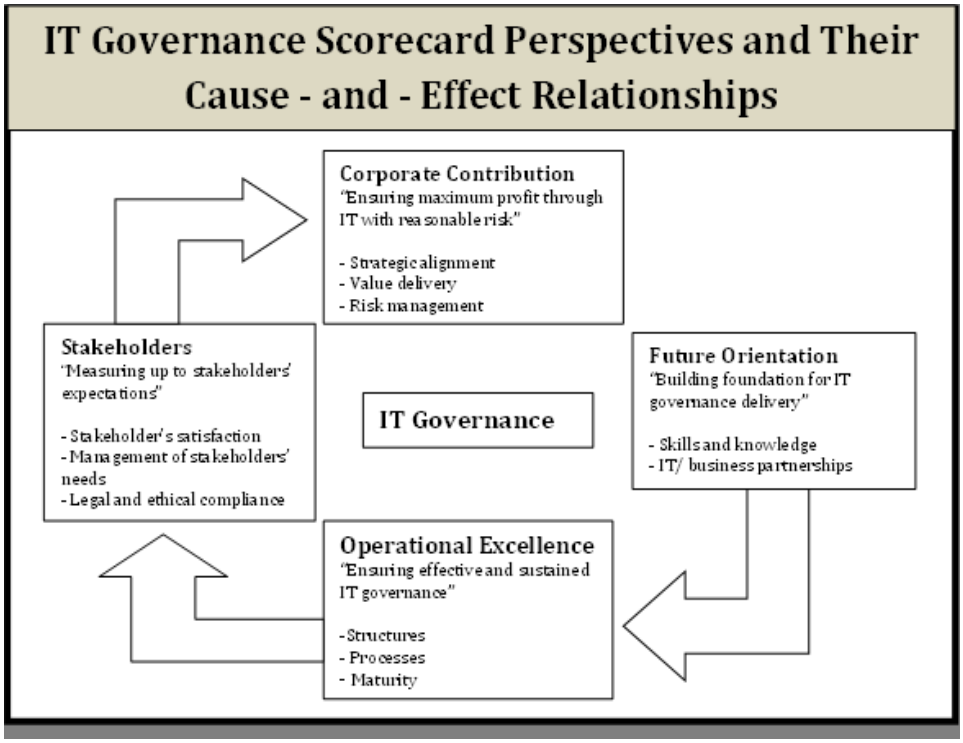


Figure 3 - IT Governance Balanced Scorecard adopted from De Haes and Van Grembergen

This perspective is linked via a cause-effect relationship to the 2) Operational Excellence perspective where IT governance is assessed by evaluating the maturity of its structures and processes. This perspective can lead to better 3) stakeholders' satisfaction and better management needs and finally leading to 4) Corporate Contribution perspective where the outcomes of IT governance; IT alignment, value delivery and risk management are evaluated.

Even though the authors do not explicitly state this, an analysis of the ITG BSC framework would remind us of the DeLone and McLean model in its attempt to put the different studies measuring the information Systems's success into perspective and under the umbrella of a holistic framework so that different findings can be compared and

eventually can be used and build upon towards the advancement of the MIS field. Similarly, we observe that different types of IT governance studies described under Track 2 and Track 3 in the previous sections, which are measuring IT governance success in terms of maturity or its impact on different organizational performance indicators, can be easily placed within one of the ITG BSC perspectives.

Moreover, DeLone and McLean (2003) indicate in their updated model that the BSC is one of the approaches that can be followed to enhance the measurement of the 'Net Benefits' dimension of their model.

The balanced scorecard tool and framework is not only useful for assessment purposes but it also links the different perspectives together in a cause-effect relationship and this would help the top management team to improve its IT governance practices and develop new strategies. However, the framework is still conceptual and not many empirical studies have used it.

2.5. The Identified Research Gaps

An analysis of the abovementioned studies investigating the ITG impact on performance measurement, leads to the identification of the following common issues that need to be further investigated:

1) The business performance is measured at the organizational level, as in Weill and Ross method shown in Table 4, where the problem lies in the level of analysis being far from the first-order effects of the implemented IT solutions (Barua et al. 1995). Both Weill and Ross (2005) and Barua et al. (1995) call for performance measurement at the business unit level.

2) The IT governance impact is measured subjectively as perceived and not as observed (Weill and Ross 2004b). In order to champion IT governance and encourage it,

the board of directors needs stronger, better founded concrete evidence. Therefore, more objective measures are needed to investigate the relationship between IT governance practices that are already implemented and the measured performance outcomes.

3) Financial figures such as productivity ratio are essential but not enough to measure performance because sometimes those figures, such as profitability, do not show the added value or benefits in the short run (Hitt and Brynjolfsson 1996). Peppard (2005) clearly explained this through a case study for CRM implementation by highlighting the fact that existing studies are focusing on the short term financial measurement such as return on investment (ROI), while forgetting that some solutions will only make a difference after two or three years. Hence, for cross-sectional studies to be able to reflect more accurate measures of performance, other non-financial criteria should be investigated.

Therefore and in an attempt to answer to those identified gaps, the next chapter will include a proposed model for measuring the IT governance impact on IT **business unit performance** and hence to investigate the correlation between the **existing and implemented** IT governance practices including structures; processes; and relational mechanisms; and business unit performance; **financial and non-financial outcomes**.

Chapter 3: Research Model

This chapter presents the research model, shown in Figure 4, which attempts to address the research gaps identified in section 2.5 and help in answering the main research question stated earlier as: **"What are the IT governance configurations that will lead to better business unit performance?"**

Hence, the research model attempts to measure the impact IT governance practices on the business unit performance and from different perspectives relying on the balanced scorecard approach. This will answer to the first and third research gaps identified in section 2.5 and will also serve as a theoretical contribution by empirically testing the ITG BSC conceptual framework.

Another issue that the proposed research model is addressing is measuring the maturity and effectiveness of the implemented IT governance instead of measuring its perceived impact on performance, and this, then would answer to the second research gap..

Building and testing theories is a major focus in most of the published research and it is a critical task in this thesis. According to Weber (2003) "A theory is an account that is intended to explain or predict some phenomena that we perceive in the world". The phenomena that this study aims at capturing and explaining, is the relationship between IT governance and business unit performance. The process of building the research model in this paper will follow Weber's suggested steps to build a theory.

The first step is defining the constructs of the research model. This task is not done from scratch. It is however opting for Weber's option of defining the constructs of an existing theory more precisely in order to capture the phenomena differently".

Although the balanced scorecard is not a theory by definition, it can be considered as a Meta theory, and the objective of the proposed research model is to zoom in on the different elements of the ITG balanced scorecard (Figure 3).

For the first construct, we open the box of the Operational Excellence perspective and look closer at the IT governance practices and their interactions. While some existing studies tried to find a correlation between the maturity of each IT governance practices and certain performance measures (Simonsson 2010) or between an aggregate score of IT governance maturity and certain performance measures (Tugas 2008), this research model will instead use a configurational approach. This is in order to investigate the different patterns that might exist among the different IT governance structures, processes and relational mechanisms and hence capture the dynamic interaction effect between those practices. Thus, the research model will be able to investigate correlations between business unit performance, and different IT governance configurations instead of individual ones. These different configurations are hypothesized to lead to different levels of performance and maybe to different types of performance outcomes; financial as well as non-financial.

Reviewing the configurational theory, Venkatraman (1989a) has cited Miller (1981) in defining the role of gestalts as follows: "Instead of looking at a few variables or at linear associations among such variables we should be trying to find frequently recurring clusters of attributes or gestalts." Similarly, Meyer (1993) states that configurational approach has a holistic synthesis in its mode of inquiry and that "rather than trying to explain how order is designed into the parts of an organization,

configurational theorists try to explain how order emerges from the interaction of those parts as a whole" (p. 1178).

Applying this theory to the proposed research model will lead to the idea of looking for clusters of IT practices to emerge into different configurations of IT governance and hence reflecting the "organizational reality". Moreover, representing and measuring the IT Governance construct as a set of "configurations" or "gestalts" would allow for clearer and more meaningful explanation of any possible correlations that might exist between IT governance and business unit performance types. Therefore, we expect that different structures, processes and relational mechanisms are clustered together to form different configurations where each configuration might lead to different level of performance and therefore, the first construct is called **IT Governance Configurations**. The different dimensions of this construct are shown in section3.1.

The second construct, **Business Unit Non-Financial Performance**, and the third construct **Business Unit Financial Performance**, are based on the Stakeholder's perspective and the corporate contribution perspective from the ITG BSC (Figure 3) with an adjustment to bring it to the business unit level so that a more accurate analysis of the correlation between mature set of IT governance practices and business unit performance can be achieved. The domains of these two constructs are discussed in further details in sections 3.2 and 3.3 respectively.

The second step to building the research model is the process of defining the relationships between the constructs.

It should be noted that prior studies have looked at IT governance using the archetypes configurational form; however, these studies focused on the structures and

accountability element of IT governance and thus looked at different archetypes of authorities in order to link it to different performance measures. For example, Weill (2004) shows that companies leading on asset utilization use IT duopoly for all five ITG domains while those leading on growth used different archetypes for the different domains. Similarly, Xue et al. (2008) have investigated different archetypes of IT governance in IT investment decision processes using case studies. The study found different patterns and combinations of different management groups such as Top management (TM), IT management (IT) or administrative staff (AM), who were involved in the governance of making IT investment decision process resulting in archetypes that were named, such as TM-IT Duopoly, and TM monarchy.

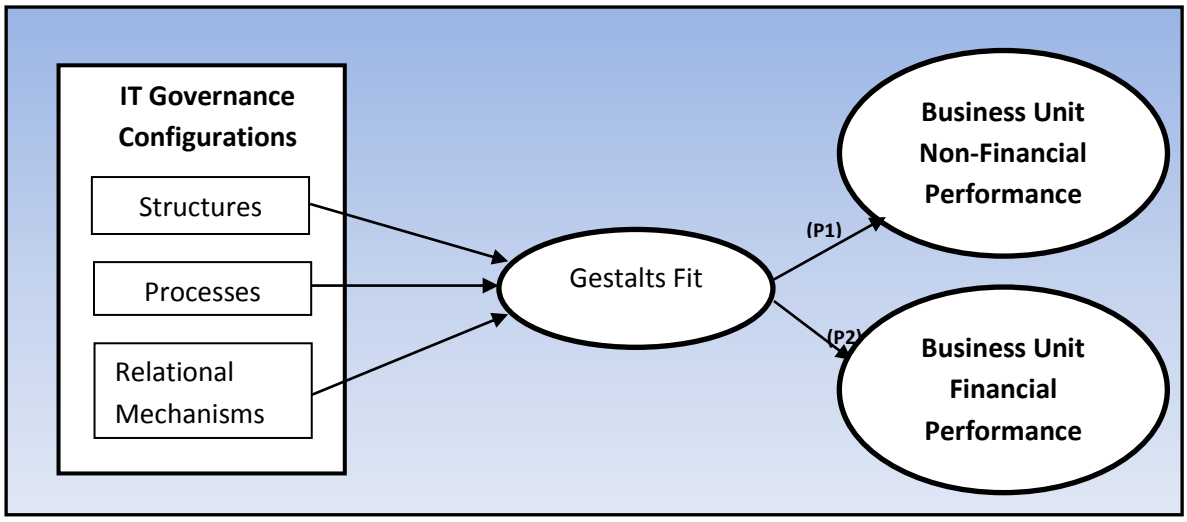


Figure 4 - Research Model

In this research model we are looking for patterns, but these are not only patterns of authorities but of structures, processes and relational mechanisms. As Xue et al. call for future research to analyze the relationship between their archetypes and outcome measures, this study is trying to analyze such relationships with new patterns of practices.

Using cluster analysis, different combinations of structures, processes and relational mechanisms are expected to emerge. Therefore, different clusters of structures, processes and relational Mechanisms can be grouped together to form different IT governance configurations.

Although there is no prior theoretical foundation for the different clusters that might emerge from the statistical analysis, indications from the literature review examined in the previous chapter direct us to expect that higher performance levels might be attained when ITG configurations are more mature. An IT governance configuration is considered mature when it contains a diversity of individually mature ITG practices. Diversity would be a combination of the three groups of practices: structures, processes and relational mechanisms, each that support and complement each other. Although we cannot foresee the interaction effect of all the IT governance practices and because we don't know how the different ITG configurations will behave before the empirical testing, theoretical support will be derived during the discussion of each practice where we can link individual practices to better business unit performance or to better implementation of another practice. For instance, an Information System Strategic Planning (ISSP) process will be more mature and effective if there is a structure such as IT strategy committee to do the job and if there is an organizational culture fostering the partnership mechanisms.

In addition and relying on the meta theory of balanced scorecard, higher stakeholder's satisfaction and stronger corporate contribution is shown to be attained when preceded by mature structures and processes (Figure 3). On the IT organizational

level, appropriate IT governance-focusing on both IT structure and IT strategy enhanced the performance of the IT department (Tamim et al. 2102).

Therefore, relying on the possibility that several IT governance configurations will be uncovered, the following propositions indicate the level of performance expected when IT governance configurations are mature:

Proposition 1: The more mature an IT governance configuration is, the higher the business unit non-financial performance.

Proposition 2: The more mature an IT governance configuration is, the higher the business unit financial performance.

The discussion of the three different constructs in the following three sections will provide more support for the above mentioned propositions.

3.1. IT Governance Configurations

IT governance can be defined as a framework of structures, processes and relational mechanisms that will help organizations make the best of information technology in driving business value and pushing the envelope towards sustainable competitive advantage.

As highlighted earlier in the literature review chapter, different frameworks have been developed by IS scholars, such as the Weill and Ross (2004) archetypes, and by the industry as well, such as the CobiT and ITIL frameworks. Based on these and other prior studies that offered IT governance frameworks (De Haes and Van Grembergen 2009; Bernroider 2008; Brown 2006; Hoffman and Weill 2007; Peterson 2004), an IT governance configurations construct is built. The construct consists of different IT governance practices which represent the construct's dimensions.

The newly developed IT governance configurations construct with its different practices is summarized in Table 5. This list of ITG practices is thought to capture a baseline of IT governance practices within an organization. The practices are grouped under structures, processes and relational mechanisms. These practices are generated as a result of an iterative process of refinement. First, an extensive literature review of IT governance studies is conducted. Second, evidence of the use and/or impact of certain structures, processes or relational mechanisms on certain aspect of organizational performance are extracted from each individual study and are inserted into a matrix. Third, the most common practices (mentioned in two or more studies) are subjectively highlighted and assembled to form the list of practices included in Table 5. Fourth, the list of IT governance practices is validated with a pilot case study and as a result, all the items are kept but more insights are gained in some of the practices. The interview guide used in the pilot case study is shown in Appendix A.

The IT Governance construct has been measured in earlier studies (Tugas 2009; De Haes and Van Grembergen 2009) as an aggregate construct, as per the Law et al. (1998) classification, where the level of maturity of each practice is aggregated to form the maturity level of IT governance as one score using an algebraic equation. However, in this study, the IT governance construct is conceptualized using the configurational approach or the fit as gestalts perspective. Accordingly, the construct is presented as the different combinations of its dimensions (Law et al. 1998).

Structures	**Sources**
1. IT Strategy committee	De Haes and Van Grembergen 2009; Brown, 2006; Wilkin and Riddett, 2009; Ali and Green, 2007; Peterson, 2004
2. IT Steering committee	Brown, 2006; Wilkin and Riddett,

	2009; Ragupathi, 2007; De Haes and Van Grembergen, 2009
3. CIO is a member of the board or the executive committee	De Haes and Van Grembergen, 2009; Peterson, 2004; Wilkin and Riddett, 2009; Huff et al., 2006; Brown, 2006
4. CIO reporting directly to CEO	De Haes and Van Grembergen, 2009; Hoffman and Weill, 2007; Brown, 2006
5. Distribution of IT governance responsibilities among existing organizational structures	Weill and Ross, 2004b
Processes	**Sources**
Strategic Information System Planning (SISP)	Peppard, 2005; ITGI, 2007; Brown, 2006; Peterson, 2004; Ragupathi, 2007; Lee et al., 2008; Van Grembergen and De Haes, 2008
Project Management Methodologies	De Haes and Van Grembergen, 2009; Weill and Ross, 2004b; Hoffman and Weill, 2007; Peppard, 2005, ITGI, 2007; Brown, 2006; Wilkin and Riddett, 2009; Nolan and McFarlan, 2005
Service Level Agreement (SLA)	De Haes and Van Grembergen, 2006; Peppard, 2005; ITGI, 2007; Brown, 2006
CobiT and ITIL	De Haes and Van Grembergen, 2006; Brown, 2006; Ragupathi, 2007
Business Continuity and Information Security Strategy	ITGI, 2007; Peppard, 2005; Ragupathi, 2007; Nolan and McFarlan, 2005
Performance Management	De Haes and Van Grembergen, 2006; Hoffman and Weill 2007; Peppard, 2005; ITGI, 2007; Brown, 2006; Peterson, 2004;
1. Managing IT Investments: a. Value Delivery vs. IT Performance b. IT Investments as an IT Portfolio c. Categories of IT investments within an IT portfolio d. Setting Value Return Targets e. Hurdle Rates and Associated Risks f. Who is involved in the Management of IT investments?	Weill and Ross, 2004b; ITGI, 2008; Hoffman and Weill, 2007
2. IT budget Control and Reporting	De Haes and Van Grembergen, 2009; Weill and Ross 2004b; Peppard, 2005; ITGI 2007
3. **Relational Mechanisms**	**Source**

4. CIO Leadership Skills	De Haes and Van Grembergen, 2009
5. Top Management Commitment and Partnership with CIO	Hoffman and Weill, 2007; Weill and Ross, 2004b; Peterson, 2004; Ragupathi, 2007; Brown, 2006; De Haes and Van Grembergen, 2006; Ali and Green, 2007; Lee et al., 2008
6. Clear Communication between IT Management and the Business Executives	ITGI, 2009; Westerman, 2009; ITGI, 2007; Weill and Ross, 2005
7. Cross-Functional Training: Business/IT Training and Rotation	Brown, 2006, De Haes and Van Grembergen, 2006; Peterson, 2004

Table 5 - Summary of the IT Governance Practices

The next subsections will include explanation and description of each practice along a justification of why it tends to contribute to better performance or to support other practice(s). The description will include the different studies that have mentioned each practice and have tested it empirically as an IT governance practice.

3.1.1. Structures

S1: IT Strategy Committee

The IT strategy committee operates at the level of the board of directors and its main mission is to make sure that IT is included on the board agenda and is reported on a regular basis (De Haes and Van Grembergen 2009). This structure is being listed among the necessary IT governance structures by many studies (Nolan and McFarlan 2005; De Haes and Van Grembergen 2006; De Haes and Van Grembergen 2009; Brown 2006; Ali and Green 2007; Peterson 2004).

The IT strategy committee is an important mechanism to highlight the fact that IT governance is an essential part of corporate governance. The committee may be composed of board and non-board members who will support the board in governing and overseeing the IT related matters. Empirical testing in the Belgium financial sector conducted by De Haes and Van Grembergen (2009) showed that although this structure is

promoted by the experts, its implementation and usage was found almost null. It turned out that the board was still not fully interested or willing to leap and get involved in IT, while they would rather discuss the core financial issues.

IT strategy committee can be the forum where other processes among the list in Table 5 can be implemented and enabled. A main example of such processes is Information Systems Strategic Planning (ISSP). Without an IT strategy committee, this process cannot be realized properly and at the appropriate level of authority which will hamper its effectiveness and eventually impede its impact on the business unit performance.

S2: IT Steering Committee

The IT steering committee is another IT governance structure listed in different studies (Brown 2006; Wilkin and Riddett 2009; Ragupathi 2007; De Haes and Van Grembergen 2009; De Haes and Van Grembergen 2006). While the IT strategy committee is at the board level, the IT steering committee is at the executives' level (Van Grembergen and De Haes 2008). It serves mainly in implementing the IT strategy and the IT plan developed by the IT strategy committee. Its potential members are business executives, the CIO and some advisors in specific fields such as IT audit, legal, and finance. The existence of this committee allows IT seniors to participate and collaborate with business executives in determining IT priorities and IT investments (Ragupathi 2007). Among its responsibilities also is recommending IT plans for the strategy committee and ensuring that requests for IT projects have a business case, creating criteria to determine the value of IT projects (Van Grembergen and De Haes 2008). In terms of authority, the IT steering committee oversees the management and delivery of IT

services and day-to-day operations (ITGI 2003). Some empirical studies (Ali and Green 2007), though, found that the IT steering committee was not significantly correlated with ITG success. However, from a project management perspective, if an initiative described in the IT strategy needs to be executed, a team of executives needs to champion it and follow on its execution; otherwise, it will remain only on blueprint. In addition, this type of committee encourages other essential practices of relational mechanisms such as partnership between top management and the CIO and a clear communication between IT management and business executives where these relationships are fostered and encouraged.

S3: CIO is a member of the board of directors or the executive committee

Having the CIO on board will help the board to make more informative decisions (De Haes and Van Grembergen 2009; Peterson 2004; Wilkin and Riddett 2009; Huff et al. 2006; Brown 2006), to recruit more IT people on board and to educate the rest of the board members about IT governance. Having the CIO on board was one of the easy to implement ITG practices as stated by the expert panels in De Haes and Van Grembergen (2009). The CIO should have an opinion on how technology should support the strategy and how it can influence it too (ITGI 2009, p.9).

The executive committee is the most senior managers' committee in the enterprise. Having the CIO as an active member on this committee is found essential to the success of IT governance (De Haes and Van Grembergen 2009; Hoffman and Weill 2007; Brown 2006). 9% of project failures in the 1990's was due to lack of executive support (Brown 2006); thus, the position of the CIO as a member in the executive team enhances the chances for better support

S4: CIO reporting directly to CEO

When the reporting process is more direct between the CIO and the CEO, the execution of other practices are better supported because it provides the CIO with the political power needed to push the whole enterprise for following best practices such as CobiT and ITIL, follow and respect IT security measures, and select the appropriate projects and prioritize it properly. In addition, having this structure in place will foster clearer and more frequent communication between the IT camp and the rest of the enterprise.

S5: Distribution of IT Governance responsibilities among existing organizational structures

Weill and Ross (2004b) have introduced six archetypes representing the different types of executive positions of business and IT. These archetypes represent different governance modes varying on a spectrum of centralization to decentralization with the hybrid mode falling in between. The Federal and Duopoly archetypes are located in the middle of this spectrum manifesting partnership between IT and business executives to make decisions on the five different domains: IT principles, IT infrastructure, IT architecture, IT applications, and IT investments. Those archetypes allow the organizations to take the best of both worlds (Van Grembergen and De Haes 2008). Along with the IT strategy and steering committees, the Federal or IT Duopoly archetypes, if applied to the Application and IT Architecture domains, can foster the necessary partnership between IT and the rest of the organization.

3.1.2. Processes

P1: Strategic Information System Planning (SISP)

Formulating the IT Strategy entails shaping the organizational IT identity, drawing its broad boundaries and directing it towards meeting the business objectives (Peppard 2005). The IT Strategy contains the main IT objectives that should be driven from the business objectives. IT policies are formulated based on the considerations and recommendations of environmental scanning as well as internal needs. At this stage, questions like "What funding level will be established for IT?", "What are our business strategies and objectives?", "What is our strategy for information systems that are required to meet business objectives?" should be addressed (Peppard 2005). These policies will then be passed to the other organizational, operational, monitoring and executive functions for implementation. The result of the process of formulating IT strategy is called Strategic Information Systems Planning (SISP). Strategic Information System Planning is also defined as the "process of deciding the objectives of organizational computing and identifying potential computer applications which the organization should implement" (Lederer and Sethi 1988; cited by Earl 1993; cited by Van Grembergen and De Haes 2008, p. 37).

SISP includes policies that affect the organizational overall performance and how IT is aligned with business objectives (Ragupathi 2007). It also shapes the goals, product, services and environmental relationships of the organization (Brown 2006).

This practice is essential in starting IT governance where it should start, at the planning phase where proper alignment between IT objectives and the corporate business objectives is achieved and planned for. When IT projects are being selected and managed based on a proper planning methodology, which is aligned with business objectives, the chances of driving value and financial benefits from these investments are higher. In

addition, business units' satisfaction will definitely increase in terms of implementing and using information systems that meet their business needs, improve their business processes, and help them in making more informative decisions. Hence, SISP process contributes to the Business Unit Non-financial Performance construct. In addition, this process will also pave the way for the second and next process; Project Management methodologies.

P2: Project Management Methodologies

An IT portfolio contains a set of IT-enabled investments programmes. Each programme is designed to meet a strategic business objective and might contain several projects (ITGI 2007). For each project, a well-defined project management methodology such as PMP or PRINCE2 should be followed, where the project follows a sequence of phases starting from project initiation, followed by project design and then project implementation, including resource and risk management (ITGI 2007).

In the ERP literature, which is an example of a major IT project, a detailed analysis of user requirements is essential to ERP implementation. An analysis document should be properly prepared and used throughout the implementation process; otherwise, a substantial misalignment will occur between the end-users needs and the ERP functionality (Peng and Nunes 2010).

In that sense, project management methodologies enable delivery on time and within the correct specifications, which will enable the business units involved in such projects to attain value and reap the benefits of its planned projects, leading to better financial benefits. In addition, this process will positively contribute to better business

unit non-financial performance satisfaction, especially in terms of business continuity and uninterrupted operations.

P3: Service Level Agreements (SLA)

SLAs are established to define customer service levels provided by internal and external IT organizations. "A service level agreement is a written contract between a provider of a service and the customer of the service. The purpose of the SLA is to establish measurable targets of performance with the objective of achieving a common understanding of the nature and level of the service required" (Van Grembergen et al. 2003, p.1). Furthermore, and according to the study of Weill and Ross (2004b), 90 percent of the organizations that participated in their study use SLAs. The SLA helps in the articulations of the services provided, expected quality and timings of the services, in addition to the cost of these services. The process includes intense discussions and negotiations between the concerned parties, which would lead to clarifications of business requirements and better informed IT governance decisions on the different domains of IT infrastructure, architecture and IT solutions (Weill and Ross 2004b). SLA is one of the processes listed as best practices in ITG in Belgian organizations (De Haes and Van Grembergen 2006). Service level management (SLM) and service level agreements (SLA) help organizations in solving problems related to not getting the services they want from internal IT departments as well as from third-party providers (Van Grembergen and De Haes 2005).

The CobiT framework contains one control objective named "Define and manage service levels" and provide nine more detailed control objectives for this process. CobiT can be used as a tool that will help corporate and IT executives to write a successful and

balanced SLA. A balanced SLA is a compromise between the needs, expectations and requirements of the organization (user group) and the service provision capabilities and promises of the service provider. At the same time and as stated by De Haes and Van Grembergen (2003), "it must protect the service provider by limiting liabilities, identifying responsibilities and rationally managing user expectations". The balanced scorecard for IT can be used to help in measuring and assessing the SLM and SLA (Van Grembergen and De Haes 2005).

The importance of SLA in enhancing business unit performance lies in its ability to increase stakeholders' satisfaction because it articulates the expectations and specifies the time frames of follow up and support by the people involved in implementing and/or running the IT initiative operations. In addition, it helps in alleviating the legal risks since all terms of agreement, services scope, roles and responsibilities are explicitly specified.

P4: CobiT and ITIL

As stated earlier, CobiT is a control framework containing 34 processes. Those processes provide support for the implementation of IT governance, since it lists the desired level of outcomes that should exist within the organization upon governing IT. In a Belgian study for ITG best practices, De Haes and Van Grembergen (2006) stated that CobiT was more implemented in Europe than the US due to some cultural differences. Currently, CobiT is being used more in the US and the Middle East mainly because it is believed to help organizations especially in the financial sector to implement some of the mandatory legislation imposed on them like the SOX in the US and Act 222 in Lebanon.

CobiT was shown, in the previous section, as a mechanism to help refine the service level management process and better define SLAs. Similarly, CobiT can be used

to support the implementation of many other processes that are essential for IT governance, such as business continuity and strategic planning.

CobiT is also used to measure IT performance and constitutes a dashboard for the board of directors to stay informed. It includes Critical Success Factors, goals and metrics to measure those goals.

The other framework that is essential for IT governance is ITIL, which is defined as "The most widely adopted approach for IT Service Management in the world. It is a practical, no-nonsense framework for identifying, planning, delivering and supporting IT services to the business" (Arraj 2010, p.3).

ITIL is also being used internationally due to its service-oriented level and unlike CobiT, it impacts the operational level directly. When compared to CobiT, it can be seen as focused on service management, which is the "Delivery & Support" domain in CobiT.

ITIL has many benefits (Arraj 2010). First, it helps the process of alignment between IT and business needs. Second, it allows those involved in the business and IT to become true partners by setting realistic achievable business solutions. Third, it makes business processes more consistent and predictable according to customer expectations. Fourth, it boosts the efficiency of business processes by having a clear documentation and accountability for each activity. Fifth, it provides measurable services and processes. For instance, when consistent processes are implemented, specific key performance indicators such as mean time to restore service can be used to measure and fine tune specific activities and services (Arraj 2010).

Accordingly, CobiT and ITIL provide organizations with the necessary guidelines and benchmarks to keep them on the right track in the different IT activities, operations,

and services. This can bring better performance within the organization in terms of non-financial benefits, such as better and improved business processes, less risk, and more compliance.

P5: Business Continuity and Information Security Strategy

A plethora of natural and human disasters can strike organizations' data centers. Examples of such disasters can be a storm flooding the data center or a power outage. In either case, it is extremely important to have a plan in place to guide organizations in recovering their data and keeping their business functioning with minimal downtime. Otherwise, the consequences can range from totally losing data to a prolonged system downtime and consequently to a huge loss of revenues (Frenzel and Frenzel 2004).

The key to surviving such an event is a business continuity strategy, a set of policies and procedures for reacting to and recovering from an IT-disabling disaster. The main component of a business continuity strategy is a disaster recovery plan (DRP)[2]. Such a strategy and plan will alleviate the regulatory, operational and financial risks; hence allowing for better compliance and more financial benefits.

CobiT 4.1 has a process (DS4) that discusses the business continuity upon the failing of IT services. Business continuity is as an important issue that should be handled by the board including disaster recovery and security of systems (Nolan and McFarlan 2005).

With the increasing threats of cybercrimes, system and information security has become one of the main issues that concern organizations.

The IT governance institute has developed an Information Security Governance guide (ITGI 2006) for the boards of directors and the executive management in order to

[2] www.Devex.xom

emphasize the importance of handling this issue--starting from the top--and providing some practical guidance on how to achieve that. The followings are some quotes from executives on the importance of this issue.

"The rising tide of cybercrime and threats to critical information assets mandate that boards of directors and senior executives are fully engaged at the governance level to ensure the security and integrity of those resources." — Shirley M. Hufstedler, Board of Directors Harman International Industries (ITGI 2006, p.2).

"To enable secure business operations, an organization must have an effective security governance strategy." — Sunil Misra, Chief Security Advisor and Management Partner Unisys Corp.(ITGI 2006, p.2).

"The complexity and criticality of information security and its governance demand that it be elevated to the highest organizational levels. As a critical resource, information must be treated like any other asset essential to the survival and success of the organization." — Terry Hancock, CEO – Easy Group (ITGI 2006, p. 2).

Since information security affects many stakeholders in the organization, the guide suggests a steering committee that might possibly include the CEO, business units' executives, CFO, CIO, CISO, audit, risk, and legal advisors, HR operations and public relations. The main mission of this committee is to make sure that the security programme is operating smoothly and in line with the business objectives.

CobiT 4.1 has also dedicated one of its main 34 processes (DS5 Ensure Systems Security) to address the IT security issue. This process includes the main controls for making sure that the integrity of information is maintained and that the IT assets are well protected.

In summary, security governance allows organization to mitigate reputational risk, as well operational risks in making sure its availability, reliability and privacy of data, which will protect the organizations from losing financially.

P6: Performance Management

This process entails the monitoring of how well IT is doing using different performance indicators and taking immediate actions when deviation is spotted (ITGI 2006). Balanced scorecards are essential tools in the performance management framework and are used by 50% of the 500 fortune companies (Deloitte 2004)[3]. Van Grembergen and De Haes (2005) have developed an IT balanced scorecard to measure the performance of IT from different perspectives, considering it as an internal service provider.

Some of the questions that performance management should provide answers to, as raised by ITGI (2005a) are: If I spend extra funds on IT, what do I get back? How does my IT benchmark against competitors? Do I get back from IT what was promised? How do I learn from past performance to optimize my organizational performance? Is my IT strategy in line with the business strategy?

Therefore, and based on the above arguments, IT performance management is a critical practice to be followed in governing IT because it allows for recursive and continuous measurement and adjustment, which help organizations to reach its objectives, and business units to benefit, especially in terms of cost savings.

P7: Managing IT Investments

Like any other type of investment, IT investments need to be monitored "before, during and after" (ITGI 2005b). Making sure that value is obtained from investments in

[3] Deloitte - Strategy & Operations performance Management and Balanced Scorecard CFO Services Self-Study Guide

Information Technology is a crucial part of IT governance. Similarly, decisions should not be made without a comprehensive view of the expected costs, anticipated returns and underlying risks. Therefore, IT governance processes should handle the selection, approval, and follow up on IT investment throughout their delivery cycle from inception to final retirement (ITGI 2005a).

Many failures of slashed IT budgets made corporations realize that they should use a risk-based IT investment strategy. Corporate and IT governance practices are helping to achieve that by forcing corporations to have a more disciplined and strict approach in governing their organizations.

Managing IT investments is very important. In a comprehensive literature review about IT value management, Maes et al. (2011) have addressed the conflicting results regarding the business value driven from IT-enabled investments and the productivity paradox. As a result, they have defined IT value management as follows: "IT value management is about the organizational processes, structures and relational mechanisms that enable business and IT to understand, initiate, prioritize, execute, organize, manage and evaluate IT enabled investments and their outcomes to secure optimal value in the entire IT enabled investment portfolio for the organization." Maes et al. (2011, p. 3).

Indeed, a study conducted during the summer of 2004 within the financial group ING[4] (ITGI 2005b) showed that IT-related business investments have a greater potential to deliver returns than the traditional type of investment in real estate or publicly traded

[4] "ING, originally through its IT performance measurement and investment management epartment, and now in its new incarnation as SeaQuation, an ING spin-off, has investedsignificant research and development into IT's contribution to value creation from a risk-weighted perspective. Therefore, this publication contains a number of references to thework of SeaQuation." (ITGI 2005b)

equities and sovereign bonds. The key is that better returns exist when there is a well-balanced portfolio of IT investments.

Organizations are faced with three main dilemmas when it comes to IT investment decisions: 1) how much to spend 2) what to spend it on, and 3) how to reconcile the needs of different constituents (Weill and Ross 2004b).

Managing IT investments processes or "value delivery" as called by the institute of IT governance is an integrated part of IT governance and is defined by Best and Buckby (2007 p. 5) as follows:

"This critical component of ITG processes aims to confirm that IT architecture is designed to get maximum business value from IT, oversee the delivery of value by IT to business and assess return on investment".

Another definition for these processes is "value delivery is about executing the value proposition throughout the delivery cycle, ensuring that IT delivers the promised benefits against the strategy, concentrating on optimizing costs and proving the intrinsic value of IT"[5] (ITGI 2005b, p. 7).

In fact, the IT governance institute considers value delivery as one of the five IT governance domains and argues that the success of this domain is highly dependent on the success of the other four domains, which are: IT alignment, performance management, risk management, and resource management (ITGI 2005b).

P7a: Value Delivery vs. IT performance

Value delivery is closely related to IT performance. While value delivery is concerned with managing the IT investment, starting from taking informed decisions,

[5]The "value delivery" referenced in this quote is what is referred to in this paper as "Managing IT investments"

allocating the resources and monitoring the return on investment, IT performance management is concerned with measuring, identifying, and quantifying the IT costs and IT benefits. So those two domains - value delivery and performance management - are interrelated and should be looked at simultaneously.

The IT value delivery should answer questions such as: Is IT capability being managed properly to deliver sustainable competitive advantage? Is the business strategy capitalizing on IT capabilities? Are the IT investments contributing to increasing corporate profitability? Is the IT budget handled in a way to decrease operating cost?

P7b: IT Investments as an IT Portfolio

Although it is easy for managers to determine how much they are spending, it is not as straightforward to determine the returns from those IT expenditures. Anticipating returns from IT investment can be hard because it differs with the type of IT. Therefore, many enterprises find it suitable to think about IT investment as an IT portfolio. This idea was introduced by Weill and Broadbent (1999) and is also supported by ValIT (ITGI 2008).

ValIT is another control framework brought forward by The IT governance institute (ITGI), based on academic research and practitioners' experience and surveys. This framework is concerned with the decision of IT investments, managing the challenges of taking such decisions and monitoring the IT investments, making sure IT delivers the proper business value promised and that the IT investment is not wasted.

"ValIT sets good practices for the ends, by providing enterprises with the structure they require to measure, monitor and optimize the realization of business value from investments in IT" (ITGI 2008, p. 6). ValIT complements the CobiT framework and

provides specific processes that can be used in order to achieve ValIT's objectives stated above. These processes are grouped under three main domains: value governance, portfolio management, and investment management.

ValIT emphasizes the fact that IT investments should be managed as a portfolio of investments and clarifies the difference between the terms: *project*, *programme* and *portfolio*. A project is a set of activities to achieve a certain capability (not necessarily business outcome). A programme is a set of in inter-dependent projects that together fulfill a business outcome and create value. The investments programme is the primary unit of investment in ValIT. A portfolio is a collection of "objects of interest" which can be investments programmes, IT resources, IT projects, and IT services.

P7c: Categories of IT investments within an IT portfolio

IT investments may be categorized within an IT portfolio into four main categories according to the organizational business needs (Weill and Broadbent 1998; Weill and Aral 2005):

1) Transactional investments, which serve the cost reduction objective; 2) Informational investments, which help in increasing profit; 3) Strategic investments, which lead to more competitive advantage; and 4) Infrastructure investments, which is the foundation for the other investments and which is shared by different applications. Savvy companies can increase their return by redistributing the percentage in investing in those four categories and without even increasing the IT investments (Weill and Aral 2005). Another way of

categorizing IT investments is based on the Run, Grow, Transform (RGT) strategy (Meta group[6]).

The categorization of IT investments is highly important. First, because it allows the firm to invest in a balanced portfolio, which ultimately includes the four types and second, because it allows better risk assessment. For instance, strategic investments have higher risk then operational ones and eventually higher return are expected from it (ITGI 2005b).

P7d: Setting Value Return Targets

Setting value return targets is another important step in managing IT investments. A prerequisite for the approval of any IT investments decision is an objective measurement environment, away from the clouds of political influences within the organizations. Taking into consideration and excluding the mandatory projects, such as those implemented for regulatory compliance, there are main steps for an IT investments approval for discretionary projects, as listed in ITGI (2005b), and ITGI (2005a). Some of them include: to present a business case; to have representative from both IT and business on the committee making the decision; to present objective financial metrics, such as net present value and internal rate of return; to specify accountability for the expected results; and finally, to take into consideration the figures from previous IT solutions implementation experience. This is obviously positively related to better financial benefits such as higher return on investment (ROI).

P7e: Hurdle Rates and Associated Risks

It is always important to determine and use the hurdle rates when approving IT projects. Hurdle rates are specified for each level of risk such as zero-based risk, medium

[6]META Group, 'Portfolio Management and the CIO, Part 3', March 2002

risk and high level risk. When categorizing the projects according to their level of risk, their anticipated returns are compared to the hurdle rate of the corresponding risk category. Anything below the hurdle rate should not be accepted. The higher the risk the higher the anticipated return should be. Moreover, quantifying expected benefits is an essential part of the investment management, whether through direct benefits, such as revenue growth, or through indirect benefits--also known as soft benefits--such as staff satisfaction, and reputation. In addition, IT investments should be tracked over the years of anticipated benefits. Usually they take the shape of an S-curve where the cash flow might be negative in the first few years, but then it neutralizes to generate positive return in later years (ITGI 2005b).

Managing the portfolio of IT investments allows executives to have a holistic view by being presented both with the inventory of current projects and also with those which are intended for approval (ITGI 2005b). The net present value of each project should be reported periodically and the sum of all returns should be calculated. Again, considering the risk exposure into consideration, projects should be periodically reassessed and terminated when necessary. For instance, if a project is a high risk project with negative returns then it should be reconsidered whether to be cancelled or re-scoped and this, according to ITGI, is a sign of good governance and not a weakness. On the other hand, high net present value (NPV) projects should be given higher priority with respect to resource allocation.

P7f: Who is involved in the Management of IT Investments?

Regarding the structure that should be handling this process, one way that has been shown effective by Weill and Ross (2004b) is when the IT executive committee

(ITEC) is in charge of managing IT investments. This will allow the investments to be discussed at the enterprise level versus at the individual business units' levels when they separately manage their IT investments. In other words, Weill and Ross (2004b) suggested that enterprise IT management be in charge of this task in order to reach better returns on IT investments and to overcome the disadvantage of independent business funding for similar IT initiatives.

In general, managing IT investments contribute directly to better financial benefits and indirectly by minimizing financial risks.

P8: IT Budget Control and Reporting

Closely related to managing the IT investment process, "IT budget control and reporting" is defined as a process to control and report upon budgets of IT. In their study of Belgian financial sector for IT governance impact on IT alignment, De Haes and Van Grembergen (2009) have found that this process is one of the five most effective practices in reaching alignment. It was also found as one of the processes that are easy to implement. Budget approval is also found as one of the key IT governance practices for firms seeking growth (Weill and Ross 2005). Therefore, this process is considered among the baseline of IT governance practices that are believed to lead to better returns and better cost management for the business units involved.

3.1.3. Relational Mechanisms

M1: CIO Leadership Skills

"The CIO recounted the multi-million-dollar cost savings a new system portfolio management program brought the company, but then he admitted that he was still working to get the top business people on his side. When asked "Why?" he replied: IT is

still not viewed as an equal at our firm, and we have to keep proving ourselves" (Kaarst-Brown 2005, p. 455).

The culture of looking at Information Technology as a second-class citizen within the organization has a crucial impact on the efficiency and productivity of this function. The leadership skills of the CIO are a cornerstone in shaping this relationship and deinstitutionalizing this culture. The CIO leadership is a topic that has been thoroughly discussed in the MIS literature and many of these studies emphasized the CIO criteria as constructs/variables leading to the success of his /her mission (Bassellier et al. 2003).

In a survey of CIOs and senior consultants, The ITGI round table (ITGI 2009, p. 9) included the following scenario between two executives when asked about the role of the CIO:

"*AH: A CIO is a business visionary who understands how to leverage technology.*

JN: If the CIO is simply a technologist, it's not going to work."

Therefore, a CIO should have both the business side and the technology side as well. S/He should understand the business direction and strategies and give suggestions on how to make the technology fulfill and drive these strategies.

Experience is also a highly important factor among the CIO skills. For instance, in a case study conducted in China (Peng and Nunes 2010), an inexperienced project manager made a costly mistake due to failing to conduct a detailed system requirement analysis, which has led to paramount difficulties in the system implementation and affected negatively the success of an ERP implementation.

The stated CIO characteristics can be further confirmed by the following quote, stated by Pete Delisi, academic Dean of the Information technology Leadership program

at Santa Clara University (Kwak 2001 p. 16): “The ideal CIO needs to be a marketer, a strategist, a technologist, a leader, an organizational behaviorist --- all these things… That’s what makes the job so difficult”.

Similarly, five important habits for the CIO were identified by Boulanger (2011): 1) The need to be strategic, and not tactical 2) Understands the business 3) Develops key business relationships 4) Operates IT in a more business-like manner 5) Communicates to key business stakeholders regularly using business-speak.

Accordingly, and as per the definition of relational mechanisms, the CIO’s characteristics represent a crucial personal element that is necessary to glue the previously stated IT governance practices together and make it possible, which would then complement its effectiveness in driving higher benefits for the business units.

M2: Top Management Commitment and Partnership with the CIO

Paying attention to the IT strategy, IT vision, and major IT applications were among the topics that unanimously suffered from a lack of attention drawn from 17 boards of directors that were surveyed by Huff et al. (2006), which ranged from medium to large organizations. The authors called the phenomena the “IT deficit Attention”. The authors of this study have suggested the following six ways to deal with it: (1) include IT on the board agenda, (2) invite the CIO to board meetings, (3) elicit brief CIO presentations, (4) recruit IT experience onto the board, (5) get the board talking about IT, and (6) realize that boards now operate in an IT environment.

A shared vision between the CIO and the top executive team (TMT) is a topic analyzed by Preston and Kaharanna (2009), who call this vision “Meeting of the minds”. The study finds that the CIO leadership, in addition to other five visioning mechanisms,

led to better CIO-TMT shared vision, which would lead to IT/business alignment. The other five constructs are: shared business language (also supported by the discussion in (ITGI 2009)), visioning network hierarchy, CIO-TMT commonalities, CIO strategic knowledge, and CIO relational capital.

Top management commitment is essential and critical to the CIO empowerment. For instance, Peng and Nunes (2010) found that empowering the ERP project manager is essential in hindering all the necessary obstacles, politics and resistance among end-users from different organizational levels and departments. Trust in the CIO from the board is another issue that affects immensely how IT governance is implemented (ITGI 2009, p. 9).

To get the board involved in IT governance, or what executives prefer to call 'Enterprise governance of IT', is the number one issue. One CIO mentioned in the (ITGI 2009) roundtable that he once initiated a training course named "IT for non IT directors" and none of them bothered to attend, even though if a similar course in finance was to be given instead, it would have attracted them much more (ITGI 2009).

M3: Clear Communication between IT Management and the Business Executives

Throughout the literature of IT governance and the publications from ITGI, one persistent topic keeps on surfacing as one of the top problems faced by CIOs: inadequate view on how well IT is doing by top executives. Sometimes, top executives are not even sure what the exact business outcomes that should result from the successful implementation of an IT initiative are. For instance, in one of the ITGI Roundtable publications - a discussion among different IT governance consultants (ITGI 2009, p. 10)

- the following statement was quoted by one of the participants: "*I'll then ask what they expected to get and the CEO will respond that they didn't really know. I then say that perhaps they could have started with that*."

In an attempt to fix this problem, Westerman (2009) suggests the use of risk as a common language between IT executives and the rest of business units heads. Westerman framework of risks provides a common ground for business executives to discuss IT risks even without the deep knowledge of IT specific issues. Westerman's framework consists of four aspects of risks that are known as the 4A's and they are:

1. Availability: making sure that information is available whenever needed and discussing it gives the business executives the opportunity to decide on the threshold of downtime vs. cost of recovery.
2. Access: making sure authentic access to information is granted to the right people who need to have access and preventing fraudulent access by unauthorized people.
3. Accuracy: providing correct and complete information in a timely fashion.
4. Agility: enduring that existing application are flexible enough to adjust to business continuity and growth.

By discussing those four aspects, business and IT executives will have the opportunity to have a common ground and an understanding to review their decisions in order to sustain better operational, resilience and strategic change.

In addition, the CobiT framework (ITGI 2007) contains different processes under the "Plan and Organize" set of processes that emphasize the need to communicate and

cross educate those involved in business and IT, making sure the stakeholders realize the strategic contribution of the IT enabled services and investments.

Weill and Ross (2005) present four important steps that should be encompassed by IT governance design. The first step is about identifying the need for autonomy and synergy, and in order to do that properly, managers must clarify all the decisions taken in the trade-off between synergy and autonomy and make it clear throughout the enterprise.

M4: Cross-Functional Training: Business/IT Training and Rotation

Very much related to clearer communication between IT and business people is the cross-functional training among them. This type of training allows business people (executives and staff) to better understand the inside of the IT black box which allows them to better specify their expectations in an informed manner and to better use the system features with less frustration. Similarly, training IT people with the soft skills specific to the business processes under consideration allows them to better serve the business process and to use IT to meet the business objectives in a faster more efficient way.

Cross-functional training is listed among the IT governance relational capabilities that enable better IT shared knowledge (Peterson 2004). Moreover, De Haes and Van Grembergen (2006) found that cross-functional training was among the drivers of IT governance in their empirical study, though it was implemented in a rather informal way.

3.2. Business Unit Non-Financial Performance

The Business Unit Non-Financial Performance construct measures the business unit performance in terms of the benefits earned by its stakeholders. It relies mainly on the Stakeholders' perspective from the IT governance BSC (Figure 3), where governance

is assessed at the organizational level. For this construct, IT governance is assessed at the business unit level and the stakeholders are the managers working within the business unit and other members of the top management team who are dealing with the business unit and are affected by its performance. It is important to note that while the Stakeholders' perspective in the ITG BSC is about "Measuring up to stakeholders' expectations" (Van Grembergen and De Haes 2005), the main assumption for this construct is that the satisfaction element of those stakeholders will not be considered in terms of their individual satisfaction but instead, in terms of their satisfaction with the business unit performance.

Furthermore, the stakeholders' perspective from the ITG BSC in Fig 3 is measured using three main dimensions: 1- Stakeholders' satisfaction, 2- Managing stakeholders' needs, and 3- Legal and ethical compliance. Combining these three dimensions, it can be customized to reflect the satisfaction and needs of the business unit. Considering the satisfaction of a business unit as the fulfillment of its business objectives, a review of the business unit performance literature leads to some non-financial benefits that are considered as business unit performance indicators, such as, improved decision-making processes; better performance and resource management; better data quality, productivity improvement, building business innovations (Shang and Seddon 2002, p.277); time to bring a new product or a new service to the market (Weill and Broadbent 1998).

The non-financial performance can also draw from the existing literature on the success measures. The D&M updated model (Delone and McLean 2003) provides a Net Benefits success dimension containing different criteria for measuring an information

system success. For instance, the D&M provides specific measures for evaluating an e-commerce information system, such as cost savings, expanded markets, incremental additional sales, reduced search costs, and time saving. As we look at these success measures we notice that even if the IS context has changed, these Net-Benefits criteria is still similar to the business performance indicators specified earlier.

Bernroider (2008) verified the new version of DeLone and McLean model (Delone and McLean 2003) and tailored it to measure the success of an ERP and came up with a model where the Net Benefits dimension is divided into Net Benefits and Financial Benefits. The Net Benefits' sub-dimensions are: enhanced decision-making; reduced cycle times; cost savings; business process improvement; an enabler for desired business processes; increased organizational flexibility; and improved innovation capabilities.

Supporting the non-financial performance, a new study has conducted 11 case studies (Lazic et al. 2011), and the results demonstrated that in some firms more mature IT governance would lead to more IT and business process relatedness which lead to better customer satisfaction, and to data extraction in a centralized way which enables firms to pinpoint weaknesses and improve goal-oriented cross selling (p. 31) creating new line of business (p. 31), which is an example of business process improvement.

More case studies have demonstrated that the implementation of IT governance provides an IT platform for data aggregation and analysis which will lead to more sensible decision-making (Lazic et al. 2012).

Collecting all the above mentioned criteria from the synthesized literature has resulted in identifying four dimensions for the Business Unit Non-Financial Performance construct, which are **decision-making, business processes, flexibility and innovation**.

As part of the non-financial benefits we can also add the legal and ethical compliance dimension borrowed from ITG balanced scorecard as shown in Table 6 - Dimensions of the Business Unit Non-Financial Performance Construct

. This dimension represents the level of legal and ethical compliance and eventually the degree of legal and reputational risk mitigation within a business unit. For instance, applying the controls related to information security alleviates the risk of customers' data being disclosed to unauthorized parties which protects the business unit from being subjected to legal persecution. Similarly, complying with CobiT and ITIL frameworks increases the assurance in meeting control objectives, eventually protecting the business unit from non-compliance risks and increasing the internal awareness among the business unit employees, which will enhance their ethical behavior.

Business Unit Non-Financial performance dimensions	Sources
1. Decision-making Process	Shang and Seddon (2002, p.277), Bernoider (2008)
2. Business Processes	Delone and McLean (2003), Bernoider (2008),(Lazic et al., 2011)
3. Flexibility	Weill and Broadbent (1998), Delone and McLean 2003, Bernoider(2008)
4. Innovation	Shang and Seddon (2002,p.277), Bernoider (2008)
5. Legal and Ethical compliance	ITGI (2007)

Table 6 - Dimensions of the Business Unit Non-Financial Performance Construct

Finally, and in support of the importance of measuring the non-financial performance, Peppard and Ward (2005), in their case study analysis for a Customer Relationship Management system (CRM) implemented at a bank, show that the curve of return on investment (ROI) might increase slightly over a short period; however, with time and increased trust from customers, the curve will increase significantly, justifying the investments. In other words, the authors convey the message that creating value is a journey rather than a destination and that using the ROI figures alone can be misleading in indicating the failures of CRM in the short run because it is a long term investment.

More support for the importance of this construct is provided by (HSU 2005) who has have identified two major types of performance measures for organizational performance: financial indicators such as ROI and ROA and also non-financial indicators such as production output and work morale to measure business operational performance (Hitt 1988 cited in Hsu 2005). Some people are focusing on the financial aspects while forgetting the non-financial aspects for measuring performance can lead to three main drawbacks (Hsu 2005). These drawbacks are, at first, focusing on operational results and not on the processes and this would not allow organizations to perform quality control. The other two drawbacks are lack of forecasting and missing on the long-rum beneficial projects.

The arguments stated above, are believed to justify the importance of using the balanced scorecard and the multi-criteria methods in general, because if the financial perspective fails to show a significant improvement due to proper IT governance practices, the other perspectives will provide other indications and assurances about the future increase.

The research model indicates that different configurations of IT governance might correlate to different business unit performances. Although it cannot be predicted which configurations will emerge and which ones will positively contribute to performance, it was shown in the previous sections that individual IT governance practices positively contribute to the different dimensions of the Business Unit Non-Financial Performance construct.

3.3. Business Unit Financial Performance

The Business Unit Financial Performance is the construct representing the financial performance measured at the business unit level. The more mature IT governance configurations are expected to be positively correlated with this construct. This proposition is built on the existing IT governance balanced scorecard (Van Grembergen and De Haes 2005) as shown in Figure 3. Many studies in the IS field has tried to link different variables such as IT capabilities (Bharadwaj 2000; Melville et al. 2004) or business strategy and technology deployment (Croteau and Bergeron 2001) to organizational performance and many of these studies have measured the financial performance at the organizational level. Some of these financial measures are productivity ratio (Neirotti and Paolucci, 2007), or growth and profitability and cost ratio (Venkatraman 1989b; Bharadwaj 2000; Weill and Ross 2004b; Weill and Aral 2005).

This construct represents the financial performance at the business unit level instead of the organizational one. By examining the relationship between IT governance practices and the value driven at the business unit level, we can respond to a need for more objective and direct link between IT investments and profitability (Neirotti and

Paolucci 2007) that is closer to the first order level of IT implementation (Barua et al. 1995; Weill and Ross 2004b).

Examining this construct at the business unit level is supported by many studies in the existing literature. For instance, Barua et al. (1995, p.6-7) argue as follows: "Our basic thesis is that primary economic impacts or contributions to performance of information technologies (if any) can be measured at lower operational levels in an enterprise, at or near the site where the technology is implemented. To capture these impacts, measurements should be taken in the organization where the potential for first-order effects exists. These effects may then be traced through a chain of relationships within the organizational hierarchy to reveal higher order impacts (if any) on enterprise performance. We suspect that as the distance between a first-order effect and higher levels increases, the ability to detect and measure an impact decreases (perhaps rapidly). For this reason, we believe prior research based on conventional microeconomic production theory (attempting to relate variables such as MIS budgets and market share directly) does not have the power to reveal an association with high statistical significance".

Another study that supports the measurement at the business unit level is Sircar et al. (2000). According to this study, many studies have attempted to link IT investments with results but have failed, so they have instead focused on the processes that IT should be enhancing. Similarly, Ray et al. (2005) state that competitive advantage might be observed at the process level but not necessarily at the whole organizational performance level.

Continuing on this point, the Van Grembergen and De Haes (2005) balanced scorecard model shown in Figure 4, states that the value delivery is an area under the corporate contribution perspective that can be measured using the business unit performance measurement, which refers to the results of individual lines of businesses claiming that the ultimate responsibility for attaining and measuring business value rests in the business units.

Based on the above line of reasoning regarding the level of analysis, this construct represents the financial performance at the business unit level instead of that at the organizational one.

The arguments presented earlier for each IT governance practice in section 3.1 has revealed that many of the IT governance practices are associated individually with better financial returns, thus, supporting second proposition of the research model. For instance, applying the performance management process and the IT investment management process is highly associated with better financial returns.

Chapter 4: Research Approach and Methodology

This chapter contains an explanation about the process of creating the measurement instruments, conducting different types of validation and describing the data collection process (Straub et al. 2004). Table 7 shows a summary of the steps to be conducted for this chapter and the next chapter as well.

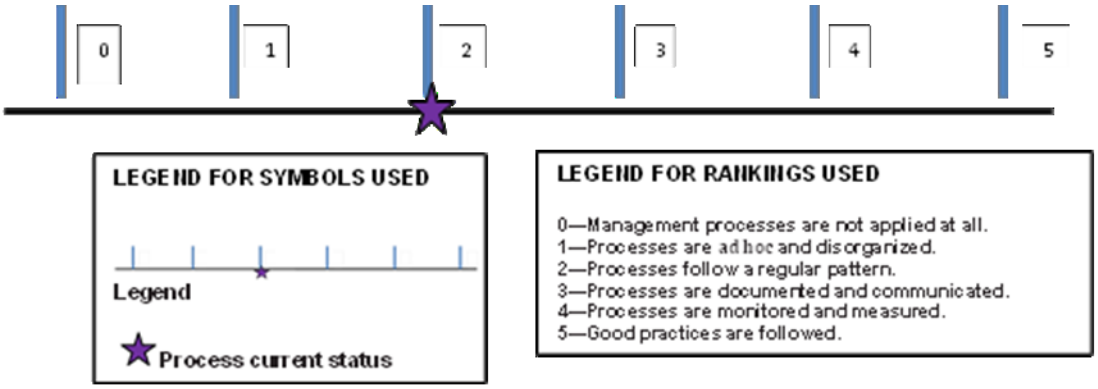
	Heuristics		
	Construct 1 – IT Governance Configurations	Construct 2 – Business Unit Non-Financial Performance	Construct 3 – Business Unit Financial Performance
Construction of the item measures and measurement refinement procedures	• Literature review • Pilot case study • Discussions with panel of expert judges for content validity • Delphi method • Card sorting • Pretest for clarity and format	• Literature Review • Discussions with a panel of expert judges for content validity • Card sorting • Pretest for clarity and format	• Literature Review • Reusing part of STROBE's instrument (Venkatraman 1989b) adopted from Croteau and Bergeron (2001) with minor modifications • Discussions with a panel of expert judges for content validity • Card sorting • Pretest for clarity and format
Reliability, construct validity and statistical conclusion	• Discriminant and convergent validity • Hypothesis testing using SPSS statistics and PLS		

Table 7 - Heuristics for the Research Methodology Steps (adopted from Aubert et al. 1996)

4.1. Item Measures for the First Construct – The IT Governance Configurations

In the previous chapter, a review of the existing literature was conducted in order to specify the domain of constructs and provide their conceptual definitions, a pre-step before the construction of the measures (Churchill 1979). Accordingly, a list of IT

governance practices, hypothesized to be most essential to lead to a mature IT governance state within an organization, was compiled to form the different dimensions for this construct.



Generic Maturity Model

0 Non-existent—Complete lack of any recognizable processes. The enterprise has not even recognized that an issue needs to be addressed.
1 Initial/Ad Hoc—There is evidence that the enterprise has recognized that the issues exist and need to be addressed. There are, however, no standardized processes; instead, there are *ad hoc* approaches that tend to be applied to an individual or on a case-by-case basis. The overall approach to management is disorganized.
2 Repeatable but Intuitive—Processes have developed to the stage where similar procedures are followed by different people undertaking the same task. There is no formal training or communication of standard procedures, and responsibility is left to the individual. There is a high degree of reliance on the knowledge of individuals and, therefore, errors are likely.
3 Defined Process—Procedures have been standardized and documented, and communicated through training. It is mandated that these processes should be followed; however, it is unlikely that deviations will be detected. The procedures themselves are not sophisticated but are formed through existing practices.
4 Managed and Measurable—Management monitors and measures compliance with procedures and takes action where processes do not appear to be working effectively. Processes are under constant improvement and provide good practice. Automation and tools are used in limited or fragmented ways.
5 Optimized—Processes have been refined to a level of good practice, based on the results of continuous improvement and maturity modeling among other enterprises. IT is used in an integrated way to automate the workflow, and to provide tools to improve quality and effectiveness, making the enterprise adapt quickly.

Figure 5 - CobiT Maturity Model

In order to further test the content validity of this list of IT governance practices, an interview with one of the IT executives in a major international technology solutions company, based in Saudi Arabia, was arranged and conducted in Beirut, Lebanon. As a result of this interview, the list of practices was kept and no new items were added.

However, insights into some of the different practices were gained. For instance, the cross-functional training usually takes place in one direction, from IT to business, while IT people are informed about business processes through e-learning modules provided on the company's intranet. Appendix A contains the interview guide used in this pilot case.

Each of the IT governance dimensions was measured using a different scale. The ITG processes were evaluated using the maturity model scale borrowed from CobiT 4.1 which ranks these processes from 0 (Non-existent) to 5 (Optimized) as illustrated in Figure 5. The ITG Structures, on the other hand, were measured using a Likert scale (0 = Not Applicable; 1 = Very Ineffective to 5 = Very Effective). As for the Relational Mechanisms, it was measured using a Likert scale (0 = Not Applicable; 1 = Very Poor to 5 = Very Good).

4.1.1. Delphi Method-Measurement Refinement for the IT Governance Configurations Construct

As another step towards stronger content validity, the Delphi method (Linstone and Turoff 2002), was used in order to further refine the list of IT governance practices. The Delphi method was chosen as one of the approaches in the research methodology of this study for different reasons.

First, a list of IT governance practices needed to be compiled as an exploratory study, and this requires some consensus from a group of people. The Delphi method is suitable for this, based on Linstone and Turoff's (2002) definition: "Delphi may be characterized as a method for structuring a group communication process so that the process is effective in allowing a group of individuals, as a whole, to deal with a complex problem." Second, the complex nature of the topic lends itself to the Delphi method

because it requires advanced knowledge by key people at certain levels of expertise (Linstone and Turoff 2002, p.3; Okoli and Pawlowski 2004, p.16).

The Delphi technique was performed in three phases (Linstone and Turoff 2002; De Haes and Van Grembergen 2009) using panels of experts as respondents. The panel's members consisted of a number of IT executives and consultants from various companies.

The panel members or the respondents needed to be selected carefully in order to preserve the rigor of the study. Okoli and Pawlowski (2004) have provided rigorous guidelines for this procedure. Accordingly, two panels were formed: one from the Middle East (ME) and another from North America (NA).

The selection procedure for the ME panel began by identifying high IT executives through personal contacts. Using LinkedIn and the network of contacts of personal friends, I reached out to 21 CIO/IT seniors from different countries in the ME: Saudi Arabia, Egypt, United Arab Emirates, and Kuwait. These companies are multifarious, including, but not limited to: Telecommunication, Information Technology, Financial Services, and Real Estate. The experts were contacted by email with a brief explanation of the study, the requirements, and the estimated time they were expected to allocate for it. Once preliminarily approved to participate, the list of experts was entered into the token management system available through the Limesurvey platform hosted by Concordia University and round 1 of the Delphi method began in the ME. Out of 15 invitations, 12 panelists participated and completed the online survey for round 1. Their average number of years of experience in IT management is 13.5 years.

The selection procedure for the North American panel began by selecting potential respondents from the Canadian Business Resource (CBR). The CBR provided generic email addresses, such as info@ or nameofcompany@, and not all records contained email addresses. Thus, from the CBR database, only companies listing an email address (18 out of 62) were selected and an email was sent, asking them to forward the online survey link to their respective CIOs or senior IT manager; however, not a single response from this list was received. Therefore, other respondents were selected from LinkedIn and through personal connections. The same selection procedure was followed as the ME panel and 14 invitations were sent. The respondents were distributed between Canada and the US. They too were derived from different industries: Financial Services, Retail Businesses, Information Technology and others. Their average number of years of experience in IT Management is 12 years.

The email message that was sent to panelists in round 1 contained a link to the online survey. Appendix B contains a copy of round 1 of the Delphi online survey as sent to the panelists. The panelists had the chance to give recommendations on the list of practices as they think it applies within their organizations. They could select whether to keep or remove the practice, but could also choose the 'No answer' option instead. Additionally, panelists could suggest the addition of new practices.

It should be noted that the "Pen-and-Pencil" (Linstone and Turoff 2002) format of the Delphi method was used; hence the "control team" consisted of the main researcher of this thesis and was therefore responsible for collecting and refining the output from each phase.

The next few paragraphs highlight the results of each round for each panel.

A. Delphi Results - Round 1 for ME Panel

Inspired by Schmidt et al. (2001), the rule for the refinement process is as follows: for any suggestion to remove an item, it is removed only if a minimum of 50% of experts are in agreement. Similarly, new items are added only if more than 50% of respondents suggested it. Accordingly, none of the practices were dropped. However, the following three modifications took place:

1) Modification 1 - Renaming an ITG Structure

Distribution of IT Governance responsibilities among existing organizational structures is the name of Structure 5 of the IT governance Structures discussed in section 3.1.1. When the first round of Delphi was run in the ME panel, we noticed a slight confusion with this item; three out of 12 respondents selected the 'No answer' option. However, their comments such as "*IT Governance should be distributed between the CEO Office/ IT/ Operations/ and Internal Audit*." showed that, while this scenario of partnership between CEO and IT is being exercised in their organizations, the respondents still selected the 'No Answer'. Therefore, the new name was introduced in order to state explicitly the organizational structures that were intended. Referring to our earlier discussion in S5, the main stakeholders involved in such archetypes are the CxO, IT corporate and unit leaders, and business unit leaders. Accordingly, the new name for this structure is **Partnership(s) between CxO, IT leaders and/or Business Leaders in Making IT Decisions**. This new name was used in the rest of Delphi rounds.

2) Modification 2 - Introducing a New Structure

In the first round of Delphi, we asked respondents to add any new structures that they felt was necessary based on their experience. We had suggestions about the need for

a project management office, which is involved with managing different IT projects within an organization. One of the respondents said the following: "*Every single IT Staff is to some extent an actor in IT governance. However, driving IT governance should be in the hand of specific entity in charge of Governance" (e.g. PMO) reporting to CIO to avoid any conflict of interest*." Taking this note into consideration, different institutions were asked if they had such an office and, as it turns out, many of them did. Therefore, and due to the fact that one of the compiled IT governance processes is *Project Management Methodologies*, we found this structure a logical one and added it. It was therefore included in the rest of the Delphi rounds as well as in the final instrument.

No items from the ITG practices were removed since no item received the minimum 50% necessary for removal.

3) Modification 3 – Refining an ITG process

The comments related to the 'Managing IT investments' process was not perfectly clear; therefore, a slight clarification was added and the item title became as follows: "Managing IT investments: the selection, approval, and follow up on IT investments".

As a general observation, the respondents' comments related to the SLA process show a great support for its need to manage expectations rather than just being a binding agreement. As one respondent stated, "*Agreeing to an SLA is key. The management team and users in the organization need to know when they can expect projects/resolutions to problems. This is a guide line in managing the expectations but not an absolute letter of the law policy.*" Finally an interesting note was that the 'Disaster Recovery and Information Security' has received a unanimous vote to be kept.

B. Delphi Results - Round 2 for ME Panel

After the results of the first round were collected, a second version of the IT practices was generated. In the second round, the panel members were asked to rate the second version of IT governance practices. The ratings were on the effectiveness (from 1= Strongly Disagree to 5= Strongly Agree) and the ease of implementation (from 1 = Strongly Disagree to 5 = Strongly Agree).

Although most of the Delphi studies have asked experts to rank the issues studied in order of importance (Dickson et al., 1984), other studies have followed Watson's (1989) evaluation method and this study followed the latter approach. Watson's rationale for choosing the rating evaluation method is based on the limited human capacity to process information simultaneously, and so he became the first researcher to ask experts to rate, rather than simply rank, the issues. Rating is less demanding mentally because issues can be evaluated one at a time without having to compare each item against the others (Neiderman et al. 1991). After the round 2 surveys were completed, the arithmetic mean and standard deviation of each item were calculated. The mean and standard deviation for each item are used as a consensus indicator (Dickson et al. 1984). The decreasing standard deviation and the increase in the arithmetic mean between rounds mean that a consensus had been reached.

Three out of twelve panelists dropped out of the panel by not responding in this round, leaving the panel with nine members. After the surveys were completed, the average of each item (practice) was calculated. This is the arithmetic mean of all the answers derived from the different judges; standard deviation was also calculated for each item. Results are shown in Table 8.

C. Delphi Results - Round 3 for ME Panel

As an output of round 2, a third version of the IT governance list was generated and sent to the respondents through as an online survey. In the new list, the average rating calculated in round 2 was included next to each item. Panelists were given the chance to do the same kind of rating as in round 2 but with the chance to change their ratings after looking at their peers' average rating.

After round 3, a survey was completed with zero attrition, the average and standard deviation for each item was calculated again.

As mentioned earlier, the mean and standard deviation for each item are used as a consensus indicator (Dickson et al. 1984). The increase in the mean and the decrease in standard deviation between rounds show a greater consensus. Table 8 contains the results

IT governance practices	Effective					Easy to implement				
	Mean R2	Mean R3	Stdv R2	Stdv R3	IQR R3	Mean R2	Mean R3	Stdv R2	Stdv R3	IQR R3
Structures										
IT strategy committee	**4.11**	**4.00**	1.05	0.50	0.00	2.67	3.00	**1.32**	**1.22**	2.00
IT steering committee	**4.44**	**4.33**	0.73	0.71	1.00	**3.89**	**3.44**	**0.93**	**1.13**	2.00
CIO is a member of the board or the executive committee	3.78	3.89	1.30	1.05	2.00	3.78	3.56	0.67	1.01	1.00
CIO is reporting directly to CEO	4.22	4.78	1.30	0.44	0.00	4.22	4.22	1.09	0.67	1.00
Partnership(s) between CxO, IT leaders and/or business leaders in making IT decisions	4.56	4.56	1.42	0.53	1.00	2.89	3.11	1.05	0.93	0.00
Project management office	3.56	3.89	1.42	1.05	2.00	3.11	3.67	1.27	0.87	1.00
Processes										
Strategic information system planning (SISP)	3.89	3.78	1.36	0.67	1.00	3.33	3.22	0.87	0.67	1.00
Project management methodologies	4.11	4.22	0.60	0.67	1.00	3.78	3.33	0.83	0.71	1.00
Service level agreement (SLA)	4.11	4.44	1.27	0.73	1.00	3.67	3.67	1.00	0.50	1.00
CobiT and ITIL	4.22	4.22	0.67	0.67	1.00	3.11	3.33	0.78	0.53	1.00
Business continuity and information security strategy	4.11	4.44	1.27	0.53	1.00	3.33	3.56	1.00	0.53	1.00
Performance management	**4.00**	**3.89**	1.00	0.33	0.00	3.22	3.56	1.20	0.73	1.00
Managing IT investments: the selection, approval, and follow up on IT investments	3.67	4.00	1.32	0.50	0.00	3.67	3.67	1.22	0.71	1.00
IT budget control and reporting	4.33	4.33	0.87	0.50	1.00	3.89	3.89	1.05	0.60	0.00
Relational Mechanisms										
CIO leadership skills	4.44	4.56	1.01	0.73	1.00	3.00	3.33	**0.71**	**1.12**	1.00
Top management commitment and partnership with CIO	**4.56**	**4.44**	0.53	0.73	1.00	3.00	3.22	**0.00**	**1.30**	1.00
Clear communication between IT management and the business executives	4.44	4.44	1.33	0.53	1.00	2.56	3.33	**0.73**	**0.87**	1.00
Cross-functional training: Business/IT training and rotation	**4.44**	**4.22**	0.73	0.67	1.00	3.00	3.67	**0.71**	**1.00**	1.00

Table 8 - Delphi Results for ME Panel

of round 2 and round 3 for this survey showing a significant move towards consensus between round 2 and round 3. This has led the Delphi survey to be stopped at round 3.

Movement towards consensus has been illustrated in numerous Delphi studies using also the inter-quartile range (IQR), where an IQR of zero indicates a perfect consensus (Dickson et al. 1984). Therefore, the IQR for each item in the third round was calculated and is also shown in Table 8.

D. Delphi Results - Round 1 for North American Panel

13 online surveys were completed out of 14 invitations sent to panelists from the US and Canada. Using the same refinement rule mentioned in round 1 for the ME panel, none of the IT governance practices were dropped and many items were voted to be kept by a vast majority of judges. Interestingly enough, one comment by a respondent on Structure 5 (distribution of IT governance responsibilities among existing organizational structures) was as follows: "*Nothing major but should rename*". This confirmed the decision reached by the ME panel to rename this structure.

Similarly, for the 'Managing IT investment' process, there were three 'No answer' responses and this enforced the decision taken to add a clarification to the name, as was decided in round 1 of the ME panel.

Another comment that was repeated stipulated that IT disaster recovery and information security were two separate areas and should therefore be separated. This was another modification to be considered; however, it was not modified for the rest of Delphi rounds, and was instead tested with the subsequent content validity refinements steps

E. Delphi Results - Round 2 for North American Panel

All practices that were included in round 1 were carried on to the next round. The same procedures used with the ME panel were also performed with the North American

panel. Members rated the second version of IT governance practices on the effectiveness and ease of implementation. A total of 14 invitations were sent (13 replied in round 1 and one new member was invited to lessen the attrition effect for later rounds). Three out of 13 did not answer round 2; 11 completed online surveys, then, were collected from this round. The average and the standard deviation of each item were calculated.

F. Delphi Results - Round 3 for North American Panel

The averages of each item, calculated in round 2, were included in the third version of the IT governance practices and invitations were then sent to 14 respondents (including those who did not reply in round 2). 11 complete replies were collected from round 3, as three members did not reply.

The mean, standard deviation and IQR for each item were used as a consensus indicator and the results of round 2 and round 3 are shown in Table 9.

IT governance practices	Effective					Easy to Implement				
	Mean R2	Mean R3	Stdv R2	Stdv R3	IQR R3	Mean R2	Mean R3	Stdv R2	Stdv R3	IQR R3
Structures										
IT strategy committee	3.91	4.10	0.83	0.57	0.00	3.27	3.90	1.01	0.57	0.00
IT steering committee	3.82	3.90	0.98	0.57	0.00	3.36	3.60	1.12	0.70	1.00
CIO is a member of the board or the executive committee	3.36	4.30	0.92	0.67	1.00	3.55	3.50	1.29	0.85	1.00
CIO is reporting directly to CEO	4.09	4.50	1.04	0.71	1.00	3.45	3.40	1.21	0.52	1.00
Partnership(s) between CxO, IT leaders and/or business leaders in making IT decisions	4.00	4.30	0.77	0.67	1.00	3.00	3.10	1.34	0.88	0.00
Project management office	3.91	3.90	0.83	0.57	0.00	3.64	3.20	0.81	0.63	0.75
Processes										
Strategic information system planning (SISP)	3.55	3.50	**0.52**	**0.71**	1.00	3.09	3.00	1.04	0.67	0.00
Project management methodologies	**3.91**	**3.40**	0.83	0.70	1.00	3.36	3.00	0.81	0.82	1.50
Service level agreement (SLA)	4.36	4.40	**0.67**	**0.84**	1.00	4.09	4.10	0.94	0.74	0.75
CobiT and ITIL	**3.55**	**3.40**	1.04	0.84	1.00	3.27	3.10	**0.90**	**0.99**	1.00
Business continuity and information security strategy	**4.18**	**4.00**	0.60	0.67	0.00	3.45	3.90	**0.52**	**0.57**	0.00
Performance management	3.82	4.00	0.75	0.47	0.00	3.09	3.50	**0.70**	**0.85**	1.00
Managing IT investments: the selection, approval, and follow up on IT investments	4.00	4.00	0.89	0.67	0.00	3.18	3.30	1.08	0.82	1.00
IT budget control and reporting	**4.27**	**4.00**	0.79	0.67	0.00	3.55	3.90	1.21	0.57	0.00
Relational Mechanisms										
CIO leadership skills	**4.27**	**4.00**	1.01	1.05	1.75	2.82	3.20	**1.17**	**1.23**	0.75
Top management commitment and partnership with CIO	4.09	4.30	0.94	0.82	1.00	2.55	3.00	0.69	0.67	0.00
Clear communication between IT management and the business executives	4.55	4.60	**0.52**	**0.70**	0.75	3.00	3.20	1.18	0.63	0.75
Cross-functional training: Business/IT training and rotation	4.00	4.50	0.89	0.71	1.00	2.64	3.00	1.21	0.67	0.00

Table 9 - Delphi Results for North American Panel

4.2. Item Measures for the Second Construct – The Business Unit Non-Financial Performance

The conceptual definition of this latent construct and its domain of construct (Churchill 1979) are highlighted in Section 3.2 and further definitions for each dimension will be presented in this section.

The item measures for this latent construct were developed by researching the existing literature related to the different dimensions that underlie the construct. Based on the diverse literature of theses dimensions, measurement items were formulated and assimilated together.

The **decision-making process** is the first dimension underlying this construct. There are different characteristics for the decision-making process and these characteristics can be used to formulate the different items to measure this dimension as shown by the four items in Table 10. The final set of items for all constructs is included in the final survey, shown in Appendix C, part II.

The characteristics under consideration are: speed or duration (Eisenhardt 1989; Schilit and Paine 1987); the extent of conflict or consensus among decision makers (Eisenhardt 1989) and the amount of political activity therein (Welsh and Slusher 1986 listed in Goll and Abdulrasheet 2005); strategic alternatives (Kaeur et al. 2007); and the degree of rationality and comprehensiveness using objective data and systematic analysis (Fredrickson 1984 cited in Goll and Abdulrasheet 2005).

Decision-making Process	
Preliminary Item Measures	**Source (based on)**
What is the speed of decisions that are made within my business unit?	Eisenhardt (1989); Schilit and Paine (1987)
What is the usage of objective criteria and systematic analysis in making decisions within my business unit?	Fredrickson (1984) cited in Goll and Abdulrasheet (2005)
What is the availability of alternatives when decisions are made within my business unit?	Kaeur (2007)
What is the consensus with other decision makers when making a decision within my business unit?	Welsh and Slusher (1986) listed in Goll and Abdulrasheet (2005); Eisenhardt (1989)

Table 10 - Preliminary Item Measures for Decision-Making Process

Business Processes is the second dimension. A business process is defined by Davenport and Short (1990) as "a set of logically related tasks performed to achieve a defined business outcome". Another simple definition of business process is provided by (Havey 2005 cited in Vergidis et al. 2008) as follows: "Business process is a step-by-step rules specific to the resolution of a business problem".

Business processes are evaluated using two sub-dimensions: Efficiency (Harvard Manage Mentor 2007; Kannan 2008) and effectiveness (Kannan 2008). Measuring efficiency can be done using different key performance indicators (KPIs) such as the process delay or the time required to produce an item. More examples of efficiency KPIs are: days to deliver an order; number of rings before a customer phone call is answered; number of employees graduating from training programs; and weeks required to fill vacant positions (Harvard Manage Mentor 2007).

Effectiveness can also be measured using KPIs, such as level of discrepancy, and percentage of customer complaints (Kannan 2008).

In the ERP literature, supply chain business processes are measured by flexibility, reliability, responsiveness and cost/assets along the supply chain (Weider et al. 2006). More generic KPIs are provided by the industry consultants (PNMSOFT 2009) such as: the percentage of processes where completion falls within +/- 5% of the estimated completion; the average process overdue time; the percentage of overdue processes; the average process age; the percentage of processes where the actual number of assigned resources is less than the planned number of assigned resources; the costs of "killed"/stopped active processes; the average time to complete a task; and the sum of deviation of time (e.g. in days) against planned schedule of all active project.

Another important definition of business processes is offered by Biazo (2000) as follows: "a process is conceived of as a system of transforming input into output, one which uses resources and which is subject to controls". This definition helps in identifying 'managing resources' as another variable to be used in measuring business process performance. Hence, where tasks are defined as the activities that are directly related to achieving the aims of a process, resources includes everything else that is used, and modified by the tasks (Biazo 2000).

More generic KPIs for measuring business processes are found in Vergidis et al. (2008) where responses from the industry experts about the most widely used KPIs included the following: lead time/cycle time (the time it takes to produce or satisfy the business outcome); balanced scorecard; client acceptance and appreciation; and process cost. KPIs are mapped to strategic business goals, benchmarking, profitability, and

financial measures/stocks. Cycle time has been shown to be measured by the number of calendar days elapsed from the start till the end of the cycle; in addition, reduced cycle time has been shown to be correlated with higher levels of process maturity (Harter et al. 2000).

A compilation of the above variables led to the following item measures shown in Table 11.

Flexibility, the third dimension of the Business Unit Non-financial construct, is defined as the ability to adjust to changes from inside the system as well as from the environment. Flexibility can be measured according to the following sub-dimensions: volume flexibility, product-mix flexibility, new product flexibility (Jack 2000), and target market (Garavelli 2003). Item measures based on these references are created and shown in Table 12.

Business Processes	
Preliminary Item Measures	**Source (based on)**
What is the satisfaction level with the average lead time for business processes until the time it takes to produce the business outcome, compared to our principal competitors?	Vergidis et al. (2008);PNMSOFT (2009); Harter et al. (2000); Harvard Manage Mentor 2007)
What is the client satisfaction level with our business processes?	Kannan (2008);Vergidis et al. (2008)
What is the level of discrepancy level between the outcomes from our business processes and the original requirements?	Kannan (2008); Weider et al. (2006)
What is the satisfaction level with the appropriate level of using resources within our business processes?	PNMSOFT (2009), Biazo (2000)
What is the optimization level of our business processes cost compared to our principal competitors?	Vergidis et al. (2008); Weider et al. (2006)

Table 11 - Preliminary Item Measures for Business Processes

Flexibility	
Preliminary Item Measures	**Source (based on)**
What is the satisfaction level with the volume flexibility within my business unit?	Jack (2000)
What is the potential to create new products by my business unit?	Jack (2000)
What is the potential to reach new target markets by my business unit?	Gravelli (2003)

Table 12 - Preliminary Item Measures for Flexibility

Innovation is the fourth dimension of this construct and it entails innovation capabilities in terms of product, process and strategy. Innovation is a key element to sustain competitiveness with the market (Esterhuizen et al. 2012).

In their study of innovation and its impacts on firm performance, Neely et al. (2001) tried to develop measures for different constructs and so they differentiated between innovation and innovation outcomes. Accordingly, innovation consists of three dimensions: product innovation (such as changes in the design and architecture of the product); process innovation (such as changes in the manufacturing or information technology); and management systems along with organizational innovation (such as better production control and quality management).

On the other hand, the innovation outcomes can be categorized as follows: lower costs; enhancement to existing products; extensions to product range (new products); and better customer service.

Therefore, and based on (Neely et al. 2001), the items to measure the innovation dimension were based on the innovation outcomes and are shown in Table 13.

Legal and ethical compliance is the last dimension for this construct. According to the IT Governance Balanced Scorecard (Van Grembergen and De Haes 2005), this

dimension has three objectives: IT adherence to Sarbanes-Oxley Act (SOX), IT adherence to privacy regulations, adherence to IT ethics and code of conduct.

When accountability and transparency exist in the reporting system within an organization it is considered as a benefit (a satisfaction for internal and external stakeholders) and this accountability and transparency is enhanced by the compliance with government and IT community regulations, such as abiding by the Sarbanes-Oxley Act for financial institutions. The adherence to SOX refers to the legal adherence aspect because SOX is intended mainly to enforce both the controls and security of the financial systems, as well as all related IT processes.

Innovation Capability	
Item Measures	**Source (Based on)**
What is the impact of innovation (such as changes in the design of the product; changes in manufacturing or information; or changes in quality management) on lowering costs within my business unit in the last year?	Neely et al. (2001)
What is the impact of innovation on enhancing existing products produced by my business unit within the last year?	Neely et al. (2001)
What is the impact of innovation on creating new products produced by my business unit within the last year?	Neely et al. (2001)
What is the impact of innovation on creating better customer service by my business unit within the last year?	Neely et al. (2001)

Table 13 - Preliminary Item Measures for Innovation

The second objective is the IT adherence to privacy regulations and this can be measured by the number of reported incidents of hacked emails or accounts within the business unit (ITGI 2007). The adherence to IT ethics and the IT code of conduct can be

measured by the number of detected unethical behaviors within the business unit (such as visiting non-work related websites, printing large personal documents, etc.) (ITGI 2007).

As a recap, the legal and ethical compliance dimension should be able to reflect the level to which the business unit is protected against legal and privacy risks by complying with the appropriate controls, mainly information security controls. Information security literature identifies the following activities that should be managed to ensure information security compliance (Solms 2005): the level to which previously identified risks are managed; the level of security awareness; the completeness, comprehensiveness and availability of information security policies as well as its procedures and standards; the level of compliance to these policies and standards; the impact on IT risks positions when policies are not complied with; the compliance with regulatory, legal and statutory requirements; software licensing issues; and others.

Based on this literature, a new set of item measures are developed and shown in Table 14.

Legal and Ethical Compliance	
Preliminary Item Measures	**Source**
What is the percentage of risks that are managed versus risks that were previously identified within my business unit?	Solms (2005)
What is the level of security awareness within my business unit?	Solms (2005)
What is the degree of completeness, comprehensiveness and availability of information security policies and procedures, as well as standards?	Solms (2005)
What is the level of compliance to these policies and standards within my business unit?	Solms (2005)
What is the mitigation level when IT risks are not complied with?	Solms (2005)
What is the number of reported hacked emails and computer accounts?	ITGI (2007)

What is the number of detected unethical behaviors within the business unit (such as visiting non-work related websites, or printing large personal documents)?	ITGI (2007)
What is the level of compliance with government regulations?	Solms (2005)
What is the level of compliance with IT Organizational requirements (as per your audit reports)?	Solms (2005)

Table 14 - Preliminary Item Measures for Privacy and Ethical Compliance

4.3. Item Measures for the Third Construct – The Business Unit Financial Performance

The conceptual definition of this latent construct and its domain of construct (Churchill 1979) are highlighted in Section 3.3.

Operationalization of financial performance has been toggling in IS research between the usage of subjective and objective measures (Chen and Huang 2012). Older studies, like Khandwalla (1977) cited in Chen and Huang (2012) argues that subjective measures better capture a broad concept. In addition, it is noted that using subjective measures allows cross industry comparisons to be more feasible. For instance, the 'Net margin' would be more significant if compared within the same industry. In addition, collecting financial figures from business units within medium and large organizations as an objective measure might be faced with a conflict of disclosing sensitive and confidential data. Therefore, in this research a subjective measure is preferred. The STROBE instrument developed for measuring business performance by Venkatraman, (1989b) has been proven to be highly rigorous and reliable. and Furthermore, it is still being used by current studies (Chen and Huang 2012; Garci-Villaverde et al. 2012; Lau and Brutton 2011; Smirnova et al. 2011; Croteau and Bergeron 2001); therefore, is was used to measure this construct.

As per STROBE, the construct is measured by two dimensions: growth (sales growth, satisfaction with sales growth rate, and market share gain), and profitability (satisfaction with return on corporate investment, net profit position, return on investment position, return on sales, and financial liquidity). The target respondents were the business unit leaders.

In order to solicit more theoretical support for these items, we searched for other studies that measure business performance at the business unit and found the following dimensions used to measure the strategic business unit effectiveness (Govindarajan and Fisher 1990). These dimensions are: return on investment, profit, cash flow from operations, cost control, development of new products, sales volume, market share, market development, personal development, and political-public affairs. We see that most of them intersect both with Venkatraman's dimensions and items, and thus provide more support for the STROBE tool.

Appendix C, part II contains the measurement instrument of this construct, the Business unit financial performance, as adopted from Croteau and Bergeron (2001) with minor modifications.

4.4. Item Measures for Control Variables

Some items for the organization and for the respondents' profiles were borrowed from Tamim (2011). Among these is the organizational strategy question. This question checks whether an organization falls under the prospector, analyzer, defender or reactor categories of organizational strategy. This information is used as a control variable in finding patterns among different IT governance clusters.

4.5. Meeting Expert Judges for Content Validity

Instrument validity should precede statistical conclusion validity; otherwise, all findings are subject to doubts (Straub 1989 p.150; Straub et al. 2004, p.8). As part of the content validity of this construct (Straub et al. 2004), feedback from experts regarding the different items to be included in the measurement instrument was solicited. Accordingly, four semi-structured interviews were conducted with four IT and business unit executives in prominent companies in Montreal at this stage.

The first interviewee was a site leader at a business unit for an international company. Based on her comments, the wording for different items was changed but no major changes to the contents were made, nor any additions or removal of any items.

The second interviewee was a director in management consulting for an international company and who had previously worked as a CIO for a large institution. Some recommendations were made to take the culture of the organization into consideration, as public institutions have major differences compared to the private sector when it comes to IT governance. The "TOGAF" is a framework developed by Open Group and is used to build enterprise architecture. This framework was suggested to be added to one of the IT processes discussing CobiT and ITIL.

The third interviewee, who was an engineer, had input on item measures of the financial and non-financial performance constructs but he was not comfortable providing input into the items of the IT governance construct. He confirmed that the non-financial measures included in the instrument can be measured on the business unit level and gave minor suggestions to some of the wording. He stated that at his company, of less than 200 employees, the financial measures were only calculated at the organizational level;

however, he knows many large organizations who definitely measure their performance at the business unit level. His comment provided more assurance that the research should be at medium to large organizations.

The fourth and last interviewee has been an IT consultant for more than 20 years, and his input was crucial in changing many items' wording for clarity. For instance, separating the "Business Continuity and Information Security Strategy" process was advised. This has been backed up through comments from the Delphi study and so eventually this process was divided into two. Another major observation and concern from this expert was that measuring the CIO skills within the IT survey represented a self-evaluation issue; accordingly, two items related to relational mechanisms were moved from the IT governance survey to the business unit survey, where business unit leaders will instead be able to evaluate the CIO vision and skills.

4.6. Card Sorting

Card sorting is a procedure that helps in assessing the construct validity; the convergent and discriminant validity of the items within the research instrument; and in identifying items that are still ambiguous (Moore and Benbasat 1991, p. 199, 200; Straub et al. 2004).

	Actual Categories							
Theroretical Categories	IT Structures	IT Processes	IT Relational Mechanisms	Non-Financial Benefits at the Business Unit Level	Financial Benefits at the Business Unit Level	Ambigious	Total	TRGT%
IT Structures	**30**	3	8	1			42	71%
IT Processes	4	**46**	8	2	1	2	63	73%
IT Relational Mechanisms	13		**25**	3		1	42	60%
Non-Financial Benefits at the Business Unit Level	23	18	31	**80**	12	11	175	46%
Financial Benefits at the Business Unit Level				5	**51**		56	91%
Total item placement= 378			**Total Hits= 232**			**Overall hit ratio= 61%**		

Table 15 - First Round of Card-sorting

The exercise started by creating an excel sheet containing instructions for the

correct procedures to be followed by the participants, the definitions of the constructs, and a list of all the items that are collected so far based on the literature, the Delphi method, and the expert interviews. The list was shuffled and listed in a random order. The instructions were to place each item under the correct category as perceived by the respondent. For any item that felt ambiguous, the participants could place it under a category called "too ambiguous". Participants were also instructed to provide any concern or comment next to each item. This excel sheet replaced the traditional cards and envelops so that the participants could fill the sheet themselves and then send it to the main researcher.

Email invitations with the excel file as an attachment were sent to seven PhD students from the joint PhD program in Montreal, inviting them to participate in the card-sorting exercise. Most of the participants were familiar with this type of exercise and individual explanations were provided for those who were not. Still, everyone was encouraged to ask questions if they needed clarifications before starting.

Round 1 results are shown in Table 15. Examination of the diagonal of the matrix shows that out of 378 theoretical placements (54 items * 7 judges), there were 232 hits, which were items placed within their correct categories, for an overall hit ration of 61%.

Looking at each row, we can see the TRGT% of items that are properly classified under the target construct. For instance, the non-financial benefits construct has a very low percentage (46%) and this indicates that the underlying items of this construct were ambiguous. In addition, looking at the off-diagonal figures, we see high numbers for the same target construct—the non-financial benefits—and this indicates a lack of discriminant validity and that the items under this construct were not being clearly

differentiated from the items under the IT structures, IT processes, and IT relational mechanisms constructs.

	Actual Categories											
Theoretical Categories	IT Structures	IT Processes	IT Relational Mechanisms	Decision Making	Business Process	Flexibility	innovation	Legal and Ethical Compliance	Financial Benefits at the Business Unit Level	Ambiguous	Total	TRGT%
IT Structures	**18**	2	5	3				1		1	30	60%
IT Processes	3	**17**	3	1	6	3	1	5	6		45	38%
IT Relational Mechanisms	4	1	**15**	1	5	2	2				30	50%
Decision Making	3	3		**16**	1	1		1			25	64%
Business Process	1				**20**	2			2		25	80%
Flexibility						**7**	6			2	15	47%
Innovation		1			1	1	**5**		1	1	10	50%
Legal and Ethical Compliance		10	10	1		3	2	**1**		5	50	38%
Financial Benefits at the Business Unit Level	1			1				**9**	**37**	1	40	93%
Total item placement = 270				Total Hits = 154			Overall hit ratio = 57%					

Table 16 - Second Round of Card-sorting

Based on the above results, the Business Unit Non-financial construct were replaced by its underlying five dimensions: the decision-making, the business processes, the flexibility, the innovation, and the legal and ethical compliance. Round 2 was conducted with six participants: two PhD students from the John Molson School of Business, three MBA graduates and one with a Master's degree of Arts in Instructional Design. The same calculations took place and the results are shown in Table 16.

The TRGT% for three dimensions—flexibility, innovation and legal and ethical compliance—remains low; however, the off-diagonal figures are all okay except for the legal and ethical compliance dimension, which is still high on other constructs. This indicates low discriminant validity and we need to further improve it.

METHOD	Coefficient	Inference/Subjects			Inference/Subjects & Raters		
		StdErr	95% C.I.	p-Value	StdErr	95% C.I.	p-Value
Conger's Kappa	0.417	0.042	0.333 to 0.501	0	0.129	0.158 to 0.676	0.001
Gwet's AC1	0.427	0.044	0.339 to 0.515	0	0.13	0.166 to 0.688	0.001
Fleiss' Kappa	0.415	0.042	0.330 to 0.500	0	0.13	0.154 to 0.676	0.001
Krippendorff's Alpha	0.417	0.043	0.331 to 0.504	0	0.13	0.157 to 0.678	0.001
Brenann-Prediger	0.426	0.044	0.338 to 0.513	0	0.13	0.165 to 0.687	0.001
Percent Agreement	0.483	0.039	0.405 to 0.562	0	0.117	0.248 to 0.718	0

Table 17- Inter-rater Reliability Coefficients from Card Sorting Analysis

To better understand the agreement between the different raters (judges), an inter-rater reliability coefficient, Fleiss's Kappa, was calculated using statistical tool called Agreestat2011. The Fleiss's Kappa is similar to Cohen's Kappa as seen in (Moore and Benbasat and 1991); however, the main difference is that this Kappa calculates the agreement between two or more raters, while Cohen's Kappa calculates the agreement between a pair of raters only[7]. After running the AgreeStat 2011 on the raw data from the second round of card sorting, the results were obtained as shown in Table 17.

Looking at Table 18, the Fleiss's Kappa is 0.415012747. Based on Fleiss et al. (2003), and the National Center of Health[8], This is considered fair to good as shown in Table 18.

0.75 – 1.00	Very Good
0.41 – 0.75	Fair to Good
< 0.40	Poor

Table 18 - Fleiss's Kappa Evaluation Ranges

4.7. Pre-testing the Instruments

This step was initiated as the final step of refinement in order to reach a sense that the surveys are clear, easy to understand, and realistic enough for the practitioners who are going to be our target population for the final data collection. In addition, the Kappa

[7] (http://www.stattools.net)

[8] http://www.eadph.org/congresses/16th/Mimimum_reporting_requirements.pdf

and total hit rations from the card sorting exercise were not ranked as very good, so we were certain that there was still room for improvement. Seven prominent business unit leaders and IT seniors working for international companies located in Montreal were then contacted and were invited to pretest the measurement instruments: the IT governance survey and the business unit performance survey (shown in Appendix C). They were asked to comment on the contents of the questions, the wording/phrasing, as well as the difficulties or ambiguities they faced while filling out the survey.

Valuable feedback was collected in this step. Again, many items were further refined. Some items within the legal and ethical compliance dimension, for example, were completely removed due to unanimous comments regarding the inability of business unit leaders to answer such questions. This is also backed up by the card-sorting analysis results as discussed in 4.5. In addition, some items were totally replaced by other items, such as the two innovations items, which were replaced by four items that detail the type of impact as an outcome of innovation. Finally, some items were kept but underwent some wording modifications.

It is worth noting that even the financial measures adopted from Venkatraman (1989b) were tested and were strongly confirmed in terms of applicability and clarity.

Some additional background information was also suggested and was added for later analysis and discussion, such as the existence of IT outsourcing contracts and the percentage of IT spending vs. total spending.

4.8. Data Collection and Survey Guidelines

The data was collected through a combination of online and paper-based surveys. At the onset, an online version of the survey was launched as a pilot study. 300 emails

were sent targeting firms in North America listed in the *Directory of Top Computer Executives in North America.*

However, there was a severe paucity of responses obtained from the email invitations. Therefore, a paper-based survey was prepared in addition to the online version. The invitations were sent by regular mail to 1700 companies. The selected firms were medium to large organizations distributed across the different Canadian provinces with number of employees greater than 200.

This study followed a multilevel design, therefore the study targeted two different types of respondents within each firm—one at the business unit level, and another at the organizational level. For data on the IT governance, the CIO's input was required because he/she is the most knowledgeable person in the company about the current IT practices, and so the data was collected at the organizational level. On the other hand, for data on the financial and non-financial performance of the business unit (dependent variables), a business unit leader was targeted because he/she is the best to know how his/her business unit is performing and so data was collected here at the business unit level. Therefore, when sending the surveys per mail, each company received a package containing two surveys and two cover letters. The main package was addressed first to the CIO, with a cover letter indicating the objective of the study, a request to fill out the survey, and a request to forward the Business Unit Performance Survey to one of the business unit leaders within his/her firm. Prepaid envelops were also included in the package to return the filled surveys. In addition to the paper-based surveys, the respondents had the choice to complete the online version through a link that was included in the cover letter for both the CIO and the business unit leader.

After one week from sending the survey by regular mail and following Dillman (1978), a second wave was initiated by sending mail reminders to all the respondents who were contacted earlier (1700 companies) in order to ask them to kindly fill the survey if they haven't done so yet. A copy of this reminder is found in Appendix C, part III.

Two weeks after the mail reminder, the response rate was still low so a third wave of phone calls was launched. Phone calls were made to a number of companies from each province. Follow-up phone calls for mail surveys have been proven to be effective in increasing the response rate (Diaz De Rada 2005). Since the average time for receiving back a paper survey is 15 days and an electronic survey is 10 days (Schaefer and Dillman 1998, p. 389), the selected date decided for the follow-up phone calls was three weeks from the launching date. It is also worth noting that the launching date was in midweek, which is recommended by best practices (Oracle, 2012).

Six weeks after starting the mail surveys in Canada, a total of 70 IT surveys and 39 business unit surveys (paper based and online) were returned. From which, 33 pairs were matched. It should be noted that, a total of 234 packages bounced back and were not delivered and the main reason was that the targeted person is no longer there, working for the company.

At this stage, another data collection from the Middle East geographic area was launched. This time people were contacted using a snowball sampling technique. This technique of sampling emerged based on the low response rate received from the random sampling technique that was used to collect data from the North American sample. Hence, personal contacts were first contacted by phone to solicit their help in participating as well as in reaching out for their own personal contacts. Email invitations

were sent to those contacts along with a link to the online surveys. Out of 59 contacts in the ME area, a total of 27 IT surveys and 29 business unit surveys were returned leading to 24 pairs.

Combining the results from both geographic areas led to a total of 97 returned IT surveys, 68 Business unit surveys, and 57 pairs that are complete and usable in the data analysis. This has resulted in a response rate of 6.4% for IT surveys, 4.5 % for business unit surveys and 3.6% for the matched surveys (pairs). Due to the nature of the study which is at the managerial level and the matching required this was considered acceptable to continue with the data analysis.

Chapter 5: Data Analysis

This chapter contains the data analysis part of the research methodology. It starts by a descriptive statistics of the sampled organizations and includes the assessment of the measurement model followed by the results obtained through the testing of the structural model.

5.1. Descriptive Statistics

In order to better understand the nature of the respondents and their corresponding organizations, a descriptive analysis on SPSS was run to generate a statistical analysis of the sample organizations' characteristics.

Table 19 shows that 40% of the 57 sampled organizations are publicly listed, 31% are privately owned, while the rest did not answer the question. In terms of geographical distribution, 58% come from Canada while 42% are from the Middle East region. Since the level of analysis is at the business unit level, a list of the business units' titles is also listed under the organizations' profile. Some of these business unit titles include 'Operations' (7%) and 'Corporate development' (3.5%), while 33% fall under 'Others', such as 'Sales and Marketing', 'International Markets Development', 'Business Analysis', and 'Corporate and Institutional Banking'.

The average number of employees is 16,346. The budget questions were also informative in reflecting the size of the organization, as shown in Table 19.

The percentage of IT budget versus the real budget gave an indication of the amount invested in IT, which indicated the importance of IT within the organizations. This likely reflected the importance of the return on IT investments issue within these organizations. This percentage ranges from 1 to 60% with an average of 8% of the total

investments dedicated to information technology. Finally, it is interesting to note that 77% of the sample organizations have one or more IT activities being outsourced, such as 'IT operations', 'data center management', and 'disaster recovery planning'.

There are two different target respondents in this survey–the IT respondent and the business unit respondent. For the IT respondents, the titles are distributed as follows: IT director (29.8%), IT manager (12%), CIO (10%), VP IT (3%), and 10% is left for other titles, such as MIS Director, Coordinateur de centre du service, Head of IT unit, and many more. The average years of experience in the current job is 7 years while the average years with the organization is 14 years. This may indicate promising insights into IT turnover.

On the other hand, the business unit respondents had different titles and are as follows: VP (14%), Director (7%), Senior Director (3%), and President (2%). Other titles (30%) were Chief Operations Officer (COO), Executive VP, VP Corporate Development, Station Manager, and Regional Commercial Manager. The mean of the years of experience for the business unit respondents within their organizations is 13.29 years and ranges from 1 to 34 years, which is very similar to those of the IT respondents.

Profile of the IT Respondents		
	N	*%*
Job Title		
IT Director	17	29.8%
IT Manager	12	21.1%
CIO	10	17.5%
VP IT	3	5.3%
Others	10	18.0%
	Mean[Range]	
Years of experience in the organization	14.61 [1-39]	
Years of work experience in current job	7.09 [1-30]	
Profile of the Business Unit Respondents		
Job Title		
VP	8	14.0%
Director	4	7.0%

Senior Director	3	5.3%
President	2	3.5%
Others	17	30.0%
	Mean[Range]	
Years of experience in the organization	13.29 [1-34]	
Years of work experience in current job	6.60[1-30]	
Profile of the Organizations / Business Units		
	N	***%***
Industry		
Financial services	15	26.3%
Manufacturing	12	21.1%
Information technology	5	8.8%
Retail business	4	7.0%
Healthcare	3	5.3%
Media	3	5.3%
Construction	2	3.5%
Others	9	15.8%
	N	***%***
Geographic Distribution		
Canada	33	57.9%
Middle East	24	42.1%
IT Strategy		
Defender	25	43.0%
Prospector	17	29.8%
Analyser	11	19.3%
Reactor	1	1.8%
IT Outsourcing Activities		
Yes	44	77.1%
NO	12	21.4%
Business Unit Title		
IT	7	12.3%
Operations	4	7.0%
Information Systems / MIS division	2	3.5%
Corporate Development	2	3.5%
Commercial Unit	2	3.5%
Others	33	58.0%
	Mean[Range]	
Number of employees in the organization	16,346[200-434,000]	
IT Budget in US$	874,224,88 [50,000- 3 billion]	
IT Budget vs. Total Budget	8.4% [1-60]	
Number of IT employees vs. Total number of employees	5.0% [1-35]	
Organization's total revenue for last year	4,652,997,368[3,900,000-1E+11]	

Table 19 - Sample Descriptive

5.2. Testing the Measurement Model

5.2.1. Formative vs. Reflective Constructs

Before testing and analyzing the measurement model, an important issue needs to be addressed regarding the constructs of the research model. The research model contains formative and reflective first-order and second order constructs. The independent variables, , shown in Figure 6, are: IT governance configurations (second-order), IT structures (first-order), IT processes (first-order), and IT relational mechanisms (first-order), constitute a type IV model as per Jarvis et al. (2003) second order factor specifications.

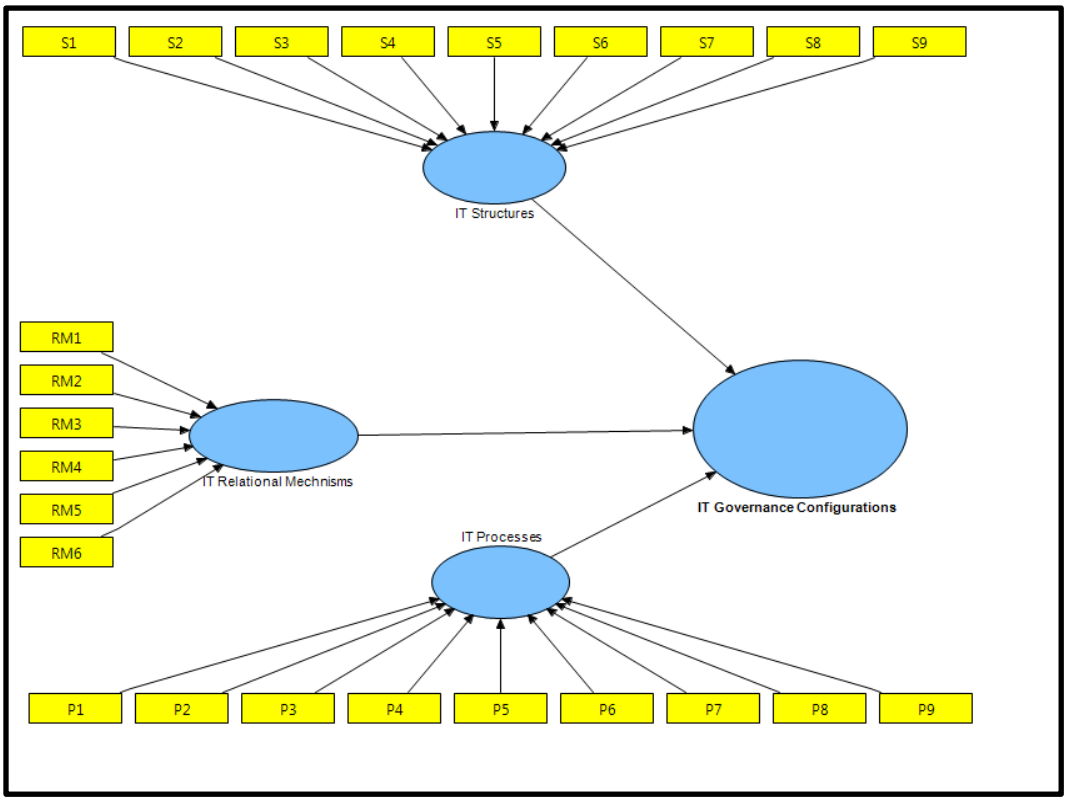


Figure 6 - Measurement Model for Independent Formative Constructs

These constructs are considered as formative for the following reasons (Jarvis et al. 2003): First, the different indicators of IT structures, such as IT strategy committee

and project management office, define and cause the set of IT structures to exist within an organization. In addition, any changes in these indicators would alter the set of IT structures, and hence its nature and conceptual definition. The same reasoning applies to the IT processes, such as strategic information systems planning, and disaster recovery planning, and to IT relational mechanisms, such as communication between IT management and business executives. As for the second-order construct–IT governance configurations–it is also formed by the different combinations of IT structures, IT processes, and IT relational mechanisms, which collectively form the IT governance configurations construct.

Second, the indicators of all the independent constructs are not interchangeable and do not necessarily share a common theme and omitting one of them would alter the nature of the respective construct.

The same reasons used to justify the formative nature of the independent variables can be used to justify the reflective ones, which are the dependent variables of the research model, shown in Figure 7.

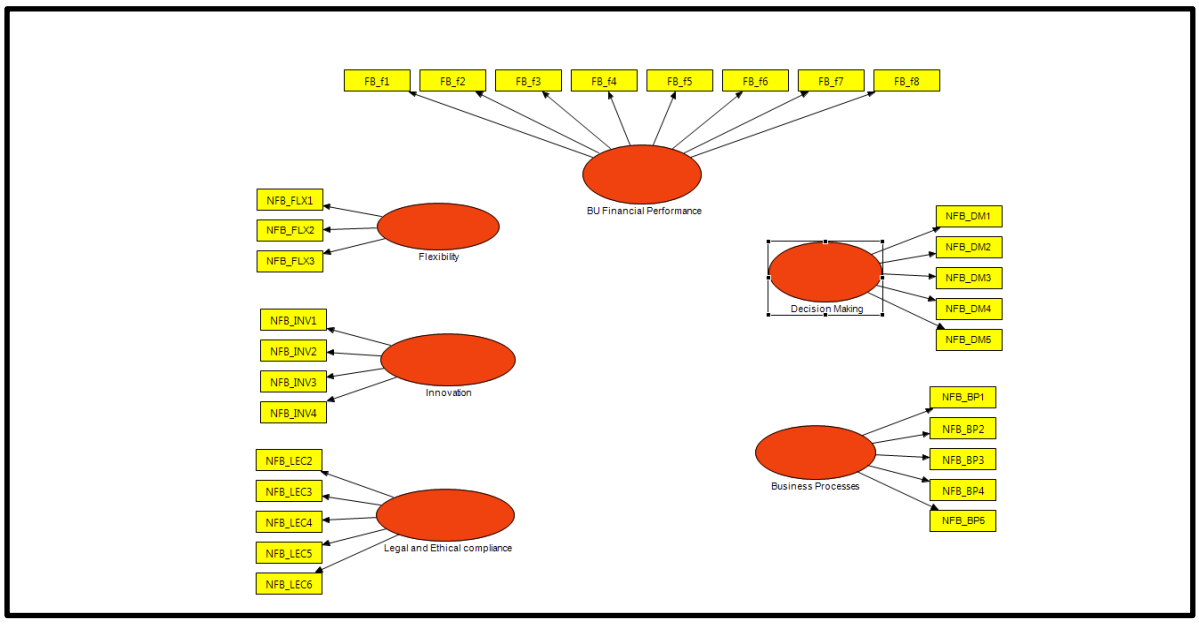


Figure 7 - Measurement Model for Dependent Reflective Constructs

First, the indicators of these variables are all manifestations of their underlying constructs and do not cause them. The changes in an indicator do not change the corresponding construct.

Second, the indicators can be interchangeable and omitting one of them would not change the conceptual domain of the construct. Third, the indicators are expected to co-vary with each other and changes in one would be associated with changes in the others (Jarvis et al. 2003).

5.2.2. Preliminary Validity Assessment

Since the measurement instruments, which are used for data collection, are mostly newly compiled and assembled by this study, some preliminary validity assessment is essential for discriminant and convergent validity (Straub et al. 2004). The study uses two separate surveys, the IT governance survey and the business unit performance survey. The former survey contains the items related to the independent latent variables of the research model (IT structures, IT processes, and IT relational mechanisms), which have formative observed variables as discussed earlier. Formative observed variables do not need to be correlated with each other, as they might not represent the same underlying dimension (Chin 1998; Gefen et al. 2000; Petter et al. 2007). In addition, correlations among formative variables are not explained by measurement models (Diamantopoulos and Winklhofer 2001; Centefelli and Bassellier 2009; Wan et al. 2012), thus, classical discriminant and convergent tests do not work for formative measures. Therefore, using SPSS, only the correlations among the 23 items of Business Unit Non-financial Performance construct are analyzed using the multitrait-multimethod (Campbell and Fiske 1959; Barki et al. 2001). The items used for the Business Unit Non-financial

Performance construct and the Financial Business Unit Performance construct are listed in Table 20 and Table 21 respectively. The correlation Matrix is shown in Table 22.

Item	Dimension
NFB_DM1: the speed of strategic decisions made is	Decision-making
NFB_DM2: the accessibility of information when decisions are made is	Decision-making
NFB_DM3: the accuracy of available information when decisions are made is	Decision-making
NFB_DM4: generating strategic alternatives before decisions are made is	Decision-making
NFB_DM5: consensus with other decision makers pertaining to a business unit outcome is	Decision-making
NFB_BP1: compared to our principal competitors, my satisfaction with the average lead time for business processes – that is, the time it takes to produce the business outcome – is	Business Processes
NFB_BP2:our employees' satisfaction with our business processes is	Business Processes
NFB_BP3: the degree to which the delivered outcomes from our business processes are compliant with the business requirements is	Business Processes
NFB_BP4: my satisfaction with the resource allocation among our business processes is	Business Processes
NFB_BP5: the cost optimization of our business processes is	Business Processes
NFB_FLX1: the flexibility to increase the volume of production is	Flexibility
NFB_FLX2: the flexibility to create new products or services is	Flexibility
NFB_FLX3: the flexibility to target new markets is	Flexibility
NFB_LEC1: the level of IT security awareness among the staff is	Legal & Ethical Compliance
NFB_LEC2: the availability of information security policies and procedures for all the staff is	Legal & Ethical Compliance
NFB_LEC3: the average time lag between the identification of IT risks and their resolution is	Legal & Ethical Compliance
NFB_LEC4: the level of compliance to information security policies and procedures is	Legal & Ethical Compliance
NFB_LEC5: the understanding of the company's risks when information security policies and procedures are not complied with is	Legal & Ethical Compliance
NFB_LEC6: the clarity of information security policies and procedures as perceived by the staff is	Legal & Ethical Compliance
NFB_INV1: the impact of innovation on enhancing existing products/services produced within my business unit is	Innovation
NFB_INV2: the impact of innovation on creating new products/services by my business unit is	Innovation
NFB_INV3: the impact of innovation on creating better customer service by my business unit is	Innovation
NFB_INV4: the impact of innovation on lowering costs within my business unit is	Innovation

Table 20- Item Measures for the Business Unit Non-financial Performance Construct

The reason for opting for this type of analysis instead of the exploratory factor analysis is the small sample size which does not comply with the 10 to 1 rule (Barki et al. 2001) given the sample data has 57 records with 23 items for business unit non-financial performance construct.

It should be noted that survey used to measure the Business Unit Financial Performance construct is a well-known and widely used instrument (STROBE) thus no MTMM analysis is conducted on it.

Items of the Financial Performance Construct
FB-f1: the sales growth position relative to our principal competitors is
FB-f2: my satisfaction with the sales growth rate is
FB-f3: the return on investment position relative to our principal competitors is
FB-f4: my satisfaction with the return on investment is
FB-f5: my satisfaction with the return on sales is
FB-f6: the market share gains relative to our principal competitors are
FB-f7: the net profit position relative to our principal competitors is
FB-f8: the financial liquidity position relative to our principal competitors is

Table 21- Items of the Business unit Financial Performance Construct

	NFB_DM1	NFB_DM2	NFB_DM3	NFB_DM4	NFB_DM5	NFB_BP1	NFB_BP2	NFB_BP3	NFB_BP4	NFB_BP5	NFB_FLX1	NFB_FLX2	NFB_FLX3	NFB_LEC2	NFB_LEC3	NFB_LEC1	NFB_LEC5	NFB_LEC6	NFB_LEC4	NFB_INV1	NFB_INV2	NFB_INV3	NFB_INV4
NFB_DM1	1	.467**	.423**	.343**	.542**	.309*	.449**	.373**	.355**	.183	-.045	.332*	-.022	.375**	.321*	.109	.081	.188	.149	.326*	.192	.440**	.046
NFB_DM2	.467**	1	.659**	.381**	.457**	.189	.489**	.389**	.399**	.096	.241	.196	.112	.399**	.274*	.078	.297*	.246	.260	.129	.036	.279*	-.094
NFB_DM3	.423**	.659**	1	.351**	.363**	.226	.627**	.496**	.552**	.090	.155	.201	.015	.436**	.346**	.089	.353**	.223	.408**	.231	.142	.317*	-.087
NFB_DM4	.343**	.381**	.351**	1	.205	.168	.318*	.072	.129	.206	.124	.099	-.023	.341**	.251	.072	.307*	.296*	.258	.269*	.196	.322*	.171
NFB_DM5	.542**	.457**	.363**	.205	1	.158	.411**	.352**	.518**	.245	.086	.122	-.191	.464**	.355**	.039	.299*	.349**	.240	.366**	.225	.420**	.125
NFB_BP1	.309*	.189	.226	.168	.158	1	.421**	.226	.269*	.041	-.095	.071	.448**	.172	.196	.303*	.154	.182	.071	.154	.092	.128	.003
NFB_BP2	.449**	.489**	.627**	.318*	.411**	.421**	1	.551**	.519**	.312*	.275*	.053	.126	.411**	.410**	.116	.321*	.332*	.306*	.366**	.077	.334*	.030
NFB_BP3	.373**	.389**	.496**	.072	.352**	.226	.551**	1	.431**	.107	.128	.124	-.057	.358**	.392**	-.012	.324*	.434**	.468**	.283*	.196	.345**	.010
NFB_BP4	.355**	.399**	.552**	.129	.518**	.269*	.519**	.431**	1	.168	.054	.022	.136	.405**	.495**	-.133	.419**	.308*	.422**	.287*	.201	.355**	.183
NFB_BP5	.183	.096	.090	.206	.245	.041	.312*	.107	.168	1	.342**	.112	-.081	.315*	.219	-.002	.178	.310*	.201	.154	-.020	.221	.320*
NFB_FLX1	-.045	.241	.155	.124	.086	-.095	.275*	.128	.054	.342**	1	.277*	.192	.194	.177	.037	.138	.211	.214	.293*	.038	.205	.186
NFB_FLX2	.332*	.196	.201	.099	.122	.071	.053	.124	.022	.112	.277*	1	.105	.292*	.062	.077	-.112	.103	.089	.181	.155	.215	-.049
NFB_FLX3	-.022	.112	.015	-.023	-.191	.448**	.126	-.057	.136	-.081	.192	.105	1	-.124	-.026	.266*	.079	.042	-.017	.156	.043	.065	.120
NFB_LEC2	.375**	.399**	.436**	.341**	.464**	.172	.411**	.358**	.405**	.315*	.194	.292*	-.124	1	.731**	.183	.567**	.683**	.644**	.244	.093	.334*	.238
NFB_LEC3	.321*	.274*	.346**	.251	.355**	.196	.410**	.392**	.495**	.219	.177	.062	-.026	.731**	1	.212	.696**	.691**	.668**	.466**	.344**	.527**	.402**
NFB_LEC1	.109	.078	.089	.072	.039	.303*	.116	-.012	-.133	-.002	.037	.077	.266*	.183	.212	1	.360**	.305*	.286*	.150	.064	.071	-.016
NFB_LEC5	.081	.297*	.353**	.307*	.299*	.154	.321*	.324*	.419**	.178	.138	-.112	.079	.567**	.696**	.360**	1	.717**	.710**	.375**	.259	.401**	.398**
NFB_LEC6	.188	.246	.223	.296*	.349**	.182	.332*	.434**	.308*	.310*	.211	.103	.042	.683**	.691**	.305*	.717**	1	.779**	.483**	.259	.473**	.391**
NFB_LEC4	.149	.260	.408**	.258	.240	.071	.306*	.468**	.422**	.201	.214	.089	-.017	.644**	.668**	.286*	.710**	.779**	1	.366**	.277*	.398**	.296*
NFB_INV1	.326*	.129	.231	.269*	.366**	.154	.366**	.283*	.287*	.154	.293*	.181	.156	.244	.466**	.150	.375**	.483**	.366**	1	.589**	.678**	.412**
NFB_INV2	.192	.036	.142	.196	.225	.092	.077	.196	.201	-.020	.038	.155	.043	.093	.344**	.064	.259	.259	.277*	.589**	1	.624**	.478**
NFB_INV3	.440**	.279*	.317*	.322*	.420**	.128	.334*	.345**	.355**	.221	.205	.215	.065	.334*	.527**	.071	.401**	.473**	.398**	.678**	.624**	1	.488**
NFB_INV4	.046	-.094	-.087	.171	.125	.003	.030	.010	.183	.320*	.186	-.049	.120	.238	.402**	-.016	.398**	.391**	.296*	.412**	.478**	.488**	1

*Significant at the 0.05 level (2-tailed)
**Significant at the 0.01 level (2-tailed)

Table 22 - Correlation Matrix for the Business unit Non-financial Performance Construct

From the correlation matrix shown in Table 22, the convergent validity can be observed by looking at the correlations of the items which are supposed to measure the same trait and making sure they are in fact measuring the underlying construct. Their values should be significantly different than zero and sufficiently large (Campbel and Fisk 1959). For the Decision Making construct, out of 15 correlations there is only one correlation that is not significant while the rest are positive and significant at 0.01 level with Cronbach alpha of 0.777. For the Business Processes, 4 out of 15 are not significant, from which 3 are related to the fifth item (NFB-BP5), the rest are all significant at 0.01

level and the Cronbach alpha is 0.654. For the Flexibility construct, 2 out of 6 correlations are non-significant and both related to the third item (NFB-FLX3). The other four correlations are significant at a 0.05 level and the Cronbach alpha is 0.405, which is considered low. For the Innovation construct, all of the six correlations are positive and significant at a 0.01 level and the Cronbach alpha is .827. The Legal and Ethical Compliance has 6 items and thus 20 correlations from which 2 are insignificant, 2 are significant at 0.05 level, while the rest are all significant at 0.01 and the Cronbach alpha is 0.877.

Discriminant validity using MTMM is demonstrated by examining the correlations between the items that are intended to measure different constructs. The correlations between items measuring the same constructs should not be significant or higher than their correlations with other items measuring other constructs.

Table 22 shows that there are some items correlating on other items measuring other constructs, but the most obvious ones are the items of Decision Making and Business Processes which are not demonstrating any discriminant validity. In addition the third item measuring Legal and Ethical Compliance construct is also correlating significantly with 11 out of 17 (23-6) items. These facts are noted and related items are flagged until further validity tests are conducted by confirmatory factor analysis.

5.2.3. Convergent and Discriminant Validity using Confirmatory Factor Analysis

After conducting the preliminary validity and reliability assessments using MTMM method and flagging some problematic items, a confirmatory factor analysis (CFA) is conducted to confirm the validity of the items. However, before showing the results of the CFA, descriptive statistics of the final constructs is presented in Table 23.

	Mean*	Median	Std. Deviation	Minimum	Maximum
IT Governance Configurations					
IT Structures	3.118	3.500	1.275	0.000	5.000
IT Processes	3.195	3.330	0.890	0.667	4.667
IT Relational Mechanisms	3.374	3.330	0.826	1.333	5.000
Business Unit Non-financial Performance					
Decision Making	3.610	3.600	.610	2.000	5.000
Business Processes	3.569	3.400	0.586	2.400	4.800
Flexibility	3.453	3.000	.679	1.670	4.670
Innovation	3.325	3.250	.769	.750	5.000
Legal & Ethical Compliance	3.079	3.500	1.006	0.000	4.630
Financial Performance					
Financial Performance	3.079	3.250	1.006	0.000	4.630

*Likert-type scale ranging from 1-5 (0 for N/A)

Table 23 - Descriptive Statistics of the Research Model Constructs

To do the confirmatory factor analysis, we chose PLS as the Structured Equation Modeling tool versus other covariance-based SEM tools for many reasons. The first reason is related to the formative nature of the independent constructs: the IT governance structures, processes, and relational mechanisms (Chin 1998; Diamanopoulous 2011; Gefen et al. 2011; Ringle et al. 2012). The second reason is the sample size, which, due to the nature of the respondents and the paired surveys, was relatively small. The third reason is the exploratory nature of the research, given that IT governance does not have a solid theory to follow (Gefen et al. 2011).

PLS was mainly used to assess the measurement model in terms of validity and reliability. Within the measurement model, there are the formative constructs: IT structures, IT processes, and IT relational mechanisms; and there are the reflective constructs: Business Unit Non-financial Performance and the Business Unit Financial Performance.

Starting with the reflective constructs, the following tests are examined for the **validity** and **reliability** testing:

- Indicator reliability: The indicators' outer loading should be higher than 0.7 (Hair 2013) or 0.5 (Gefen 2000). As a rule of thumb, items between 0.4 and 0.7 should not be removed unless their removal would increase the composite reliability.
- Convergent validity: The average extracted variance (AVE) for each construct is examined. Values above 0.5 demonstrate a convergent validity (Bergeron et al. 2004, Hair 2013).
- Discriminant validity: The average extracted variance (AVE) for a latent construct is compared with the shared variances between that construct and the other latent constructs. The shared variance is calculated as the squared correlation between latent variables, which is generated by SmartPLS[i]. If the AVE is greater than all the corresponding shared variances, then discriminant validity is established (Bergeron et al. 2004).

  In addition, the cross-loadings are examined by checking whether the loading of an item on its construct is higher that its loadings on the other constructs.
- Internal consistency reliability: The composite reliability, provided by SmartPLS, is checked for values above 0.7 (0.6-0.7 is acceptable for exploratory research) (Hair 2011).

Applying these rules by using the PLS algorithm on a model containing the six dependent variables of the research model: Decision making, Business Processes, Flexibility, Innovation, Legal & Ethical compliance, and Business Unit Financial Performance, the following was noted:

- **Indicators reliability** is checked through the items' loadings for the each latent construct as shown in Figure 8 to Figure 13. Most of the loadings for the Decision Making construct are above 0.7. The loading of the fourth item (NFB_DM4) is 0.565 but still should not be removed according to the rule of thumb stated earlier.

  For the Business Processes, three items are above 0.75; however, the first and fifth items (NFB_BP1, NFB_BP5) are on the edge of acceptable cutoff. Therefore, the composite reliability was calculated after removing these 2 items and the new value is 0.857; a significant improvement from 0.798. Therefore, these 2 items are removed especially that they were flagged earlier by the preliminary validity assessment using MTMM.

  For the Flexibility construct, the third item (NFB_FLX3) is 0.288 which is very low and is removed. After its removal the composite reliability has risen from 0.667 to 0.776. This removal is also backed up by the assessment results provided in the previous section of MTMM validity assessment.

  For the innovations constructs, all four items have strong loadings between 0.674 and 0.894 and hence no items are removed. As for the Legal and ethical compliance, all items are loading high (>0.8) except for the first item (NFB_LEC1) with a loading of 0.363 and thus it is removed. Finally, for the business unit financial performance, although, the set of item used come from a widely used instrument (STROBE), the loading of the fourth item (FB_f4) is very low (1.79).

  Thus in summary, the following items are removed: **NFB_BP1, NFB_BP5, NFB_FLX3, NFB_LEC1** and **Fb-f4**.

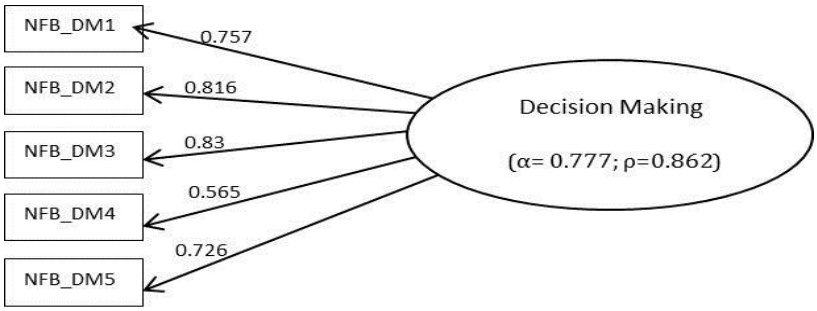
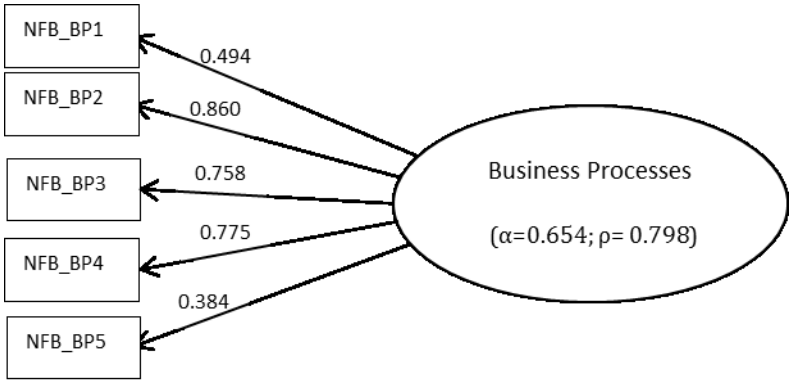


Figure 8- - Confirmatory Factor Analysis of the Decision Making Measures



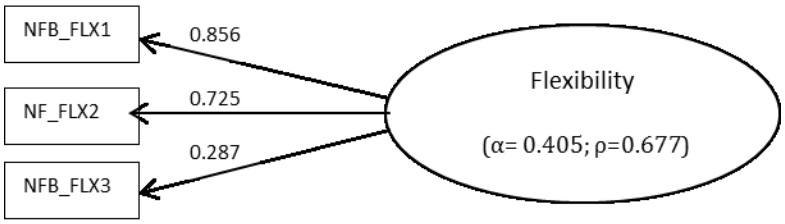


Figure 10- Confirmatory Factor Analysis of the Flexibility Measures

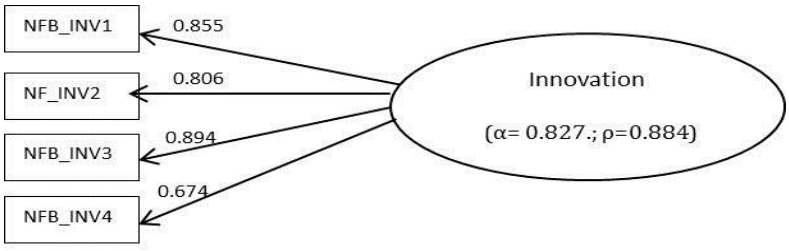


Figure 11 - Confirmatory Analysis of the Innovation Measures

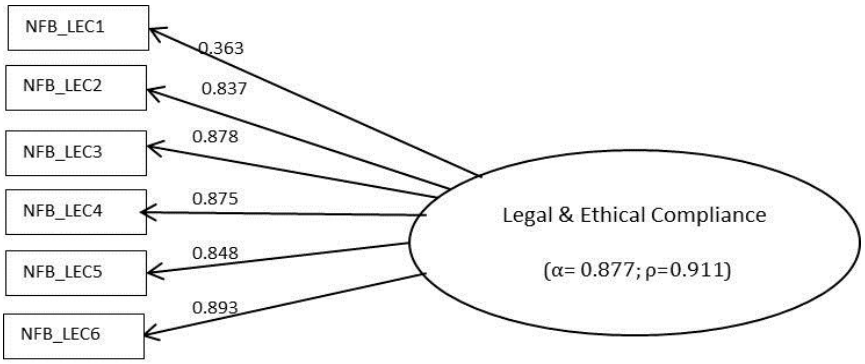


Figure 12 - Confirmatory Analysis of the Legal & Ethical Compliance Measures

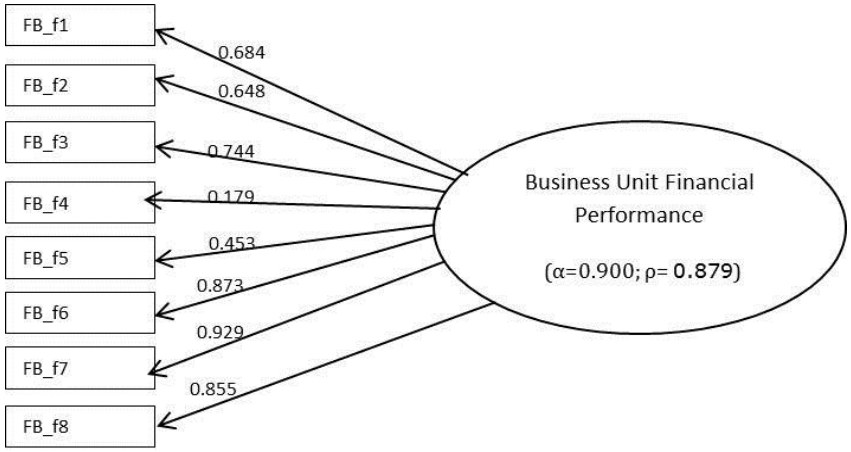


Figure 13 - Confirmatory Analysis of the Business Unit Financial Performance Measures

- The AVE of the different dimensions are calculated, they are all above 0.5 as shown in Table 24 and this support their **convergent validity**.
- **The internal consistency reliability** is demonstrated through the composite reliability (shown in Figure 8 toFigure 13) where all numbers are above 0.7. In addition, Cronbach alphas show high values, further supporting the construct reliability.
- **The discriminant validity** is demonstrated by comparing the AVE of each dimension with the shared variance (squared correlations between the specific dimension and the other dimensions). For instance, Table 24 shows the AVE of the

innovation dimension as 0.659 (the AVEs are highlighted diagonally in grey while the shared variances are in the other cells). This is higher than its shared variances with the business processes dimension (0.150) and legal and ethical compliance dimension (0.260) and demonstrates its discriminant validity. Similar comparison between the AVE of business processes and legal and ethical compliance lead to the support of their discriminant validity. Another indication of the discriminant validity is the cross-loadings. Table 25 shows the cross-loadings and the loadings of all items on all dependent variables constructs. A comparison across columns shows that the items are loading the highest on their own constructs, demonstrating discriminant validity between all constructs based on the cross-loading criterion (Hair 2013).

	BU Financial Performance	Decision Making	Business Processes	Flexibility	Innovation	Legal and Ethical Compliance
BU Financial Performance	0.610					
Decision Making	0.012	0.539				
Business Processes	0.033	0.469	0.667			
Flexibility	0.019	0.061	0.030	0.636		
Innovation	0.022	0.141	0.150	0.067	0.659	
Legal and Ethical Compliance	0.025	0.225	0.288	0.043	0.260	0.751

Table 24 - AVE & Shared Variances of the Dependent Variables

	BU Financial Performance	Business Professes	Decision Making	Flexibility	Innovation	Legal and Ethical compliance
FB_f1	0.687	0.025	0.014	0.109	0.216	-0.056
FB_f2	0.669	-0.044	-0.064	0.079	0.234	-0.131
FB_f3	0.840	-0.084	-0.114	0.137	0.107	-0.102
FB_f5	0.541	-0.058	-0.132	0.082	0.215	-0.042
FB_f6	0.892	-0.176	-0.137	0.020	0.177	-0.141
FB_f7	0.920	-0.167	-0.076	0.130	0.098	-0.174
FB_f8	0.843	-0.202	-0.008	0.232	0.070	-0.093
NFB_BP2	-0.096	0.845	0.636	0.224	0.286	0.412

NFB_BP3	-0.329	0.803	0.481	0.157	0.286	0.456
NFB_BP4	-0.031	0.802	0.559	0.051	0.331	0.474
NFB_DM1	-0.135	0.480	0.756	0.146	0.345	0.259
NFB_DM2	-0.085	0.522	0.816	0.276	0.144	0.340
NFB_DM3	-0.181	0.684	0.784	0.217	0.222	0.407
NFB_DM4	0.081	0.213	0.565	0.141	0.307	0.334
NFB_DM5	-0.030	0.525	0.726	0.126	0.377	0.394
NFB_FLX1	0.162	0.186	0.153	0.858	0.233	0.216
NFB_FLX2	0.040	0.080	0.261	0.731	0.176	0.101
NFB_INV1	0.044	0.382	0.358	0.305	0.855	0.448
NFB_INV2	0.090	0.193	0.212	0.110	0.806	0.286
NFB_INV3	0.124	0.423	0.483	0.260	0.894	0.494
NFB_INV4	0.276	0.093	0.031	0.106	0.674	0.399
NFB_LEC2	-0.074	0.480	0.553	0.294	0.292	0.837
NFB_LEC3	-0.144	0.530	0.425	0.159	0.544	0.878
NFB_LEC4	-0.204	0.488	0.362	0.200	0.419	0.876
NFB_LEC5	-0.108	0.435	0.365	0.038	0.441	0.849
NFB_LEC6	-0.148	0.437	0.351	0.205	0.505	0.893

Table 25 - Cross-loadings of All Items on all Dependent Variables

Testing the validity and reliability of formative constructs–the independent latent constructs–of the measurement model is different in many ways than assessing that of the reflective constructs. First, while the removal of a reflective indicator does not affect the meaning of the underlying construct, the removal of a formative indicator does affect it seriously and eliminates a part of it (Diamantopoulos and Winklhofer 2001). Second, testing internal consistency reliability does not seem logical (Diamantopoulos et al. 2008) because formative indicators represent separate, independent causes of latent construct and they are not expected to correlate with each other. Hence, classical validity assessment does not cover formative indicators (Diamantopoulos and Winklhofer 2001; Hair 2013). Accordingly, the issues that should be essential in assessing the formative measures validity are:

1. Formative indicators should be comprehensive and should cover most aspects and facets of the latent construct. Thus, content validity should be overly emphasized (Diamantopoulos and Winklhofer 2001; Hair et al. 2011).
2. Indicators' collinearity should be measured because formative indicators can be affected by the sample size; extensive collinearity between the items makes it difficult to distinguish the effect of individual items on the latent variable.
3. Some researchers argue that when formative measures are involved, no quantitative values can serve to test validity (Homburg and Klarmann, 2006 cited in Diamantopoulos et al. 2008), and that the expert judges should be enough to decide upon these measures (Albers and Hildebrandt 2006; Rossiter 2002, p. 315, cited in Diamantopoulos et al. 2008). Others still think that some validity assessment is possible. Hence, Hair (2013) suggests using the items' weights and significance levels after running bootstrapping techniques for t-statistics. If the weights are not significant, then we should look at the outer loadings and their T-Values.

For the formative constructs of this research model, the **content validity,** including content and indicators' specifications, was done through an extensive literature review (Chapter 2) and through a three-round Delphi method which has resulted in a list of items used as the formative observed items for the three latent formative constructs: IT structures, IT processes, and IT relational mechanisms. Furthermore, these indicators were further tested with subject matter experts and experienced many iterations before reaching the final survey. Table 26 displays the list of these items.

Item Code	Items of IT Governance Practices (IT structures. IT processes, IT relational mechanisms)
S1.	IT strategy committee, which is at the board of directors level with a role to oversee and approve the IT strategy
S2.	IT steering committee, which is at the executive level with a role to implement the IT strategy
S3.	centralization mode of IT governance
S4.	decentralization mode of IT governance
S5.	hybrid mode of IT governance
S6.	project management office
S7.	CIO's presence as a member of the board of directors
S8.	CIO's presence as a member of the executive committee
S9.	CIO reporting directly to CEO
P1.	strategic information system planning (SISP)
P2.	project management methodologies
P3.	service level agreements (SLA)
P4.	following IT industry best practices (CobiT, ITIL, or TOGAG)
P5.	disaster recovery planning
P6.	Information security management
P7.	IT performance management
P8.	management of IT investments
P9.	IT budget control and reporting
RM1.	CIO's understanding of the business
RM2.	CIO's strategic vision
RM3.	top management support for the CIO's vision
RM4.	communication between IT management and business executives
RM5.	IT training offered to business staff
RM6.	business training offered to IT staff

Table 26 - List of IT Governance Items

Second, the **collinearity** of the indicators is measured using the collinearity statistics VIF, which should be above 1 and below a threshold of 5. Table 27 to Table 29 show the VIF values for the three sets of items for the three formative constructs. It shows an acceptable level of collinearity as per the requirements, except for RM1 and RM2. It is important to note that these values are generated using IBM SPSS since PLS does not provide these values. RM1 and RM2 have collinearity levels of 6.87 and 9.96, respectively, which are considered high. Therefore, these two items are flagged waiting for more tests before removing them, since the removal of formative items might affect

the nature of the underlying IT relational mechanisms construct.

It should be noted that the two items; RM1: CIO's understanding of the business and RM2: items CIO's strategic vision; were placed in the business unit survey, although they are measuring the IT governance relational mechanisms construct, in order to avoid a self-reporting issue. This was earlier suggested by the pre-test respondents. This difference in the respondents who have completed the IT governance survey and those who have completed the business unit performance survey including RM1 and RM2 might have contributed to these levels of collinearity.

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
Constant)	3.096	.639		4.849	.000		
S2	.146	.126	.217	1.158	.253	.515	**1.940**
S1	-.068	.084	-.147	-.810	.422	.545	**1.836**
S3	.019	.115	.026	.165	.870	.715	**1.398**
S4	.048	.113	.075	.426	.672	.580	**1.724**
S5	-.004	.095	-.008	-.043	.966	.579	**1.727**
S6	-.150	.096	-.261	-1.567	.124	.648	**1.543**
S7	.013	.083	.030	.155	.878	.488	**2.048**
S8	.085	.130	.138	.652	.518	.405	**2.469**
S9	-.007	.080	-.014	-.085	.933	.652	**1.534**

Table 27- Collinearity Statistics for the IT Structures First Order Formative Construct Using SPSS

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(constant)	3.312	.554		5.983	.000		
P1	-.133	.120	-.205	-1.109	.273	.547	**1.827**
P2	.039	.146	.051	.267	.790	.521	**1.918**
P3	.099	.145	.146	.682	.499	.411	**2.434**
P4	.064	.159	.086	.403	.689	.413	**2.420**
P5	.192	.166	.261	1.159	.252	.370	**2.706**
p6	-.295	.176	-.366	-1.677	.100	.394	**2.537**
P7	-.273	.191	-.368	-1.428	.160	.283	**3.540**
P8	.118	.182	.147	.652	.517	.367	**2.721**
P9	.193	.156	.249	1.240	.221	.465	**2.152**

a. Dependent Variable: NFB_DM1

Table 28- Collinearity Statistics for the IT Processes First Order Formative Construct Using SPSS

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(constant)	2.011	.784		2.566	.013		
RM1	-.515	.225	-.749	-2.289	.026	.145	**6.873**
RM2	.621	.233	.879	2.670	.010	.144	**6.961**
RM3	.066	.137	.070	.481	.632	.741	**1.350**
RM4	.213	.170	.194	1.253	.216	.647	**1.545**
RM5	.211	.143	.248	1.482	.145	.555	**1.803**
RM6	-.226	.124	-.295	-1.819	.075	.593	**1.687**

a. Dependent Variable: NFB_DM1

Table 29- Collinearity Statistics for the IT Relational Mechanisms First Order Formative Construct Using SPSS

Third, the bootstrapping technique was run on the PLS model and the outer weights't-statistics are shown in Table 30.

	Outer weight (T-Value)	Outer loading (T-Value)
P1 -> IT Processes	0.165 (1.670)*	0.681(5.637)**
P2 -> IT Processes	0.101 (0.895)	0.650 (3.763)**
P3 -> IT Processes	0.203 (2.070)*	0.687 (4.461)**
P4 -> IT Processes	0.068 (0.406)	0.691 (3.713)**
P5 -> IT Processes	0.103 (0.725)	0.640 (4.203)**
P6 -> IT Processes	0.260 (2.278)*	0.779(5.713)**
P7 -> IT Processes	0.233 (1.953)*	0.862 (7.906)**
P8 -> IT Processes	0.135 (1.266)	0.743 (5.644)**
P9 -> IT Processes	0.107 (0.910)	0.630 (5.191)**
RM1 -> IT Relational Mechanisms	-0.432 (0.798)	-0.1631 (0.534)
RM2 -> IT Relational Mechanisms	0.516 (0.949)	-0.115 (0.368)
RM3 -> IT Relational Mechanisms	-0.146(0.428)	0.077 (0.192)
RM4 -> IT Relational Mechanisms	0.233 (0.745)	0.504 (1.723)*
RM5 -> IT Relational Mechanisms	0.566(1.918)*	0.842 (3.935)**
RM6 -> IT Relational Mechanisms	0.471 (1.574)	0.864(3.821)**
S1 -> IT Structures	0.378 (1.869)*	0.687 (4.054)**
S2 -> IT Structures	0.188 (0.763)	0.205 (0.766)
S3 -> IT Structures	0.681 (3.542)**	0.780 (4.285)**
S4 -> IT Structures	0.198(1.052)	0.348 (1.439)
S5 -> IT Structures	-0.044 (0.191)	0.324 (1.284)
S6 -> IT Structures	0.106 (0.563)	0.549 (2.554)**
S7 -> IT Structures	0.130 (0.511)	0.560 (2.435)**
S8 -> IT Structures	-0.252 (0.909)	0.060 (0.190)

S9 -> IT Structures	0.120 (0.587)	0.007 (0.024)

*Significant at the 0.05 level (df= 56; t>1.67)
**Significant at the 0.01 level (df= 56; t>2.39)

Table 30 - Outer Weights & Outer Loadings for the Formative Indicators: IT Structures, IT Processes & IT Relational

P1, P3, P6, P7, RM5, S1, and S3, while the remaining items are non-significant. However, no items are yet removed based on this analysis. Instead, we look at the outer loadings and their t-values column (Hair 2013, Centefelli and Bassellier 2009).

Accordingly, the items that have outer loadings > 0.6 and t-value >1.67 ($p<0.05$, df= 56) are combined with the items with high outer weights (>0.6) and significant t-values to lead to the final set of items to be retained for the structural model assessment. Thus, the final items to be retained for the formative independent constructs are: P1, P2, P3, P4, P5, P6, P7, P8, P9; RM4, RM5, RM6; S1, S3, S6, S7. On the other hand, the following items are removed, including the items with high collinearity which were flagged earlier: **RM1, RM2, RM3** and **S2, S4, S5, S8, S9**.

5.3. Testing the Structural Model

5.3.1. Cluster Analysis

Linking the various IT governance practices individually to business performance will not reflect the reality of the organizations. Therefore, in order to capture the dynamics of IT governance as a set of practices necessary for the corporate governance of IT, a "Fit as gestalt" perspective (Venkatraman 1989a) is used to find different patterns and profiles of IT governance practices that might be linked to different levels of non-financial and financial performance. There are no priori theoretical expectations, thus it will be an inductive approach using cluster analysis, which was used in many similar studies (Jain 1988; Bergeron et al. 2004; Bergeron et al. 2001; Raymond and Croteau 2006; Fabi et al. 2009; Tamim et al. 2012).

Hierarchical cluster analysis is run with SPSS using the Ward's method with Euclidean distance. The clustering variables are the IT structures, IT processes, and IT relational mechanisms.

Three-cluster solution was retained by examining, first, the Dendogram, which is a

hierarchical tree showing the different linkages among the clusters (Mooi and Sarstedt (2011), Sage Publications[ii])). Ward's method uses the analysis of variance to estimate the

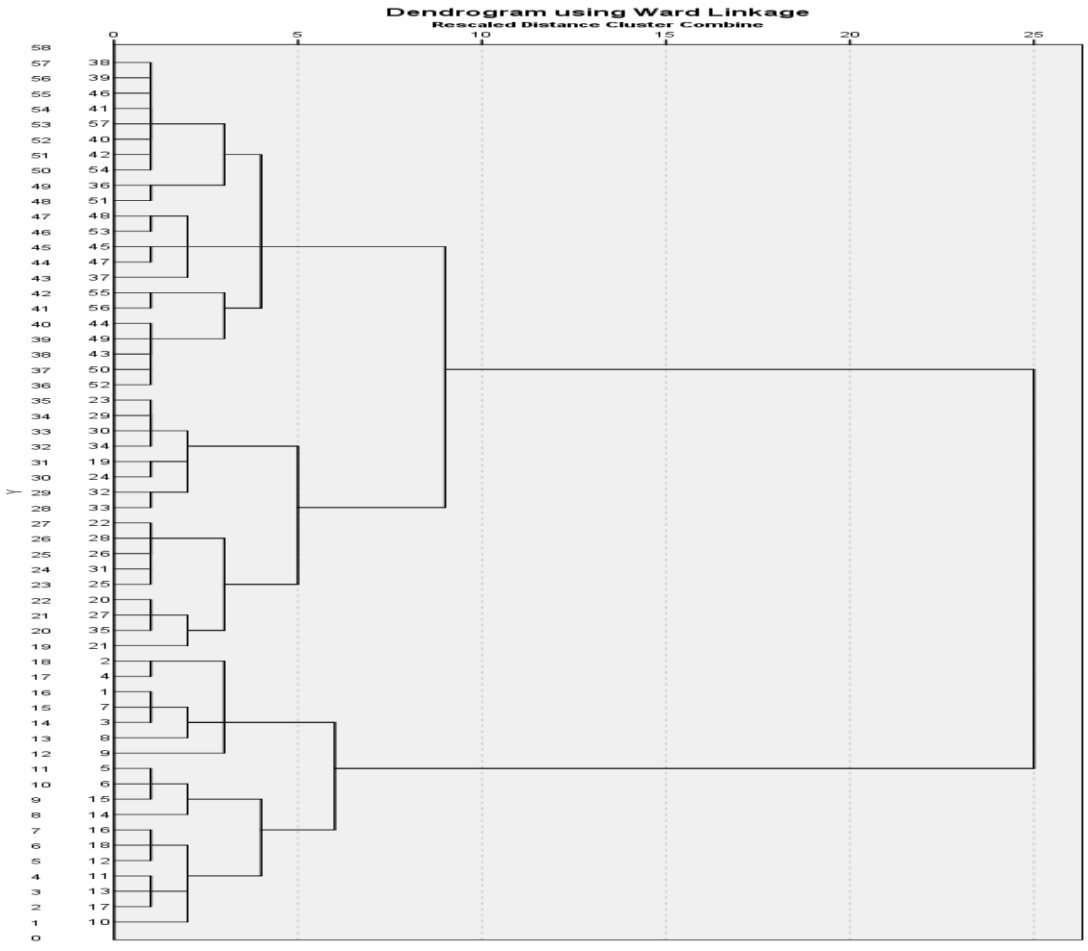


Figure 14 - SPSS Generated Dendogram

distance between two clusters. Examining these distances in Figure 14, a three-cluster solution would be a good judgment call.

Another way to decide on the number of clusters is looking at the Agglomeration schedule (Mooi and Sarstedt (2011), Sage Publications[ii])) shown in Table 31.

Stage	Cluster Combined		Coefficients	Stage Cluster First Appears		Next Stage
	Cluster 1	Cluster 2		Cluster 1	Cluster 2	
1	38	39	.056	0	0	6
2	23	29	.167	0	0	16
3	43	50	.292	0	0	28
4	40	42	.428	0	0	17
5	11	13	.565	0	0	20
6	38	46	.732	1	0	24
7	48	53	.908	0	0	39
8	19	24	1.083	0	0	36
9	26	31	1.259	0	0	19
10	5	6	1.459	0	0	23
11	22	28	1.668	0	0	30
12	41	57	1.883	0	0	24
13	1	7	2.105	0	0	32
14	44	49	2.341	0	0	29
15	55	56	2.596	0	0	45
16	23	30	2.855	2	0	21
17	40	54	3.121	4	0	34
18	2	4	3.427	0	0	46
19	25	26	3.739	0	9	30
20	11	17	4.084	5	0	40
21	23	34	4.436	16	0	43
22	20	27	4.796	0	0	35
23	5	15	5.161	10	0	38
24	38	41	5.531	6	12	34
25	16	18	5.906	0	0	33
26	36	51	6.299	0	0	48
27	45	47	6.708	0	0	39
28	43	52	7.132	3	0	29
29	43	44	7.616	28	14	45
30	22	25	8.107	11	19	47
31	32	33	8.634	0	0	36
32	1	3	9.250	13	0	42
33	12	16	9.875	0	25	44
34	38	40	10.543	24	17	48
35	20	35	11.230	22	0	37
36	19	32	11.967	8	31	43
37	20	21	12.753	35	0	47
38	5	14	13.538	23	0	51
39	45	48	14.349	27	7	41
40	10	11	15.215	0	20	44
41	37	45	16.235	0	39	50
42	1	8	17.274	32	0	46
43	19	23	18.453	36	21	53
44	10	12	19.676	40	33	51
45	43	55	21.068	29	15	52
46	1	2	22.544	42	18	49
47	20	22	24.029	37	30	53
48	36	38	25.539	26	34	50
49	1	9	27.456	46	0	54
50	36	37	29.483	48	41	52
51	5	10	31.664	38	44	54

52	36	43	34.154	50	45	55
53	19	20	37.015	43	47	55
54	1	5	40.818	49	51	56
55	19	36	46.176	53	52	56
56	1	19	62.602	54	55	0

Table 31 -Agglomeration Schedule Generated by Ward Clustering Method

Following the method mentioned in Sage Publications[ii], a "Reformed agglomeration table" was created as shown in Table 32. The first column, '# of clusters,' shows which clusters the agglomeration coefficients are being calculated at. Reading the agglomeration schedule from the bottom, it shows that at cluster 1 the agglomeration coefficient (which expresses the distinction between clusters) was high at 62.602, then a change occurred to this coefficient when cluster 2 was introduced and it became 46.176, and so on. The criterion to stop is when there is a major leap in change between coefficients, which means that the difference is not substantial anymore. Based on this, we see that the demarcation point should possibly be at the two or, at most, three clusters solution, but not more. Therefore, as a final decision, three clusters were retained.

Reformed Agglomeration Table			
# of Clusters	Agglomeration Last step	Coefficient this step	Change
2	62.602	46.176	**16.426**
3	46.176	40.818	**5.358**
4	40.818	37.015	**3.803**
5	37.015	34.154	**2.861**

Table 32 - Reformed Agglomeration Table

Using the three clusters that emerged from the data file, Anova tests were performed on the different independent variables in order to test for significant differences across the three clusters (Bergeron et al. 2004, Raymond and Croteau 2006) and the results are shown in Table 33. The Anova tests for the independent variables are all significant at p=0.00, showing a distinction between the values of IT structures, IT processes, and IT relational mechanisms across the three clusters. In addition, the

Tamhane's test was used to check the pairwise significance between each pair of clusters and was significant at 0.05.

The three clusters were analyzed in terms of low, medium, and high maturity of each IT governance construct (IT structures, IT processes, and IT relational mechanisms) based on the mean of high/medium/low percentile (33%) of the total sample (Bergeron et al. 2001). Cluster 1 (n=18) is characterized by low IT structures but medium IT processes and IT relational mechanisms. Cluster 2 (n=17) ranks medium on IT structures and high on IT processes and IT relational mechanisms. Finally, cluster 3 (n=22) has high IT structures and high IT processes but medium IT relational mechanisms. This shows that the clusters mainly differ in terms of IT structures from low to high.

Clusters Results for the IT Governance Constructs (Ward)				
	Cluster 1 (n=18)	Cluster 2 (n=17)	Cluster 3 (n=22)	ANOVA F*
IT Structures	1.625_a (L)	3.279_b (M)	4.215_c (H)	75.696
IT Processes	2.382_a (M)	3.594_b (H)	3.550_b (H)	17.403
IT Relational Mechanisms	2.963_a (M)	4.098_b (H)	3.151_a (M)	13.976

* All differences were significant at p = 0.00

$_{a, b, c}$ Within rows, subscript letters (a to c) indicate homogeneous subsets resulting from Tamhane's T2 test, where significant pairwise differences between means were obtained. The mean difference between pairwise is significant at 0.05

Table 33 - Mean Differences and Anova Test for Independent Variables across the Three Clusters

Furthermore, the pairwise comparison using the Tamhane's test, shown in Table 33, confirms that there are significant differences between the three clusters on the different types of IT governance practices. The IT structures show a significant difference across all three clusters. The first cluster contains the IT structures with the

lowest mean, while the second cluster has a medium ranking IT structures and the third cluster contains the highest ranking IT structures.

The Tamhane's test shows also that the IT processes within cluster 2 and cluster 3 do not seem to be significantly different and as such both clusters have high maturity IT processes. On the other hand, the first cluster has IT processes that rank medium and is significantly different than the other two clusters.

As for the relational mechanisms, the Tamhane's test indicates that cluster 2 is significantly different with high ranked IT relational mechanisms, versus cluster 1 and cluster 3 which do not manifest any significant difference, having both medium ranked IT relational mechanisms.

In order to better understand the dynamics of each cluster, inspired by Hambrick (1983), the mean and standard deviation of each IT practice within each cluster are compared to the corresponding mean and standard deviation of the whole sample, as shown in Table 34.

The results in the table below show that, in general, the mean and standard deviation of almost all practices within the first cluster are below the corresponding sample mean and standard deviation, while this is different in the other two clusters.

	IT Governance Practice	**Entire Sample (n=57)**		**Cluster 1 (n=18)**		**Cluster 2 (n=17)**		**Cluster 3 (n=22)**	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
1	S1: IT strategy committee, which is at the board of directors level with a role to oversee and approve the IT strategy	2.464	2.010	.889	1.491	2.529	2.004	3.818	1.368
2	S3: centralization mode of IT governance	3.754	1.286	2.778	1.665	4.118	.781	4.273	.703

3	S6: project management office	3.316	1.616	2.167	1.855	3.353	1.539	4.227	.612
4	S7: CIO's presence as a member of the board of directors	2.895	2.152	.667	1.572	3.118	1.867	4.545	.739
5	P1: strategic information system planning (SISP)	2.368	1.435	1.611	1.145	2.824	1.551	2.636	1.364
6	P2: project management methodologies	3.351	1.203	2.667	1.372	3.529	.943	3.773	1.020
7	P3: service level agreements (SLA)	3.228	1.363	2.333	1.534	3.529	1.328	3.727	.827
8	P4: following IT industry best practices (CobiT, ITIL, or TOGAG)	2.982	1.246	2.167	1.249	3.412	1.176	3.318	.995
9	P5: disaster recovery planning	3.368	1.263	2.389	1.290	4.294	.772	3.455	.963
10	P6: Information security management	3.561	1.150	2.667	1.283	4.118	.781	3.864	.834
11	P7: IT performance management	3.070	1.252	2.056	1.259	3.471	.874	3.591	1.008
12	P8: management of IT investments	3.246	1.154	2.667	1.283	3.529	.943	3.500	1.058
13	P9: IT budget control and reporting	3.579	1.194	2.889	1.278	3.647	1.115	4.091	.921
14	RM4: communication between IT management and business executives	4.00	.845	3.722	1.127	4.471	.514	3.864	.640
15	RM5: IT training offered to business staff	3.246	1.090	2.889	1.132	4.059	.827	2.909	.921
16	RM6: business training offered to IT staff	2.877	1.211	2.278	1.127	3.765	.903	2.682	1.129

Table 34 -Comparisons between Clusters and the Mean Sample

Furthermore, in order to observe which practices are working together, the top five ranked practices within each cluster are shown in Table 35.

Cluster 1 Top IT Governance Practices		**Cluster 2 Top IT Governance Practices**		**Cluster 3 Top IT Governance Practices**	
Item	**Mean**	**Item**	**Mean**	**Item**	**Mean**
RM4: communication between IT management and business executives	**3.722**	**RM4:** communication between IT management and business executives	**4.471**	**S7:** CIO's presence as a member of the board of directors	**4.545**
P9: IT budget control	**2.889**	**P5:** disaster recovery	**4.294**	**S3:** centralization	**4.273**

and reporting		planning		mode of IT governance	
RM5: IT training offered to business staff	**2.889**	**S3:** centralization mode of IT governance	**4.118**	**S6:** project management office	**4.227**
S3: centralization mode of IT governance	**2.778**	**P6:** information security management	**4.118**	**P9**: IT budget control and reporting	**4.091**
P2: project management methodologies	**2.667**	**RM5:** IT training offered to business staff	**4.059**	**RM4:** communication between IT management and business executives	**3.864**
Average Maturity	**2.989**		**4.212**		**4.200**

Table 35- Top 5 IT Governance Practices within each Cluster

In Summary, the three clusters that emerged contain different sets of IT governance configurations with different levels of maturity. The top 5 practices show some differences and some communalities. What is dominantly different across the clusters is the IT structures factor. While it ranks low on effectiveness in the first cluster, it ranks medium in the second cluster and high in the third. The higher the IT structures ranks, the higher are the IT processes.

Another major difference is the IT processes in cluster 2 which are totally different than those in cluster 1 and 3, focusing on security and disaster recovery versus IT budget planning in the first and third cluster.

Among the communalities across the clusters are the IT structures related to the centralization mode, and the relational mechanism related to the communication between IT management and business executives. These two practices exist in the top 5 practices within all three clusters. What is also prevailingly common is the existence of all three types of IT governance practices, which reinforce the essence of IT governance revolving around the interplay between IT structures, IT processes, and IT relational mechanisms.

Anova tests were also conducted to compare the means of the performance constructs across the three different clusters. However, no significant differences were

spotted. These results, as shown in Table 36, are suspected to be mainly related to the low sample size. More predictive validity methods are used in order to find out if the different combinations of IT governance structures, or in other words, if the different combinations of maturity levels for these practices, are somehow correlated with financial and non- financial performance.

Clusters Results for Output Variables (Ward)				
	Cluster 1 (n=18)	**Cluster 2 (n=17)**	**Cluster 3 (n=22)**	ANOVA F
Decision Making	3.556	3.671	3.610	0.151
Business Processes	3.356	3.600	3.418	0.849
Flexibility	3.000	3.216	3.424	2.006
Innovation	3.208	3.073	3.613	2.841
Legal and Ethical Compliance	3.083	3.803	3.659	5.144
Financial Performance	3.215	2.580	3.352	3.316

N.B. No significant differences were found

Table 36- Mean Differences and ANOVA Tests for Dependent Variables across the three Clusters

5.3.2. Predictive Validity & Hypothesis Testing

Based on the three clusters generated from the cluster analysis, three separate models were created for each cluster using SmartPLS, linking the IT Governance configurations to the six dependent variables: Decision Making, Business Processes, Flexibility, Innovation, Legal and Ethical Compliance, and Business Unit Financial Performance.

Examining the structural model, we report the necessary figures generated by the PLS analysis (Gefen 2000): the path coefficients, the t-values, and the R^2.

The results of running the PLS algorithms and the bootstrapping techniques are shown in Table 37, Table 38, and Table 39 for cluster 1, cluster 2, and cluster 3,

respectively. In addition, the structural models are shown in Figure 15 to 17 for clusters one to three, respectively.

The results for the first cluster (L-M-M) show that there is a significant and positive impact on Flexibility (0.633), Innovation (0.778) and Legal and Ethical Compliance (0.822) with an explained variance of 40%, 61% and 68%, respectively. However, there is no significant impact on Business Unit Financial Performance and, surprisingly, a negative impact on Decision Making and Business Processes.

Links of Cluster 1	Path Coefficients (T-Value)	R^2
ITGoveCluster1 -> DecisionMaking	-0.823(5.27)*	0.677
ITGoveCluster1 -> BusinessProcesses	-0.890 (5.782)*	0.792
ITGoveCluster1 -> Flexibility	0.633(4.112)*	0.401
ITGoveCluster1 -> Innovation	0.778 (6.620)*	0.605
ITGoveCluster1 -> LegaEthicalCompliance	0.822 (5.609)*	0.676
ITGoveCluster1 -> FinancialPerformance	0.338(1.646)	0.151

*Significant at the 0.01 level (df= 56; t>2.39)

Table 37 - Path Coefficients of PLS Model for Cluster 1

Links of cluster 2	Path Coefficients (T-Value)*	R^2
ITGoveCluster2 ->DecisionMaking	0.796(2.607)*	0.634
ITGoveCluster2 -> BusinessProcesses	0.844 (2.827)*	0.712
ITGoveCluster2 ->Flexibility	-0.253(0.790)	0.064
ITGoveCluster2 -> Innovation	0.665 (2.545)*	0.442
ITGoveCluster2 -> LegalEthicalCompliance	0.761 (2.685)*	0.579
ITGoveCluster2 -> FinancialPerformance	0.503(1.283)	0.253

*Significant at the 0.01 level (df= 56; t>2.39)

Table 38 - Path Coefficients of PLS Model for Cluster 2

Links of Cluster 3	Path Coefficients (T-Value)*	R^2
ITGoveCluster3->DecisionMaking	0.756(3.745)**	0.571
ITGoveCluster3 -> BusinessProcesses	0.471(1.935)*	0.222
ITGoveCluster3->Flexibility	-0.490(1.066)	0.240
ITGoveCluster3 -> Innovation	-0.505 (1.157)	0.255
ITGoveCluster3 -> LegalEthicalCompliance	0.603(4.285)**	0.364
ITGoveCluster3 -> FinancialPerformance	-0.244 (0.486)	0.060

*Significant at the 0.05 level (df= 56; t>1.67)

**Significant at the 0.01 level (df= 56; t>2.39)

Table 39 - Path Coefficients of PLS Model for Cluster 3

The second cluster (M-H-H) has better results for the Decision Making and Business Processes with positive correlations of (0.796) and (0.844) an explained variance of 63% and 71% respectively. Hence, this IT governance configuration has positive correlations with four out of five business unit non-financial performance constructs, while the impact on financial performance is also insignificant in this cluster.

The third cluster (H-H-M) exhibits a positive correlation with Business Processes (0.471), but less than that in cluster 2 with an explained variance of 22%, which is also less than cluster 2. The impact on Business Unit Financial Performance, Flexibility and Innovation is insignificant while it is significant on the Legal & Ethical Compliance (0.603) with an explained variance of 36%, which is less than the previous clusters.

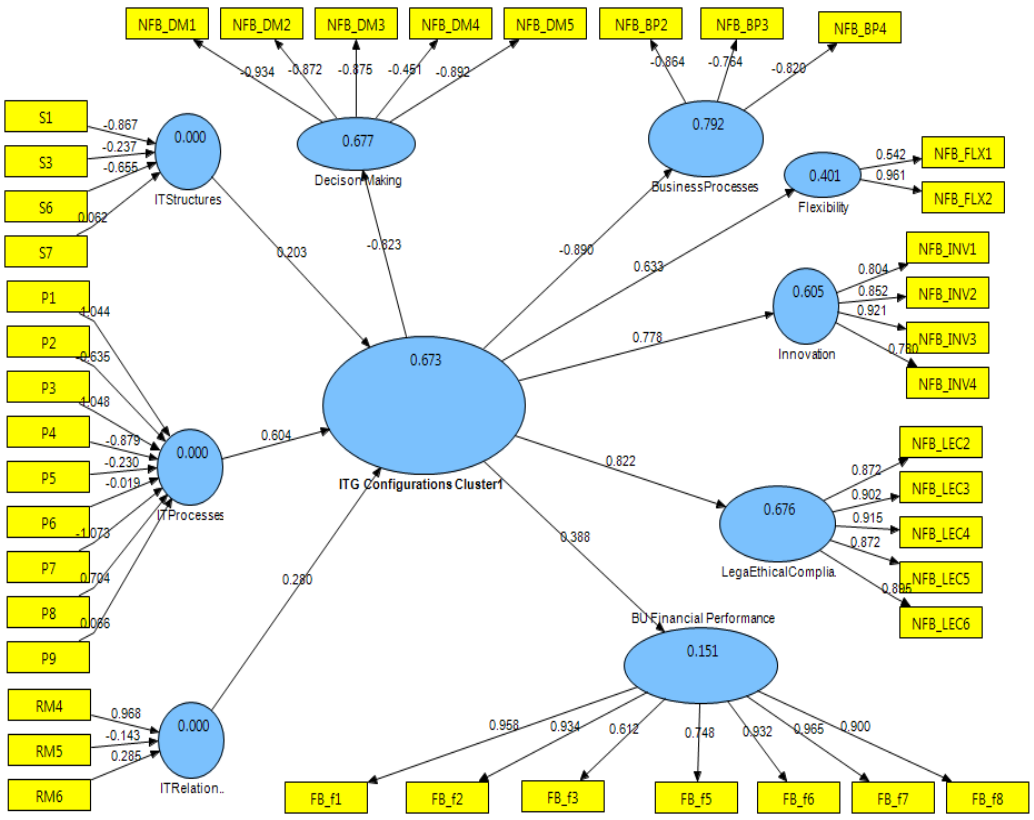


Figure 15 - Structural Model for Cluster 1

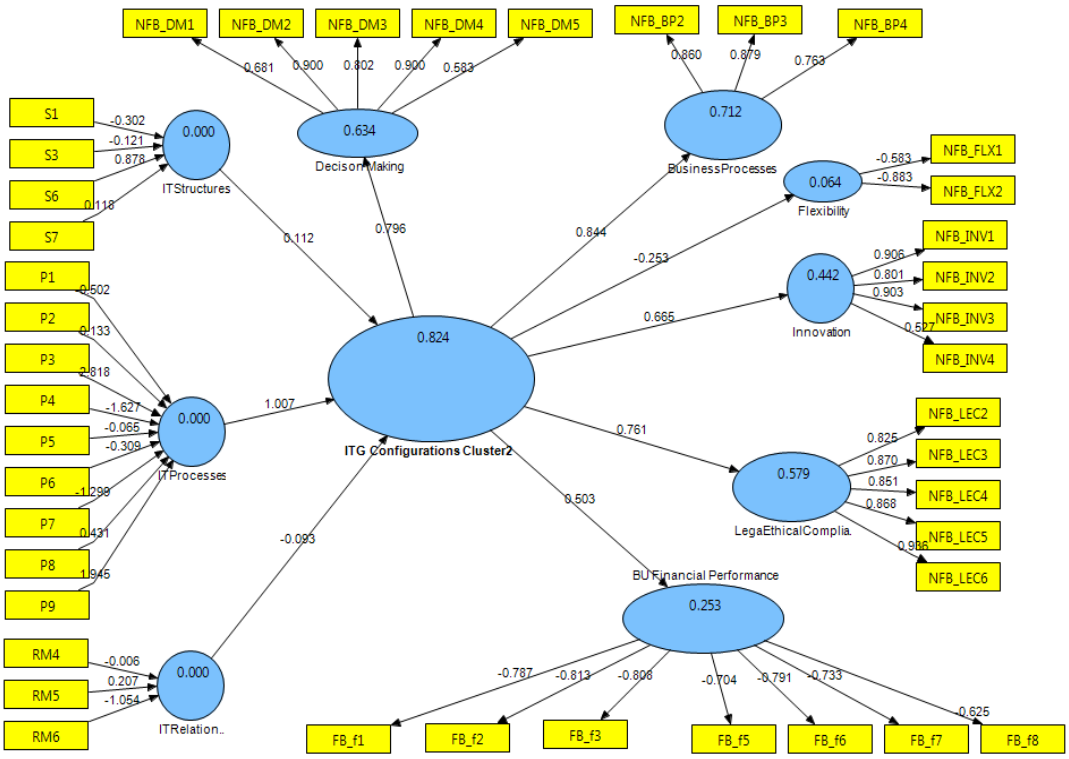


Figure 16 - Structural Model for Cluster 2

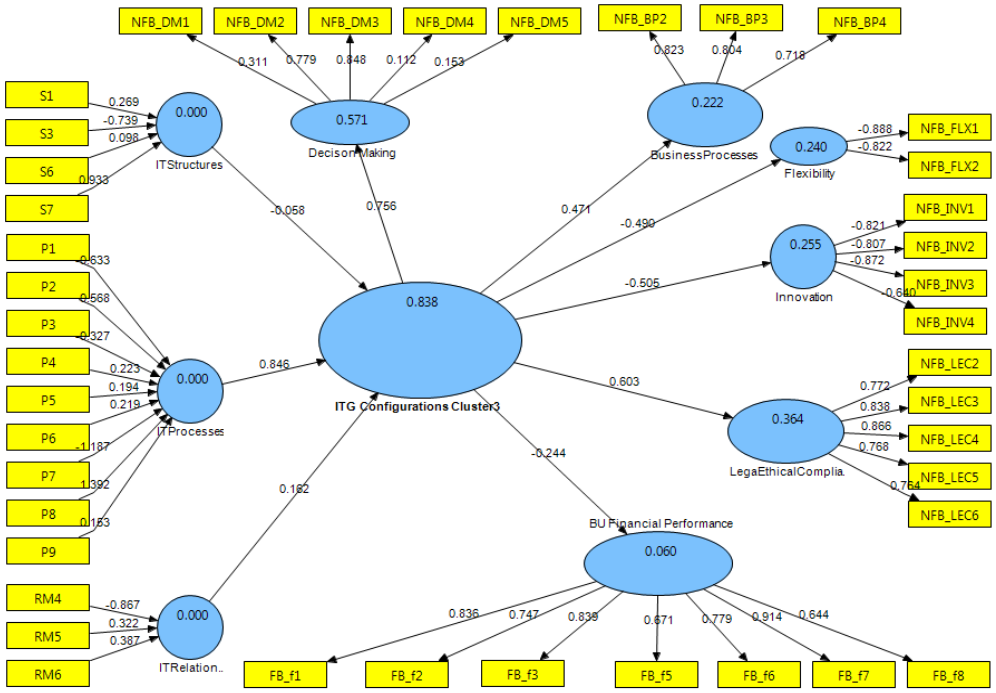


Figure 17 - Structural Model for Cluster 3

Recapping on the propositions listed in Chapter 3 (p. 32), a mature IT governance configuration was defined as a combination of a diversity of individually mature ITG practices (IT structures, IT processes, IT relational mechanisms). Diversity was demonstrated in all three configurations (clusters) that were revealed in this study; furthermore,, individual maturity of IT practices within the three identified configurations were distinct as expected and as shown in Table 35. A summary recap of the propositions and their support is shown in Table 40.

Proposition	Results
Proposition 1: The more mature an IT governance configuration is, the higher the business unit non-financial performance is.	**Supported**. According to the PLS structural model testing, the different clusters of IT governance are differently correlated with the different dimensions of the non-financial performance construct. Hence, **cluster 2**, which contains more mature IT governance practices than cluster 1, is positively and significantly correlated with four out of five non-financial performance dimensions, while **cluster 1,** which contains the set of ITG practices with the least level of maturity, is negatively correlated with the performance of Business Processes and Decision Making. **Cluster 3**, which contains relational mechanisms less mature than those in cluster 2, is positively and significantly correlated with Business Processes and Legal and Ethical compliance, but weaker loadings and R-squared values than cluster 2. In addition, the Innovation, and Flexibility dimensions have insignificant loadings.
Proposition 2: The more mature an IT governance configuration is, the higher the business unit financial performance is.	**Not supported**. The model does not show any significant correlation between the IT governance clusters (configurations) and the Business Unit Financial Performance.

Table 40 - Propositions Results

Chapter 6: Discussion

This chapter discusses the results obtained from cluster analysis and the hypothesis testing. The different IT governance configurations (clusters) are analyzed along with their impact on non-financial performance, followed by a contrast of the different configurations and their insignificant impact on financial performance.

The first and second propositions are stated in chapter 3 as follows:

Proposition 1: The more mature an IT governance configuration is, the higher the business unit non-financial performance.

Proposition 2: The more mature an IT governance configuration is, the higher the business unit financial performance.

Hence, they are based on the premise that different IT configurations are going to be formed and, indeed, the differences among these configurations were proven to be statistically significant. The first proposition was supported; hence, significant links were found between the different configurations and the non-financial performance of a business unit, and the configurations with higher maturity showed stronger correlation and variance with the different constructs of the Business Unit Non-financial Performance. However, the second proposition was not supported and no significant links were found between any of the different IT configurations and the financial performance of a business unit. The subsequent sections contain a zoom-in at the results of each configuration and its links with the business unit non-financial and financial performance to shed the light on different findings and insights.

To aid recollection and engagement in the discussion, the final list of IT governance practices that can be recommended for implementation within organizations is shown in Table 41, showing the top five ranking practices within each cluster.

Item Code	Items of IT Governance Practices	Cluster 1	Cluster 2	Cluster 3
S3	centralization mode of IT governance	x	X	x
RM4	communication between IT management and business executives	x	X	x
RM5	IT training offered to business staff	x	X	
P9	IT budget control and reporting	x		x
P2	project management methodologies	x		
P5	disaster recovery planning		X	
P6	information security management		X	
S6	project management office			x
S7	CIO's presence as a member of the board of directors			x
S1	IT strategy committee, which is at the board of directors level with a role to oversee and approve the IT strategy			
P1	strategic information system planning (SISP)			
p3	service level agreements (SLA)			
P4	following IT industry best practices (CobiT ITIL, or TOGAG)			
P7	IT performance management			
P8	management of IT investments			
RM6	business training offered to IT staff			

X : showing among the top 5 ranking ITG practices

Table 41- Recap of The Final List of Recommended ITG practices

6.1. Cluster 1 – Low on Structures Configuration

This cluster showed a combination of L-M-M (Low-Medium-Medium) for the IT structures, IT processes, and IT relational mechanisms, respectively, when compared to the whole sample mean and when categorized on a 33% percentile as explained in Chapter 5 (Table 34, Table 35). The prevailing and most obvious difference between the three clusters is in the maturity level of the IT structures. In this cluster, the IT structures are categorized in the lowest percentile compared to the mean of the whole IT structures; this is why this cluster is called the 'Low on Structures Configuration'.

In addition, the average mean of maturity level for the top 5 practices within this configuration is 2.989 which is the lowest among cluster 2 (4.212) and cluster3 (4.20). Furthermore, the mean of each IT practice within this cluster is, individually, below the sample mean.

Referring to Table 35 or Table 41, the top five practices within this cluster are listed as follows: *RM4: communication between IT management and business executives; P9: IT budget control and reporting; RM5: IT training offered to business staff; S3: centralization mode of IT governance; P2: project management methodologies.*

Although individually each practice ranks low compared to other clusters, the combination of the top 5 shows a balance between IT structures, IT relational mechanisms, and IT processes; thus, demonstrating the diversity within configuration. The IT structure 'S3' implies that the centralization mode is relatively high, which means that the IT activities are centralized but complemented with good communication between the IT camp and the business camp as indicated by RM4 and RM5.

The impact on legal and ethical compliance (non-financial performance) is positive and the highest among the other two clusters. The impact on innovation (non-financial performance) is also the highest among the other two clusters, and this might be related to the existence and use of project management methodologies which would apply to the innovation projects as well.

The interesting issue, though, is the negative correlation with Business Processes and Decision Making dimensions. This is follows the same logic as the first proposition, but at the lower end, low maturity is leading to low performance.

A subjective perspective at this negative correlation might be due to the low mean of IT structures which eventually showed that only the Centralization mode ranked among the top 5 while all other structures such as IT strategy committee, a PMO, or presence of a CIO on the board of directors are absent or have a weak presence. This might negatively impact the Decision Making and Business Processes in terms of taking strategic decisions or delivering business outcomes compliant with business requirements accompanied by cost optimization and ensuring user satisfaction.

In summary, although the IT structures collectively ranks low, and the mean of all IT practices individually rank low compared to the sample mean, the Legal and Ethical Compliance, Flexibility, and Innovation constructs are correlated with high significance and magnitude with the 'Low on Structures Configuration'. We might call this the secret ingredient of the interaction effect among the top IT governance practices within this configuration.

6.2. Cluster 2 – Medium on Structures Configuration

This cluster showed a combination of M-H-H for the IT structures, IT processes and IT relational mechanisms. So for this cluster, the IT structures collectively ranked on the medium percentile compared to the sample mean and, accordingly, it is called the 'Medium on Structures Configuration'. Furthermore, the mean of all IT practices within this cluster rank higher than the sample mean in the other two clusters. The top 5 practices within this cluster are shown in Table 35 and recapped in Table 41 and listed in order as follows**:** RM4: communication between IT management and business executives; P5: disaster recovery planning; S3: centralization mode of IT governance; P6: information security management; RM5: IT training offered to business staff.

The impact on the non-financial performance constructs is significant and positive for four out of five constructs: Decision Making, Business Processes, Innovation, and Legal and Ethical compliance. Flexibility is not significant. So the main difference between cluster 1 and cluster 2, in terms of its impact on non-financial performance constructs, lies in the Decision Making, and Business Processes constructs– while it is significant but negative in the first one, it is significant and positive in the second one. In addition, while flexibility is significant in the first cluster it is not in the second one.

Looking at the similarities (Table 41) between the two configurations 1 and 2, it is noted that there are three common IT practices among their top 5 ITG practices. These practices are about centralization mode and the relational mechanisms reflecting good communication between IT and business people and good IT training to business people (S3, RM4, & RM5).

As for the main difference between cluster 1 and cluster 2, the latter has higher maturity of IT processes related to disaster recovery planning and information security.

6.3. Cluster 3 – High on Structures Configuration

This cluster showed a combination of H-H-M for the IT structures, IT processes, and IT relational mechanisms respectively. So for this cluster, the IT structures collectively ranked high, which is why this configuration is called the 'High on Structures Configuration'.

In addition, the mean of all the IT structures and IT processes ranked higher than the sample mean but not for the relational mechanisms. The top 5 ITG are listed in order of means as follows: S7: CIO's presence as a member of the board of directors; S3:

centralization mode of IT governance; S6: project management office; P9: IT budget control and reporting; RM4: communication between IT management and business executives.

The most obvious difference in this cluster is the high score of IT structures, which is taking the lead in the top three among the ITG practices within this cluster. The structure, S7: The 'CIO's presence as a member of the board of directors' was not among the top practices in the other two clusters.

Although the top 5 practices within this configuration has an average maturity mean of 4.2 which is very similar to that of configuration 2 (4.212), yet the impact on the Business Unit Non-financial performance constructs is better for configuration 2. Thus, we can cautiously nominate it as **the best configuration among the other two**. While the impact of configuration 3 is positive and significant on Decision Making, Business Processes and Legal and Ethical Compliance, it is insignificant for Flexibility, and Innovation. The difference seems to lie within relational mechanisms which have higher maturity in configuration 2.

A deeper analysis of the insignificant impact on the innovation construct suggests that when innovation was measured, it was explained as changes in the design of a product, changes in manufacturing or information, or changes in quality management. It was measured as its impact on four dimensions: lowering costs, creating new products, modifying exiting ones, and creating better customer service. Thus, the insignificant link to Innovation might be explained by the fact the too many IT structures, such as high centralization, might impede the innovation process from the business unit side or since relational mechanisms do not score as high as on other clusters, there is not enough

diffusion of IT people within the business unit to inspire or brainstorm on ways to strengthen innovation capabilities. The same reasoning applies to the Flexibility Construct.

6.4. Comparing the Different practices with the different configurations

Two IT governance practices dominated the top 5 within all three clusters. The first one among the two is the IT relational mechanisms RM4: communication between IT management and business executives. The presence of this ITG practice confirms earlier discussions conducted with CIOs through the Delphi method, the pre-testing meetings, and the existing literature as well. For instance, the following quote belongs to a CIO in a round table conducted by ITGI, and was included earlier in Chapter 3 p. 54: "*I'll then ask what they expected to get and the CEO will respond that they didn't really know. I then say that perhaps they could have started with that*." Furthermore, the Delphi Middle East panel emphasized the importance of this practice as well when they voted 11 out of 12 to keep it and rated it as 4.44 out of 5 for being effective, but 3.33 on being easy to implement. While this indicates the importance of this practice, it also says that it is easier said than done!

The second common practice is the IT structure S3: centralization mode of IT governance. It seems that most companies are still using the centralized mode of governing their IT and that would allow for less control to be relinquished to the individual business units. This finding brings us back to the first interview conducted to verify the initial list of IT governance. When asked about the hierarchy of his organization in preparation for a question about the centralization/decentralization mode, the IT executive said: "*Starting from the international level, the highest board is the*

managing board of CEOs, which is composed of the CEO and other CEO's for each sector, such as CEO for energy sector, CEO for health sector…I guess it is a maximum of seven members, not more. At the same time, each of these CEOs is responsible for a geographical cluster or meta-clusters, such as in our case Asia and Australia meta-cluster. At the same time, each of these CEOs is responsible for an organizational function such as HR and IT. So one of these CEOs is responsible for the general CIO who is in turn the head of what we call the CIOs board, which is composed of different CIOs for each sector and also for one cluster. We in KSA report as an IT team to the CIO of our cluster."

The same IT executive answered to the question of centralization mode as follows: *"I would say highly centralized, however sometimes certain solutions or infrastructure recommendations would not be feasible to be implemented in certain region but the decision is centralized."*

On the other hand, the IT process P1: strategic information system planning (SISP), was almost absent. It did not show up in any of the top 5 and not even the top 10 within any cluster. Its arithmetic mean across the entire sample is the lowest (Table 34). It was the unspoken truth heard from most executives who were interviewed formally and even informally that strategic planning gets the back seat to what is more pressing of IT issues, such as meeting the implementation deadline and going live with an online service. However, it was still expected to see strategic planning taking the lead in at least one of the configurations. Along with this practice is the second lowest ranking IT practice—The IT structure S1: IT Strategy Committee. Although the same results were encountered y earlier studies (De Haes and Van Grembergen 2009), it was expected to

have this structure in place in some organizations and eventually to appear in some clusters, but given also the fact that the IT process of strategic planning is absent; the absence of this structure is justifiable or understandable.

Furthermore, during the collection of IT governance practices from the literature, there was actually some anticipation about specific IT structures, processes, and relational mechanisms to bundle together. P1 and S1 are one of the expected practices to bundle together, which they did, but negatively in a sense, both were absent.

Other expected practices to be bundled together were S6 project management office and P2: Project management Methodologies, which was not realized, and while the process appeared in cluster 1, the structure appeared in cluster 3. Another set that was expected to bundle together was the two IT processes: P5 and P6 and indeed they did in cluster 2.

6.5. Impact on Financial Performance

The three IT governance configurations have been shown during the statistical analysis to be insignificantly linked to the business unit financial performance, which did not support the second proposition of this study. However, looking back and recapping the research gaps and the research model built to answer to these gaps makes it all look logical and even expected.

The major issue that we demarked from was measuring the impact of IT and IT governance on the organizational performance. Some existing studies used pure financial measures, such as return on investment (ROI) from IT. Often, this did not show any positive contribution on the short run and that has kept IT personnel from providing proof for the contribution of their work and justification of huge expenditure in IT. With

this concern in mind, the balanced scorecard (BSC) was looked at as a solution for its balanced approach. It measures IT and IT governance not only financially, but using different perspectives: future orientation, operational excellence, stakeholders', and corporate contribution perspectives. Each of these perspectives leads to another, including the stakeholders' perspective, which leads to the corporate contribution entailing value delivery (Table 3). Building on this, the research model of this thesis was designed to measure the performance from financial and non-financial perspectives. It was also designed to measure it closer to its implementation–at the business unit–where specific key performance indicators (KPIs) can be identified and measured.

In a nutshell, the link from IT governance to financial performance is still believed to exist strongly but indirectly and through non-financial performance. Although measuring this link between non-financial performance and financial performance was not explicitly conducted by this study, it is believed that it can be conducted by other disciplines such as Operational management or Finance. Furthermore, one of the IT governance processes suggested that within the IT governance framework of this study is performance management, which provides guidelines on how to specify KPIs for different business processes and how to measure it on a continuous basis. For instance, when evaluating the benefits attained from a business process that is automated through an information system, you can measure things like saved time, saved resources, and higher quality, which leads to higher sales and better customer retention. All the above mentioned confirms an essential belief about information technology–its support for the business processes (those dealing with the core business and also those helping with the support services). Unless IT is a core

competency of the business, such as in organizations like Apple and Google, information technology is not made for technology, and its contribution and added value to the business performance resides through enabling the business processes to achieve their operational and strategic goals.

Chapter 7: Conclusion

This study has attempted to investigate the link between IT governance practices and organizational performance at the business unit level. This investigation began by collecting from the existing literature a set of IT governance practices that are considered essential for the governance of information technology. After testing this list with the Delphi method and pretesting it through expert meetings, a cluster analysis was performed in order to check if there are distinct configurations (combinations of IT structures, IT processes, IT relational mechanism). As a result, three such configurations have emerged. These configurations differed mainly in the level of effectiveness of IT structures. Running the statistical analysis for predictive validity led to significant links between these different configurations and the different non-financial business unit performances; showing higher non-financial performance in correlation with higher maturity of IT governance. However, no significant impact was shown on the financial business unit performance.

7.1 Expected Contribution to Theory

Organizational performance is an issue that is thoroughly discussed in MIS literature. However, there have been several calls by many scholars to bring performance measurement closer to IT implementation, and we hope that this study has contributed in this direction by measuring the performance at the business unit level. In addition, existing IT governance has tested the impact of IT governance practices individually on dependent variables such as alignment and productivity, but this study has attempted to approach the issue form a configurational approach, instead of individual or aggregated

practices approach, and tested its impact on non-financial performance measures in addition to the financial ones.

Finally, the business unit non-financial performance measurement tool has been created by this study. To assemble this tool, the different topics tapped into are: strategic decision-making, innovation, legal compliance, and business processes. This tool has also been tested and pretested and has undergone several refinement steps. Hopefully, this tool can be used and improved upon by other studies, not only those discussing IT governance, but any study that needs to measure the performance at the business unit level using non-financial measures.

7.2 Expected Contribution to Practice

This study tries to offer practitioners a baseline set of IT governance practices; it can be called an 'IT governance recipe'. This recipe contains the set of practices that can hopefully guide CIOs and senior business executives in the IT governance process and enable them to reach improved business unit performance.

As shown in Table 41, there are 16 practices in this recipe. They have been proven to have some impact on non-financial performance. They were also found to rank and cluster differently so to group the participating organizations under three categories. Looking first at the complete set of ITG practices, CIOs can see the importance of the interplay between all three types of ITG practices. For example, they might have been focusing on improving their IT processes without paying attention to the importance of better relational mechanisms such as communication with the business managers or dedicating more time to educate themselves with the business processes knowledge. Another example might be that the CIOs are applying some IT processes such as project

management methodologies while ignoring other IT processes that are crucial such as disaster recovery planning which many time is overlooked by organizations for being costly.

The list can also serve as an internal audit tool that CIOs can use to check the maturity and effectiveness of their own IT practices and based on this evaluation, they can create a road map towards better IT governance. For instance, if their information security management process has been ranked as less than 2 on the maturity model scale or as a zero for non-existent, the IT management can include it in their yearly plan to make sure that first, an IT security policies and procedures document is properly developed, and second, the support from top management to implement such policies and procedures throughout the organizational business units is granted. Similarly, if the IT strategy committee was found very ineffective, than a request to the top management is issued in order to give it the right privileges so to meet more often and to act in a more effective way.

If the CIOs have limited resources to implement the whole IT governance lists, they can start by the top 5 practices found in Cluster 2 for instance, since this configuration is proven to be significantly and positively related to the all types of non-financial performance.

The findings might also constitute an acceptable proof or argument that can be used by IT executives to justify the work and resources they require from the organizational budget for the IT investments, since, as mentioned in the introduction chapter, they have always lacked the valid proof that investing in IT will bring returns and business value if the organization opened itself to more extensive IT governance

practices. This might not only alleviate the pressure on CIOs in terms of justifying their expenditures, but might also grant them more help and championing for the IT governance process as a whole from the individual business units and the corporate management level as well.

7.3 Limitations and Future Research

Along the identified contributions to theory and to practice, the study has several limitations to be pinpointed.

The main limitation of the current study is the small sample size. This was due to the nature of the study, which requires respondents to be at a very senior level. In addition to that, the surveys had to be paired for them to be considered complete. A related limitation is in the discrepancy between the sampling techniques. While random sampling was used in Canada, snow ball sampling was used in the Middle East. The main reason for this discrepancy is that the data collection process started in Canada and when the response rate turned out to be low, a new sampling technique was introduced in order to improve the response rate; and indeed it did.

Future study aiming at a larger sample size and covering Europe and the other geographic areas is very much in need.

In addition, qualitative longitudinal case studies are believed to serve this research model and to further validate the findings of the study.

Finally, testing the link between non-financial performance at the business unit level and its financial performance can be conducted as a separate study whether under the MIS umbrella or the management field.

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Appendix A – The Interview Guide

Greetings and opening statement

I am a PhD candidate at Concordia University, Montreal. I am conducting an IT research to support my doctoral dissertation. Can I ask you some questions about your firm's IT practices?

Firm's Background Questions

I need to confirm some of the information I found on your website.

I1. **XYZ Vision**: A world of proven talent, delivering breakthrough innovations, giving our customers a unique competitive edge, enabling societies to master their most vital challenges and creating sustainable value

I2. **XYZ Goal** is to be the leading electrical infrastructure supplier in Saudi Arabia in the areas of industry, energy and healthcare.

I3. XYZ Mission:

a. To provide the state of art technology to our customers in Saudi Arabia in order to meet and even exceed their expectations.

b. To maximize XYZ business success in creating balanced partnership with the employees.

c. To establish the most appropriate performance, compensation, development and career opportunities for our local and global talents.

I4. **XYZ Size in KSA**: 1700 employees

I5. **Geographical coverage**: Services provided by KSA XYZ covers only Saudi Arabia Market?

I6. What type of support and relationship does the KSA branch have with the Global Company?

IT executive Leadership Questions

I7. How long have you been working as a CIO or IT executive in general? In this company?

IT Structures Questions

I8. Do you have a strategy committee? If yes, how useful do you find it? Is it effective, what is its role, who takes the decisions? If not, at what level do you align the objectives of IT department with the corporate objectives?

I9. Any steering committees to follow up on projects and infrastructure? Who is on this committee, how often do they meet?

I10. What type of relationship do you have with the CEO and TMT? Do you report directly to CEO? How formal it is? How often do you/CIO meet?

I11. Are you or the CIO on the board of directors? On the top management executive team? If not are you/CIO called on demand?

I12. How would you describe the governance mode: centralized, decentralized or Hybrid? Other modes? (Hint: who takes the IT decisions regarding IT principles (policies and procedures), IT infrastructure, Application, Investments)

I13. Any project management office (PMO)? How does it work? What is the impact?

I14. Any other forms of partnership between IT and other business units? How does it work? Is it efficient?

IT Processes

I15. Strategic information business planning:

I16. Project portfolio management

I17. IT budget control and financial reporting including Chargeback systems

I18. IT performance management including IT BSC: What kind of performance measurement do you conduct to assess the satisfaction of those business units? To assesses the business value from IT services? To solicit feedback?

I19. How do you think IT governances affecting the business performance? Any direct link?

I20. Do you use Service Level agreement (SLA)?

I21. Do you implement CobiT, ITIL, or any other industry standard frameworks?

I22. Do you have a Disaster recovery plan and information security policies, including data integrity and availability? Are they adopted by TMT? Are they implemented?

I23. Exception Handling

I24. Outsourcing: if yes then what is outsources, location? Motivation? How do you manage and monitor? Who took the decision?

I25. Operational excellence

I26. Demand management and Capability maturity management

Relational Mechanisms

I27. Clear communication between IT management and the business executives: Does the CIO or IT executive give presentations about current projects? How does the CIO update the TMT on the objectives and updates of current IT projects?

I28. Active participation and collaboration between principal stakeholders: What type of relationship you have with other business units? How often do you communicate? How many business units are involved with the IT department?

I29. Do you conduct any Cross-functional training business/IT training? Any Job Rotation?

Appendix B – The Delphi Method Survey for IT Governance Practices

IT Governance Practices - First Round of Delphi Survey

Thank you for accepting to participate in this survey. Please note that this is round one out of three rounds Delphi study aiming at investigating the applicability and effectiveness of IT governance practices within medium and large organizations.

The main objective of this round is to brainstorm on the main IT governance practices that are essential within your organization. Links to complete round two and three will be sent to you later by email.
Data that we receive will remain private and confidential and will be used solely to serve our research project. The identity of all participants will be protected at all times.
For any further inquiries please feel free to contact me at afaf_96@jmsb.concordia.ca

Afaf Tabach
PhD Candidate
John Molson School of Business
Concordia University
Montreal, Canada

There are 29 questions in this survey.

Load unfinished survey | Next >> | [Exit and clear survey]

IT Governance Practices - First Round of Delphi Survey

0% 100%

Section 1/4 - IT Governance Structures

IT governance structures *address the accountabilities and represent the clear stating of roles and responsibilities.*

Do you think that the following IT governance structures are essential within your organization?
Please choose whether to keep it or remove it from the list of IT governance structures.
Also feel free to add any other comments that you deem important.

***a) IT Strategy committee**
Choose one of the following answers

- Keep
- Remove
- No answer

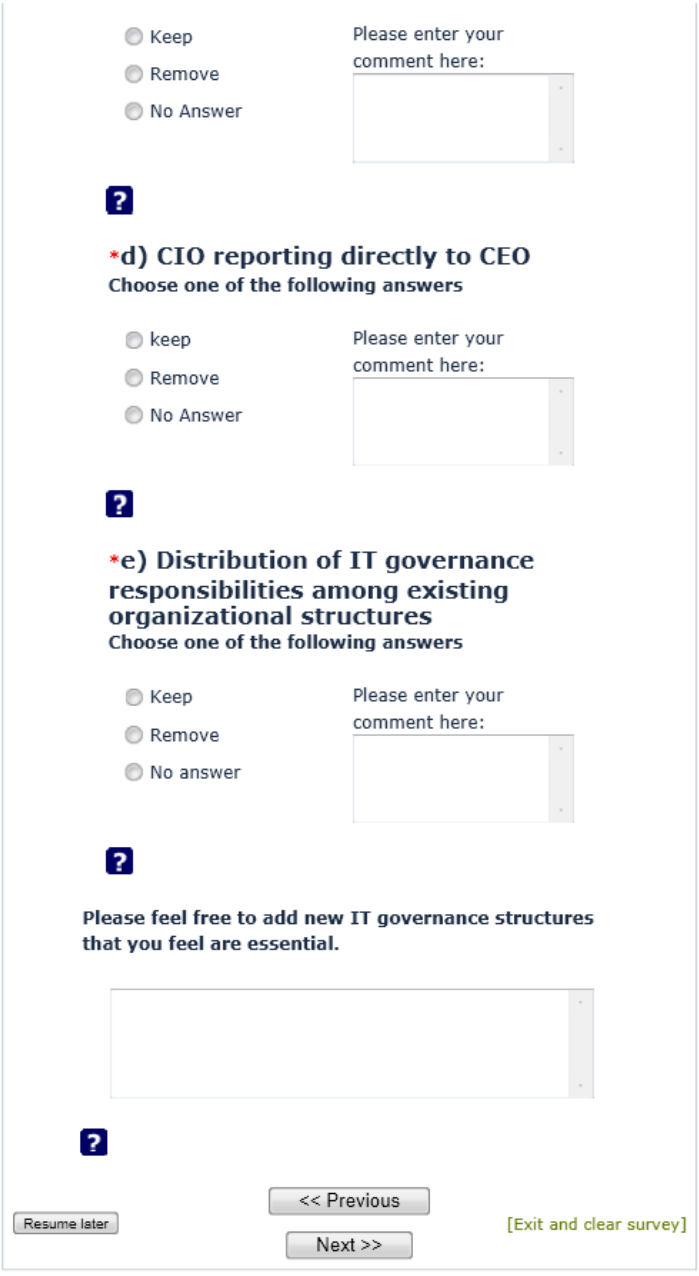
Please enter your comment here:

***b) IT Steering committee**
Choose one of the following answers

- Keep
- Remove
- No Answer

Please enter your comment here:

***c) CIO is a member of the board or the executive committee**
Choose one of the following answers



Keep
Remove
No Answer
Please enter your comment here:

*d) CIO reporting directly to CEO
Choose one of the following answers

keep
Remove
No Answer
Please enter your comment here:

*e) Distribution of IT governance responsibilities among existing organizational structures
Choose one of the following answers

Keep
Remove
No answer
Please enter your comment here:

Please feel free to add new IT governance structures that you feel are essential.

Resume later
<< Previous
Next >>
[Exit and clear survey]

IT Governance Practices - First Round of Delphi Survey

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Section 3/4 - IT Governance Relational Mechanisms

IT governance relational mechanisms represent *the mechanisms that enable better communication across the organization.*

Do you think that the following IT governance relational mechanisms are essential within your organization?
Please choose whether to keep it or remove it from the list of IT governance relational mechanisms.
Also feel free to add any other comments that you deem important.

***a) CIO Leadership Skills**

Choose one of the following answers

- Keep
- Remove
- No Answer

Please enter your comment here:

***b) Top Management Commitment and Partnership with CIO**

Choose one of the following answers

- Keep
- Remove
- No Answer

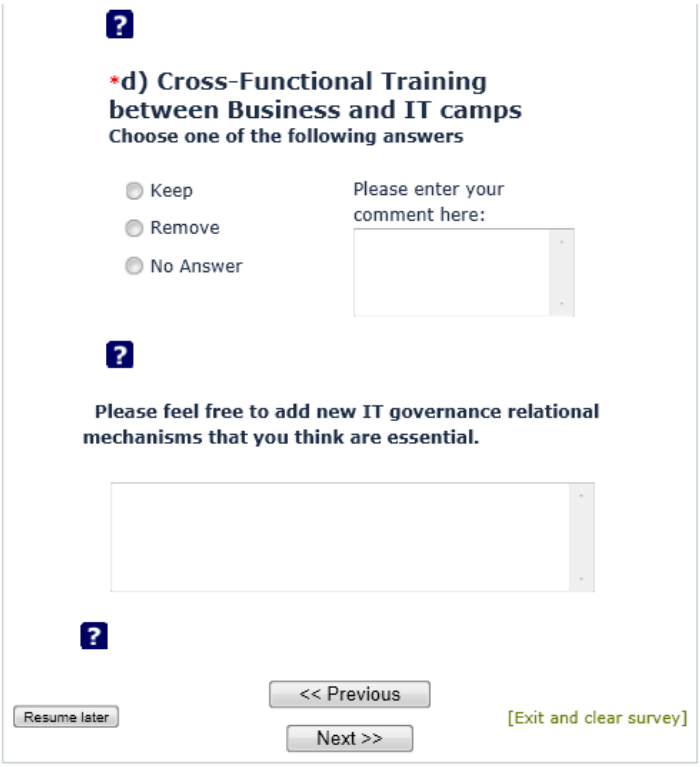
Please enter your comment here:

***c) Clear Communication between IT Management and the Business Executives**

Choose one of the following answers

- Keep
- Remove
- No Answer

Please enter your comment here:


*d) Cross-Functional Training between Business and IT camps
Choose one of the following answers
Keep
Remove
No Answer
Please enter your comment here:
Please feel free to add new IT governance relational mechanisms that you think are essential.
Resume later
<< Previous
Next >>
[Exit and clear survey]

IT Governance Practices - First Round of Delphi Survey

0% 100%

Section 4/4 - Background Information

It is very important for our study that you complete the following section. Please answer the following brief questions.

P.S. Rest assured that all your answers will remain confidential and will be used only for analysis.

*** What is your title your current job title?**

*** How many years have you occupied this position for?**

Only numbers may be entered in this field

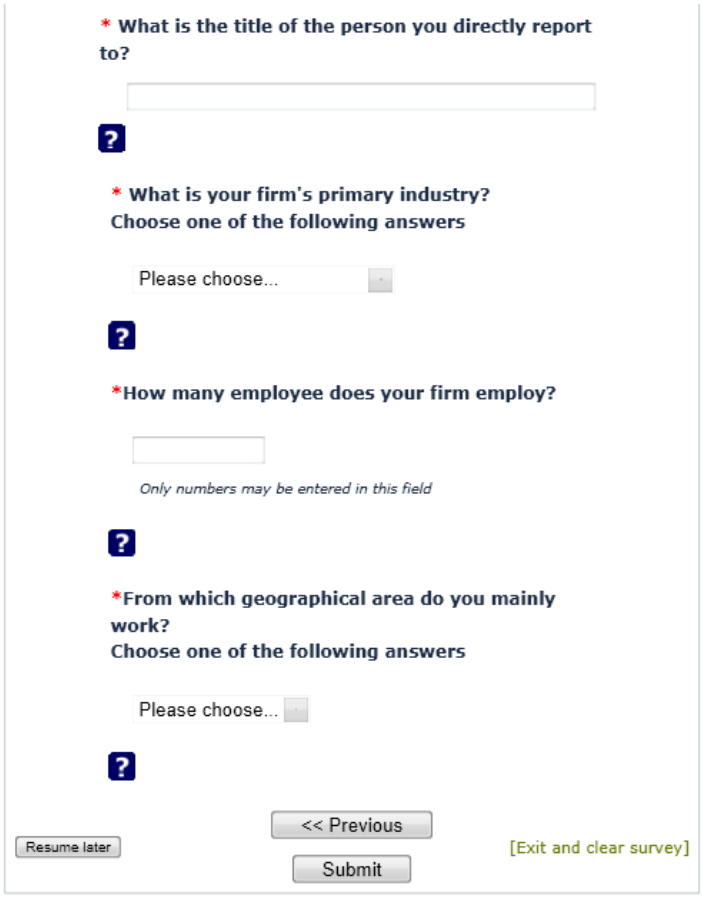
*** How many years have you been working for your current firm?**

Only numbers may be entered in this field

*** How many years of experience do you possess in the IT management?**

Only numbers may be entered in this field

*** What is the title of the person who appointed you to your current position?**


* What is the title of the person you directly report to?
* What is your firm's primary industry?
Choose one of the following answers
Please choose...
*How many employee does your firm employ?
Only numbers may be entered in this field
*From which geographical area do you mainly work?
Choose one of the following answers
Please choose...
Resume later
<< Previous
Submit
[Exit and clear survey]

Submission is complete!
Thank You for taking the time to complete this Survey.
Link to Round 2 will be sent to you in few weeks.

IT Governance Practices - Second Round of Delphi Survey

Thank you for accepting to participate in the second round of this Delphi survey.

Your participation is still crucial to the success of the study.

This questionnaire requires you to rate the items that were confirmed and added by you in the first round.

It should take between 5-10 minutes at most.

Please be assured that your responses will be strictly confidential. Please also note that the completion of this questionnaire will be considered as your consent to participate in this survey.

If you have any enquiries on how to complete this questionnaire please do not hesitate to contact me on afaf_96@jmsb.concordia.ca.

Sincerely,

Afaf Tabach
PhD Candidate
Concordia University, Montreal- Canada

There are 6 questions in this survey.

Load unfinished survey Next >> [Exit and clear survey]

IT Governance Practices - Second Round of Delphi Survey

0% 100%

Section 1/3 - IT Governance Structures

***The first round resulted in six IT structures. For each structure, please select the extent to which you agree, or disagree with it being "Effective"**

	Strongly disagree 1	2	3	4	Strongly agree 5
IT Strategy Committee					
IT Steering Committee					
CIO is a member of the board or the executive committee					
CIO reporting directly to CEO					
Partnership (s) between CxO, IT leaders and/or business Leaders in making IT decisions					
Project Management Office					

***Using the same set of structures; for each one, please select the extent to which you agree, or**

disagree with it being "Easy to implement".

	Strongly disagree 1	2	3	4	Strongly agree 5
IT Strategy Committee	○	○	○	○	○
IT Steering Committee	○	○	○	○	○
CIO is a member of the board or the executive committee	○	○	○	○	○
CIO reporting directly to CEO	○	○	○	○	○
Partnership (s) between CxO, IT leaders and/or business Leaders in making IT decisions	○	○	○	○	○
Project Management Office	○	○	○	○	○

Resume later << Previous Next >> [Exit and clear survey]

IT Governance Practices - Second Round of Delphi Survey

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Section 2/3 - IT Governance Processes

***The first round resulted in eight IT processes.For each process, please select the extent to which you agree, or disagree with it being "Effective".**

	Strongly disagree 1	2	3	4	**Strongly agree** 5
Strategic Information System Planning (SISP)	○	○	○	○	○
Project Management Methodologies	○	○	○	○	○
Service Level Agreement (SLA)	○	○	○	○	○
CobiT and ITIL	○	○	○	○	○
Business Continuity and Information Security Strategy	○	○	○	○	○
Performance Management	○	○	○	○	○
Managing IT Investments:the selection, approval, and follow up on IT investments	○	○	○	○	○
IT Budget Control and Reporting	○	○	○	○	○

***Using the same set of processes; for each one, please select the extent to which you agree, or disagree with it being "Easy to implement".**

	Strongly disagree 1	2	3	4	Strongly agree 5
Strategic Information System Planning (SISP)	○	○	○	○	○
Project Management Methodologies	○	○	○	○	○
Service Level Agreement (SLA)	○	○	○	○	○
CobiT and ITIL	○	○	○	○	○
Business Continuity and Information Security Strategy	○	○	○	○	○
Performance Management	○	○	○	○	○
Managing IT Investments:the selection, approval, and follow up on IT investments	○	○	○	○	○
IT Budget Control and Reporting	○	○	○	○	○

Resume later << Previous Next >> [Exit and clear survey]

IT Governance Practices - Second Round of Delphi Survey

0% 100%

Section 3/3 - IT Governance Relational Mechanisms

*The first round resulted in four IT relational mechanisms. For each relational mechanism, please select the extent to which you agree, or disagree with it being "Effective".

	Strongly disagree 1	2	3	4	Strongly agree 5
CIO Leadership Skills					
Top Management Commitment and Partnership with CIO					
Clear Communication between IT Management and the Business Executives					
Cross-Functional Training between Business and IT camps					

*Using the same set of IT relational mechanisms; for each one, please select the extent to which you agree, or disagree with it being "Easy to implemet".

	Strongly disagree 1	2	3	4	Strongly agree 5
CIO Leadership Skills					
Top Management Commitment and Partnership with CIO					
Clear Communication between IT Management and the Business Executives					
Cross-Functional Training between Business and IT camps					

Resume later << Previous Submit [Exit and clear survey]

Submission is complete!
Thank You for taking the time to complete this Survey.
Link to the third and last round will be sent to you in few weeks.

IT Governance Practices - Third Round of Delphi Survey

Thank you for accepting to participate in the third and last round of this Delphi survey.

Your participation is still crucial to the success of the study.

This questionnaire requires you to review your ranking of the items, which took place on the second round. The average ranking of your peers from the MEA region and from different industries is included next to each item. Feel free to either provide the same ranking you provided in the second round or a different one.

It should take between 5-10 minutes at most.

Please be assured that your responses are strictly confidential. Please also note that the completion of this questionnaire is considered as your consent to participate in this survey.

If you have any enquiries on how to complete this questionnaire please do not hesitate to contact me on afaf_96@jmsb.concordia.ca.

Sincerely,

Afaf Tabach
PhD Candidate
Concordia University, Montreal- Canada

There are 6 questions in this survey.

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IT Governance Practices - Third Round of Delphi Survey

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Section 1/3 - IT Governance Structures

***The followings are the same six IT structures provided in the second round. The average per item provided by your peers is indicated below each one. Given that information, please select again the extent to which you agree, or disagree with it being "Effective".**

	Strongly disagree 1	2	3	4	Strongly agree 5
IT Strategy Committee **Average= 3.91**	○	○	○	○	○
IT Steering Committee **Average= 3.82**	○	○	○	○	○
CIO is a member of the board or the executive committee **Average= 4.36**	○	○	○	○	○
CIO reporting directly to CEO **Average= 4.09**	○	○	○	○	○
Partnership(s) between CxO, IT leaders and/or business leaders in making IT decisions **Average= 4**	○	○	○	○	○
Project Management Office **Average= 3.91**	○	○	○	○	○

***Using the same set of IT structures and given that the average per item provided by your peers is indicated below each one, please select again the extent to which you agree, or disagree with it being "Easy to implement".**

	Strongly disagree 1	2	3	4	Strongly agree 5
IT Strategy Committee **Average= 3.27**	○	○	○	○	○
IT Steering Committee **Average= 3.36**	○	○	○	○	○
CIO is a member of the board or the executive committee	○	○	○	○	○

	Strongly disagree 1	2	3	4	Strongly agree 5
Average= 3.55					
CIO reporting directly to CEO **Average= 3.45**	○	○	○	○	○
Partnership(s) between CxO, IT leaders and/or business Leaders in making IT decisions **Average= 3**	○	○	○	○	○
Project Management Office **Average= 3.64**	○	○	○	○	○

Resume later << Previous Next >> [Exit and clear survey]

IT Governance Practices - Third Round of Delphi Survey

0% 100%

Section 2/3 - IT Governance Processes

***The followings are the same eight IT processes provided in the second round. The average per item provided by your peers is indicated below each one. Given that information, please select again the extent to which you agree, or disagree with it being "Effective".**

	Strongly disagree 1	2	3	4	Strongly agree 5
Strategic Information System Planning (SISP) **Average= 3.55**					
Project Management Methodologies **Average= 3.91**					
Service Level Agreement (SLA) **Average= 4.36**					
CobiT and ITIL **Average= 3055**					
Business Continuity and Information Security Strategy **Average= 4.18**					
Performance Management **Average= 3.82**					
Managing IT Investments:the selection, approval, and follow up on IT investments **Average= 4**					
IT Budget Control and Reporting **Average= 4.27**					

***Using the same set of IT processes and given that the average per item provided by your peers is indicated below each one, please select again the extent to which you agree, or disagree with it being "Easy to implement".**

	Strongly disagree 1	2	3	4	Strongly agree 5
Strategic Information System Planning (SISP) **Average= 3.09**					
Project Management Methodologies **Average= 3.36**					

	Strongly disagree 1	2	3	4	Strongly agree 5
Service Level Agreement (SLA) **Average= 4.09**	○	○	○	○	○
CobiT and ITIL **Average= 3.27**	○	○	○	○	○
Business Continuity and Information Security Strategy **Average= 3.45**	○	○	○	○	○
Performance Management **Average= 3.09**	○	○	○	○	○
Managing IT Investments:the selection, approval, and follow up on IT investments **Average= 3.18**	○	○	○	○	○
IT Budget Control and Reporting **Average= 3.55**	○	○	○	○	○

Resume later << Previous Next >> [Exit and clear survey]

IT Governance Practices - Third Round of Delphi Survey

0% 100%

Section 3/3 - IT Governance Relational Mechanisms

***The followings are the same four IT relational mechanisms provided in the second round. The average per item provided by your peers is indicated below each one. Given that information, please select again the extent to which you agree, or disagree with it being "Effective".**

	Strongly disagree 1	2	3	4	Strongly agree 5
CIO Leadership Skills **Average= 4.27**	○	○	○	○	○
Top Management Commitment and Partnership with CIO **Average= 4.09**	○	○	○	○	○
Clear Communication between IT Management and the Business Executives **Average= 4.55**	○	○	○	○	○
Cross-Functional Training between Business and IT camps **Average= 4**	○	○	○	○	○

***Using the same set of IT relational mechanisms and given that the average per item provided by your peers is indicated below each one, please select the extent to which you agree, or disagree with it being "Easy to implement".**

	Strongly disagree 1	2	3	4	Strongly agree 5
CIO Leadership Skills **Average= 2.82**	○	○	○	○	○
Top Management Commitment and Partnership with CIO **Average= 2.55**	○	○	○	○	○
Clear Communication between IT Management and the Business Executives **Average= 3**	○	○	○	○	○
Cross-Functional Training between Business and IT camps **Average= 2.64**	○	○	○	○	○

Resume later << Previous Submit [Exit and clear survey]

Submission is complete!
Thank You for taking the time to complete this Survey.

Appendix C – The Final Measurement Instrument

Part I – Cover letter and IT Governance Questionnaire

March 6th, 2013

"Att" "First name" "Last name"
"Title" "Department"
"Company"
"Address"
"City" "State"
"Zip"

Object: Information Technology Governance and Business Unit Performance

Dear "Att" "Last name",

My name is Afaf Tabach and I am a PhD student at Concordia University in Montreal. I am currently conducting a study under the supervision of Dr. Anne-Marie Croteau to investigate the relationship between the governance of information technology and the performance of business units. Your coordinates have been obtained from the Directory of Top Computer Executives in Canada.

Because I strongly value **your views on IT governance**, I have carefully prepared a questionnaire on this subject. I believe that responding to the attached questionnaire should not take more than **15 minutes** of your valuable time. It would be greatly appreciated if your duly filled questionnaire could be returned to me by **February 22nd** using the enclosed envelope. An **online version is also available** at http://lms.concordia.ca/limesurvey/index.php?sid=46327&lang=en

I also need the input on the subject from one of the **business unit leaders** within your firm. Since I do not know his/her name, I would kindly ask you to **forward the attached Business unit performance questionnaire to his/her attention**.

This survey is a critical part of the dissertation required for the completion of my doctoral studies. Therefore, your participation and the one from your colleague are essential for better understanding the relationships under study.

Please rest assured that the data collected will remain private and confidential and will be used solely for this research project. The identity of all participants will be protected at all times. Note that the completion of this questionnaire will be regarded as your consent to participate in this research study.

Having both questionnaires filled will enable me to generate a customized executive summary of the results of this survey which I will be glad to send to you if you provide me with a business card in the return envelope or if you send me an email. To keep your responses confidential and anonymous, please do not identify yourself on the survey. I thank you in advance and look forward for your answers.

Best regards,
Afaf Tabach, PhD Candidate
John Molson School of Business
Concordia University
Montreal, Quebec, Canada Email: atabach@jmsb.concordia.ca

Concordia University
John Molson
School of Business

IT Governance Maturity:
A Survey of Canadian
& Middle Eastern Organizations

This questionnaire is aimed at the
Chief Information Officer or **Senior IT Executive** of your firm**.**

The main objective of the questionnaire is to get your ratings on the governance of information technology within your firm. There is no good or bad answer. Indicate your first impression. This questionnaire should not take more than 15 minutes to complete.

Section A: IT Governance Practices

*Using the provided scale, please rate the following dimensions **related to IT governance structures** within your firm by selecting the number that best represents your opinion about its status. Level 1 indicates "Very Ineffective" whereas level 5 refers to "Very Effective"; "N/A" means "Not Applicable".*

Within my firm, the …	Very Ineffective	Ineffective	Marginally Effective	Effective	Very Effective	N/A
S1 IT strategy committee, which is at the board of directors level with a role to oversee and approve the IT strategy, is	1	2	3	4	5	0
S1 IT steering committee, which is at the executive level with a role to implement the IT strategy, is	1	2	3	4	5	0
S1 centralization mode of IT governance is	1	2	3	4	5	0
S1 decentralization mode of IT governance is	1	2	3	4	5	0
S1 hybrid mode of IT governance is	1	2	3	4	5	0
S1 project management office is	1	2	3	4	5	0
S1 CIO's presence as a member of the board of directors is	1	2	3	4	5	0
S1 CIO's presence as a member of the executive committee is	1	2	3	4	5	0
S1 CIO reporting directly to CEO is	1	2	3	4	5	0

*Using the following scale, please rate the following dimensions **related to IT governance processes.** Please select the number that best represents your opinion about its status within your firm.*

Generic Maturity Model

1 Initial/Ad Hoc—There is evidence that the enterprise has recognized that the issues exist and need to be addressed. There are, however, no standardized processes; instead, there are *ad hoc* approaches that tend to be applied on an individual or case-by-case basis. The overall approach to management is disorganized.

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

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

4 Managed and Measurable—Management monitors and measures compliance with procedures and takes action where processes appear not to be working effectively. Processes are under constant improvement and provide good practice. Automation and tools are used in a limited or fragmented way.

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

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

Within my firm, the level of maturity for …		**Initial / Ad Hoc**	**Repeatable but Intuitive**	**Defined**	**Managed and Measurable**	**Optimized**	**Non-Existent**
S19.	strategic information system planning (SISP) is	**1**	**2**	**3**	**4**	**5**	**0**
S20.	project management methodologies is	**1**	**2**	**3**	**4**	**5**	**0**
S21.	service level agreements (SLA) is	**1**	**2**	**3**	**4**	**5**	**0**
S22.	following IT industry best practices (CobiT, ITIL, or TOGAG) is	**1**	**2**	**3**	**4**	**5**	**0**
S23.	disaster recovery planning is	**1**	**2**	**3**	**4**	**5**	**0**
S24.	information security management is	**1**	**2**	**3**	**4**	**5**	**0**
S25.	IT performance management is	**1**	**2**	**3**	**4**	**5**	**0**
S26.	management of IT investments is	**1**	**2**	**3**	**4**	**5**	**0**
S27.	IT budget control and reporting is	**1**	**2**	**3**	**4**	**5**	**0**

Using the provided scale, please rate the following dimensions ***related to IT governance relational mechanisms*** *within your firm by selecting the number that best represents your opinion about its status. Level 1 indicates "Very Poor" whereas level 5 refers to "Very Good"; "N/A" means "Not Applicable".*

Within my firm, the …	Very Poor	Poor	Fair	Good	Very Good	N/A
S2(top management support for the CIO's vision is	1	2	3	4	5	0
S2' communication between IT management and business executives is	1	2	3	4	5	0
S3(IT training offered to business staff is	1	2	3	4	5	0
S3 business training offered to IT staff is	1	2	3	4	5	0

Section B: Organizational and Respondent Profiles

S3. Which one of the following statements best describes your **organizational strategy**? Select only one item.

- ☐ My organization locates and maintains a secure niche in a stable product or service area. It offers limited products and services. It protects its domain by providing higher quality, superior services, and lower prices than its competitors. It concentrates on doing the best job possible in limited area.
- ☐ My organization operates within a broad-market domain. It values most being "first" in new product and market areas even if they are not highly profitable. It responds rapidly to early signs concerning areas of opportunity.
- ☐ My organization maintains a stable, limited line of products or services, while moving out quickly to carefully-selected new developments in the industry. It can be "second-in" with a more cost-efficient product or service by carefully monitoring the actions of its competitors.
- ☐ My organization does not have a consistent product-market orientation. It is not as aggressive in maintaining established markets, nor is it willing to take as many risks as other competitor.

S3. What is the budget allowed to the IS department? _____(CAN$)

S3. What is the percentage of IT spending to total organization spending? _____%

S3. How many employees does your firm employ? _____

S3(What is the percentage of IT employees to the total number of employees? _____%

S37. Does your firm have any IT outsourcing contracts?

☐ Yes ☐ No

S38. Please select one or more types of IT activities outsourced by your firm

☐ IT operations

☐ Data center management

☐ Facilites management (e.g. PC management, infrastructure management)

☐ Telecommunications and telephony management and maintenance

☐ Application development

☐ IT planning / management activities

☐ Other: _____

S39. Is your firm a publicly-traded company?

☐ Yes ☐ No

S40. What is your firm's primary industry? Please choose only one of the following:

☐ Information technology ☐ Food and beverages

☐ Financial services ☐ Real estate

☐ Manufacturing ☐ Retail business

☐ Construction ☐ Wholesale

☐ Agriculture ☐ Travel and transportation

☐ Other: _____

S41. What is your current job title?

☐ CIO ☐ IT Director

☐ IT Manager ☐ Other: _____

S42. How many years have you held this position? _____ /year(s)

S43. How many years have you been working for your current firm? _____ /year(s)

S44. What is the title of the person you directly report to?

☐ CEO ☐ CIO

☐ CFO ☐ Other: _____

Thank you for your cooperation

Please return this questionnaire by using the enclosed prepaid envelope

If you wish to obtain a copy of the results of this survey, please attach your business card

Attn: Ms. Afaf Tabach, 1455 De Maisonneuve Blvd. West, S-301, Montreal, Quebec H3G 1M8

Part II – Cover Letter and Business Unit Performance Questionnaire

February 6th, 2013

Object: Business Unit performance

Dear Madame/Sir,

My name is Afaf Tabach and I am a PhD student at Concordia University in Montreal. I am currently conducting a study under the supervision of Dr. Anne-Marie Croteau to investigate the relationship between the governance of information technology and the performance of business units.

Because I strongly value your views on the **performance of business units**, I have carefully prepared a questionnaire on this subject. I believe that responding to the attached questionnaire should not take more than **15 minutes** of your valuable time. It would be greatly appreciated if your duly filled questionnaire could be returned to me by **February 22nd** using the enclosed envelope**.**

An **online version is also available** at:
http://lms.concordia.ca/limesurvey/index.php?sid=11683&lang=en

This survey is a critical part of the dissertation required for the completion of my doctoral studies. Therefore, your participation is essential for better understanding the relationships under study.

Please rest assured that the data collected will remain private and confidential and will be used solely for this research project. The identity of all participants will be protected at all times. Note that the completion of this questionnaire will be regarded as your consent to participate in this research study.

Having questionnaires filled will enable me to generate a customized executive summary of the results of this survey which I will be glad to send to you if you provide me with a business card in the return envelope or if you send me an email. To keep your responses confidential and anonymous, please do not identify yourself on the survey.

I thank you in advance and look forward for your answers.

Best regards,

Afaf Tabach, PhD Candidate
John Molson School of Business
Concordia University
Montreal, Quebec, Canada
Email: atabach@jmsb.concordia.ca

Concordia University
John Molson School of Business

Business Unit Performance:
A Survey of Canadian & Middle Eastern Organizations

This questionnaire is aimed at the
Business Unit Leader or Senior Manager of one of the Business Units within your firm.

The main objective of the questionnaire is to get your ratings regarding the *performance of your business unit*, financially and non-financially. There is no good or bad answer. Indicate your first impression. This questionnaire should not take more than 15 minutes to complete.

Section A: Business Unit Non-financial Performance

Using the provided scale, please indicate your perception of the following dimensions ***related to non-financial performance within your business unit****. Level 1 indicates "Very Low" whereas level 5 refers to "Very High"; "N/A" means "Not Applicable".*

Within my business unit, …		**Very Low**	**Low**	**Medium**	**High**	**Very High**	**N/A**
1.	the speed of strategic decisions made is	**1**	**2**	**3**	**4**	**5**	**0**
2.	the accessibility of information when decisions are made is	**1**	**2**	**3**	**4**	**5**	**0**
3.	the accuracy of available information when decisions are made is	**1**	**2**	**3**	**4**	**5**	**0**
4.	generating strategic alternatives before decisions are made is	**1**	**2**	**3**	**4**	**5**	**0**
5.	consensus with other decision makers pertaining to a business unit outcome is	**1**	**2**	**3**	**4**	**5**	**0**
6.	compared to our principal competitors, my satisfaction with the average lead time for business processes – that is, the time it takes to produce the business outcome – is	**1**	**2**	**3**	**4**	**5**	**0**
7.	our employees' satisfaction with our business processes is	**1**	**2**	**3**	**4**	**5**	**0**
8.	the degree to which the delivered outcomes from our business processes are compliant with the business requirements is	**1**	**2**	**3**	**4**	**5**	**0**
9.	my satisfaction with the resource allocation among our business processes is	**1**	**2**	**3**	**4**	**5**	**0**

Please keep using the same scale as provided in the previous section.

Within my business unit, …	Very Low	Low	Medium	High	Very High	N/A
10. the cost optimization of our business processes is	1	2	3	4	5	0
11. the flexibility to increase the volume of production is	1	2	3	4	5	0
12. the flexibility to create new products or services is	1	2	3	4	5	0
13. the flexibility to target new markets is	1	2	3	4	5	0
14. the level of IT security awareness among the staff is	1	2	3	4	5	0
15. the availability of information security policies and procedures for all the staff is	1	2	3	4	5	0
16. the average time lag between the identification of IT risks and their resolution is	1	2	3	4	5	0
17. the level of compliance to information security policies and procedures is	1	2	3	4	5	0
18. the understanding of the company's risks when information security policies and procedures are not complied with is	1	2	3	4	5	0
19. the clarity of information security policies and procedures as perceived by the staff is	1	2	3	4	5	0

Within the last year, ...	Very Low	Low	Medium	High	Very High	N/A
20. the impact of innovation on enhancing existing products/services produced within my business unit is	1	2	3	4	5	0
21. the impact of innovation on creating new products/services by my business unit is	1	2	3	4	5	0
22. the impact of innovation on creating better customer service by my business unit is	1	2	3	4	5	0
23. the impact of innovation on lowering costs within my business unit is	1	2	3	4	5	0

Within my firm, the...	Very Poor	Poor	Fair	Good	Very Good	N/A
24. CIO's understanding of the business is	1	2	3	4	5	0
25. CIO's strategic vision is	1	2	3	4	5	0

Section B: Business Unit Financial Performance

Using the following scale, please indicate your perception of the following dimensions ***related to your financial business unit performance****. Level 1 indicates "Very Low", whereas level 5 refers to "Very High"; "N/A" means "Not Applicable".*

Within my business unit, …	Very Low	Low	Medium	High	Very High	N/A
26. the sales growth position relative to our principal competitors is	1	2	3	4	5	0
27. my satisfaction with the sales growth rate is	1	2	3	4	5	0
28. the return on investment position relative to our principal competitors is	1	2	3	4	5	0
29. my satisfaction with the return on investment is	1	2	3	4	5	0
30. my satisfaction with the return on sales is	1	2	3	4	5	0
31. the market share gains relative to our principal competitors are	1	2	3	4	5	0
32. the net profit position relative to our principal competitors is	1	2	3	4	5	0
33. the financial liquidity position relative to our principal competitors is	1	2	3	4	5	0

Section C: Organizational and Respondent Profiles

34. Which one of the following statements best describes your **organizational strategy**? Select only one item.

- ☐ My organization locates and maintains a secure niche in a stable product or service area. It offers limited products and services. It protects its domain by providing higher quality, superior services, and lower prices than its competitors. It concentrates on doing the best job possible in limited area.
- ☐ My organization operates within a broad-market domain. It values most being "first" in new product and market areas even if they are not highly profitable. It responds rapidly to early signs concerning areas of opportunity.
- ☐ My organization maintains a stable, limited line of products or services, while moving out quickly to carefully-selected new developments in the industry. It can be "second-in" with a more cost-efficient product or service by carefully monitoring the actions of its competitors.
- ☐ My organization does not have a consistent product-market orientation. It is not as aggressive in maintaining established markets, nor is it willing to take as many risks as other competitor.

35. What are the firm's total revenues for the latest fiscal year? _____(CAN$)

36. How many employees does your firm employ? _____

37. Is your firm a publicly-traded company?

☐ Yes ☐ No

38. What is your firm's primary industry? Please choose only one of the following:

- ☐ Information technology
- ☐ Financial services
- ☐ Manufacturing
- ☐ Construction
- ☐ Agriculture
- ☐ Food and beverages
- ☐ Real estate
- ☐ Retail business
- ☐ Wholesale
- ☐ Travel and transportation
- ☐ Other: _____

39. What is title of your business unit? _____

40. Does your business unit manage a Profit and Loss account? ☐ Yes ☐ No

41. What is your current job title? _____

42. How many years have you held this position? _____ /year(s)

43. How many years have you been working for your current firm? _____ /year(s)

44. What is the title of the person to whom you directly report to? _____

Thank you for your cooperation

Please return this questionnaire by using the enclosed prepaid envelope

If you wish to obtain a copy of the results of this survey, please attach your business card

Attn: Ms. Afaf Tabach, 1455 De Maisonneuve Blvd. West, S-301, Montreal, Quebec H3G 1M8

Part III- Mail Reminders to respondents

Concordia University
John Molson
School of Business

March 13, 2013

Reminder

Dear "Att" "Last Name",

Last week I have mailed you two questionnaires on IT governance and business unit performance. If you have returned them, please accept my sincere thanks and disregard this reminder. Otherwise, I would like to kindly ask you to complete it as your participation is highly crucial in completing my PhD thesis and in highlighting important issues on this topic. If you did not receive the package please email me at atabach@jmsb.concordia.ca and I will be glad to send you another package or a link to the online version.

Sincerely,
Afaf Tabach (atabach@jmsb.concordia.ca)
John Molson School of Business
Concordia University
Montreal, Quebec, Canada

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[i] Ringle, C.M./Wende, S./Will, S.: SmartPLS 2.0 (M3) Beta, Hamburg 2005, http://www.smartpls.de

[ii] Cluster Analysis: Chapter 23 from EXTENSION CHAPTERS ON ADVANCED TECHNIQUES, Sage Publications.http://www.uk.sagepub.com/burns/website material/Chapter 23 - Cluster Analysis.pdf